



Mill Test Certificate

Bri-Steel Manufacturing Inc.
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Product: **Seamless Carbon Steel Pipe** Product Heat Number: **BSM-0906** Product Size: **NPS 20 SCH 60** Production Date: **May 14, 2013**

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

Product Standards: **ASME B36.10-2004, ASTM/ASME A/SA106-2011 Grade B/C NDE, A/SA53-2012 Grade B Type S, NACE MR0175-2009, MR0103-2010**

Product Markings: **BRI-STEEL MFG ASTM/ASME A/SA106 GR B/C A/SA53 GR B NPS 20 SCH 60 0.812 inchWT HEAT BSM-0906 (PIPE # LENGTH MASS) 166.4lb/ft NDE SMIS NACE MR0175 2013/05 MADE IN CANADA.**

| Product Details | | | | Non-Destructive Testing | | | | | | | | | | |
|-----------------|-----------|----------------------------|--------|-------------------------|------------|--------------|-----------------|--------------|------|-------|--------------|--------------|-----------|---------------|
| Heat | Test Type | Product Size | Pieces | Length | Mass lb/ft | Gelger µR/hr | Res. Mag. Gauss | Visual Insp. | OD | UT WT | UT ASTM E213 | ET ASTM E309 | HydroTest | End Condition |
| BSM-0906 | Heat | NPS 20 SCH 60 0.812 in. WT | 5 | DRL | 166.40 | <5 | <20 | Pass | Pass | Pass | Pass | Pass | * | Plain End |

| Chemical Analysis (wt%) | | | | | | | | | | | | | | | | | |
|-------------------------|--|----------|------|------|-------|-------|------|------|------|------|------|-------|-------|-------|--------|----------|----------|
| Heat | Steelmaking Method | Analysis | C | Mn | P | S | Si | Cr | Cu | Mg | Ni | V | Ti | Nb | B | CE (IIW) | CE (CSA) |
| BSM-0906 | Blast Furnace; EAF; Ladle Refining; Vacuum Degas; Fully Killed | Heat | 0.19 | 0.88 | 0.012 | 0.008 | 0.27 | 0.05 | 0.06 | 0.01 | 0.04 | - | - | - | 0.0003 | - | - |
| | | Product | 0.20 | 0.85 | 0.014 | 0.007 | 0.24 | 0.05 | 0.06 | 0.01 | 0.03 | 0.002 | 0.001 | 0.001 | 0.0001 | 0.36 | 0.37 |

| Mechanical Properties | | | | | | | | | | | | | | |
|-----------------------|---------------|----------------------------|---------------|-----------------|--------------|---------------------------|-------------------|------------------|----------------|------------------|---------------|-----|-------------------|----|
| Heat | Test Type | Microstructure | Hardness HRBW | Flattening Test | Tension Test | | Yield (Rt0.5) psi | Tensile (Rm) psi | V/T (Rt0.5/Rm) | Elongation (A) % | Impact Energy | | Lateral Expansion | |
| | | | | | 50mm GL | Longitudinal; 38.1mm x WT | | | | | J | AVG | mm | mm |
| BSM-0906 | Heat | Ferrite & Pearlite | 77 | Pass | | | 42,100 | 71,000 | 0.59 | 51 | | | | |
| BSM-0906 | Test Standard | Impact Test Sample Details | | | | | | | | | | | | |

Additional Details:

- ✓ We hereby certify that this pipe product was manufactured, sampled, tested and inspected by Bri-Steel Manufacturing Inc. in accordance with 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: _____
Kenton Dechant, P.Eng.
 Manager of Quality and R&D

2013 May 22