



Bri-Steel Manufacturing Inc.
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Mill Test Certificate

Product: **Seamless Carbon Steel Pipe** Product Heat Number: **BSM-0432** Product Size: **NPS 20 SCH 160** Production Date: **August 1, 2012**

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

Product Standards: **ASTM/ASME A/SAL106-2011 Grade B, A/SAS3-2012 Grade B Type S, NACE MR0175-2009**

Product Markings: **.BRI-STEEL MFG NPS 20 SCH 160 ASTM/ASME A/SAL106 GR B A/SAS3 GR B HEAT BSM-0432 (PIPE # LENGTH MASS) 379lb/ft NDE 1000PSI NACE MR0175 2012/08 MADE IN CANADA.**

Product Details						Non-Destructive Testing									
Heat	Test Type	NPS	Wall Thickness	Pieces	Length	Mass lb/ft	Geiger μ R/hr	Res. Mag. Gauss	Visual Insp.	OD Pass*	WT Pass	UT ASTM E213	ET ASTM E309	HydroTest 1000 psi/5s	End Condition
BSM-0432	Heat	20	SCH 160	1	DRL	379.00	<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 (liw)	CE (CSA)
BSM-0432	Blast Furnace; EAF; Ladle Refining;	Heat	0.14	1.00	0.018	0.003	0.28	0.06	0.06	0.01	0.02	0.005	0.002	0.001	0.0001	-	-
	Vacuum Degas; Fully Killed	Product	0.15	0.95	0.018	0.004	0.28	0.04	0.05	0.01	0.02	0.005	0.003	0.001	0.0002	0.32	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	Y/T (Rt0.5/Rm)	Elongation (A) %
					50mm GL	Transverse: 19.1mm x WT					
BSM-0432	Heat	Ferrite & Pearlite	76	Pass	Longitudinal: 19.1mm x WT		46,500	46,300	63,500	0.73	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/SAL106-2011, A/SAS3-2012 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:

[Signature]
 2012 Aug 10

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