



Bri-Steel Manufacturing
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Mill Test Certificate

Product: Seamless Carbon Steel Pipe Product Heat Number: BSM-2747 Product Size: NPS 16 XS Production Date: May 02, 2016
 Production Method: Hot Expansion Product Heat Treatment: As Rolled Certificate No.: MTR- 002810

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 16 XS 0.500 INCHWT SMLS 2016/05 NDE 1310PSI
 HEAT BSM-2747 (PIPE # LENGTH MASS) 82.77lb/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 | ET | HydroTest | End | | | | | |
| BSM-2747 | Heat | NPS 16 XS 0.500in. WT | 8 | DRL | 82.77 | <5 | <20 | Pass | Pass | N12.5 Pass | - | - | Pass | 31° Bevel | | | | | |

| Chemical Analysis (wt%) | | | | | | | | | | | | | | |
|-------------------------|---|------|------|-------|-------|------|------|------|------|------|-------|-------|-------|--------|
| Heat | Steelmaking Method | C | Mn | P | S | Si | Cr | Cu | Mo | Ni | V | Ti | Nb | B |
| BSM-2747 | Blast Furnace; EAF; Ladle Refining; Vacuum Degass; Fully Killed | 0.17 | 1.18 | 0.016 | 0.002 | 0.25 | 0.05 | 0.02 | 0.01 | 0.01 | 0.046 | - | - | - |
| | Product | 0.16 | 1.22 | 0.011 | 0.003 | 0.29 | 0.05 | 0.02 | 0.01 | 0.01 | 0.052 | 0.002 | 0.001 | 0.0003 |
| | | - | - | - | - | - | - | - | - | - | - | - | - | - |

| 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-2747 | Heat | Ferrite & Pearlite | 78 HRBW | Pass | Longitudinal; 1.5 in. x WT | 46 600 | 73 000 | 0.64 | 41 |
| | | | | Pass | Longitudinal; 1.5 in. x WT | 51 500 | 74 500 | 0.69 | 42 |

| Heat | Test Standard | Impact Test Sample Details | Temp °C | Impact Energy Min. (J) | Impact Energy (J) | Shear (%) | Lateral Expansion (mm) |
|----------|---------------|----------------------------|---------|-----------------------------|---------------------------------|-----------------------------|-------------------------------------|
| BSM-2747 | ASTM A333 | CVN Long 10 x 10 mm | -45 | (3 Tests) AVG (14/14/14) 18 | (3 Tests) AVG (124/111/109) 115 | (3 Tests) AVG (40/30/30) 33 | (3 Tests) AVG (2.08/1.82/1.54) 1.81 |

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 (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 MR0103-2012 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 May/05/2016

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