



Bri-Steel Manufacturing
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Mill Test Certificate

Product: **Seamless Alloy Steel Pipe** Product Heat Number: **BSM-2521** Product Size: **NPS 30 STD** Production Date: **September 10, 2015**
 Production Method: **Hot Expansion** Product Heat Treatment: **Normalized (1060°C) and Tempered (780°C)** MTR: **1967**
 Product Standards: **ASME B36.10-2004, ASTM A335/ASME SA335-2015 GRADE P91**
 Product Markings: **BRI-STEEL MFG NPS 30 STD 0.375 INCHWT ASTM/ASME A/SA335 GR. P91 NDE(UT) 900PSI SMLS 2015/09 HEAT BSM-2520 (PIPE# LENGTH MASS) 118.6 lb/ft 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	UT WT	UT ASTM E213	ET ASTM E309	HydroTest 900 psi/5s	End Condition				
BSM-2521	Heat	NPS 30 STD 0.375 in.WT	2	DRL	118.60	<5	<20	Pass	Pass	Pass	Pass	-	Pass	32.5° Bevel				
Chemical Analysis (wt%)																		
Steelmaking Method		Analysis	C	Mn	P	S	Si	Cr	Cu	Mo	Ni	V	Ti	Nb	B	N	Al	Zr
Blast Furnace; EAF; Ladle Refining; Vacuum Degass; Fully Killed		Heat	0.10	0.48	0.018	0.002	0.26	8.60	0.03	0.87	0.17	0.200	0.01	0.09	0.0002	0.040	<0.01	<0.01
		Product	0.09	0.48	0.018	0.001	0.27	*	0.03	0.88	0.15	0.197	<0.01	0.09	0.0004	*	*	*
		Product	0.09	0.49	0.018	0.001	0.27	*	0.03	0.88	0.15	0.197	<0.01	0.09	0.0005	*	*	*
Mechanical Properties																		
Microstructure			Hardness HRC	Flattening Test		Tension Test 50mm GL		Yield (Rt0.5) psi	Tensile (Rm) psi	Y/T (Rt0.5/Rm)	Elongation (A) %							
Tempered Martensite & Fine Carbides			25	Pass		Longitudinal; 38.1mm x WT		103,900	117,700	0.88	25							
						Longitudinal; 38.1mm x WT		85,500	104,000	0.82	30							
Impact Test Properties																		
Impact Test Standards		Impact Test Sample Details		Test Temp	Impact Energy				% Shear				Lateral Expansion					
ASTM A370		CVN Longitudinal 10 x 7.5mm		+21°C	J	J	J	Avg	%	%	%	Avg	mm	mm	mm	Avg		
					75.0	68.0	60.5	67.8	60	55	45	53.3	1.44	1.21	0.79	1.15		

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/SA335-2015, and the purchase order requirements, and that the results meet the corresponding requirements.
 - ✓ 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.
 - ✓ No weld repairs have been performed on this product.
 - ✓ Bri-Steel Manufacturing is registered and certified to ISO-9001:2008, API Q1 and PED 97/23/EC.
 - ✓ Manufactured in accordance with document titled "KBR Specifications for P91 Chrome", which was provided at time of order.
- * The product analysis instrument was not capable of measuring this element.

Mill Test Certificate approved by:

Kenton Dechant
 2015 Oct 6

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