



## BRI-STEEL MANUFACTURING

2125-64<sup>th</sup> Avenue NW  
Edmonton, AB T6P 1Z4

Ph: (780) 469-6603 · Fax: (780) 469-6986  
www.bri-steel.com

2015 May 21

### BSM-0516 NPS 24 T40 Pipe Impact Testing at -20°F

Bri-Steel was requested to perform impact testing on a sample of BSM-0516 NPS 24 T40 (0.688 inchWT). Refer to the corresponding mill test report (MTR) for more information. In particular, we were requested to perform the transverse impact test at -20°F in accordance with ASTM A370.

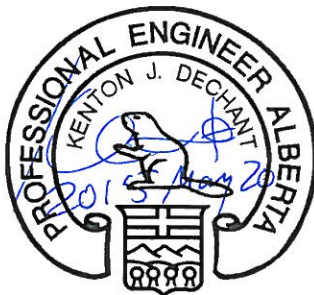
The Charpy V-Notch (CVN) impact test was performed in accordance with ASTM A370 and ASTM E23. The test specimen size was 10x10mm (full size), and three specimens were tested. The recorded test temperature was -20°F (-28.9°C). In accordance with ASTM A370, no temperature deration is required. The samples were taken in the transverse orientation, and were procured from the mid-wall location in the pipe wall thickness.

The results of the impact tests are as follows:

	Impact Energy (J)	Impact Energy (ft-lb)	Percent Shear (%)	Lateral Expansion (mm)
Specimen 1	71.0	52.4	10	1.31
Specimen 2	72.5	53.5	10	1.29
Specimen 3	70.0	51.6	10	0.88
<b>Average</b>	<b>71.2</b>	<b>52.5</b>	<b>10</b>	<b>1.16</b>

We trust that you will find this information satisfactory. If you have any questions or concerns, please do not hesitate to contact me at (780) 953-0093 or [kdechant@bri-steel.com](mailto:kdechant@bri-steel.com)

Sincerely,



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

APEGA Permit to Practice 10505



# Mill Test Certificate

**Bri-Steel Manufacturing Inc.**  
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Product: **Seamless Carbon Steel Pipe**      Product Heat Number: **BSM-0516**      Product Size: **NPS 24 TRUE40**      Production Date: **October 23, 2012**

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

Product Standards: **ASME B36.10-2004, API 5L-44th Ed, Grade B PSL1, ASTM/ASME A/SA106-2011 Grade B/C NDE, A/SAS3-2012 Grade B Type S, NACE MR0175-2009, MR0103-2010**

Product Markings: **BRI-STEEL MFG <API> 5L-0898 API 5L GR B PSL1 ASTM/ASME A/SA106 GR B/C A/SAS3 GR B NPS 24 TRUE40 HEAT BSM-0516 (PIPE # LENGTH MASS) 171.2lb/ft NDE 1220PSI SMIS NACE MR0175 2012/10 MADE IN CANADA.**


Product Details				Non-Destructive Testing											
Heat	Test Type	NPS	Wall Thickness	Pieces	Length	Mass	Geiger	Res. Mag.	Visual	OD	UT	UT	ET	HydroTest	End
BSM-0516	Heat	24	TRUE40	2	DRL	lb/ft	HR/hr	Gauss	Insp.	Pass	Pass	Pass	Pass	Pass	Plain End

Chemical Analysis (wt%)																	
Heat	Steelmaking Method	Analysis	C	Mn	P	S	Si	Cr	Cu	Mo	Ni	V	Ti	Nb	B	CE	CE
BSM-0516	Blast Furnace; EAF; Ladle Refining; Vacuum Degass; Fully Killed	Heat	0.20	0.92	0.018	0.002	0.30	0.04	0.07	0.01	0.03	0.003	0.002	0.001	0.0001	-	-
		Product	0.19	0.93	0.013	0.007	0.29	0.03	0.08	0.02	0.04	0.003	0.002	0.001	0.0001	0.36	0.37

Mechanical Properties											
Heat	Test Type	Microstructure	Hardness	Flattening Test	Tension Test		Yield (Rt0.5)	Yield (Rp0.2)	Tensile (Rm)	Y/T	Elongation (A)
					HRBW	Pass					
BSM-0516	Heat	Ferrite & Pearlite	78	Pass	Transverse; 38.1mm x WT	Longitudinal; 38.1mm x WT	48,200	45,700	74,000	0.65	47

**Additional Details:**

- ✓ We hereby certify that this pipe product was manufactured, sampled, tested and inspected by Bri-Steel Manufacturing Inc. in accordance with API 5L-44th Ed., ASTM/ASME A/SA106-2011, A/SAS3-2012 and the purchase order requirements, and that the results meet the corresponding requirements.
- ✓ This pipe product meets the sour service requirements of NACE MR0175/ISO 15156-2:2009 Annex A2 for Region 3 Sour Service, and NACE MR0103-2010 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:  **2012 Nov 30**  
 Kanton Dechant, P.Eng.  
 Manager of Quality and R&D