



# Mill Test Certificate

Bri-Steel Manufacturing  
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Product: Seamless Carbon Steel Pipe    Product Heat Number: BSM-2888    Product Size: NPS 20 XS    Production Date: Sep 20, 2016  
 Production Method: Hot Expansion    Product Heat Treatment: Normalizing Forming    Certificate No.: MTR- 002964  
 Product Standards: ASME B36.10M-2015, ASTM/ASME 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 XS 0.500 INCHWT SMLS 2016/09 NDE 1100PSI  
 HEAT BSM-2888 (PIPE # LENGTH MASS) 104.1lb/ft ASTM/ASME 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 ASTM E114 | UT ASTM E213 | ET ASTM E309 | HydroTest 1100PSI/ 5 s | End Condition |
| BSM-2888         | Heat      | NPS 20 XS 0.500in. WT | 4      | DRL                     | 104.1      | <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    | CE(IIW) | CE(IIW)Max | CE(CSA) |
| BSM-2888                | Blast Furnace; EAF; Ladle Refining; Vacuum Degass; Fully Killed | Heat      | 0.16 | 1.17 | 0.012 | 0.002 | 0.26 | 0.01 | 0.01 | 0.01 | 0.02 | 0.050 | 0.001 | 0.001 | 0.0001  | 0.37       | 0.36    |
|                         |   | Product   | 0.16 | 1.15 | 0.009 | 0.001 | 0.29 | 0.05 | 0.01 | 0.01 | 0.02 | 0.056 | 0.002 | 0.002 | 0.0003  | 0.38       | 0.37    |
|                         |   |           | -    | -    | -     | -     | -    | -    | -    | -    | -    | -     | -     | -     | -       | -          | -       |

| Mechanical Properties |           |                    |          |                 |   |                  |
|-----------------------|-----------|--------------------|----------|-----------------|---|------------------|
| Heat                  | Test Type | Microstructure     | Hardness | Flattening Test | Tension Test 2 in. GL                           | Elongation (A) % |
| BSM-2888              | Heat      | Ferrite & Pearlite | 81 HRBW  | Pass            | Yield (Rt0.5) psi<br>Tensile (Rm) psi<br>74 500 | 0.64             |
|                       |           |                    |          |                 | 47 800  | 46               |

| Heat     | Test Standard | Result | Impact Test Sample Details | Temp °C | Impact Energy Min. (J) (3 Tests) AVG | Impact Energy Results (J) (3 Tests) AVG | Shear (%) (3 Tests) AVG | Lateral Expansion (mm) (3 Tests) AVG |
|----------|---------------|--------|----------------------------|---------|--------------------------------------|---|-------------------------|--------------------------------------|
| BSM-2888 | -             | -      | -                          | -       | -                                    | -                                       | -                       | -                                    |

**Additional Details:**

- ✓ We hereby certify that this pipe product was manufactured, sampled, tested and inspected by Bri-Steel Manufacturing in accordance with ASTM/ASME 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 2014/68/EU.
- ✓ 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* Sept 21/2016

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