INTERCHANGE / INTERMIX

SSP UNILOK® VS. PARKER HANNIFIN CPI™

ENGINEERING TECHNICAL REPORT
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**SSP INTRODUCTION**

Since 1970, Parker CPI™ Instrumentation Tube Fittings have been designed as leak-free connections for process, power and instrumentation applications. The Parker CPI™ single ferrule system requires only two metal-to-metal seal points to effect a leak-tight seal. These seals are to the fitting and to the tubing. The Parker CPI™ tube fitting is designed so that repeated remakes will not affect sealing performance. Even in the over-made condition sealing ability is excellent. The single-ferrule design is responsible for this performance. The Parker CPI™ single ferrule design allows the ferrule to bow during make-up. The bowing action of the ferrule creates an active element that can expand and contract with temperature cycling and maintain a leak-tight seal.¹

In 1993 in response to continued customer requests for an alternative product offering in the Instrumentation marketplace; strategic plans were developed within SSP to design, manufacture and distribute American manufactured, Instrumentation quality tube fittings as a direct alternative to the registered trademark brand of Parker CPI™. Following an ISO 9001 design process pattern, the critical elements of design planning, including the detailed documentation of design inputs and outputs occurred for the development of Unilok® tube fittings.

To accomplish the required design plan tasks of verification and validation, a specialized Technical Center was built within SSP. In addition to the exhaustive engineering calculations for confirmation of design conformance to industry standards and other engineering developed criteria, customized NIST traceable testing equipment was procured to allow comprehensive validation of design inputs.

In 1998, SSP Unilok brand tube fittings were offered to the marketplace as a direct alternative to Parker CPI™ single ferrule instrumentation tube fittings. Since then, hundreds of thousands of SSP Unilok tube fittings have been manufactured and installed throughout the world.

In 2010, SSP’s Technical Center Laboratory was certified by A2LA to be compliant with the requirements of ISO/IEC 17025:2005 (A2LA Certificate No. 3030.01). This certification assures that results developed by SSP’s Technical Center Laboratory meet the same standard of accuracy, independence and integrity as other certified third-party commercial laboratories. The scope of SSP’s accreditation, includes the following test methods:

- **Impulse Testing** (ASTM F1387, A5)
- **Pneumatic Proof Test** (ASTM F1387, A3)
- **Hydrostatic Proof Test** (ASTM F1387, A4)
- **Flexural Fatigue Test** (ASTM F1387, A6)
- **Tensile Test** (ASTM F1387, A7)
- **Hydrostatic Burst Test** (ASTM F1387, A8)
- **Rotary Flex Test** (ASTM F1387, A10)
- **Hardness – Rockwell C, B & N** (ASTM E18)
- **Hardness – Vickers** (ASTM E384)

1.0 INTRODUCTION

This document’s purpose is to report, in a published format for public review, a representative sampling of the Unilok tube fitting’s actual performance results from Production Validation Tests. The performance results are measured against the Design Team’s Approved Acceptance Criteria, which are based on meeting or exceeding the published and/or test-based performance of equivalent Parker CPI™ tube fittings.

1.1 SCOPE

Scope: This test report documents the results of performance testing for the ¼”, ½”, ¾” and 1”, SSP Unilok and Parker-Hannifin CPI Tube Fittings. The samples were tested for Interchange and Intermix in SSP’s accredited Technical Center Laboratory.

1.2 REFERENCES

- SSP No. QM06, “SSP Tech Center Laboratory Quality Manual”
- ISO 17025, “General Requirements for the Competence of Testing and Calibration Laboratories”
- ISO 10012-1, “Quality Assurance Requirements for Measuring Equipment”
- SSP No. IP11, “Interchange Test”
1.3 TEST SPECIMEN DESCRIPTION

This test report will document all of the testing involved in the validation of the Unilok design for Interchange and Intermix with Parker CPI design.

SSP Sample (s)                     Heat Code (s)  
Size 16 (1 inch)                   
SSP Male Connector                ESL         
SSP Nut                           RRJ         
SSP Ferrule                       VAE         

Size 12 (3/4 inch)                 
SSP Male Connector                CNN         
SSP Nut                           BRV         
SSP Ferrule                       RAA         

Size 8 (1/2 inch)                  
SSP Male Connector                CRO         
SSP Nut                           BRV         
SSP Ferrule                       RAR         

Size 4 (1/4 inch)                  
SSP Male Connector                CRO         
SSP Nut                           BRJ         
SSP Ferrule                       RAC         

1.4 SUMMARY

In every case all Unilok test results met or exceeded the established Design Team’s Acceptance Criteria for these products. As such, they also met or exceeded equivalent major competitive product performance, as measured in test data and / or reported in publications.
2.0 TEST PROCEDURES AND RESULTS
2.1: INTERCHANGE TEST

**Purpose:** Test determines if all combinations of both a tube fitting body and a tubing assembly (tube, nut, back ferrule, and front ferrule, assembled together per standard assembly instructions) of Unilok and a Parker CPI fitting can be Interchanged in a complete tube fitting assembly, resulting in both adequate gas and liquid pressure-retaining capability, based on ANSI / ASME B 31.3 maximum allowable working pressure of the tubing.

This test simulates the interchange of fitting bodies with already made up tube assemblies in the field, for components from either Unilok or Parker CPI fittings.

**Test Procedure:** Five fittings of each manufacturer are tested. 1 fitting of each manufacturer is tested at a time— one on each end of a 4 ½” long test tube, per Initial Makeup Test (see Section 3). Maximum recommended wall tubing (worst case condition) is used for each tested product configuration. See Figures 2.1.1 – 2.

The tube fitting assembly is assembled with body and components of same brand then subjected to the Pneumatic Proof Test (ASTM F1387, A3), the bodies are then interchanged with the components of the competitive brand and subjected again the Pneumatic Proof Test before being subjected the hydrostatic Proof Test (ASTM F1387, A4) and Hydrostatic Burst Test (ASTM F1387, A8) in this interchanged condition.
**Acceptance Criteria:**

**Pneumatic Proof Test:** The tube fitting assembly is to sustain an air booster test pressure of 100 PSIG, and then again at 1.25 times the ANSI / ASME maximum allowable working pressure of the tubing, up to a maximum pressure of 10,000 PSIG. Failure is any observed air leakage bubble.

**Hydrostatic Proof Test:** The tube fitting assembly is to sustain a hydrostatic test pressure of 100 PSIG, and then again at 1.50 times the ANSI / ASME maximum allowable working pressure of the tubing, up to a maximum pressure of 10,000 PSIG. Failure is any observed water leakage.

**Burst Test:** The tube fitting assembly is to sustain a hydrostatic pressure, without observed leakage, exceeding a minimum of 4 times the ANSI / ASME maximum allowable working pressure of the tubing. Failure is to be by tubing burst, not by tube pushout from fitting. Acceptance criteria, not more than one sample to fail per size.

<table>
<thead>
<tr>
<th>Size 16 Interchange Test</th>
<th>Make up Torque 1&quot; x 0.095</th>
<th>1st Pneumatic Proof Test 100 PSI</th>
<th>1st Pneumatic Proof Test 4,563 PSI</th>
<th>Remake Torque Ft lb</th>
<th>2nd Pneumatic Proof Test 100 PSI</th>
<th>2nd Pneumatic Proof Test 4,563 PSI</th>
<th>1st Hydrostatic Proof 5,475 PSI</th>
<th>Hydro Burst 14,600 PSI</th>
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<tbody>
<tr>
<td>Body #</td>
<td>Ft Lbs @ .25 turns</td>
<td>Ft Lbs @ .50 turns</td>
<td>Ft Lbs @ .75 turns</td>
<td>Ft Lbs @ 1.00 turns</td>
<td>Ft Lbs @ 1.25 turns</td>
<td>Ft Lbs @ .25 turns</td>
<td>Ft Lbs @ .50 turns</td>
<td>Ft Lbs @ .75 turns</td>
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<td>95</td>
<td>150</td>
<td>220</td>
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<td>P</td>
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<td>145</td>
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<td>P</td>
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<td>P</td>
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<td>85</td>
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<td>N</td>
<td>P</td>
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Table 2.1.0 Size 16 Interchange Test
### Size 12 Interchange Test

<table>
<thead>
<tr>
<th>Body #</th>
<th>Make up Torque 3/4&quot; x 0.095 wall tubing</th>
<th>1st Pneumatic Proof Test 100 PSI</th>
<th>1st Pneumatic Proof Test 6,188 PSI</th>
<th>Remake Torque Ft lb</th>
<th>2nd Pneumatic Proof Test 100 PSI</th>
<th>2nd Pneumatic Proof Test 6,188 PSI</th>
<th>1st Hydrostatic Proof 7,425 PSI</th>
<th>Hydro Burst 19,800 PSI</th>
<th>Test Press.</th>
<th>None Burst Leak push-off</th>
<th>P/F</th>
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</tr>
<tr>
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<tr>
<td>3-SSP</td>
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<tr>
<td>4-SSP</td>
<td>8 18 40 55 70 None P None P 65 None P None P None P 21,080 Burst P</td>
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<td>6-CPI</td>
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<tr>
<td>7-CPI</td>
<td>11 15 42 55 65 None P None P 95 None P None P None P 21,254 Burst P</td>
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<td>8-CPI</td>
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<tr>
<td>9-CPI</td>
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<tr>
<td>10-CPI</td>
<td>17 20 43 55 62 None P None P 60 None P None P None P 21,205 Burst P</td>
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Table 2.1.1, Size 12 Interchange Test

### Size 8 Interchange Test

<table>
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<tr>
<th>Body #</th>
<th>Make up Torque 1/2&quot; x 0.065 wall tubing</th>
<th>1st Pneumatic Proof Test 100 PSI</th>
<th>1st Pneumatic Proof Test 5,938 PSI</th>
<th>Remake Torque Ft lb</th>
<th>2nd Pneumatic Proof Test 100 PSI</th>
<th>2nd Pneumatic Proof Test 5,938 PSI</th>
<th>1st Hydrostatic Proof 7,125 PSI</th>
<th>Hydro Burst 19,000 PSI</th>
<th>Test Press.</th>
<th>None Burst Leak push-off</th>
<th>P/F</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
<td>2-SSP</td>
<td>55 120 160 195 235 None P None P 290 None P None P None P 20,293 Burst P</td>
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<tr>
<td>3-SSP</td>
<td>50 125 180 205 250 None P None P 260 None P None P None P 20,506 Burst P</td>
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<td>4-SSP</td>
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<td>5-SSP</td>
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<tr>
<td>6-CPI</td>
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<tr>
<td>9-CPI</td>
<td>95 195 245 280 360 None P None P 330 None P None P None P 20,506 Burst P</td>
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Table 2.1.2, Size 8 Interchange Test
### Size 4 Interchange Test

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<th>Fitting #</th>
<th>Make up Torque 1/4” x 0.049 wall tubing</th>
<th>1st Pneumatic Proof Test 100 PSI</th>
<th>1st Pneumatic Proof Test 9,375 PSI</th>
<th>Remake Torque Ft lb</th>
<th>2nd Pneumatic Proof Test 100 PSI</th>
<th>2nd Pneumatic Proof Test 9,375 PSI</th>
<th>1st Hydrostatic Proof 11,250 PSI</th>
<th>Hydro Burst 30,000 PSI</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Ft Lbs @ .25 turns</td>
<td>Ft Lbs @ .50 turns</td>
<td>Ft Lbs @ .75 turns</td>
<td>Ft Lbs @ 1.00 turns</td>
<td>Ft Lbs @ 1.25 turns</td>
<td>Leak None</td>
<td>P/F</td>
<td>Leak None</td>
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Table 2.1.3, Size 4 Interchange Test
2.2: INTERMIX TEST

**Purpose:** Test determines if all combinations of tube fitting components (nut, ferrule and fitting body) of Unilok and Parker CPI can be intermixed in a tube fitting assembly, resulting in both adequate gas and liquid pressure-retaining capability, based on ANSI / ASME B 31.3 maximum allowable working pressure of the tubing.

This test simulates the random intermixing of inventoried Unilok and Parker CPI fitting components in the field to make up tube fitting assemblies.

**Test Procedure:** Five samples of each intermix combination are tested. Two fittings of a given combination of fitting components are tested at a time – one on each end of a 4 ½” long test tube. Maximum recommended wall tubing (worst case condition) is used for each tested product configuration. See Table 3.2.1 below for the intermix combinations tested and figure 3.1.2 above for the test equipment.

The tube fitting assembly is subjected to the Pneumatic Proof Test (ASTM F1387, A3), and then the Hydrostatic Proof Test (ASTM F1387, A4) and finally the Hydrostatic Burst Test (ASTM F1387, A8).

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Table 2.2.0, Intermix Combination Sampling Configuration

**Acceptance Criteria:**

**Pneumatic Proof Test:** The tube fitting assembly is to sustain an air booster test pressure of 100 PSIG, and then again at 1.25 times the ANSI / ASME maximum allowable working pressure of the tubing, up to a maximum pressure of 10,000 PSIG. Failure is any observed air leakage bubble.

**Hydrostatic Proof Test:** The tube fitting assembly is to sustain a hydrostatic test pressure of 100 PSIG, and then again at 1.50 times the ANSI / ASME maximum allowable working pressure of the tubing, up to a maximum pressure of 10,000 PSIG. Failure is any observed water leakage.

**Burst Test:** The tube fitting assembly is to sustain a hydrostatic pressure, without observed leakage, exceeding a minimum of 4 times the ANSI / ASME maximum allowable working pressure of the tubing. Failure is to be by tubing burst, not by tube pushout from fitting. Acceptance criteria, not more than 1 sample per size allowed to fail.
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<th>1st Pneumatic Proof Test 100 PSI</th>
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Table 2.2.1, Size 16 Interchange Test
## Size 12 Intermix Test

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<th>1st Hydrostatic Proof Test 7,425 PSI</th>
<th>Hydro Burst 19,800 PSI</th>
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Table 2.2.2, Size 12 Intermix Test
## Size 8 Intermix Test

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<th>Make up Torque 1/2” x 0.065 wall tubing</th>
<th>1st Pneumatic Proof Test 100 PSI</th>
<th>1st Pneumatic Proof Test 5,938 PSI</th>
<th>1st Hydrostatic Proof 7,125 PSI</th>
<th>Hydro Burst 19,000 PSI</th>
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Table 2.2.3, Size 8 Intermix Test
### Size 4 Intermix Test

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<th>1st Hydrostatic Proof 11,250 PSI</th>
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Table 2.2.4, Size 4 Intermix Test
3.0: TEST EQUIPMENT AND INSTRUMENTATION

Calibration and Standardization:

1. Description: 10,000 psi digital gage  
   Range: 0 - 10,000 psi  
   ID #: 67176  
   Calibration Date: 01/21/10  
   Due Date: 01/21/11

2. Description: 10,000 psi transducer  
   Range: 0 – 10,000 psi  
   ID #: 74466  
   Calibration Date: 01/21/10  
   Due Date: 01/21/11

3. Description: 72,000 psi digital gage  
   Range: 0 – 72,000 psi  
   ID #: 096221-1  
   Calibration Date: 12/01/09  
   Due Date: 12/01/10

4. Description: 72,000 psi transducer  
   Range: 0 – 72,000 psi  
   ID #: 096221  
   Calibration Date: 12/01/09  
   Due Date: 12/01/10

4.0: QUALITY ASSURANCE PROGRAM

The preceding lists the major Validation Tests that were performed, and the sections which follow describe the tests and outline specific results. All products manufactured at SSP are to approved and controlled engineering documentation, to established process and quality procedures at every stage of manufacture, with fully calibrated quality and process instrumentation, using only certified and traceable materials. Tested products were selected randomly from documented normal production runs. Before and after test samples were retained for reference. All tubing used in testing meets applicable ASTM specifications, and has approved material and chemical certifications.

All SSP tests conducted on products are with laboratory equipment and instrumentation in current calibration in an ISO 17025 accredited laboratory. Trained personnel conducted tests by following approved, written test procedures. All test results were subjected to thorough engineering review and approval before internal publication.
ASTM Material Standards

<table>
<thead>
<tr>
<th>Standard</th>
<th>Material Shape</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A 182</td>
<td>Forged Fittings, Parts</td>
<td>Standard Specification for Forged or Rolled Alloy – Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service</td>
</tr>
<tr>
<td>A 276</td>
<td>Bars</td>
<td>Standard Specification for Stainless Steel Bars and Shapes</td>
</tr>
<tr>
<td>A 479</td>
<td>Bar, Shapes</td>
<td>Standard Specification for Stainless Steel Bars and Shapes for use in Boilers and other Pressure Vessels</td>
</tr>
<tr>
<td>B 16</td>
<td>Bar, Shapes</td>
<td>Standard Specification for Free-Cutting Brass Rod, Bar and Shapes for use in Screw Machines</td>
</tr>
<tr>
<td>B 124</td>
<td>Bar, Shapes</td>
<td>Standard Specification for Copper and Copper Alloy Forging Rod, Bar and Shapes</td>
</tr>
<tr>
<td>B 453</td>
<td>Bar, Shapes</td>
<td>Standard Specification for Copper-Zinc-Lead Alloy (Leaded-Brass) Rod</td>
</tr>
<tr>
<td>A 179</td>
<td>Tube</td>
<td>Standard Specification for Seamless Cold-Drawn Low-Carbon Steel Heat-Exchanger and Condenser Tubes</td>
</tr>
<tr>
<td>A 213</td>
<td>Tube</td>
<td>Standard Specification for Seamless Ferritic and Austenitic Alloy-Steel Boiler, Superheater and Heat-Exchanger Tubes</td>
</tr>
<tr>
<td>A 249</td>
<td>Tube</td>
<td>Standard Specification for Welded Austenitic Steel Boiler, Superheater, Heat-Exchanger, and Condenser Tubes</td>
</tr>
<tr>
<td>A 269</td>
<td>Tubing</td>
<td>Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service</td>
</tr>
<tr>
<td>B 68</td>
<td>Tube</td>
<td>Standard Specification for Copper Tube, Bright Annealed</td>
</tr>
<tr>
<td>B 75</td>
<td>Tube</td>
<td>Standard Specification for Seamless Copper Tube</td>
</tr>
<tr>
<td>B 88</td>
<td>Tube</td>
<td>Standard Specification for Seamless Copper Water Tube</td>
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Table 4.0.0, ASTM Material Standards

Applicable Codes and Standards

<table>
<thead>
<tr>
<th>Section</th>
<th>Test Description</th>
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<tbody>
<tr>
<td>ANSI/ASME B 31.1</td>
<td>Power Piping Code</td>
</tr>
<tr>
<td>ANSI/ASME B 31.3</td>
<td>Process Piping Code</td>
</tr>
<tr>
<td>ANSI/ASME BPV Section VIII</td>
<td>Boiler &amp; Pressure Vessel Code</td>
</tr>
<tr>
<td>ISO 7257</td>
<td>Aircraft – Hydraulic tubing joints and fittings – Rotary flexure test</td>
</tr>
</tbody>
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Table 4.0.1, Applicable Codes and Standards
5.0: ATTACHMENTS

A. PHOTOGRAPHS

Figure 2.1.1, Interchange Test Equipment

Figure 2.1.2, Interchange Test Combinations
# B. TEST DATA

## SSP Instrumentation

**SSP I-Line Doc. # ITR - 1091 - 00 -**  
**Rev. B**  
**Subject: ASTM F 1387 Testing Data Sheets**  
**ITR - 1091 - 00, Test Data**

<table>
<thead>
<tr>
<th>Sam #</th>
<th>Test</th>
<th>Make up Torques</th>
<th>1st Pneumatic Proof Test 100 PSI</th>
<th>1st Pneumatic Proof Test</th>
<th>Remake Torque</th>
<th>2nd Pneumatic Proof Test 100 PSI</th>
<th>2nd Pneumatic Proof Test</th>
<th>1st Hydrostatic Proof</th>
<th>Hydro Burst</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Ft Lbs @ 2% turns</td>
<td>Ft Lbs @ 10 turns</td>
<td>Ft Lbs @ 25 turns</td>
<td>Ft Lbs</td>
<td>Leak None</td>
<td>Pass</td>
<td>Fail</td>
<td>Ft Lbs</td>
</tr>
<tr>
<td>1</td>
<td>1-SSP</td>
<td>25 30 50 95 155 220 None</td>
<td>Pass</td>
<td>Fail</td>
<td>150</td>
<td>None</td>
<td>Pass</td>
<td>Fail</td>
<td>150</td>
</tr>
<tr>
<td>2</td>
<td>2-SSP</td>
<td>25 30 50 95 155 220 None</td>
<td>Pass</td>
<td>Fail</td>
<td>150</td>
<td>None</td>
<td>Pass</td>
<td>Fail</td>
<td>150</td>
</tr>
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<td>3</td>
<td>3-SSP</td>
<td>25 30 50 95 155 220 None</td>
<td>Pass</td>
<td>Fail</td>
<td>150</td>
<td>None</td>
<td>Pass</td>
<td>Fail</td>
<td>150</td>
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<td>4-SSP</td>
<td>25 30 50 95 155 220 None</td>
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<td>Fail</td>
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<td>Fail</td>
<td>150</td>
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<td>150</td>
<td>None</td>
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<td>Fail</td>
<td>150</td>
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<td>25 30 50 95 155 220 None</td>
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<td>Pass</td>
<td>Fail</td>
<td>150</td>
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<td>7</td>
<td>7-CR</td>
<td>25 30 50 95 155 220 None</td>
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<td>Fail</td>
<td>150</td>
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<td>150</td>
</tr>
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<td>8</td>
<td>8-CR</td>
<td>25 30 50 95 155 220 None</td>
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<td>Fail</td>
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<td>None</td>
<td>Pass</td>
<td>Fail</td>
<td>150</td>
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<tr>
<td>9</td>
<td>9-CR</td>
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<td>25 30 50 95 155 220 None</td>
<td>Pass</td>
<td>Fail</td>
<td>150</td>
<td>None</td>
<td>Pass</td>
<td>Fail</td>
<td>150</td>
</tr>
</tbody>
</table>

**Note:** Leaks were not detected in any of the tests. All tests passed the criteria for leak tightness.

---

**SSP**  
8250 Boyle Parkway  
Twinsburg, Ohio 44087  
U.S.A.  
mysspusa.com  
1.330.425.4250
## ASTM F 1387 Testing Data Sheets

### ITR - 1091 - 00, Test Data

<table>
<thead>
<tr>
<th>Sample</th>
<th>Test</th>
<th>Make up Torque</th>
<th>1st Pneumatic Proof Test 100 PSI</th>
<th>2nd Pneumatic Proof Test 150 PSI</th>
<th>1st Hydrostatic Proof</th>
<th>Hydro Burst</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Flats lbs @ 25 tons</td>
<td>Flats lbs @ 50 tons</td>
<td>Flats lbs @ 75 tons</td>
<td>Flats lbs @ 125 tons</td>
<td>Leak None</td>
</tr>
<tr>
<td>1 - 3SP</td>
<td>12</td>
<td>19</td>
<td>53</td>
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<td>30</td>
<td>48</td>
<td>58</td>
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</tr>
<tr>
<td>6 - CFI</td>
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<td>15</td>
<td>42</td>
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<td>65</td>
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<td>55</td>
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<td>55</td>
<td>83</td>
<td>None Pass</td>
</tr>
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</table>

**Note:** The table above contains data for ASTM F 1387 testing for different samples and tests, including make up torque, 1st and 2nd pneumatic proof tests, and 1st hydrostatic proof. The results indicate whether each test passed or failed, along with the pressure and type of burst for each test.
Subject: ASTM F 1387 Testing Data Sheets

<table>
<thead>
<tr>
<th>Sample</th>
<th>Make up Torque</th>
<th>1st Pneumatic Proof Test 100 PSI</th>
<th>2nd Pneumatic Proof Test 100 PSI</th>
<th>1st Hydrostatic Proof Pressure</th>
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<tbody>
<tr>
<td></td>
<td>In Lbs @ .25 turn</td>
<td>Leak None</td>
<td>Pass Fail</td>
<td>Leak None</td>
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<td>1</td>
<td>80</td>
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<td>Pass</td>
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</table>
Subject: ASTM F 1387 Testing Data Sheets  
**ITR - 1091 - 00, Test Data**

<table>
<thead>
<tr>
<th>Sample No</th>
<th>Make-up Torque</th>
<th>1st Pneumatic Proof Test 100 PSI</th>
<th>1st Pneumatic Proof Test</th>
<th>2nd Pneumatic Proof Test 100 PSI</th>
<th>2nd Pneumatic Proof Test</th>
<th>1st Hydrostatic Proof</th>
<th>Hydro Burst</th>
</tr>
</thead>
</table>
|            | Leak None | Leak None | Pass | Fail | Leak None | Leak None | Pass | Fail | Leak None | Leak None | Pass | Fail | Leak None | Leak None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | Pass | Fail | None | None | P...
C. MATERIAL CERTS

Certificate of Test

OUTO KUMPU

Heat El 026898
Order 613432/01
Sol 0209867
* Certification *
11/12/10

Shipped to:
Yarde Metals (YMH Orders)
75 Aircraft Rd

E-mail:
mike@yarde.com

Order No & Date
11/12/10 CUSTM 007E0001 CUST ZM02690617680002

Item Description:
Grades 316L/316

Ship Condition:
Conda

List 416L Rex Conda Conda L. 7350 x 94.200 Ft

Country of Mfg.: United Kingdom
Country of Mfg.: United States

No weld repair
Free of mercury contamination, Free of radiation contamination

No NDE relevant substances, Meets BU electrical code

Total Bundles: 1
Total Weight: 1784

Material Heat Code: 764 frequent

Mechanical & Other Tests:

Hardness as shipped: 207 HB
Hardness as shipped: 98 HRB
Radius: 5.5
Macro: OK

Intergranular corrosion:

Chemical Composition:

Carbon (C)
0.019

Phosphorus (P)
0.009

Sulphur (S)
0.006

Nickel (Ni)
1.000

Chromium (Cr)
18.710

Copper (Cu)
0.100

Moly (Mo)
2.000

Nickel (Ni)
0.100

Manganese (Mn)
1.710

Moly (Mo)
0.100

Phosphorus (P)
0.006

Aluminum (Al)
0.006

Vanadium (V)
0.050

Columbium (Cb)
0.050

Iron (Fe)
Balance

Melt Practice:
Defining Practice:
Defining Practice:

Elongation % in 100:
Reduction of area %:

Known or willfully falsifying or concealing a material fact on this form,
or making false, fictitious, or fraudulent statements or representations
herein could constitute a felony punishable under federal statutes.

We hereby certify that the test results shown in this report are correct
and accurate as contained in the records of the company involved and in compliance
with the specifications, codes, and standards listed above.

M.F. Mercancio, Quality Manager

Yarde Metals Inc. Certification Processor

Yarde Metals Inc. 02-12-11

1105157000-1

22


Report No: ILETR110120
Revision: C
Total Pages: 40
Date: 01/20/11
Certificate of Test

Report No: ILETR110120
Revision: C
Total Pages: 40
Date: 01/20/11

OUTO KUMPÜ
HEAT E100930 ORDER 014337/01 WOL 0210646 * CERTIFICATION * 01/07/11
SHIP TO:
YARDE METALS (YMI ORDERS)
75 AIRCRAFT RD
SOUTHTOWN, 06487

YOUR ORDER & DATE 1/07/11 CUSTOM 0975003 CUSTOM TAGS#CU061778003

ITEM DESCRIPTION
CONAI 316L/316
Size: 316L HEX CONA CONA 1.8000 x 144.000 XL
Country of Mfg.: UNITED STATES
NAPTA Country of Origin: UNITED STATES

No weld repair
Free of mercury contamination, Free of radiation contamination
No WEEE relevant substances; Meets EU electrical ROHS

Total Bundle: 1
Total Weight: 1859

NO: 2013746 BUndles: 1A

SPECSIFICATIONS

Material Heat Code DFARS
FEB 03 2011
Certified by: INP 500

MECHANICAL & OTHER TESTS

Hardness as shipped 30 HB
Grain size 4.0
Micro
Intergranular corrosion OK

Tensile strength, KSI (MPA) 95.0 (665)
0.2% Yield Strength, KSI (MPA) 72.0 (496)
Elongation % in 4D 43.0
Reduction of area % 70.0

CHEMICAL COMPOSITION

Carbon (C) 0.020
Phosphorus (P) 0.022
Silicon (Si) 0.411
Nickel (Ni) 10.086
Copper (Cu) 0.558
Nitrogen (N) 0.077
Titanium (Ti) 0.025
Tin (Sn) 0.028
Vanadium (V) 0.096
Columbium/Columbium 0.024
Tantalum (CD-CD) 0.096
Iron (Fe) Balance
Melt Practice ER7F
Refining Practice ACD
De-long Ferrite

Known fully & willfully falsifying or concealing a material act on this form,
or making false, fictitious or fraudulent statements or representations
herein could constitute a felony punishable under federal statutes.

We hereby certify that the test results shown in this report are correct and
accurate as contained in the records of the company and are in compliance
with the specifications, codes, and standards listed above.

M.F. Marcanio, Quality Manager

OUTOKUMPÜ Stainless Steels Inc.
5450 Greenshade Pkwy.
Twinsburg, OH 44087

T.M. Marcanio

CERTIFICATE OF TESTS
CERT SERIAL# 000441186

CARPENTER
Carpenter Technology Corporation
P.O. Box 14662, Reading, PA 19612-4662

04/06/04
CUSTOMER/BUYER/CLIENT
SSP FITTINGS CORP
ATTN: EVONA MYERS
8250 BOYLE PARKWAY
TWINSBURG, OH 44087

SELLER/VERKAUF/VERDIER PAGE - 1
CARPENTER TECHNOLOGY CORP(ALN)
SUITE 200
1075 VIRGINIA DRIVE
FORT WASHINGTON, PA 19034

0094907 Hc, WZY 0 VAE
HEAT NUMBER / SCHMELZE-NR. / N° DE COULEES: 729003

PRODUCT DESCRIPTION: TYPE 316 PROJECT 70 STAINLESS STRAIN HARDENED
GROUND & POLISHED

SPECIFICATION: ASTM-A276-03 (CONDITION B)
- *QQ-S-753P (06/27/96)
- *ASTM-A479-06
- *ASTM-A262-02A

SIZE 1.250000 IN. (31.75 MM) RD BAR

PRIMARY HEAT CHEMISTRY (WT%):

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<tr>
<th>Element</th>
<th>C</th>
<th>Mn</th>
<th>Si</th>
<th>P</th>
<th>S</th>
<th>Cr</th>
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<td>0.59</td>
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<td>0.027</td>
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*INTERGRANULAR CORROSION TESTED TO ASTM A262, PRACTICE A - ACCEPTABLE.

SOLUTION ANNEALED TO PROVIDE A MICROSTRUCTURE FREE FROM CONTINUOUS GRAIN BOUNDARY CARBIDE PRECIPITATION (NETWORK).

YIELD STRENGTH (0.20%) (ksi (MPA)): 59.1 (413)
TENSILE STRENGTH (ksi (MPA)): 71.0 (490)
ELONGATION IN 2" (%) : 33.0
REDUCTION OF AREA, (%) : 23.0
HARDNESS, HB : 195

*GRAIN SIZE PER ASTM E112: 4

CARPENTER'S QUALITY MANAGEMENT SYSTEM WAS REGISTERED AS OF NOVEMBER 11, 2003
TO THE REQUIREMENTS OF ISO 9001:2000. APPROVAL CERTIFICATE 101921 BY LSOA, INC.
CERTIFICATE OF TEST IS PREPARED IN ACCORDANCE WITH PARAGRAPH 3.1.B OF EN 10204
(DIN 50045). WE HEREBY CERTIFY THAT THE ABOVE TEST DATA ARE IN ACCORDANCE WITH
THE PURCHASE ORDER AND SPECIFICATION REQUIREMENTS.

DATE REVISED: 04/06/04
JAMES R. GARVERICH
MET RELEASE/REQUIREMENTS ANALYST
CARPENTER TECHNOLOGY CORPORATION

This certificate is made to the person named on this form. Carpenters neither assumes nor grants responsibility for any representation or certification to any third party.

Report No: ILETR110120
Revision: C
Total Pages: 40
Date: 01/20/11

24
CERTIFICATE OF TESTS
CERT SERIAL# 000457693
CARPENTER
Carpenter Technology Corporation
101 West Barn Street, Reading, Pa. 19601

07/02/04
CUSTOMER/SELLER/CLIENT
SPP FITTINGS CORP
ATTN: EYONA MYERS
8250 BOYLE PARKWAY
TWINSBURG, OH 44087

CERTIFICATE No. VERIFICATION/VENTURE
DUN

0095159 HC: XRF & VAE W58183 2494

HEAT NUMBER / SCHMELZE-NU./ N° DE COULEE: 729928
PRODUCT DESCRIPTION: PROJECT 70+ TYPE 316/316L STAINLESS STRAIN HARDENED GROUND
PART NUMBER: RMT316PS1250

SPECIFICATION: SPP RMT316HT REV C (10/18/01)
ASTM-A276-04
ASTM-A479-04 (CHEMISTRY ONLY)
ASTME-SA479 2001 EDITION

SIZE 1.250000 IN. (31.75 MM) RD BAR

PRIMARY HEAT CHEMISTRY(WT%): (TEST METHOD IS SHOWN IN PARENTHESES)
C (COM) 0.019 MN (XRF) 1.59 P (XRF) 0.58 S (COM) 0.032 CR (XRF) 16.99
NI (XRF) 11.30 MO (XRF) 2.05 CU (XRF) 0.82 N (FUS) 0.02

INTERGRANULAR CORROSION TESTED TO ASTM-A262, PRACTICE A - ACCEPTABLE.

SOLUTION ANNEALED TO PROVIDE A MICROSTRUCTURE FREE FROM CONTINUOUS GRAIN BOUNDARY CARBIDE PRECIPITATION (NETWORK).

YIELD STRENGTH, (0.2% ) KSI (MPA) 92.0 (634)
TENSILE STRENGTH, KSI (MPA) 110.0 (758)
ELONGATION IN 2.00", % 28.0
REDUCTION OF AREA, % 72.0
GRAIN SIZE PER ASTM E112: 6
MICROSTRUCTURE FERRITE - NONE

CARPENTER'S QUALITY MANAGEMENT SYSTEM WAS REGISTERED AS OF NOVEMBER 11, 2003
TO THE REQUIREMENTS OF ISO 9001:2000. APPROVAL CERTIFICATE 101921 BY LROA, INC.
CERTIFICATE OF TEST IS PREPARED IN ACCORDANCE WITH PARAGRAPH 3.1.B OF EN 10204
(DIN 50049). WE HEREBY CERTIFY THAT THE ABOVE TEST DATA ARE IN ACCORDANCE WITH
THE PURCHASE ORDER AND SPECIFICATION REQUIREMENTS.

IRVIN D. ULMER, JR.
MET RELEASE/REQUIREMENTS ANALYST
CARPENTER TECHNOLOGY CORPORATION
### Acciaierie Valbruna S.p.A.

**Report No:** ILETR110120  
**Revision:** C  
**Total Pages:** 40  
**Date:** 01/20/11

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#### Certificato di Collasso

**Certificato di Collasso**

**ABNAMROEUFZUGK**

**INSPECTION CERTIFICATE**

**CERTIFICAT DE RECEPTION**

EN 19204 (2005), 3.1

---

#### Specchietto

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#### Quota 319/316L

**Marca:** NVAPAL, MAXIVAL

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#### TEST

**A** springs per ASTM F1110

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#### Analisi chimica

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**Produzione:** linea続け林行.

**Solution Heat Treat Test:** linea続け林行.

#### Vicenza, 09/04/10

**R. Razzetti**

---

**Address:** SSP US Inc.

**Address:** 8250 Boyle Parkway  
**City:** Twinsburg, Ohio 44087  
**Country:** U.S.A.  
**Website:** mysspusa.com  
**Phone:** 1.330.425.4250
Acciaierie Valbruna S.p.A.

Certificato di Collasso
Abnahmeurkunde
Inspection Certificate
Certificato di recezione
EN 10204 (2005), 3.1

Agenzia di Schede: D.V.12007/3007

Data: 01/20/11

Certificate of Test

OUTOKUMPU

HEAT E101251
ORDNR 617100/01 BOL 02101095 CERTIFICATION 01/12/11

SHIP TO:
YARDE METALS (VMI ORDERS)
75 AIRCRAFT RD
SOUTHINGTON
06489-0000

YOUR ORDER & DATE 1/12/11 ORDER 0975001 CUST TAG

C0092182413

ITEM DESCRIPTION
GRADE 316L
Size 16.45X12.16 MAX CDA CONTA 1.1250 X 144.000 EL
Country of Mfg.: UNITED KINGDOM
Country of Origin is Country of Melt
No weld repair
Free of mercury contamination, Free of radiation contamination
No VISIBLE relevant matters. Meets EU electrical RCM

Total Bundles: 1 Total Weight: 1921

SMO TO FINISHED BAR IN THE USA FROM BILLET IMPORTED UNITED KINGDOM
AMS 5648H, 5653F
ASME SA182 K07, A07-09, E10
ASME SA182 F07, A07-09, E10
ASTM A262 02a Practice A/X
ASTM A179/413K/A
ASTM A390 08 BHM Class 1
DFARS 252.202-1014 6/08
Federal Spec QQ-S-763F
MACK N90175-03, mid-rad hard
EN 10204 Type 3.1 Document
Sol Anod Vel 1900F min/WQ

MECHANICAL & OTHER TESTS
Hardness as shipped (197 HB)
Hardness as shipped 93 HRB
Grain size 4.0
Intergranular corrosion OK
Macro OK

CHEMICAL COMPOSITION
Carbon (C) 0.017
Phosphorus (P) 0.028
Silicon (Si) 4.58
Nickel (Ni) 10.070
Copper (Ca) 3.79
Nitrogen (N) 0.077
Titanium (Ti) 0.091
Tin (Sn) 0.012
Vanadium (V) 0.070
Columbium/Tantalum (Cb-Ta) 0.3
Iron (Fe) Balance
Melt Practice EAF
Refining Practice AOD
De-long Ferrite

Knowningly & willfully falsifying or concealing a material act on this form,
or making false, fictitious or fraudulent statements or representations
herein could constitute a felony punishable under federal statutes.
We hereby certify that the test results shown in this report are correct and
accurate as contained in the records of the company and are in compliance
with the specifications, codes, and standards listed above.

M.F. Marcum, Quality Manager

YARDE METALS Inc. 01-27-31
610124V024-1 SEP FITTINGS CO DO 156441 Part #
12.0042 120.0018
CERTIFICATE OF TESTS

Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 268-2000 (800) 338-4592

10/14/09

CUSTOMER/SELLER/CLIENT

SSP FITTINGS CORP
ATTN: JOE MERCER
8250 BOYLE PARKWAY
TWINSBURG, OH 44087

Carpenter No./VEND-NR./R. DE COMMANDE

0120601

PHL351701 L39351 10/14/09 552.000

HEAT NUMBER/SCHMELZEN-NR./N. DE COUPE:

737802

PRODUCT DESCRIPTION: TYPE 316 STRAIN HARDENED GROUND NUCLEAR QUAL

SPECIFICATION:

PARKER HANNIFIN SS-62 (07/28/00)
ASTM-A276-06 (CONDITION B)
B&P V CODE SECT III* 2007 EDITION
SUBJECT NCA3800 2007 EDITION
PARKER HANNIFIN BS2040 (10/01/96)

SIZE: 0.937500 IN. (23.81 MM) RD BAR

PRIMARY HEAT CHEMISTRY (WT%): (TEST METHOD IS SHOWN IN PARENTHESIS)
C (COM) 0.06
Mn (XRF) 1.45
Si (XRF) 0.62
P (XRF) 0.020
S (COM) 0.021
Cr (XRF) 17.29
Ni (XRF) 10.40
Mo (XRF) 2.0
N (FUS) 0.06

INTERGRANULAR CORROSION TESTED TO ASTM-A262, PRACTICE A - ACCEPTABLE. (OXALIC)

ANNANLED MICROSTRUCTURE FREE FROM CONTINUOUS GRAIN BOUNDARY CARBIDE PRECIPITATION (NETWORK).

SOLUTION ANNEALED TO PROVIDE A MICROSTRUCTURE FREE FROM CONTINUOUS GRAIN BOUNDARY CARBIDE PRECIPITATION (NETWORK).

THIS CERTIFICATE AFFIRMS THAT THE CONTENTS OF THIS REPORT ARE CORRECT AND ACCURATE AND THAT ALL TEST RESULTS AND OPERATIONS PERFORMED BY US, OR OUR SUBCONTRACTORS, ARE IN COMPLIANCE WITH THE ORDER REQUIREMENTS AS MAY HAVE BEEN MODIFIED BY PRIOR CORRESPONDENCE BETWEEN THE PARTIES.

IN PRODUCTION OR TESTING OF MATERIAL SHIPPED AGAINST THIS ORDER, NO DIRECT CONNECTED MERCURY MANOMETER, MERCURY PUMPS, MERCURY SEALS, OR MERCURY IN GLASS THERMOMETERS HAVE BEEN USED. NOR IN SUCH PRODUCTION OR TESTING HAS MERCURY BEEN HANDLED IN THE IMMEDIATE VICINITY OF SUCH MATERIAL.

NO WELD REPAIR.

PROVISIONS OF 10 CFR PART 21 AND 10 CFR PART 50 - APPENDIX B APPLY. THIS ORDER WAS PRODUCED AND SUPPLIED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS OPERATIONS QUALITY PROGRAM MANUAL REV. 27, DATED 1/08 AND CARPENTER TECHNOLOGY'S WAREHOUSE QUALITY ASSURANCE MANUAL M25-21, DATED 01/00.

MICROSTRUCTURE FREE FROM CONTINUOUS GRAIN BOUNDARY CARBIDE PRECIPITATE.

ALL MATERIAL SHIPPED VIA HARTSVILLE, SOUTH CAROLINA DISTRIBUTION CENTER.

CONTINUED ON NEXT PAGE
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 298-2000 (800) 338-4992

10/14/09
CUSTOMER/SELLER/CLIENT

SSP FITTINGS CORP
ATTN: JOE MERCER
8250 BOYLE PARKWAY
TWINSBURG, OH 44087

Heat number/Schmelz-Nr./N° de coulée:
737802

Mill heat treatment:
Type: Solution anneal
Temp: 1940°F (1065°C)
Time: (Batch furnace) 50 hours
Quench: Water

Yield strength, (0.20%) ksi(MPa): 105.0 (724)
Tensile strength, ksi(MPa): 141.0 (972)
Elongation in 2.00%, %: 23.0
Reduction of area, %: 68.0

Material produced on this order was melted and manufactured in the U.S.A. Material has been melted in USA or qualifying country to DFARS requirements 252.225-7014 with Alternate 1 for Qualifying Country 225.872.1. Carpenter's quality management system was registered as of November 24, 2007 to the requirements of ISO 9001:2000 approval certificate 07-0889 by Performance review institute. Certificate of test is prepared in accordance with paragraph 3.1 of EN 10204 (DIN 50049). We hereby certify that the above test data are in accordance with the purchase order and specification requirements.

Date revised: 10/09/08
MARGARET A TURNER
MPT RELEASE/REQUIREMENTS ANALYST
CARPENTER TECHNOLOGY CORPORATION

Date revised: 10/30/09
Margaret R. Turner

This certificate is made to the customer printed on this form. Carpenter neither assumes, nor releases responsibility for, any representation or certification to their parties.

Margaret R. Turner

SSP TECHNOLOGY CORPORATION
8250 Boyle Parkway
Twinsburg, Ohio 44087
U.S.A.
mysspusa.com
1.330.425.4250
CERTIFICATE OF TESTS
CERT SERIAL# 000717502
ABNAHMEPRUEFZEUGNIS
CERTIFICAT DE CONTRÔLE

CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
(610) 208-2000 (800) 338-4592

04/27/10
CUSTOMER/SELLER/CLIENT

SSP FITTINGS CORP
ATTN: JOE MERCER
8250 BOYL PARKWAY
TWINSTUG, OH 44087

REPORT NO: ILETR110120
REVISION: C
TOTAL PAGES: 40
DATE: 01/20/11

DFARS
101 W. BERN STREET
READING, PA 19601

CUSTOMER ORDER NO./SELLER/CLIENT/NO. DE COMMANDE
0121485

FLH828801 L33285
04/27/10
868.00

HEAT NUMBER / SCHMELZEN-NR. / N° DE COÛT:
739459

PRODUCT DESCRIPTION: PROJECT 70+ TYPE 316/316L STAINLESS ANNEALED COLD DRAWN

SPECIFICATION: SSP RMT316 REV B (09/11/01) EXCEPT LTR (04/11/03) PENDING
ASTM-A276-08A TYPE 316/316L
ASTM-A479-08 TYPE 316/316L
ASME-SA475 2007 EDITION, 2009B ADD TYPE 316/316L

SIZE: 0.812000 IN. (20.62 MM) HEX BAR

PRIMARY HEAT CHEMISTRY (%): (TEST METHOD IS SHOWN IN PARENTHESES)

C (COM): 0.015
MN (XRF): 1.66
SI (XRF): 0.67
P (XRF): 0.027
S (COM): 0.022
CR (XRF): 16.79

NI (XRF): 11.25
NQ (XRF): 2.06
CU (XRF): 0.82
N (FUS): 0.02

INTERGRANULAR CORROSION TESTED TO ASTM-A262, PRACTICE A - ACCEPTABLE.
SOLUTION ANNEALED TO PROVIDE A MICROSTRUCTURE FREE FROM CONTINUOUS GRAIN
BOUNDARY CARBIDE PRECIPITATION (NETWORK).

HARDNESS AS SHIPPED, HRB/W - 97 (MIDRADIUS)

YIELD STRENGTH, (0.20 %) KSI (MPA) 78.5 (541)
TENSILE STRENGTH, KSI (MPA) 95.0 (655)
ELONGATION IN 2.000, % 40.0
REDUCTION OF AREA, % 75.0

GRAIN SIZE PER ASTM E112: 4

MATERIAL PRODUCED ON THIS ORDER WAS MELTED AND MANUFACTURED IN THE U.S.A.
MATERIAL HAS BEEN MELTED IN USA OR QUALIFYING COUNTRY TO DFARS REQUIRE-
MENTS 52.225-7014 WITH ALTERNATE 1 FOR QUALIFYING COUNTRY 225.72-1.1
CARPENTER’S QUALITY MANAGEMENT SYSTEM WAS REGISTERED AS OF NOVEMBER 24, 2007 TO
THE REQUIREMENTS OF ISO 9001:2000 APPROVAL CERTIFICATE 07-0869 BY PERFORMANCE
REVIEW INSTITUTE. CERTIFICATE OF TEST IS PREPARED IN ACCORDANCE WITH PARAGRAPH
3.1 OF EN 10204 (DIN 50049). WE HEREBY CERTIFY THAT THE ABOVE TEST DATA ARE
IN ACCORDANCE WITH THE PURCHASE ORDER AND SPECIFICATION REQUIREMENTS.

HEIDI L. SUNDAY
GROUP LR - SPECIFICATIONS/CERTIFICATIONS
CARPENTER TECHNOLOGY CORPORATION

RMT3160812
4/28/11
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 268-3800 (800) 336-4592

05/13/10
CUSTOMER/BESTELLER/CLIENT

SSP FITTINGS CORP
ATTN: JOE MERCER
8250 BOYLE PARKWAY
TWINSBURG, OH 44087

REPORT NO: ILETR110120
REVISION: C
TOTAL PAGES: 40
DATE: 01/20/11

---

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<th>CERTIFICAT DE CONTROLE</th>
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<td>101 W. BERN STREET</td>
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<td>READING, PA 19601</td>
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| 0122900 HC: EFN + RAR | PHIL875401 L35329 | 05/13/10 | 1401.00 |

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<td>MAX 120.0 KSI YIELD MIN 50.0 KSI</td>
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<td>ASTM-A276-08A</td>
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<td>ASTM-A479-08 (CHEMISTRY ONLY)</td>
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<td>C (COM)</td>
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<td>Ni (XRF)</td>
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<td>Mo (XRF)</td>
<td>2.05</td>
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<td>Ni (XRF)</td>
<td>0.02</td>
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<td>Al (XRF)</td>
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<td>HARDNESS AS SHIPPED, HBW</td>
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<td>YIELD STRENGTH, (0.20%) KSI (MPA)</td>
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<td>TENSILE STRENGTH, KSI (MPA)</td>
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<td>ELONGATION IN 1.00%, %</td>
<td>27.0</td>
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<tr>
<td>REDUCTION OF AREA, %</td>
<td>72.0</td>
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MATERIAL PRODUCED ON THIS ORDER WAS MELTED AND MANUFACTURED IN THE U.S.A.
MATERIAL HAS BEEN MELTED IN USA OR QUALIFYING COUNTRY TO DFARS REQUIREMENTS 252.225-7008 AND 252.225-7009.
CARPENTER'S QUALITY MANAGEMENT SYSTEM WAS REGISTERED AS OF NOVEMBER 24, 2007 TO THE REQUIREMENTS OF ISO 9001:2000 APPROVAL CERTIFICATE 07-0855 BY PERFORMANCE REVIEW INSTITUTE. CERTIFICATE OF TEST IS PREPARED IN ACCORDANCE WITH PARAGRAPH 3.1 OF EN-10204 (DIN 50049). WE HEREBY CERTIFY THAT THE ABOVE TEST DATA ARE IN ACCORDANCE WITH THE PURCHASE ORDER AND SPECIFICATION REQUIREMENTS.

TIMOTHY DUVALL
QUALITY ASSURANCE REP.
CARPENTER TECHNOLOGY CORPORATION

5/14/10

This certification is made to the customer printed on this form. Carpenter neither makes, nor assumes responsibility for, any representation or verification of information to other parties.
CERTIFICATE OF TESTS
CERT SERIAL# 00697088

TALLEY METALS
A Carpenter Company

Talley Metals Technology, Inc.
285 Talley Metals Lane
Maitland, SC 29301
Tel: (610) 204-3000 (800) 338-4592

Customer/Buyer/Client

ALA - POTTERVILLE
PO BOX 937
JACKSON, MI 49204

RECEIVED
AUG 10 2010

TALLEY METALS TECH, INC.
ACCOUNTS PAYABLE
P.O. BOX 2498
HARTSVILLE, SC 29551

JCPV7443515 HC: EU + CRO

PRODUCT DESCRIPTION: TYPE 316/316L STAINLESS ANNEALED COLD DRAWN

SPECIFICATION: TALLEY 316L-T1 (12/21/98)
- ASTM A276 REV E (06/27/96)
- ASTM A553 REV 1 (05/02)
- ASTM A320-07 (CHEM ONLY)
- ASTM A193-08A (CL 1)
- ASTM A276-06
- ASTM A320-07A
- ASTM A479-06A
- ASTM A484-06B
- ASTM A580-06 (SIZES .500" AND UNDER ONLY)
- ASME SA193 2017 EDITION (CHEM ONLY)
- ASME SA320 2017 EDITION
- ASME SA479 2017 EDITION
- AMS-QS-963B (08/08)

SIZE: 0.562500 ID X 0.926000 UD (14.29 MM) HEX BAR

PRIMARY HEAT CHEMISTRY (WT%): (TEST METHOD IS SHOWN IN PARENTHESES)

C (COM) 0.034
Mn (XRF) 1.45
Si (XRF) 0.57
P (XRF) 0.027
S (COM) 0.028
Cr (XRF) 16.43

Ni (XRF) 10.13
Mo (XRF) 2.03
Cu (XRF) 0.37
Co (XRF) 0.37
N (PUS) 0.054

INTEGRAL CORROSION TESTED TO ASTM-A262; PRACTICE E - ACCEPTABLE.
ANNEALED MICROSTRUCTURE PERM (CONTINOUS GRAIN BOUNDARY CARBIDE)
PRECIPITATION (NETWORK). THIS MATERIAL WAS MANUFACTURED IN ACCORDANCE WITH CARPENTER SPECIALTY ALLOYS
OPERATIONS QUALITY PROGRAM MANUAL REVISION 27, DATED 1/08.

YIELD STRENGTH, 0.2% ELONGATION (%)ksi (MPa) 85.1 (592)
TENSILE STRENGTH, KSI (MPA) 90.0 (612)
ELONGATION IN 2" 7.00 %
REDUCTION OF AREA, % 63.0
HARDNESS, HBW 202.0

CONTINUED ON NEXT PAGE
CERTIFICATE OF TESTS

CERT SERIAL #: 000697088

TALLEY METALS
A Carpenter Company

Talley Metals Technology, Inc.
205 Talley Metals Lane
McBee, SC, 29361
Tel: (803) 208-2000 (800) 334-4502

08/06/10
CUSTOMER / BESTELLER / CLIENT

ALRO - POTTERVILLE
PO BOX 527
JACKSON, MI 49204

DFARS

TALLEY METALS TECH, INC.
ACCOUNTS PAYABLE
P. O. BOX 2498
HARTSVILLE, SC 29551

CUSTOMER ORDER NO. / BESTELL-NR. / NO. DE COMPRO:
JCPVFV7443515

MANUFACTURER NO. / MEINE-NR. / NO DE REFERENZ:
HC'EUI + CRO

HEAT NUMBER / SCHMELZEN-BR. / NO DE COURRIE:

GRAIN SIZE PER ASTM E112: 6

152639

NO WELD REPAIR PERFORMED
MATERIAL PRODUCED ON THIS ORDER WAS MELTED AND MANUFACTURED IN THE U.S.A.
MATERIAL HAS BEEN MELTED IN USA OR QUALIFYING COUNTRY TO DFARS REQUIRMENTS 252.225-7014 WITH ALTERNATIVE 1 FOR QUALIFYING COUNTRY 225.972-1, SUPERSEDED BY DFARS REQUIREMENTS DFARS 252.225-7008 AND 252.225-7009.
WE HEREBY CERTIFY THAT THE ABOVE TEST DATA ARE IN ACCORDANCE WITH THE PURCHASE ORDER AND SPECIFICATION REQUIREMENTS. CERTIFICATE OF TEST IS PREPARED IN ACCORDANCE WITH PARAGRAPH 3.1 OF AN 10294 (DIN50049)

SHARON S. BRUINSON
QUALITY ASSURANCE REP.
CARPENTER TECHNOLOGY CORPORATION

8/6/11

THIS CERTIFICATE IS MADE IN THE CONFORMITY STATED ON THIS FORM. CORPORATE SUBSIDIARIES, OUR SUBSIDIARY CORPORATE COMPANIES ARE RESPONSIBLE FOR MEETING THE REQUIREMENTS STATED HEREIN.

The above certificate is required to be completed in accordance with SAE J10294, 252.225-7001 and 225.972-1. We hereby certify that the above test data are in accordance with the purchase order and specification requirements. Certificate of tests is prepared in accordance with paragraph 3.1 of an 10294 (DIN50049).

SHARON BRUINSON

8/6/11

10641550
CERTIFICATE OF TESTS
SERIAL # 000716464

Carpenter Technology Corporation
201 West Born Street, Reading, PA 19601
Tel: (610) 208-2000 (800) 938-4952

02/11/10
CUSTOMER / RESELLER / CLIENT

SSP FITTINGS CORP
ATTN: JOR MERCE
8250 BOYLE PARKWAY
TWINSBURG, OH 44087

0121909  HC: DWN 4 BRJ

101 W, BERN STREET
READING, PA 19601

TOTAL PAGES: 40
DATE: 01/20/11

SSP FTTINGS CORP
ATTN: JOR MERCE
8250 BOYLE PARKWAY
TWINSBURG, OH 44087

0121909  HC: DWN 4 BRJ

Carpenter Technology Corporation
201 West Born Street, Reading, PA 19601
Tel: (610) 208-2000 (800) 938-4952

02/11/10
CUSTOMER / RESELLER / CLIENT

ABNACHIHRPFUEZUEUGNIS CERTIFICAT DE CONTROLE

CARPENTER
Carpenter Technology Corporation
201 West Born Street, Reading, PA 19601
Tel: (610) 208-2000 (800) 938-4952

02/11/10
CUSTOMER / RESELLER / CLIENT

ABNACHIHRPFUEZUEUGNIS CERTIFICAT DE CONTROLE

CARPENTER
Carpenter Technology Corporation
201 West Born Street, Reading, PA 19601
Tel: (610) 208-2000 (800) 938-4952

02/11/10
CUSTOMER / RESELLER / CLIENT

PRODUCT DESCRIPTION: PROJECT 70+ TYPE 316/316L STAINLESS ANNEALED COLD DRAWN

SPECIFICATION: SSP RNT316 REV B (09/11/01) EXCEPT LTR (04/11/03) PENDING
- ASTM-A276-08A TYPE 316/316L
- ASTM-A479-08 TYPE 316/316L
- ASME-SA479 2007 EDITION, 2009B ADD TYPE 316/316L

SIZE
0.562500 IN. (14.29 MM) HEX BAR

PRIMARY HEAT CHEMISTRY (Wt%): (TEST METHOD IS SHOWN IN PARENTHESES)

- C (COM) 0.018
- Mn (XRF) 1.62
- Si (XRF) 0.67
- P (XRF) 0.029
- S (COM) 0.023
- Cr (XRF) 16.64

- Ni (XRF) 11.44
- Mo (XRF) 2.05
- Cu (XRF) 0.83
- N (FUS) 0.02

INTERGRANULAR CORROSION TESTED TO ASTM-A262, PRACTICE A - ACCEPTABLE.
SOLUTION ANNEALED TO PROVIDE A MICROSTRUCTURE FREE FROM CONTINUOUS GRAIN BOUNDARY CARBIDE PRECIPITATION (NETWORK).

HARDNESS AS SHIPPED, HREW - 97 (MIDRADIUS)

YIELD STRENGTH, (0.20 %) KSI (MPA) 84.5 (583)
TENSILE STRENGTH, KSI (MPA) 98.0 (676)
ELONGATION IN 2.00%, % 35.0
REDUCTION OF AREA, % 74.0

GRAIN SIZE PER ASTM E112: 5

MATERIAL PRODUCED ON THIS ORDER WAS MELTED AND MANUFACTURED IN THE U.S.A.
MATERIAL HAS BEEN MELTED IN USA OR QUALIFYING COUNTRY TO DFARS REQUIREMENTS 252.246-7014 WITH ALTERNAT 1 FOR QUALIFYING COUNTRY 225.872.
CARPENTER'S QUALITY MANAGEMENT SYSTEM WAS REGISTERED AS OF NOVEMBER 24, 2007 TO THE REQUIREMENTS OF ISO 9001:2008 APPROVAL CERTIFICATE 07-0860 BY PERFORMANCE REVIEW INSTITUTE. CERTIFICATE OF TEST IS PREPARED IN ACCORDANCE WITH PARAGRAPH 3.1 OF EN 10204 (DIN 50049). WE HEREBY CERTIFY THAT THE ABOVE TEST DATA ARE IN ACCORDANCE WITH THE PURCHASE ORDER AND SPECIFICATION REQUIREMENTS.

HEIDI L. SUNDAY
MRT RELEASE/REQUIREMENTS ANALYST
CARPENTER TECHNOLOGY CORPORATION

This certification is made to the customer printed on this form, Carpenter neither makes, nor assumes responsibility for, any reproduction or certification to other parties.

The certification of this material is based on the data shown in this certificate. Necessary changes, however, can be made by Carpenter. The customer shall act accordingly to satisfy themselves for the accuracy of the data or certifications.

RHT3160562
2/1/12

2/1/12

35
CERTIFICATE OF TESTS
CERT SERIAL # 000751007
CARPENTER
Carpenter Technology Corporation
101 West Bern Street, Reading, Pa. 19601
Tel: (610) 268-4200 (800) 338-4952

03/02/11
CUSTOMER / BUYER / CLIENT
SSP FITTINGS CORP
ATTN: JOE MERCER
8250 BOYLE PARKWAY
TWINSBURG, OH 44087

127230 HC: FW & RAC
PHL578701 L23134
03/02/11 469,000

PRODUCT DESCRIPTION: PROJECT 70+ TYPE 316/316L STAINLESS STEEL COLD WORKED
PRECISION B.LD & PRECISION POLISHED TENSILE MIN 105.0 / MAX 120.0 KSI YIELD MIN 50.0 KSI
SPECIFICATION: SSP RMT316HT REV E (08/04/06) EXCEPT LTR (08/23/06) APPROVED
ASME-SA276-10 ASME-SA479-2007 EDITION, 2009 ADD
SIZE 0.375000 IN. ( 9.53 MM) RD BAR
PRIMARY HEAT CHEMISTRY (WT%): (TEST METHOD IS SHOWN IN PARENTHESES)
C (COM) 0.017 1.60 0.60 0.022 0.023 16.78 740556
Mn (XRF) 2.25
SI (XRF) 0.12 0.35
P (XRF) 0.002 0.001
S (COM) 0.023 0.022
Cr (XRF) 15.98
NI (XRF) 11.31 2.05 0.82 0.02
NI (XRF) 2.05
MO (XRF) 2.05
Cu (XRF) 0.00 0.00
N (FUS) 0.00
INTERGRANULAR CORROSION TESTED TO ASTM A262, PRACTICE A, ACCEPTABLE.
ANNEXED MICROSTRUCTURE FREE FROM CONTINUOUS GRAIN BOUNDARY PRECIPITATION (NETWORK).
YIELD STRENGTH (0.2%) KSI (MPA) 92.0 (634)
TENSILE STRENGTH, KSI (MPA) 110.0 (758)
ELONGATION IN 1.0%, % 36.0 72.0
REDUCTION OF AREA, % 31.0
HARDNESS, HBW 231.0 (CONVERTED FROM TENSILE STRENGTH)
GRAIN SIZE PER ASTM E112: 6
***FERRITE TESTING PERFORMED BY LTI
MICROSTRUCTURE - FERRITE - NONF
MATERIAL PRODUCED ON THIS ORDER WAS MELTED AND MANUFACTURED IN THE U.S.A.
MATERIAL HAS BEEN MELTED IN USA OR QUALIFYING COUNTRY TO DFARS REQUIREMENTS
CARPENTER’S QUALITY MANAGEMENT SYSTEM WAS REGISTERED AS OF NOVEMBER 24, 2010 TO
THE REQUIREMENTS OF ISO 9001:2008 APPROVAL CERTIFICATE 10-13853 BY PERFORMANCE
REVIEW INSTITUTE. CERTIFICATE OF TEST IS PREPARED IN ACCORDANCE WITH PARAGRAPH
3.1 OF EN 10204 (DIN 50049). WE HEREBY CERTIFY THAT THE ABOVE TEST DATA ARE
IN ACCORDANCE WITH THE PURCHASE ORDER AND SPECIFICATION REQUIREMENTS.

Carpenter Technology Corporation
101 W. BERN STREET
READING, PA 19601

Date: 01/20/11


36
CERTIFICATE OF TESTS

CARPENTER Technology Corporation
101 W. Bern Street, Reading, PA 19601
Tel: (610) 209-2600 (800) 334-4392

12/22/10

CUSTOMER/BESTELLER/CLIENT

SSP FITTINGS CORP
ATTN: JOE MERCER
9250 BOYLE PARKWAY
TWINBURG, OH 44087

123918

HEAT NUMBER / SCHMELZEN-NR. / Nº DE COLECCIÓN: 740371

CARPENTER'S QUALITY MANAGEMENT SYSTEM WAS REGISTERED AS OF NOVEMBER 24, 2007 TO THE REQUIREMENTS OF ISO 9001:2000 APPROVAL CERTIFICATE 07-0869 BY PERFORMANCE REVIEW INSTITUTE. CERTIFICATE OF TEST IS PREPARED IN ACCORDANCE WITH PARAGRAPH 3.1 OF EN 10204, IDENT. 50042. WE HEREBY CERTIFY THAT THE ABOVE TEST DATA ARE IN ACCORDANCE WITH THE PURCHASE ORDER AND SPECIFICATION REQUIREMENTS.

STEPHANIE E. MCCULLUM
QUALITY ASSURANCE ENGINEER
CARPENTER TECHNOLOGY CORPORATION

Date: 01/20/11

Signature: [Signature]

Report No: ILETR110120
Revision: C
Total Pages: 40
Date: 01/20/11
**CERTIFICATE OF TESTS**

**Carpenter Technology Corporation**

101 West Bern Street, Reading PA 19601

Tel: (610) 366-2000 (610) 334-4592

**12/22/10**

**CUSTOMER/BUYER/CLIENT**

SSP FITTINGS CORP
ATTN: JOE MERCER
8250 BOYLE PARKWAY
TWINSBURG, OH 44087

**SALE/VERKAUER/VERDIEN**

**CARPENTER TECHNOLOGY CORP**

101 W. BERN STREET
READING, PA 19601

**123918**

**HC: 6X4 RAC**

**PH-412501 L-20050**

**12/22/10**

**577.000**

**HEAT NUMBER / SCHNITZ/NUMBER: 740371**

**PRODUCT DESCRIPTION: PROJECT 70+ TYPE 316/316L STAINLESS & COLD WORKED**

**SPECIFICATION: SSP BTM316HT REV E (08/04/06) EXCEPT LTR (08/23/06) APPROVED**

**ASME-NA-276-10**

**ASME-NA-479-09 (CHEMICALS)**

**ASME-8A479 2007 EDITION, 2009B ADD**

**SIZE**: 0.37500 IN. (9.53 MM) RD BAR

**PRIMARY HEAT CHEMISTRY (WT%):**

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<th>Si (XRF)</th>
<th>P (XRF)</th>
<th>S (XRF)</th>
<th>Cr (XRF)</th>
<th>Ni (XRF)</th>
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<th>N (PUS)</th>
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<td>0.017</td>
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<td>16.85</td>
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<td>0.83</td>
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**INTERGRANULAR CORROSION TESTED TO ASTM-A262, PRACTICE A - ACCEPTABLE.**

**ANNEALED MICROSTRUCTURE FREE FROM CONTINUOUS GRAIN BOUNDARY CARBIDE.**

**PRECIPITATION (NETWORK).**

**HARDNESS AS SHIPPED, HBW**: 222 (MIDRADIUS)

**YIELD STRENGTH, (0.2%) KSI (MPA)**: 87.5 (603)

**TENSILE STRENGTH, KSI (MPA)**: 110.0 (756)

**ELONGATION IN 1.50, %**: 37.0

**REDUCTION OF AREA, %**: 70.0

**HARDNESS, HBW**: 231.0

**GRAIN SIZE PER ASTM E112**: 5

**FERRITTES TESTING COMPLETED BY LTI**: UNKNOWN

**MICROSTRUCTURE**: FERRIT - NONR

**MATERIAL PRODUCED ON THIS ORDER WAS MELTED AND MANUFACTURED IN THE U.S.A. MATERIAL HAS BEEN MELTED IN USA OR QUALIFYING COUNTRY TO DPARS REQUIREMENTS 252.225-7004 WITH ALTERNATE 1 FOR QUALIFYING COUNTRY 225.872-1, SUPERSEDED BY DPARS REQUIREMENTS DPARS 252.225-7008 AND 252.225-7009.**

**CONTINUED ON NEXT PAGE**

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**SSP** 8250 Boyle Parkway Twinsburg, Ohio 44087 U.S.A. myspusa.com 1.330.425.4250
## D. EQUIPMENT

### Validation Test Equipment

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<td>DLE 15-75 Maximator Booster Pump</td>
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<td>Intermix Assurance Test</td>
<td>2100 Strain Gage Conditioner System.</td>
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<td>The Measurements Group</td>
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<td></td>
<td>DLE 15-75 Maximator Air Booster Pump</td>
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<tr>
<td>Interchange Assurance Test</td>
<td>L-400 Maximator Liquid Pump</td>
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<td></td>
<td>DLE 15-75 Maximator Air Booster Pump</td>
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<td>Gas Pressure Leak Test</td>
<td>L-400 Maximator Liquid Pump</td>
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<td>HP 224 McDaniels Pressure Gage</td>
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Table 5.0.D.0
E. REVISIONS

Rev. B - 05/25/11
- Corrected “A2LA Accredited” logo to maintain compliance with A2LA policies.

Rev. C – 03/09/15
- Updated data to include tubing wall thickness and test pressures.

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