




# Mill Test Certificate

Bri-Steel Manufacturing  
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Product: Seamless Carbon Steel Pipe    Product Heat Number: BSM-3238    Product Size: NPS 18 STD    Production Date: Sep 05, 2017  
 Production Method: Hot Expansion    Product Heat Treatment: Normalizing Forming    Certificate No.: MTR- 003495  
 Product Standards: ASME B36.10M-2015, API 5L-45th Ed. Grade BN/X42N PSL2, ASTM/ASME A333-2016/SA333-2015 Grade 6 LT(M45C) A106-2014/SA106-2015 Grade B/C NDE, A53-2012/SA53-2015 Grade B Type S, NACE MR0175/ISO 15156-2:2015 MR0103/ISO 17495:2015  
 Product Markings:  <API & L/C No.> API SPEC 5L NPS 18 STD 0.375 INCHWT GR BN/X42N PSL2 SMLS 2017/09 NDE 1490PSI  
 HEAT BSM-3238 (PIPE # LENGTH MASS) 70.69lb/ft ASTM/ASME A/SA333 GR 6 LT(M45C) A/SA106 GR B/C 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 $\mu$ R/hr       | Res. Mag. Gauss | Visual Insp. | OD   | UT (WT) ASTM E114 | UT ASTM E213 | ET ASTM E309 | HydroTest 1490psi/ 5s | End Condition |
| BSM-3238         | Heat      | NPS 18 STD 0.375in. WT | 9      | DRL    | 70.69      | <5                      | <32             | Pass         | Pass | Pass              | N12.5 Pass   | -            | Pass                  | 35° Bevel     |

| Chemical Analysis (wt%) |  |           |      |      |       |       |      |      |      |      |      |       |       |       |        |      |         |            |         |
|-------------------------|--|-----------|------|------|-------|-------|------|------|------|------|------|-------|-------|-------|--------|------|---------|------------|---------|
| Heat                    | Steelmaking Method   | Test Type | C    | Mn   | P     | S     | Si   | Cr   | Cu   | Mo   | Ni   | V     | Ti    | Nb    | B      | Mn/C | CE(IIW) | CE(IIW)Max | CE(CSA) |
| BSM-3238                | Blast Furnace; EAF; Ladle Refining; Vacuum Degas; Fully Killed (at TPCO China) | Heat      | 0.16 | 1.27 | 0.007 | 0.006 | 0.30 | 0.06 | 0.03 | 0.01 | 0.01 | 0.040 | 0.005 | 0.001 | 0.0004 | 7.94 | 0.40    | -          | 0.39    |
|                         |  | Product   | 0.18 | 1.26 | 0.010 | 0.007 | 0.31 | 0.06 | 0.04 | 0.01 | 0.02 | 0.044 | 0.002 | 0.001 | 0.0003 | 7.00 | 0.42    | 0.43       | 0.42    |
|                         |  |           | 0.18 | 1.28 | 0.009 | 0.007 | 0.31 | 0.07 | 0.03 | 0.01 | 0.01 | 0.041 | 0.004 | 0.001 | 0.0003 | 7.11 | 0.42    | 0.43       | 0.42    |

| 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-3238              | Heat      | Ferrite & Pearlite | 82 HRBW  | Pass            | Longitudinal; 1.5 in. x WT | 49 900            | 76 000           | 0.66           | 38               |
|                       |           |                    |          | Pass            | Longitudinal; 1.5 in. x WT | 56 500            | 78 000           | 0.72           | 39               |

| Heat     | Test Standard | Result | Impact Test Sample Details | Temp °C | Impact Energy Min. (J) | Impact Energy Results (J) | Shear (%)     | Lateral Expansion (mm) |
|----------|---------------|--------|----------------------------|---------|------------------------|---------------------------|---------------|------------------------|
|          |               |        |                            |         | (3 Tests) AVG          | (3 Tests) AVG             | (3 Tests) AVG | (3 Tests) AVG          |
| BSM-3238 | ASTM A333     | Pass   | CVN Long 8STR 10x7.5mm     | -48     | (11/11/11) 14          | (84/99/109) 97            | (40/50/60) 50 | (1.76/2.27/2.40) 2.14  |
| BSM-3238 | API 5L PSL2   | Pass   | CVN Trans 8STR 10x7.5mm    | 0       | (15/15/15) 20          | (87/81/83) 84             | (15/15/15) 15 | (1.62/1.60/1.52) 1.58  |

**Additional Details:**

- ✓ We hereby certify that this pipe product was manufactured, sampled, tested and inspected by Bri-Steel Manufacturing in accordance with API 5L-45th Ed., N 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 9001:2015 (APIQR-1584), API Q1, and PED 2014/68/EU.
- ✓ This pipe product meets the **SOUR SERVICE** requirements of ANSI/NACE MR0175/ISO 15156-2A:2015 (Annex A2 for Region 3 Sour Service), and ANSI/NACE MR0103/ISO 17495:2015 Section 13.1

Mill Test Certificate approved by:

*T. Lam* Sept/07/2017  
 Tonya Lam, P. Tech (Eng.)  
 Assistant QA Manager

- ✓ 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.