



Mill Test Certificate

Bri-Steel Manufacturing Inc.
 2125-64 Avenue, Edmonton, AB Canada T6P 1Z4
 Tel: 001 (780) 469-6603
 Fax: 001 (780) 469-6986
 www.brichemsteel.com

Product: **Seamless Carbon Steel Pipe** Product Heat Number: **BSM-0614** Product Size: **NPS 20 SCH 160** Production Date: **December 18, 2012**

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/SAS3-2012 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 160 HEAT BSM-0614 (PIPE # LENGTH MASS) 379lb/ft NDE SMLS NACE MR0175 2012/12 MADE IN CANADA.**


| Product Details | | | | Non-Destructive Testing | | | | | | | | | | | |
|-----------------|-----------|-----|----------------|-------------------------|--------|------------|-------------------|-----------------|--------------|------|-------|--------------|--------------|-----------|---------------|
| Heat | Test Type | NPS | Wall Thickness | Pieces | Length | Mass lb/ft | Geiger μ R/hr | Res. Mag. Gauss | Visual Insp. | OD | UT WT | UT ASTM E213 | ET ASTM E309 | HydroTest | End Condition |
| BSM-0614 | Heat | 20 | SCH 160 | 5 | DRL | 379.00 | <5 | <20 | Pass | Pass | Pass | Pass | Pass | * | Plain End |

| Chemical Analysis (wt%) | | | | | | | | | | | | | | | | | |
|-------------------------|---|----------|------|------|-------|-------|------|------|------|------|------|-------|-------|-------|--------|----------|----------|
| Heat | Steelmaking Method | Analysis | C | Mn | P | S | Si | Cr | Cu | Mo | Ni | V | Ti | Nb | B | CE (IIV) | CE (CSA) |
| BSM-0614 | Blast Furnace: EAF; Ladle Refining: Vacuum Degass; Fully Killed | Heat | 0.19 | 0.88 | 0.013 | 0.006 | 0.28 | 0.05 | 0.05 | 0.01 | 0.02 | 0.003 | 0.002 | 0.001 | 0.0004 | - | - |
| | | Product | 0.20 | 0.93 | 0.013 | 0.006 | 0.27 | 0.04 | 0.06 | 0.01 | 0.02 | 0.003 | 0.003 | 0.001 | 0.0002 | 0.37 | 0.38 |

| Mechanical Properties | | | | | | | | | | | |
|-----------------------|-----------|--------------------|---------------|-----------------|-------------------------|---------------------------|-------------------|-------------------|------------------|----------------|------------------|
| Heat | Test Type | Microstructure | Hardness HRBW | Flattening Test | Tension Test | | Yield (Rp0.5) psi | Yield (Rp0.2) psi | Tensile (Rm) psi | Y/T (Rt0.5/Rm) | Elongation (A) % |
| | | | | | 50mm GL | 19.1mm x WT | | | | | |
| BSM-0614 | Heat | Ferrite & Pearlite | 0 | Pass | Transverse: 19.1mm x WT | Longitudinal: 19.1mm x WT | 44,200 | 44,300 | 74,000 | 0.66 | 46 |

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/SAS3-2012 and the purchase order requirements; and that the results meet the corresponding requirements.
- ✓ This pipe product meets the sour service requirements of NACE MR0175/SO 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 Jan 18
 Kenton Dechant, P. Eng.
 Manager of Quality and R&D

*Note that this product was hydrotested to 1000 psi for 5 seconds.