



## Mill Test Certificate

Product: **Seamless Carbon Steel Pipe** Product Heat Number: **BSM-0581** Product Size: **NPS 16 SCH 160** Production Date: **November 29, 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/C A/SA53 GR B NPS 16 SCH 160 HEAT BSM-0581 (PIPE # LENGTH MASS) 245.1lb/ft NDE SMIS NACE MR0175 2012/11 MADE IN CANADA.**

Product Details				Non-Destructive Testing											
Heat	Test Type	NPS	Wall Thickness	Pieces	Length	Mass lb/ft	Geiger $\mu$ R/hr	Res. Mag. Gauss	Visual Insp.	OD	UT WT	UT ASTM E213	ET ASTM E309	HydroTest	End Condition
BSM-0581	Heat	16	SCH 160	6	DRL	245.10	<5	<20	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 (IIW)	CE (CSA)
BSM-0581	Blast Furnace; EAF; Ladle Refining; Vacuum Degas; Fully Killed	Heat	0.14	1.01	0.002	0.001	0.30	0.06	0.09	0.01	0.03	0.006	0.001	0.001	0.00002	-	-
		Product	0.14	1.01	0.013	0.004	0.23	0.09	0.06	0.05	0.03	0.003	0.002	0.001	0.00002	0.34	0.32

Mechanical Properties											
Heat	Test Type	Microstructure	Hardness HRBW	Flattening Test	Tension Test		Yield (Rt0.5) psi	Yield (Rp0.2) psi	Tensile (Rm) psi	V/T (Rt0.5/Rm)	Elongation (A) %
					50mm GL	Transverse: 19.1mm x WT					
BSM-0581	Heat	Ferrite & Pearlite	72	Pass	Longitudinal: 19.1mm x WT		38,400	36,900	66,000	0.58	48

**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/SA106-2011, A/SA53-2012 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 Dec 12

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



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## Mill Test Certificate

Product: **Seamless Carbon Steel Pipe** Product Heat Number: **BSM-0581** Product Size: **NPS 16 SCH 140\*** Production Date: **November 29, 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/SAS3-2012 Grade B Type S, NACE MR0175-2009, MR0103-2010**

Product Markings: **.BRI-STEEL MFG ASTM/ASME A/SA106 GR B A/SAS3 GR B NPS 16 SCH 140 HEAT BSM-0581 (PIPE # LENGTH MASS) 245.1lb/ft NDE SMIS NACE MR0175 2012/11 MADE IN CANADA.**

Product Details				Non-Destructive Testing											
Heat	Test Type	NPS	Wall Thickness	Pieces	Length	Mass lb/ft	Geiger $\mu$ R/hr	Res. Mag. Gauss	Visual Insp.	OD	UT WT	UT ASTM E213	ET ASTM E309	HydroTest	End Condition
BSM-0581	Heat	16	SCH 140*	6	DRL	245.10	<5	<20	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 (IIW)	CE (CSA)	
			Heat	0.14	1.01	0.002	0.001	0.30	0.06	0.09	0.01	0.03	0.006	0.001	0.001	0.0002	-	-
			Vacuum Degass; Fully Killed	Product	0.14	1.01	0.013	0.004	0.23	0.09	0.06	0.05	0.03	0.003	0.002	0.001	0.0002	0.34

Mechanical Properties											
Heat	Test Type	Microstructure	Hardness HRBW	Flattening Test	Tension Test		Yield (Rt0.5) psi	Yield (Rp0.2) psi	Tensile (Rm) psi	V/T (Rt0.5/Rm)	Elongation (A) %
					50mm GL						
					Transverse: 19.1mm x WT	Longitudinal: 19.1mm x WT					
BSM-0581	Heat	Ferrite & Pearlite	72	Pass			36,900	36,900	66,000	0.56	48

**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/SA106-2011, 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.

\*Note that these pipes were downgraded from NPS 16 SCH 160.

Mill Test Certificate approved by:

  
 2012 Dec 12

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