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°): **162456**

CLIENTE (CUSTOMER): PLESA ANÁHUAC Y CIAS., S.A. DE C.V.

ORDEN DE COMPRA (PURCHASE ORDER): 24757

DIRECCION (ADDRESS): AV. VALLE DE LAS ALAMEDAS # 66-O COL. SAN FCO. CHILPAN
TULTITLÁN, EDO. DE MEXICO. 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) | NIVEL DE ESPECIFICACION DE PRODUCTO (PRODUCT SPECIFICACTION LEVEL) | TYPO DE TUBO (TYPE OF PIPE) | PROVEEDOR (SUPPLIER) | FECHA (DATE) |
|---|---|---|---|---|---|---|---|---|---|---|
| SB-270-2016 | 33683 | 14.000" | 0.375" | API 5L 45 ED./A.S.T.M. | X42/B/A53B | - | 1 | HFW/ERW | AHMSA | 12/12/2016 |

| N° DE TUBO/ N° DE SERIE QUALIFICATION (PIPE NUMBER) | NUMERO COLADA (NUMBER) (HEAT) | ENSAYO DE TENSION (TENSILE TEST) A | B | C | D | UNIDADES (UNITS) PSI (Y.S) | (T.S) | TAMAÑO (SIZE): % E | 14 Y.S/T.S. | ENSAYO DOBLEZ GUIADO (GUIDED BEND TESTS) D | * | ENSAYO DE IMPACTO CHARPY (CHARPY IMPACT TEST) TEMPERATURA DE ENSAYO (TEST TEMPERATURE): ENERGIA (ENERGY): D | 1 | 2 | 3 | PROMEDIO: (AVG.) | TAMAÑO (SIZE): TIPO (TYPE): 1 | 2 | 3 | PROMEDIO: (AVG.) | ENSAYO DWT (DWT TEST) TEMPERATURA DE ENSAYO (TEST TEMPERATURE): TIPO (TYPE): F | D | 1 | 2 | PROMEDIO (AVG.) | ENSAYO DE DUREZA (HARDNESS TEST) C | G | METAL BASE (PARENT METAL) | ZONA AFECTADA (HEAT AFFECTED ZONES) | SOLDADURA (WELD) | ZONA AFECTADA (HEAT AFFECTED ZONES) | METAL BASE (PARENT METAL) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 153 | 252622 | - | 1 | T | 4<br>5 | 50700 | 74900<br>67400 | 39 | 0.75 | - | - | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | - | - | - | - | - | - | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- |
| 37 | 252628 | - | 1 | T | 4<br>5 | 53700 | 73300<br>69300 | 40 | 0.77 | - | - | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | - | - | - | - | - | - | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- |
| 147 | 252629 | - | 1 | T | 4<br>5 | 54200 | 78400<br>70100 | 39 | 0.77 | - | - | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | - | - | - | - | - | - | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- |
| 68 | 152642 | - | 1 | T | 4<br>5 | 49900 | 73700<br>69600 | 39 | 0.72 | - | - | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | - | - | - | - | - | - | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- |
| **CRITERIO DEACEPTACION (ACCEPTANCE CRITERIA)** | | MIN:<br>MAX: | | | -<br>-<br>- | 42100<br>-<br>- | 60200<br>-<br>- | 28<br>-<br>- | -<br>-<br>- | -<br>-<br>- | -<br>-<br>- | -<br>-<br>- | -<br>-<br>- | -<br>-<br>- | -<br>-<br>- | -<br>-<br>- | -<br>-<br>- | -<br>-<br>- | -<br>-<br>- | -<br>-<br>- | - | - | - | - | - | -<br>-<br>- | -<br>-<br>- | -<br>-<br>- | -<br>-<br>- | -<br>-<br>- | -<br>-<br>- | -<br>-<br>- | -<br>-<br>- | -<br>-<br>- |

| | | | |
|---|---|---|---|
| PRUEBA HIDROSTATICA. (HYDROSTATIC TEST): | PRESION: (PRESSURE): 1920 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): 1600°F MIN | | |
| PRUEBA DE APLASTAMIENTO: (FLATTENING TEST): | 0° OK 90° OK | | |
| NOTAS (NOTES): | | | |

**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)
31. LÍNEA DE FUSIÓN (FUSION LINE SEAM WELD 3 HAZ)

**E. SIZE (TAMAÑO)**
14 1.500" X 18" (38 mm x 457.2 mm)
15. CILINDRICA (ROUND BAR) 0.500" (12.5 mm)
16. CILINDRICA (ROUND BAR) 0.350" (8.75 mm)
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" (1.6 mm)
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 ) 1/8" (3.2 mm)

HACEMOS CONSTAR QUE EL MATERIAL DESCRITO HA SIDO FABRICADO, MUESTREADO, PROBADO E INSPECCIONADO DE ACUERDO CON LA ESPECIFICACION API 5L 45 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 THE SPECIFICATION API 5L 45 ED./A.S.T.M. AND THAT THESE TEST RESULT, ARE AS THEY APPER IN RECORDS OF THE COMPANY).

**JEFE DE LABORATORIO**
**(HEAD OF LABORATORY)**

Tubacero

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# CONSTANCIA DE INSPECCION
# (INSPECTION CONSTANCY)



N° CONSTANCIA (CONSTANCY N°): **162456**

CLIENTE (CUSTOMER): PLESA ANÁHUAC Y CÍAS., S.A. DE C.V.

ORDEN DE COMPRA (PURCHASE ORDER): 24757

DIRECCION (ADDRESS): AV. VALLE DE LAS ALAMEDAS # 66-O COL. SAN FCO. CHILPAN
TULTITLÁN, EDO. DE MEXICO. 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) | NIVEL DE ESPECIFICACION DE PRODUCTO (PRODUCT SPECIFICACTION LEVEL) | TYPO DE TUBO (TYPE OF PIPE) | PROVEEDOR (SUPPLIER) | FECHA (DATE) |
|---|---|---|---|---|---|---|---|---|---|---|
| SB-270-2016 | 33683 | 14.000" | 0.375" | API 5L 45 ED./A.S.T.M. | X42/B/A53B | - | 1 | HFW/ERW | AHMSA | 12/12/2016 |

ANALISIS QUIMICO (%) / CHEMICAL ANALYSIS (%)

| COLADA/PLACA HEAT PLATE PLATE | TAMAÑO DE GRANO GRAIN SIZE | C | C | Mn | P | S | Si | Al | Cu | Cr | Ni | Mo | Ti | Nb | B | V | N | Ca | Pcm | CE | Nb+V+Ti | Nb+V | (Cu+Ni+Cr+Mo+V) | - |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 252622 | - | H | 0.17 | 0.83 | 0.011 | 0.005 | 0.11 | 0.051 | 0.02 | 0.02 | 0.02 | 0.01 | 0.002 | 0.000 | 0.0001 | 0.002 | - | - | - | - | 0.004 | 0.002 | 0.07 | - |
| | | P | 0.17 | 0.82 | 0.010 | 0.005 | 0.12 | 0.051 | 0.02 | 0.02 | 0.02 | 0.01 | 0.001 | 0.000 | 0.0001 | 0.002 | - | - | 0.22 | 0.32 | 0.003 | 0.002 | 0.07 | - |
| | | P | 0.16 | 0.83 | 0.011 | 0.004 | 0.11 | 0.051 | 0.02 | 0.02 | 0.02 | 0.01 | 0.002 | 0.000 | 0.0001 | 0.002 | - | - | 0.21 | 0.31 | 0.004 | 0.002 | 0.07 | - |
| | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 252628 | - | H | 0.16 | 0.82 | 0.012 | 0.004 | 0.11 | 0.039 | 0.01 | 0.02 | 0.02 | 0.01 | 0.002 | 0.000 | 0.0001 | 0.002 | - | - | - | - | 0.004 | 0.002 | 0.06 | - |
| | | P | 0.17 | 0.83 | 0.011 | 0.005 | 0.12 | 0.039 | 0.01 | 0.02 | 0.02 | 0.01 | 0.002 | 0.000 | 0.0001 | 0.002 | - | - | 0.22 | 0.32 | 0.004 | 0.002 | 0.06 | - |
| | | P | 0.17 | 0.83 | 0.012 | 0.005 | 0.11 | 0.038 | 0.01 | 0.02 | 0.02 | 0.01 | 0.002 | 0.000 | 0.0001 | 0.002 | - | - | 0.22 | 0.32 | 0.004 | 0.002 | 0.05 | - |
| | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 252629 | - | H | 0.17 | 0.83 | 0.016 | 0.006 | 0.12 | 0.036 | 0.03 | 0.08 | 0.02 | 0.01 | 0.002 | 0.000 | 0.0001 | 0.002 | - | - | - | - | 0.004 | 0.002 | 0.14 | - |
| | | P | 0.17 | 0.83 | 0.015 | 0.005 | 0.12 | 0.035 | 0.03 | 0.08 | 0.02 | 0.01 | 0.003 | 0.000 | 0.0001 | 0.003 | - | - | 0.22 | 0.33 | 0.006 | 0.003 | 0.14 | - |
| | | P | 0.18 | 0.84 | 0.015 | 0.005 | 0.11 | 0.035 | 0.03 | 0.08 | 0.02 | 0.01 | 0.003 | 0.000 | 0.0001 | 0.002 | - | - | 0.23 | 0.34 | 0.005 | 0.002 | 0.14 | - |
| | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 152642 | - | H | 0.17 | 0.83 | 0.014 | 0.005 | 0.13 | 0.042 | 0.02 | 0.03 | 0.03 | 0.01 | 0.003 | 0.000 | 0.0001 | 0.002 | - | - | - | - | 0.005 | 0.002 | 0.09 | - |
| | | P | 0.17 | 0.82 | 0.014 | 0.005 | 0.13 | 0.042 | 0.02 | 0.03 | 0.02 | 0.01 | 0.003 | 0.000 | 0.0001 | 0.003 | - | - | 0.22 | 0.32 | 0.006 | 0.003 | 0.09 | - |
| | | P | 0.16 | 0.83 | 0.013 | 0.004 | 0.13 | 0.043 | 0.02 | 0.03 | 0.03 | 0.01 | 0.003 | 0.000 | 0.0001 | 0.002 | - | - | 0.21 | 0.31 | 0.005 | 0.002 | 0.09 | - |
| | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**INFORMACION ADICIONAL (ADDITIONAL INFORMATION)**

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-
-
-
-
-
-
-

| CRITERIO DEACEPTACION (ACCEPTANCE CRITERIA) | C | Mn | P | S | Si | Al | Cu | Cr | Ni | Mo | Ti | Nb | B | V | N | Ca | Pcm | CE | Nb+V+Ti | Nb+V | (Cu+Ni+Cr+Mo+V) | - |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MIN: | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| MAX: | 0.26 | 1.20 | 0.030 | 0.030 | - | - | 0.400 | 0.400 | 0.400 | 0.15 | - | - | 0.001 | 0.080 | - | - | - | - | 0.15 | 0.06 | 1.0 | - |
| | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

| | | | |
|---|---|---|---|
| PRUEBA HIDROSTATICA. (HYDROSTATIC TEST): | PRESION: (PRESSURE): 1920 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) (R'<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): 1600° F MIN | | |
| PRUEBA DE APLASTAMIENTO: (FLATTENING TEST): | 0° OK 90° OK | | |
| NOTAS (NOTES) | | | |

**CLAVE (KEY):**

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

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31. LÍNEA DE FUSIÓN (FUSION LINE SEAM WELD 3 HAZ)

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21. CHEVRON (CHEVRON)
22. PRENSADA (PRESSED)

**G:LOCALIZACION (LOCATION):**
23. EXTERIOR (OUTSIDE)
24. INTERIOR (INSIDE)
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**JEFE DE LABORATORIO**
**(HEAD OF LABORATORY)**