



Mill Test Certificate

Bri-Steel Manufacturing
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Product: Seamless Carbon Steel Pipe Product Heat Number: BSM-2818 Product Size: NPS 24 TRUE 40 Production Date: Jun 29, 2016
 Production Method: Hot Expansion Product Heat Treatment: Normalizing Forming Certificate No.: MTR- 002886

Product Standards: ASME B36.10M-2015, ASTM/ASME A333-2016/SA333-2015 Grade 6 LT(M45C) NDE, A53-2012/SA53-2015 Grade B Type S, NACE MR0175/ISO 15156-2:2009 MR0103/ISO 17495:2015

Product Markings
 NPS 24 TRUE 40 0.688 INCHWT SMLS 2016/06 NDE 1200PSI
 HEAT BSM-2818 (PIPE # LENGTH MASS) 171.2lb/ft ASTM/ASME A/SA333 GR 6 LT(M45C) 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 Pass | ET ASTM E213 | HydroTest 1200PSI/ 5 s | End Condition |
| BSM-2818 | Heat | NPS 24 TRUE 40 0.688in. WT | 8 | DRL | 171.2 | <5 | <20 | Pass | Pass | N12.5 | Pass | - | Pass | 30° Bevel |

Chemical Analysis (wt%)

| Heat | Steelmaking Method | Test Type | C | Mn | P | S | Si | Cr | Cu | Mo | Ni | V | Ti | Nb | B | CE (IIW) | CE (IIW)Max | CE (CSA) |
|----------|--|-----------|------|------|-------|-------|------|------|------|------|------|-------|-------|-------|--------|----------|-------------|----------|
| BSM-2818 | Blast Furnace; EAF; Ladle Refining; Vacuum Degas; Fully Killed | Heat | 0.18 | 1.13 | 0.021 | 0.003 | 0.29 | 0.03 | 0.02 | 0.00 | 0.01 | 0.056 | 0.003 | 0.002 | 0.0002 | 0.39 | - | 0.39 |
| | | Product | 0.18 | 1.14 | 0.019 | 0.006 | 0.32 | 0.03 | 0.02 | 0.01 | 0.01 | 0.063 | 0.002 | 0.002 | 0.001 | 0.0003 | 0.39 | - |
| | | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

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) % |
|----------|-----------|--------------------|----------|-----------------|-----------------------|---------|-------------------|------------------|----------------|------------------|
| | | | | | Impact Test | Temp °C | | | | |
| BSM-2818 | Heat | Ferrite & Pearlite | 81 HRBW | Pass | Pass | Pass | 52 500 | 76 000 | 0.69 | 41 |
| | | | | | Pass | Pass | 49 900 | 74 500 | 0.67 | 40 |

| Heat | Test Standard | Result | Impact Test Sample Details | Temp °C | Impact Energy Results (J) | | Shear (%) | Lateral Expansion (mm) |
|----------|---------------|--------|----------------------------|---------|---------------------------|---------------|---------------|------------------------|
| | | | | | (3 Tests) AVG | (3 Tests) AVG | | |
| BSM-2818 | ASTM A333 | Pass | CVN Long 10 x 10 mm | -45 | (14/14/14) 18 | (98/85/90) 91 | (60/60/60) 60 | (1.63/1.38/1.44) 1.48 |

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, 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:

T. Lam July 105/2016

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