

## Mill Test Certificate

Bri-Steel Manufacturing Inc.

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BSM-0834 Product Size: NPS 20 SCH 60 Production Date: April 15, 2013

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

Product:

Seamless Carbon Steel Pipe

Product Heat Number:

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 20 SCH 60 0.812 inchWT HEAT BSM-0834 (PIPE # LENGTH MASS) 166.4lb/ft NDE SMLS NACE MR0175 2013/04 MADE IN CANADA.

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	BSM-0834	Heat		
	Heat	Test Type		
	NPS 20 SCH 60 0.812 in.WT	Product Size		Product Detail:
	9	Pieces		S
	DRL	Length		
	166.40	lb/ft	Mass	
	<5	μR/hr	Geiger	
	<20	Gauss	Res.Mag.	
	Pass	Insp.	Visual	
	Pass	OD		Non-E
200	Pass	WT	TU	Destructive T
	Pass	ASTM E213	TU	esting
	Pass	ASTM E309	ET	
	*		HydroTest	
	Plain End	Condition	End	

Heat	Steelmaking Method	Analysis	0	Mn	Р	Chemica S	Chemical Analysis (wt%) S Si Cr	(wt%)	Cr Cr	Mo	<u>z</u> .	<	<b>T</b>	Nb	В	CE (IIW)	(CSA)
									I								T
BSM_0834	Blast Furnace; EAF; Ladle Refining;	Heat	0.19	0.89	0.013	0.004	0.32	0.06	0.03	0.01	0.02	0.003	0.002	0.001	0.0002		
1000-1000	Vacuum Degas; Fully Killed	Product	0.20	0.93	0.016	0.008	0.37	0.07	0.07	0.01	0.03	0.005	0.002	0.001	0.0003	85.0	0.40

Heat Test Type Microstructure Hardness Flattening Test Somm GL psi psi (Rt0.5) Tensile (Rm) Y/T Elongation (A)  BSM-0834 Heat Ferrite & Pearlite 79 Pass Longitudinal; 38.1mm x WT 48,700 73,500 0.66 50  Heat Standard Sample Details ©C J J AVG % % 6% AVG mm mm AVG	_	_		,	_		-	_
Test Type         Microstructure         Hardness         Flattening Test         50mm GL         Yield (Rt0.5)         Tensile (Rm)         Y/T         Elongatic           Heat         Ferrite & Pearlite         79         Pass         Longitudinal; 38.1mm x WT         48,700         73,500         0.66         50           Test         Impact Test         Temp         Impact Energy         % Shear         Lateral Expansion           Standard         Sample Details         9C         J         J         AVG         %         AVG         mm         mm         mm         mm		Section 1			BSM-0834	Heat		
Hardness         Hardness         Tension Test         Yield (Rt0.5)         Tensile (Rm)         Y/T         Elongatic           HRBW         Flattening Test         50mm GL         psi         ysi         (Rt0.5/Rm)         %           79         Pass         Longitudinal; 38.1mm x WT         48,700         73,500         0.66         50           Test         Temp         Impact Energy         % Shear         Lateral Expansion           Details         9C         J         J         AVG         %         AVG         mm         mm         mm         mm		Standard	Test			Test Type		
Temp   Impact Energy   Grading   Temp   Grading   Temp   Grading   Temp   Flattening   Temp   Temp		Sample Details	Impact Test		Ferrite & Pearlite	Microstructure		
Tension Test   Yield (Rt0.5)   Tensile (Rm)   Y/T   Elongatic					79	HRBW	Hardness	
Tension Test   Yield (Rt0.5)   Tensile (Rm)   Y/T   Elongatic   S0mm GL   psi   psi   (Rt0.5/Rm)   %		°C	Temp		Pass	Flattenin		
n Test         Yield (Rt0.5)         Tensile (Rm)         Y/T         Elongatic           n GL         psi         psi         (Rt0.5/Rm)         %           38.1mm x WT         48,700         73,500         0.66         50           gy         % Shear         Lateral Expansion           AVG         %         %         AVG         mm         mm         mm		J				g Test		VIECTIGIT
n Test         Yield (Rt0.5)         Tensile (Rm)         Y/T         Elongatic           n GL         psi         psi         (Rt0.5/Rm)         %           38.1mm x WT         48,700         73,500         0.66         50           gy         % Shear         Lateral Expansion           AVG         %         %         AVG         mm         mm         mm		٦	Impact En		Longitudinal	50r	Tens	rai riopei ti
Yield (Rt0.5)         Tensile (Rm)         Y/T         Elongatic           psi         psi         (Rt0.5/Rm)         %           48,700         73,500         0.66         50           % Shear         Lateral Expansion           % %         %         AVG         mm         mm         mm		J AVG	ergy		; 38.1mm × W	nm GL	on Test	3
Mathematic   Mat							Yie	
ensile (Rm) Y/T Elongatic		%	% S		18,700	psi	ld (Rt0.5)	
) Y/T Elongatic (Rt0.5/Rm) % 0.66 50  Lateral Expansion G mm mm mm		%	hear		73		Tensi	
V/T Elongatic 0.5/Rm) % 0.66 50  Lateral Expansion mm mm		AVG			,500	osi	e (Rm)	
Elongatic ) % 50 ral Expansion m mm		mm			0.1	(Rt0.5	Υ,	
		mm	Lateral E		66	i/Rm)	Ή	
tion (A) % 30 AVG		mm	xpansion		(,,		Elonga	
		AVG			jo jo	1%	tion (A)	

Additional Details:

BSM-0834

AVG t

results meet the corresponding requirements. Inc. in accordance with ASTM/ASME A/SA106-2011, A/SA53-2012, and the purchase order requirements, and that the ✓ We hereby certify that this pipe product was manufactured, sampled, tested and inspected by Bri-Steel Manufacturing

Service, and NACE MR0103-2010 Section 2.1.  $\checkmark$  This pipe product meets the sour service requirements of NACE MR0175/ISO 15156-2:2009 Annex A2 for Region 3 Sour

No weld repairs have been performed on this product.

This product has not come into contact with mercury during the Bri-Steel Manufacturing processes

 $\checkmark$  This certificate represents a quality control system that is compliant with EN 10204:2004 Type 3.1.

\*Note that this product was hydrotested to 1000 psi for 5 seconds.

Mill Test Certificate approved by:

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

2013Apr19