



Mill Test Certificate

Bri-Steel Manufacturing
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Product: Seamless Carbon Steel Pipe Product Heat Number: BSM-3230 Product Size: NPS 20 STD Production Date: Aug 24, 2017
 Production Method: Hot Expansion Product Heat Treatment: Normalizing Forming Certificate No.: MTR- 003489
 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-3230 (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	Gelger μR/hr	Res. Mag. Gauss	Visual Insp.	OD	UT (WT)	UT	ET	HydroTest	End Condition
BSM-3230	Heat	NPS 20 STD 0.375in. WT	5	DRL	78.71	<5	<10	Pass	Pass	Pass	Pass	-	Pass	35° Bevel

Heat	BSM-3230	Steelmaking Method Blast Furnace; EAF; Ladle Refining; Vacuum Degass; Fully Killed (at IPCCO China)	Test Type	Chemical Analysis (wt%)																
				C	Mn	P	S	Si	Cr	Cu	Mo	Ni	V	Ti	Nb	B	Mn/C	CE(IIW)	CE(IIW)Max	CE(CSA)
				0.15	1.25	0.014	0.008	0.30	0.06	0.03	0.01	0.01	0.039	0.003	0.001	0.0005	8.33	0.38	-	0.37
Product	0.17	1.25	0.016	0.010	0.31	0.06 <td>0.03 <td>0.01 <td>0.01 <td>0.040 <td>0.004 <td>0.001 <td>0.0004 <td>7.35 <td>0.40 <td>0.43 <td>0.40 </td></td></td></td></td></td></td></td></td></td></td>	0.03 <td>0.01 <td>0.01 <td>0.040 <td>0.004 <td>0.001 <td>0.0004 <td>7.35 <td>0.40 <td>0.43 <td>0.40 </td></td></td></td></td></td></td></td></td></td>	0.01 <td>0.01 <td>0.040 <td>0.004 <td>0.001 <td>0.0004 <td>7.35 <td>0.40 <td>0.43 <td>0.40 </td></td></td></td></td></td></td></td></td>	0.01 <td>0.040 <td>0.004 <td>0.001 <td>0.0004 <td>7.35 <td>0.40 <td>0.43 <td>0.40 </td></td></td></td></td></td></td></td>	0.040 <td>0.004 <td>0.001 <td>0.0004 <td>7.35 <td>0.40 <td>0.43 <td>0.40 </td></td></td></td></td></td></td>	0.004 <td>0.001 <td>0.0004 <td>7.35 <td>0.40 <td>0.43 <td>0.40 </td></td></td></td></td></td>	0.001 <td>0.0004 <td>7.35 <td>0.40 <td>0.43 <td>0.40 </td></td></td></td></td>	0.0004 <td>7.35 <td>0.40 <td>0.43 <td>0.40 </td></td></td></td>	7.35 <td>0.40 <td>0.43 <td>0.40 </td></td></td>	0.40 <td>0.43 <td>0.40 </td></td>	0.43 <td>0.40 </td>	0.40			
			0.17	1.25	0.015	0.008 <td>0.30 <td>0.06 <td>0.03 <td>0.01 <td>0.01 <td>0.041 <td>0.002 <td>0.001 <td>0.0004 <td>7.35 <td>0.40 <td>0.43 <td>0.40 </td></td></td></td></td></td></td></td></td></td></td></td></td>	0.30 <td>0.06 <td>0.03 <td>0.01 <td>0.01 <td>0.041 <td>0.002 <td>0.001 <td>0.0004 <td>7.35 <td>0.40 <td>0.43 <td>0.40 </td></td></td></td></td></td></td></td></td></td></td></td>	0.06 <td>0.03 <td>0.01 <td>0.01 <td>0.041 <td>0.002 <td>0.001 <td>0.0004 <td>7.35 <td>0.40 <td>0.43 <td>0.40 </td></td></td></td></td></td></td></td></td></td></td>	0.03 <td>0.01 <td>0.01 <td>0.041 <td>0.002 <td>0.001 <td>0.0004 <td>7.35 <td>0.40 <td>0.43 <td>0.40 </td></td></td></td></td></td></td></td></td></td>	0.01 <td>0.01 <td>0.041 <td>0.002 <td>0.001 <td>0.0004 <td>7.35 <td>0.40 <td>0.43 <td>0.40 </td></td></td></td></td></td></td></td></td>	0.01 <td>0.041 <td>0.002 <td>0.001 <td>0.0004 <td>7.35 <td>0.40 <td>0.43 <td>0.40 </td></td></td></td></td></td></td></td>	0.041 <td>0.002 <td>0.001 <td>0.0004 <td>7.35 <td>0.40 <td>0.43 <td>0.40 </td></td></td></td></td></td></td>	0.002 <td>0.001 <td>0.0004 <td>7.35 <td>0.40 <td>0.43 <td>0.40 </td></td></td></td></td></td>	0.001 <td>0.0004 <td>7.35 <td>0.40 <td>0.43 <td>0.40 </td></td></td></td></td>	0.0004 <td>7.35 <td>0.40 <td>0.43 <td>0.40 </td></td></td></td>	7.35 <td>0.40 <td>0.43 <td>0.40 </td></td></td>	0.40 <td>0.43 <td>0.40 </td></td>	0.43 <td>0.40 </td>	0.40	

Heat	BSM-3230	Test Type	Microstructure	Hardness	Flattening Test	Tension Test		Yield (Rt0.5) psi	Tensile (Rm) psi	Y/T (Rt0.5/Rm)	Elongation (A) %
						2 in. GL	1.5 in. x WT				
		Heat	Ferrite & Pearlite	82 HRBW	Pass	Longitudinal; 1.5 in. x WT	50 500	76 500	0.72	37	
					Pass	Longitudinal; 1.5 in. x WT	50 500	75 500	0.67	39	

Heat	BSM-3230	Test Standard	Result	Impact Test Sample Details	Temp °C	Impact Energy Results (J)		Shear (%)	Lateral Expansion (mm)
						(3 Tests) AVG	(3 Tests) AVG		
		ASTM A333	Pass	CVN Long 85TR 10X7.5mm	-48	(11/11/11) 14	(87/41/85) 71	(40/20/40) 33	(1.91/0.81/1.90) 1.54
		API 5L PSL2	Pass	CVN Trans 85TR 10X7.5mm	0	(15/15/15) 20	(66/58/65) 63	(15/15/15) 15	(1.45/1.31/1.40) 1.39

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.
- ✓ 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

Mill Test Certificate approved by:

Tonya Lam Aug 31/2017

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.