



Mill Test Certificate

Bri-Steel Manufacturing
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Product: Seamless Carbon Steel Pipe Product Heat Number: BSM-2992 Product Size: NPS 24 STD Production Date: Dec 13, 2016
 Production Method: Hot Expansion Product Heat Treatment: Normalizing Forming Certificate No.: MTR- 003170

Product Standards: ASME B36.10M-2015, API 5L-45th Ed. Grade BN/X42N/X46N PSL2, CSA Z245.1-2014 Grade 241/290 CAT 1, 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 15156-2:2009 MR0103/ISO 17495:2015

Product Markings <API & L/C No.> API SPEC 5L NPS 24 STD 0.375 INCHWT GR BN/X42N/X46N PSL2 SMLS 2016/12 NDE 1300PSI
 HEAT BSM-2992 (PIPE # LENGTH MASS) 94.76lb/ft CSA Z245.1 GR 241/290 CAT 1 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 µR/hr	Res. Mag. Gauss	Visual Insp.	OD	UT (WT) ASTM E114	UT ASTM E213	ET ASTM E309	HydroTest 1300PSI/ 10s	End Condition
BSM-2992	Heat	NPS 24 STD 0.375in. WT	3	DRL	94.76	<5	<10	Pass	Pass	N12.5 Pass	-	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	CE(IIW)	CE(IIW)Max	CE(CSA)
BSM-2992	Blast Furnace; EAF; Ladle Refining; Vacuum Degass; Fully Killed (at TPCO China)	Heat	0.15	1.06	0.014	0.003	0.25	0.06	0.01	0.01	0.01	0.038	0.002	0.002	0.0005	0.35	-	0.34
		Product	0.16	1.08	0.011	0.003	0.26	0.06	0.02	0.01	0.01	0.040	0.002	0.001	0.0004	0.36	0.43	0.36
			0.15	1.06	0.012	0.003	0.26	0.06	0.02	0.01	0.01	0.039	0.002	0.001	0.0004	0.35	0.43	0.34

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-2992	Heat	Ferrite & Pearlite	77 HRBW	Pass	Longitudinal; 1.5 in. x WT	48 600	71 500	0.68	46
				Pass	Longitudinal; 1.5 in. x WT	48 000	71 000	0.68	46

Heat	Test Standard	Result	Impact Test Sample Details	Temp °C	Impact Energy Min. (J) (3 Tests) AVG	Impact Energy Results (J) (3 Tests) AVG	Shear (%) (3 Tests) AVG	Lateral Expansion (mm) (3 Tests) AVG
BSM-2992	ASTM A333	Pass	CVN Long 10 x 7.5 mm	-48	(11/11/11) 14	(160/169/171) 167	(100/100/100) 100	(2.45/2.49/2.53) 2.49
BSM-2992	API 5L PSL2	Pass	CVN Trans 10 x 7.5 mm	0	(15/15/15) 20	(140/161/177) 159	(100/100/100) 100	(2.34/2.42/2.49) 2.42

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 CSA Z245.1-2014 Grade 241/290 CAT 1, 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-9001:2008 (APIQR-1584), API Q1, and PED 2014/68/EU.

✓ This pipe product meets the sour service requirements of NACE MR0175/ISO 15156-2:2009 Annex A2 for Region 3 Sour Service, and NACE MR0103/ISO 17495:2015 Section 13.1

✓ 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.

Mill Test Certificate approved by:

T. Lam Feb 23/2017

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