



Mill Test Certificate

Bri-Steel Manufacturing
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Product: Seamless Carbon Steel Pipe Product Heat Number: BSM-2849 Product Size: NPS 20 TRUE 40 Production Date: Jul 26, 2016
 Production Method: Hot Expansion Product Heat Treatment: Normalizing Forming Certificate No.: MTR- 002918
 Product Standards: ASME B36.10M-2015, ASTM/ASME A333-2016/SA333-2015 Grade 6 LT(M45C) A106-2014/SA106-2015 Grade B NDE, A53-2012/SA53-2015 Grade B Type S, NACE MR0175/ISO 15156-2:2009 MR0103/ISO 17495:2015
 Product Markings: NPS 20 TRUE 40 0.594 INCHWT SMLS 2016/07 NDE 1200PSI
 HEAT BSM-2849 (PIPE # LENGTH MASS) 122.9lb/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 | Geiger | Res. Mag. | Visual | OD | UT | UT | ET | HydroTest | End | | |
| BSM-2849 | Heat | NPS 20 TRUE 40 0.594in. WT | 15 | DRL | 122.9 lb/ft | <5 µR/hr | <50 Gauss | Insp. Pass | Pass | Pass | Pass | ASTM E213 | ASTM E309 | 1200PSI/ 5s | Pass | 30° Bevel |

| Heat | Steelmaking Method | Test Type | Chemical Analysis (wt%) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------|--|-----------|-------------------------|---------|-------|-------|-------|-------|------|------|------|-------|-------|-------|--------|-------|--------|------|----|------|---|--|----|--|----|--|---|--|---------|--|------------|--|---------|--|
| | | | C | | Mn | | P | | S | | Si | | Cr | | Cu | | Mo | | Ni | | V | | Ti | | Nb | | B | | CE(IIW) | | CE(IIW)Max | | CE(CSA) | |
| | | | Heat | Product | 0.14 | 0.99 | 0.011 | 0.003 | 0.29 | 0.06 | 0.05 | 0.03 | 0.02 | 0.004 | 0.002 | 0.001 | 0.0004 | 0.33 | - | 0.31 | | | | | | | | | | | | | | |
| BSM-2849 | Blast Furnace; EAF; Ladle Refining; Vacuum Degas; Fully Killed | Heat | 0.15 | 0.99 | 0.016 | 0.004 | 0.28 | 0.08 | 0.03 | 0.04 | 0.02 | 0.004 | 0.002 | 0.001 | 0.0003 | 0.34 | - | 0.33 | | | | | | | | | | | | | | | | |

| Mechanical Properties | | | | | | | | | |
|-----------------------|-----------|--------------------|----------|-----------------|--|---------------|--------------|------|----------------|
| Heat | Test Type | Microstructure | Hardness | Flattening Test | Tension Test | Yield (Rt0.5) | Tensile (Rm) | Y/T | Elongation (A) |
| BSM-2849 | Heat | Ferrite & Pearlite | 73 HRBW | Pass | Longitudinal; 1.5 in. x WT Longitudinal; 1.5 in. x WT | 41 800 psi | 67 500 psi | 0.62 | 46 |
| | | | | Pass | | 46 800 | 68 000 | 0.69 | 47 |

| Heat | Test Standard | Result | Impact Test | Temp °C | Impact Energy Min. (J) | Impact Energy Results (J) | Shear (%) | Lateral Expansion (mm) |
|----------|---------------|--------|---------------------|---------|------------------------|-----------------------------|-----------------------------|-------------------------------------|
| BSM-2849 | ASTM A333 | Pass | CVN Long 10 x 10 mm | -45 | (14/14/14) 18 | (3 Tests) AVG (72/80/81) 78 | (3 Tests) AVG (20/20/20) 20 | (3 Tests) AVG (1.14/1.42/1.49) 1.35 |

Additional Details:
 ✓ We hereby certify that this pipe product was manufactured, sampled, tested and inspected by Bri-Steel Manufacturing in accordance with ASTM/ASME A333-2016/SA333-2015, A106-2014/SA106-2015, A53-2012/SA53-2015, and the purchase order requirements, and that the results meet the corresponding requirements. Bri-Steel Manufacturing is registered and certified to ISO-9001:2008 (APIQR-1584), 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/ISO 17495:2015 Section 13.1.
 ✓ 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:

 Tonya Lam, P. Tech (Eng.)
 Assistant QA Manager