



Mill Test Certificate

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

Product: **Seamless Carbon Steel Pipe** Product Heat Number: **BSM-0176** Product Size: **NPS 16 XS** Production Date: **January 12, 2012**

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

Product Standards: **ASTM/ASME A/SA106-2010 Grade B/C, A/SA53-2010 Grade B Type S, NACE MR0175-2009**

Product Markings: **.BRI-STEEL MFG NPS 16 XS ASTM/ASME A/SA106 GR B/C A/SA53 GR B HEAT BSM-0176 (PIPE # LENGTH MASS) NDE 1490PSI NACE MR0175 2012/01 MADE IN CANADA.**

Product Details						Non-Destructive Testing									
Heat	Test Type	NPS	SCH	Pieces	Length	Mass lb/ft	Gelger μR/hr	Res. Mag. Gauss	Visual Insp.	OD Pass	UT Pass	UT ASTM E213	ET ASTM E309	HydroTest 1490 psi/5s	End Condition
BSM-0176	Heat	16	XS	12	DRL	82.77	<5	<20	Pass	Pass	Pass	---	Pass	Pass	37.5° Bevel


		Chemical Analysis (wt%)																			
Heat	Test Type	Steelmaking Method																			
		Blast Furnace; EAF; Ladle					C	Mn	P	S	Si	Cr	Cu	Mo	Ni	V	Ti	Nb	B	CE (IIV)	CE (CSA)
BSM-0176	Heat	Refining; Vacuum Degas					0.19	0.88	0.013	0.010	0.27	0.06	0.11	0.03	0.05	0.003	0.001	0.001	0.0002	0.37	0.37

Mechanical Properties											
Heat	Test Type	Microstructure	Hardness HRBW	Flattening Test	Tension Test		Yield (Rt0.5) psi	Yield (Rp0.2) psi	Tensile (Rm) psi	Y/T (Rt0.5/Rm)	Elongation (A) %
					50mm GL; 38mm x WT	Transverse					
BSM-0176	Heat	Ferrite & Pearlite	77	Pass	Longitudinal	47,300	46,900	73,000	0.65	41	

Additional Details:

- ✓ We hereby certify that this pipe product was manufactured, sampled, tested and inspected by Bri-Steel Manufacturing Inc. in accordance with ASTM/ASME A/SA106-2010, A/SA53-2010 and the purchase order requirements, and that the results meet the corresponding requirements.
- ✓ This pipe product meet 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 no mercury contamination.
- ✓ This certificate represents a quality control system that is compliant with EN 10204:2004 Type 3.1.

Mill Test Certificate approved by:


 2012 Mar 21
 Kenton Dechant, P. Eng.
 Manager of Quality and R&D



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Product: **Seamless Carbon Steel Pipe** Product Heat Number: **BSM-0176** Product Size: **NPS 16 STD** Production Date: **January 12, 2012**

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

Product Standards: **ASTM/ASME A/SA106-2010 Grade B/C, A/SA53-2010 Grade B Type S, NACE MR0175-2009**

Product Markings: **.BRI-STEEL MFG NPS 16 STD ASTM/ASME A/SA106 GR B/C A/SA53 GR B HEAT BSM-0176 (PIPE # LENGTH MASS) NDE 1490PSI NACE MR0175 2012/01 MADE IN CANADA.**

Product Details						Non-Destructive Testing									
Heat	Test Type	NPS	SCH	Pieces	Length	Mass	Gelger	Res. Mag.	Visual	OD	UT	UT	ET	HydroTest	End
BSM-0176	Heat	16	STD	1	DRL	82.77*	µR/hr	Gauss	Insp.	Pass	Pass	ASTM E213	ASTM E309	1490 psi/5s	Condition
							<5	<20	Pass	Pass	Pass	---	Pass	Pass	37.5° Bevel

Chemical Analysis (wt%)																
Heat	Test Type	Steelmaking Method														
BSM-0176	Heat	C	Mn	P	S	Si	Cr	Cu	Mo	Ni	V	Ti	Nb	B	CE	CE
		0.19	0.88	0.013	0.010	0.27	0.06	0.11	0.03	0.05	0.003	0.001	0.001	0.0002	0.37	0.37
		Blast Furnace; EAF; Ladle Refining; Vacuum Degas														

Mechanical Properties											
Heat	Test Type	Microstructure	Hardness	Flattening Test	Tension Test		Yield (Rt0.5)	Yield (Rp0.2)	Tensile (Rm)	y/T	Elongation (A)
BSM-0176	Heat	Ferrite & Pearlite	HRBW	Pass	50mm GL; 38mm x WT	Transverse	psi	psi	psi	(Rt0.5/Rm)	%
			77		Longitudinal		45,600	44,100	72,000	0.63	37
							47,300	46,900	73,000	0.65	41

Additional Details:

- ✓ We hereby certify that this pipe product was manufactured, sampled, tested and inspected by Bri-Steel Manufacturing Inc. in accordance with ASTM/ASME A/SA106-2010, A/SA53-2010 and the purchase order requirements, and that the results meet the corresponding requirements.
- ✓ This pipe product meet 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 no mercury contamination.
- ✓ This certificate represents a quality control system that is compliant with EN 10204:2004 Type 3.1.
- *This product was recertified as NPS 16 STD from NPS 16 XS due to the presence of thin regions in the pipe wall thickness.

Mill Test Certificate approved by:

[Signature]
 2012 Mar 21

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