



Bri-Steel Manufacturing Inc.
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Mill Test Certificate

Product: **Seamless Carbon Steel Pipe** Product Heat Number: **BSM-0899** Product Size: **NPS 20 STD** Production Date: **May 9, 2013**

Production Method: **Hot Expansion** Product Heat Treatment: **As-rolled**

Product Standards: **ASME B36.10-2004, API 5L-44th Ed. Grade B PSL1, ASTM/ASME A/SA106-2011 Grade B NDE, A/SA53-2012 Grade B Type S, NACE MR0175-2009, MR0103-2010**

Product Markings: **BRI-STEEL MFG <API> 5L-0898 API 5L GR B PSL1 ASTM/ASME A/SA106 GR B A/SA53 GR B NPS 20 STD 0.375 inchWT HEAT BSM-0899 (PIPE # LENGTH MASS) 78.6lb/ft NDE 910 PSI SMLS NACE MR0175 2013/05 MADE IN CANADA.**

| Product Details | | | | Non-Destructive Testing | | | | | | | | | | |
|-----------------|-----------|-------------------------|--------|-------------------------|--------|-------------------|-----------------|--------------|------|-------|---------|--------------|----------------------|---------------|
| Heat | Test Type | Product Size | Pieces | Mass lb/ft | Length | Geiger $\mu R/hr$ | Res. Mag. Gauss | Visual Insp. | OD | UT WT | UT Pass | ET ASTM E309 | HydroTest 910 psi/5s | End Condition |
| BSM-0899 | Heat | NPS 20 STD 0.375 in. WT | 9 | 78.60 | DRL | <5 | <20 | Pass | Pass | Pass | Pass | Pass | Pass | 32.5° Bevel |

| Chemical Analysis (wt%) | | | | | | | | | | | | | | |
|-------------------------|---|------|------|-------|-------|------|------|------|------|------|-------|-------|-------|----------|
| Heat | Steelmaking Method | C | Mn | P | S | Si | Cr | Cu | Mo | Ni | V | Ti | Nb | CE (IIW) |
| BSM-0899 | Blast Furnace; EAF; Ladle Refining; Vacuum Degass; Fully Killed | 0.20 | 0.91 | 0.010 | 0.010 | 0.25 | 0.04 | 0.06 | 0.01 | 0.04 | - | - | - | - |
| | | 0.21 | 0.87 | 0.011 | 0.013 | 0.25 | 0.04 | 0.07 | 0.01 | 0.03 | 0.002 | 0.001 | 0.001 | 0.37 |
| | | | | | | | | | | | | | | 0.38 |

| Mechanical Properties | | | | | | | | | | |
|-----------------------|-----------|--------------------|---------------|-----------------|--------------|---------------------------|-------------------|------------------|----------------|------------------|
| Heat | Test Type | Microstructure | Hardness HRBW | Flattening Test | Tension Test | | Yield (Rt0.5) psi | Tensile (Rm) psi | Y/T (Rt0.5/Rm) | Elongation (A) % |
| | | | | | 50mm GL | Longitudinal; 38.1mm x WT | | | | |
| BSM-0899 | Heat | Ferrite & Pearlite | 77 | Pass | Pass | 46,000 | 69,500 | 0.66 | 44 | |

| Heat | Test Standard | Impact Test Sample Details | Temp $^{\circ}C$ | Impact Energy | | | % Shear | | | Lateral Expansion | | | |
|----------|---------------|----------------------------|------------------|---------------|---|---|---------|---|---|-------------------|----|----|---|
| | | | | J | J | J | % | % | % | mm | mm | mm | |
| BSM-0899 | - | - | - | - | - | - | - | - | - | - | - | - | - |

Additional Details:

- ✓ We hereby certify that this pipe product was manufactured, sampled, tested and inspected by Bri-Steel Manufacturing Inc. in accordance with API 5L-44th Ed., ASTM/ASME A/SA106-2011, A/SA53-2012, and the purchase order requirements, and that the results meet the corresponding requirements.
- ✓ This pipe product meets the sour service requirements of NACE MR0175/ISO 15156-2:2009 Annex A2 for Region 3 Sour Service, and NACE MR0103-2010 Section 2.1.
- ✓ No weld repairs have been performed on this product.
- ✓ This product has not come into contact with mercury during the Bri-Steel Manufacturing processes.
- ✓ This certificate represents a quality control system that is compliant with EN 10204:2004 Type 3.1.

Mill Test Certificate approved by:


 2013 May 24
 Kenton Dechant, P.Eng.
 Manager of Quality and R&D