## Bri-Steel Manufacturing Inc.

2125-64 Avenue, Edmonton, AB Canada TGP 124
Tel: 001 (780) 469-6603
Fax: 001 (780) 469-6986
www.brichemsteel.com

## Mill Test Certificate

Seamless Carbon Steel Pipe Product Heat Number: BSM-0619 Product Size: NPS 20 SCH 100 Production Date: December 20, 2012

Production Method: Hot Expansion Product Heat Treatment: As-rolled

Product:

Product Standards: ASME B36.10-2004, ASTM/ASME A/SA106-2011 Grade B NDE, A/SA53-2012 Grade B Type S, NACE MR0175-2009, MR0103-2010

Product Markings: .BRI-STEEL MFG ASTM/ASME A/SA106 GR B A/SA53 GR B NPS 20 SCH 100 HEAT BSM-0619 (PIPE # LENGTH MASS) 256.1lb/ft NDE SMLS NACE MR0175 2012/12 MADE IN CANADA.

| Plain End | *         | Pass      | Pass      | Pass        | Pass  | Pass   | <20      | <b>&amp;</b> | 256.10 | DRL    | 4      | SCH 100        | 20  | Heat      | BSM-0619 |
|-----------|-----------|-----------|-----------|-------------|-------|--------|----------|--------------|--------|--------|--------|----------------|-----|-----------|----------|
| Condition |           | ASTM E309 | ASTM E213 | TW          | OD    | Insp.  | Gauss    | μR/hr        | lb/ft  | Length | Pieces | Thickness      | NPS | Test Type | Heat     |
| End       | HydroTest | ET        | TU        | TU          |       | Visual | Res.Mag. | Geiger       | Mass   |        |        | Wall           |     |           |          |
| 100       |           |           | Testing   | Destructive | Non-l |        |          |              |        |        | 5      | Product Detail | _   |           |          |

|            |                                     |          |      |      |       | Chemical | Chemical Analysis (wt%) | (wt%) |      |      |      |       |       |       |        |       |       |
|------------|-------------------------------------|----------|------|------|-------|----------|-------------------------|-------|------|------|------|-------|-------|-------|--------|-------|-------|
|            |                                     |          |      |      |       |          |                         |       |      |      |      |       |       |       |        | Э     | Œ     |
| Heat       | Steelmaking Method                  | Analysis | С    | Mn   | Р     | S        | Si                      | Cr    | Cu   | Мо   | N.   | <     | Ti    | Nb    | В      | (WII) | (CSA) |
| BSM 0610   | Blast Furnace; EAF; Ladle Refining; | Heat     | 0.20 | 0.97 | 0.017 | 0.004    | 0.28                    | 0.05  | 0.08 | 0.01 | 0.03 | 0.005 | 0.004 | 0.001 | 0.0001 | 1     | 1     |
| CTOO-101CG | Vacuum Degas; Fully Killed          | Product  | 0.19 | 0.99 | 0.015 | 0.004    | 0.28                    | 0.03  | 0.07 | 0.01 | 0.04 | 0.003 | 0.003 | 0.001 | 0.0002 | 0.37  | 0.38  |

|                           | BSM-0                   | Heat            |                |                       |
|---------------------------|-------------------------|-----------------|----------------|-----------------------|
| i                         | BSM-0619 Heat           |                 |                |                       |
|                           | Heat                    | Test Type       |                |                       |
|                           | Ferrite & Pearlite      | Microstructure  |                |                       |
|                           | 68                      | HRBW            | Hardness       |                       |
| 00 000                    | Pass                    | Flattening Test |                | Mechar                |
| Longitudinal; 19.1mm x WT | Transverse; 19.1mm x WT | 50mm GL         | Tension Test   | Mechanical Properties |
| 46,500                    | 36,200                  | psi             | Yield (Rt0.5)  |                       |
| 47,000                    | 45,000                  | psi             | Yield (Rp0.2)  |                       |
| 68,500                    | 68,500                  | psi             | Tensile (Rm)   |                       |
| 0.68                      | 0.53                    | (Rt0.5/Rm)      | Υ/Τ            | 5 S                   |
| 49                        | 46                      | %               | Elongation (A) |                       |

Additional Details:

results meet the corresponding requirements. Inc. in accordance with ASTM/ASME A/SA106-2011, A/SA53-2012 and the purchase order requirements, and that the We hereby certify that this pipe product was manufactured, sampled, tested and inspected by Bri-Steel Manufacturing

Service, and NACE MR0103-2010 Section 2.1. This pipe product meets the sour service requirements of NACE MR0175/ISO 15156-2:2009 Annex A2 for Region 3 Sour

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.

\*Note that this product was hydrotested to 1000 psi for 5 seconds.

Mill Test Certificate approved by:

2013 Jan 18

Kenton Dechant, P.Eng. Manager of Quality and R&D



## Mill Test Certificate

Bri-Steel Manufacturing Inc.

2125-64 Avenue, Edmonton, AB Canada T6P 1Z4 Fax: 001 (780) 469-6986 www.brichemsteel.com Tel: 001 (780) 469-6603

Product: Seamless Carbon Steel Pipe

Product Heat Number: BSM-0619

Product Size:

NPS 20 SCH 120

Production Date:

December 20, 2012

Production Method: **Hot Expansion** 

Product Heat Treatment: As-rolled

Product Standards: ASME B36.10-2004, ASTM/ASME A/SA106-2011 Grade B NDE, A/SA53-2012 Grade B Type S, NACE MR0175-2009, MR0103-2010

Product Markings: .BRI-STEEL MFG ASTM/ASME A/SA106 GR B A/SA53 GR B NPS 20 SCH 120 HEAT BSM-0619 (PIPE # LENGTH MASS) 296.41b/ft NDE SMLS NACE MR0175 2012/12 MADE IN CANADA.

| Heat               |   | 7.                      | BSM-0619  | Heat                |           |                         |
|--------------------|---|-------------------------|-----------|---------------------|-----------|-------------------------|
| Steelr             |   |                         | Heat      | Test Type           |           |                         |
| Steelmaking Method |   |                         | 20        | NPS                 |           | P                       |
|                    |   |                         | SCH 120   | Thickness           | Wall      | <b>Product Details</b>  |
| Analysis           |   |                         | 4         | Pieces              |           | ils                     |
| C Mn               |   |                         | DRL       | Length              |           |                         |
| n<br>P             |   |                         | 296.40    | lb/ft               | Mass      |                         |
| s                  |   | Chemical /              | <5        | μR/hr               | Geiger    |                         |
| Si                 |   | Chemical Analysis (wt%) | <20       | Gauss               | Res.Mag.  |                         |
| 宁                  |   | %)                      |           |                     |           |                         |
| 5                  |   |                         | Pass      | Insp.               | Visual    |                         |
| M <sub>o</sub>     |   |                         | Pass      | OD                  |           | Non-                    |
| Z.                 |   |                         | Pass      | WT                  | UT        | Non-Destructive Testing |
| <                  |   | Š.                      |           | AS                  |           | e Testi                 |
| =                  |   |                         | Pass      | TM E213             | TU        | ng                      |
| Νb                 |   |                         | Pass      | ASTM E213 ASTM E309 | ΕT        |                         |
| B (1               |   |                         | *         |                     | HydroTest |                         |
| (IW)               | æ |                         | Pla       | Col                 | - 13 h 3  |                         |
| (CSA)              | Œ |                         | Plain End | Condition           | End       |                         |

|                           | BSM-0619 Heat           | Heat            |                            |                       |   | DJIVI-0013                  | BSM-0610                            |           |                |
|---------------------------|-------------------------|-----------------|----------------------------|-----------------------|---|-----------------------------|-------------------------------------|-----------|----------------|
|                           | Heat                    | Test Type       |                            |                       |   |                             |                                     | Vacuum Di | Blast Furnace; |
|                           | Ferrite & Pearlite      | Microstructure  |                            |                       |   | Vacuum Degas; Fully Killed  | Blast Furnace; EAF; Ladle Refining; |           |                |
|                           | ·lite                   | ire             |                            |                       |   | Product 0.19                | Heat                                |           |                |
|                           | 68                      | HRBW            | Hardness                   |                       |   | 0.19                        | 0.20   0.97   0.017   0.004   0.28  |           |                |
|                           | 3                       | W               | less                       |                       | 3 | 0.99                        | 0.97                                |           |                |
|                           | Pass                    | Flatteni        |                            |                       |   | 0.015                       | 0.017                               |           |                |
|                           | ss                      | Flattening Test |                            | Mechan                |   | 0.004                       | 0.004                               |           |                |
| Longitudinal; 19.1mm x WT | Transverse; 19.1mm x WT |                 | Te                         | Mechanical Properties |   | 0.015   0.004   0.28   0.03 | 0.28                                |           |                |
| nal; 19.1r                | se; 19.1m               | 50mm GL         | Tension Test               | rties                 |   | 0.03                        | 0.05                                |           |                |
| nm x WT                   | m x WT                  |                 | ;t                         |                       |   | 0.07                        | 0.08                                |           |                |
| 46,50                     | 36,200                  | psi             | Yield (Rt0.5)              |                       |   | 0.01                        | 0.01                                |           |                |
| ō                         | 0                       |                 | .0.5)   Yi                 |                       |   | 0.04                        | 0.03                                |           |                |
| 47,000                    | 45,000                  | psi             | eld (Rp0.2                 |                       |   | 0.003                       | 0.005                               |           |                |
| 39                        | 39                      | psi<br>psi      | Yield (Rp0.2) Tensile (Rm) |                       |   | 0.003                       | 0.004                               |           |                |
| 68,500                    | 68,500                  |                 |                            |                       |   | 0.001                       | 0.001 0.0001                        |           |                |
| 0.68                      | 0.53                    | (Rt0.5/Rm)      | Υ/Τ                        |                       |   | 0.001 0.0002 0.37           | 0.0001                              |           |                |
|                           |                         | _               | Elong                      |                       |   | 0.37                        | ı                                   |           |                |
| 49                        | 46                      | %               | Elongation (A)             |                       |   | 0.38                        | 1                                   |           |                |

0.97

Additional Details:

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Mill Test Certificate approved by:

Kenton Dechant, P.Eng. 2013 Jan 18

Manager of Quality and R&D

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