# Mill Test Certificate

Bri-Steel Manufacturing
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Product: Seamless Carbon Steel Pipe  Product Heat Number: BSM-2622  Product Size: NPS 24 TRUE 80  Production Date: Jan 13, 2016

Production Method: Hot Expansion  Product Heat Treatment: ThermoMechanical Formed  Certificate No.: MTR- 002051

Product Standards: ASME B36.10M-2015, ASTM/ASME A333-2015/SA333-2013 Grade 6 LT(M45C) A106-2014/SA106-2013 Grade B NDE, A53-2012/SA53-2013 Grade B Type S, NACE MR0175-2009 MR0103-2012

Product Markings: NPS 24 TRUE 80 1.219 INCHWT SMLS 2016/01 NDE 2100PSI
HEAT BSM-2622 (PIPE # LENGTH MASS) 296.4lb/ft ASTM/ASME A/SA333 GR 6 LT(M45C) A/SA106 GR B A/SA53 GR B NACE MR0175/MR0103 MADE IN CANADA

| Product: Details | | | | | | Non-Destructive Testing | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Heat | Test Type | Product Size | Pieces | Length | Mass lb/ft | Geiger µR/hr | Res. Mag. Gauss | Visual Insp. | OD | UT WT | UT ASTM E213 | ET ASTM E309 | HydroTest 2100 PSI/ 5 s | End Condition |
| BSM-2622 | Heat | NPS 24 TRUE 80 1.219in. WT | 3 | DRL | 296.4 | <5 | <20 | Pass | Pass | Pass | Pass | Pass | Pass | Plain End |

Chemical Analysis (wt%)

| Heat | Steelmaking Method | Test Type | C | Mn | P | S | Si | Cr | Cu | Mo | Ni | V | Ti | Nb | B | CE(IIW) | CE(CSA) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BSM-2622 | Blast Furnace; EAF; Ladle Refining; Vacuum Degas; Fully Killed | Heat | 0.16 | 1.18 | 0.010 | 0.002 | 0.26 | 0.02 | 0.01 | 0.01 | 0.01 | 0.050 | 0.001 | 0.001 | 0.0001 | 0.37 | 0.37 |
| | | Product | 0.18 | 1.18 | 0.015 | 0.004 | 0.28 | 0.05 | 0.01 | 0.01 | 0.02 | 0.061 | 0.002 | 0.001 | 0.0003 | 0.40 | 0.41 |
| | | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Mechanical Properties

| Heat | Test Type | Microstructure | Hardness | Flattening Test | Tension Test 2 in. GL | Yield (Rt0.5) psi | Tensile (Rm) psi | Y/T (Rt0.5/Rm) | Elongation (A) % |
|---|---|---|---|---|---|---|---|---|---|
| BSM-2622 | Heat | Ferrite & Pearlite | 77 HRBW | Pass | Longitudinal; 0.5 in. Round Bar | 49,800 | 75,500 | 0.66 | 41 |
| | | | | Pass | Longitudinal; 0.5 in. Round Bar | 50,000 | 71,500 | 0.70 | 40 |

| Heat | Test Standard | Impact Test Sample Details | Temp °C | Impact Energy | | | | % Shear | | | | Lateral Expansion | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | J | J | J | AVG | % | % | % | AVG | mm | mm | mm | AVG |
| BSM-2622 | ASTM A333 | CVN Long 10 x 10 mm | -45 | 80.5 | 288.0 | 60.0 | 142.8 | 20 | 100 | 10 | 43 | 1.35 | unbroken | 0.92 | 1.14 |

Additional Details:

✓ We hereby certify that this pipe product was manufactured, sampled, tested and inspected by Bri-Steel Manufacturing in accordance with ASTM/ASME A333-2015/SA333-2013, A106-2014/SA106-2013, A53-2012/SA53-2013, and the purchase order requirements, and that the results meet the corresponding requirements. Bri-Steel Manufacturing is registered and certified to ISO-9001:2008, API Q1, and PED 97/23/EC.

✓ This pipe product meets the sour service requirements of NACE MR0175/ISO 15156-2:2009 Annex A2 for Region 3 Sour Service , and NACE MR0103-2012 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:

T. Lam Jan 19/2016

Tonya Lam, C.E.T.
Assistant QA Manager