

## Mill Test Certificate

Bri-Steel Manufacturing Inc.

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Product: Seamless Carbon Steel Pipe

Product Heat Number:

BSM-0330

May 16, 2012

Production Method:

Hot Expansion

Product Heat Treatment: As-rolled

Product Size:

**NPS 24 XS** 

Production Date:

Product Standards: ASTM/ASME A/SA106-2011 Grade B/C, A/SA53-2012 Grade B Type S, NACE MR0175-2009

Product Markings: .BRI-STEEL MFG NPS 24 XS ASTM/ASME A/SA106 GR B/C A/SA53 GR B HEAT BSM-0330 (PIPE # LENGTH MASS) 125.5lb/ft NDE 970PSI NACE MR0175 2012/05 MADE IN CANADA.

37.5° B	Pass	Pass	1 1	Pass	Pass	Pass	<20	\$	125.50	DRL	10	XS	24	Heat	BSM-0330
Conditi	970 psi/5s	ASTM E309	ASTM E213	TW	OD	Insp.	Gauss	µR/hr	lb/ft	Length	Pieces	SCH	NPS	Test Type	Heat
End	HydroTest	目	디	TU		Visual	Res.Mag.	Geiger	Mass						
												1000		- The second sec	
			esting	estructive 1	Non-D						S	Product Detail	-		

Heat         Test Type         Blast Furnace; EAF; Ladle         C         Mn         P         S         Si         Cr         Cu         Mo         Ni         V         Ti         Nb         B         (IIW)         (CSA)           BSM-0330         Heat         Refining; Vacuum Degas         0.21         0.88         0.007         0.013         0.24         0.03         0.08         0.01         0.04         0.002         0.001         0.0003         0.37         0.38			_		_
Steelmaking Method         Chemical Analysis (wt%)         CE         CE <th></th> <td>BSM-0330</td> <td>Heat</td> <td></td> <td></td>		BSM-0330	Heat		
Chemical Analysis (wt%)   CE		Heat	Test Type		
Chemical Analysis (wt%)  Mn P S Si Cr Cu Mo Ni V Ti Nb B (IIW)  0.88 0.007 0.013 0.24 0.03 0.08 0.01 0.04 0.002 0.001 0.001 0.0003 0.37			Blast Furnace; EAF; Ladle	I a	
Chemical Analysis (wt%)  P S Si Cr Cu Mo Ni V Ti Nb B (IIW)  0.007 0.013 0.24 0.03 0.08 0.01 0.04 0.002 0.001 0.001 0.0003 0.37		0.21	C		
Chemical Analysis (wt%)  CE  S  Si  Cr  Cu  Mo  Ni  V  Ti  Nb  B  (IIW)  0.013  0.24  0.03  0.08  0.01  0.04  0.002  0.001  0.001  0.0003  0.37		0.88	Mn		
al Analysis (wt%)  Si Cr Cu Mo Ni V Ti Nb B (IIW)  0.24 0.03 0.08 0.01 0.04 0.002 0.001 0.001 0.0003 0.37		0.007	ъ		
is (wt%)  Cr Cu Mo Ni V Ti Nb B (IIW)  0.03 0.08 0.01 0.04 0.002 0.001 0.001 0.0003 0.37		0.013	S		Chemica
Cr Cu Mo Ni V Ti Nb B (IIW) 0.03 0.08 0.01 0.04 0.002 0.001 0.001 0.0003 0.37		0.24	Si		l Analysis
Mo Ni V Ti Nb B (IIW) 0.01 0.04 0.002 0.001 0.001 0.0003 0.37		0.03	Ç		(wt%)
Ni V Ti Nb B (IIW) 0.004 0.002 0.001 0.001 0.0003 0.37	0.000	0.08	Cu		
V Ti Nb B (IIW) 0.002 0.001 0.001 0.0003 0.37	200	0.01	Mo		
Ti Nb B (IIW) 0.001 0.003 0.37	0.0000000000000000000000000000000000000	0.04	Z.		
Nb B (IIW) 0.0001 0.0003 0.37	100000000000000000000000000000000000000	0.002	٧		
CE B (IIW) 0.0003 0.37		100.0	П		
CE (IIW) 0.37	10000	0.001	Nb		
		0.0003	В		
CE (CSA) 0.38		0.37	(IIW)	CE	
		0.38	(CSA)	Ж	

	BS			Γ
	BSM-0330	Heat	7	
	Heat	Test Type		
	Ferrite & Pearlite	Microstructure		
	76	HRBW	Hardness	
	Pass	Flattening Test		Mechan
Longitudinal	Transverse	Flattening Test 50mm GL; 38mm x WT	Tension Test	Mechanical Properties
47,700	42,600	psi	Yield (Rt0.5)	
47,700	41,200	psi	Yield (Rp0.2)	
71,500	72,000	psi	Tensile (Rm)	
0.67	0.59	(Rt0.5/Rm)	Τ/Υ	
47	46	%	Elongation (A)	

Additional Details:

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  $\checkmark~$  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. 🖊 No weld repairs have been performed on this product. This product has no mercury contamination

✓ This pipe product meet the sour service requirements of NACE MR0175/ISO 15156-2:2009 Annex A2 for Region 3 Sour

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

Mill Test Certificate approved by:

2012 May 29

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