




# Mill Test Certificate

Bri-Steel Manufacturing  
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Product: Seamless Carbon Steel Pipe    Product Heat Number: BSM-3222    Product Size: NPS 20 STD    Production Date: Aug 17, 2017  
 Production Method: Hot Expansion    Product Heat Treatment: Normalizing Forming    Certificate No.: MTR- 003481  
 Product Standards: ASME B36.10M-2015, API 5L-45th Ed. Grade BN/X42N PSL2, ASTM/ASME A333-2016/SA333-2015 Grade 6 LT(M45C) A106-2014/SA106-2015 Grade B/C NDE, A53-2012/SA53-2015 Grade B Type S, NACE MR0175/ISO 15156-2:2015 MR0103/ISO 17495:2015

Product Markings  <API & L/C No.> API SPEC 5L NPS 20 STD 0.375 INCHWT GR BN/X42N PSL2 SMLS 2017/08 NDE 1420PSI  
 HEAT BSM-3222 (PIPE # LENGTH MASS) 78.71lb/ft ASTM/ASME A/SA333 GR 6 LT(M45C) A/SA106 GR B/C A/SA53 GR B NACE MR0175/MR0103 MADE IN CANADA

Product: Details						Non-Destructive Testing								
Heat	Test Type	Product Size	Pieces	Length	Mass lb/ft	Geiger $\mu$ R/hr	Res. Mag. Gauss	Visual Insp.	OD	UT (WT) ASTM E114	UT ASTM E213	ET ASTM E309	HydroTest 1420PSI/ 5s	End Condition
BSM-3222	Heat	NPS 20 STD 0.375in. WT	6	DRL	78.71	<5	<10	Pass	Pass	Pass	N12.5 Pass	-	Pass	35° Bevel

### Chemical Analysis (wt%)

Heat	Steelmaking Method	Test Type	C	Mn	P	S	Si	Cr	Cu	Mo	Ni	V	Ti	Nb	B	Mn/C	CE(IIW)	CE(IIW)Max	CE(CSA)
BSM-3222	Blast Furnace; EAF; Ladle Refining; Vacuum Degas; Fully Killed (at TPCO China)	Heat	0.16	1.27	0.010	0.004	0.29	0.05	0.04	0.01	0.02	0.045	0.002	0.001	0.0004	7.94	0.40	-	0.39
		Product	0.17	1.26	0.012	0.006	0.31	0.05	0.04	0.01	0.02	0.045	0.002	0.001	0.0003	7.41	0.40	0.43	0.40
			0.18	1.26	0.012	0.006	0.31	0.05	0.04	0.01	0.02	0.046	0.002	0.001	0.0003	7.00	0.41	0.43	0.42

### Mechanical Properties

Heat	Test Type	Microstructure	Hardness	Flattening Test	Tension Test 2 in. GL	Yield (Rt0.5) psi	Tensile (Rm) psi	Y/T (Rt0.5/Rm)	Elongation (A) %
BSM-3222	Heat	Ferrite & Pearlite	83 HRBW	Pass	Longitudinal; 1.5 in. x WT	54 000	77 500	0.70	38
				Pass	Longitudinal; 1.5 in. x WT	54 500	80 500	0.68	37

Heat	Test Standard	Result	Impact Test Sample Details	Temp °C	Impact Energy Min. (J)	Impact Energy Results (J)	Shear (%)	Lateral Expansion (mm)
					(3 Tests) AVG	(3 Tests) AVG	(3 Tests) AVG	(3 Tests) AVG
BSM-3222	ASTM A333	Pass	CVN Long 8STR 10x7.5mm	-48	(11/11/11) 14	(70/77/78) 75	(30/30/30) 30	(1.37/1.72/1.77) 1.62
BSM-3222	API 5L PSL2	Pass	CVN Trans 8STR 10x7.5mm	0	(15/15/15) 20	(80/86/62) 76	(40/30/20) 30	(1.20/1.08/0.88) 1.05

#### Additional Details:

✓ We hereby certify that this pipe product was manufactured, sampled, tested and inspected by Bri-Steel Manufacturing in accordance with API 5L-45th Ed., N ASTM/ASME A333-2016/SA333-2015, A106-2014/SA106-2015, A53-2012/SA53-2015, and the purchase order requirements, and that the results meet the corresponding requirements. Bri-Steel Manufacturing is registered and certified to ISO 9001:2015 (APIQR-1584), API Q1, and PED 2014/68/EU.

Mill Test Certificate approved by:

✓ This pipe product meets the **SOUR SERVICE** requirements of ANSI/NACE MR0175/ISO 15156-2A:2015 (Annex A2 for Region 3 Sour Service), and ANSI/NACE MR0103/ISO 17495:2015 Section 13.1

*T. Lam* Aug 23/2017

Tonya Lam, P. Tech (Eng.)  
 Assistant QA Manager

✓ 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.