



Mill Test Certificate

Bri-Steel Manufacturing Inc.
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Product: **Seamless Carbon Steel Pipe** Product Heat Number: **BSM-1078** Product Size: **NPS 16 SCH 160** Production Date: **July 15, 2013**

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

Product Standards: **ASME B36.10-2004, ASTM/ASME A/SA106-2011 Grade B/C 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 1.594 inchWT HEAT BSM-1078 (PIPE # LENGTH MASS) 245.1lb/ft NDE SMIS NACE MR0175 2013/07 MADE IN CANADA.**

Product Details				Non-Destructive Testing											
Heat	Test Type	Product Size	Pieces	Length	Mass lb/ft	Geiger μ R/hr	Res. Mag. Gauss	Visual Insp.	OD	WT	UT	UT	ET	HydroTest	End Condition
BSM-1078	Heat	NPS 16 SCH 160 1.594 in. WT	3	DRL	245.10	<5	<20	Pass	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-1078	Blast Furnace; EAF; Ladle Refining; Vacuum Degas; Fully Killed	Heat	0.20	0.94	0.015	0.003	0.33	0.05	0.06	0.01	0.03	0.054	0.002	0.001	0.0003	-	-
		Product	0.20	0.92	0.016	0.003	0.30	0.05	0.06	0.01	0.03	0.004	0.002	0.001	0.0001	0.37	0.38

Mechanical Properties													
Heat	Test Type	Microstructure	Hardness HRBW	Flattening Test	Tension Test 50mm GL	Yield (Rt0.5) psi	Tensile (Rm) psi	Y/T (Rt0.5/Rm)	Elongation (A) %				
BSM-1078	Heat	Ferrite & Pearlite	76	Pass	Longitudinal; 19.1mm x WT	41,100	70,000	0.59	52				
Heat	Test Standard	Impact Test Sample Details	Temp $^{\circ}$ C	J	Impact Energy	% Shear	AVG	mm	Lateral Expansion	mm	mm	mm	AVG
BSM-1078	-	-	-	-	-	-	-	-	-	-	-	-	-

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: *Paul Sowden*

2013 JUL 19
 Paul Sowden, T.T.
 Assistant QA Manager