

## Mill Test Certificate

Bri-Steel Manufacturing Inc.

2125-64 Avenue, Edmonton, AB Canada T6P 1Z4 Fax: 001 (780) 469-6986 Tel: 001 (780) 469-6603

www.brichemsteel.com

Product: Seamless Carbon Steel Pipe

Product Heat Number: BSM-0914

NPS 20 TRUE40

Production Date:

Product Size:

May 16, 2013

Production Method: Hot Expansion

**Product Heat Treatment:** As-rolled

Product Standards: ASME B36.10-2004, API 5L-44th Ed. Grade B PSL1, ASTM/ASME A/SA106-2011 Grade B/C NDE, A/SA53-2012 Grade B Type S, NACE MR0175-2009, MR0103-2010

Product Markings: BRI-STEEL MFG <API> 5L-0898 API 5L GR B PSL1 ASTM/ASME A/SA106 GR B/C A/SA53 GR B NPS 20 TRUE40 0.594 inchWT HEAT BSM-0914 (PIPE # LENGTH MASS) 122.9lb/ft NDE 1370 PSI SMLS NACE MR0175 2013/05 MADE IN CANADA.

Product Details  Mass Geiger Res.Mag. Visual UT ET HydroTest End Heat Test Type Product Size Pieces Length lb/ft µR/hr Gauss Insp. OD WT ASTM E213 ASTM E309 1370 psi/5s Condition  BSM-0914 Heat NPS 20 TRUE40 0.594 in.WT 6 DRL 122.90 <5 <20 Pass Pass Pass Pass Pass Plain End		_	_		_
Product Details  Mass Geiger Res.Mag. Visual  Product Size Pieces Length Ib/ft µR/hr Gauss Insp.  Non-Destructive Testing  HY  Geiger Res.Mag. Visual  UT UT ET HY  Gauss Insp. OD WT ASTM E213 ASTM E309 133  NSTM E309 133		BSM-0914	Heat		
lls Non-Destructive Testing  Mass Geiger Res.Mag. Visual UT UT ET Hy Pieces Length lb/ft μR/hr Gauss Insp. OD WT ASTM E213 ASTM E309 133  6 DRL 122.90 <5 <20 Pass Pass Pass Pass Pass		Heat	Test Type		
Non-Destructive Testing  Mass Geiger Res.Mag. Visual  Length lb/ft μR/hr Gauss Insp. OD WT ASTM E213 ASTM E309 133  DRL 122.90 <5 <20 Pass Pass Pass Pass Pass Pass		NPS 20 TRUE40 0.594 in.WT	Product Size	70	Product Detail:
Mass Geiger Res.Mag. Visual UT UT ET Hy lb/ft μR/hr Gauss Insp. OD WT ASTM E213 ASTM E309 133  122.90 <5 <20 Pass Pass Pass Pass Pass Pass		6	Pieces		S
Geiger Res.Mag. Visual UT UT ET Hy  µR/hr Gauss Insp. OD WT ASTM E213 ASTM E309 133  <5 <20 Pass Pass Pass Pass Pass		DRL	Length		
Res.Mag. Visual UT UT ET Hy Gauss Insp. OD WT ASTM E213 ASTM E309 133  <20 Pass Pass Pass Pass Pass Pass		122.90	lb/ft	Mass	
Visual UT UT ET Hy Insp. OD WT ASTM E213 ASTM E309 133  Pass Pass Pass Pass Pass Pass		Ġ	μR/hr	Geiger	
Non-Destructive Testing  UT  UT  UT  ET  Hy  OD  WT  ASTM E213 ASTM E309 133  Pass  Pass  Pass  Pass  Pass  Pass		<20	Gauss	Res.Mag.	
Dn-Destructive Testing  UT  UT  ET  Hy  ASTM E213 ASTM E309 133  Pass  Pass  Pass  Pass		Pass	insp.	Visual	
ve Testing  UT  ET  Hy  ASTM E213 ASTM E309 133  Pass  Pass  Pass		Pass	OD		Non-C
ET Hy 213 ASTM E309 133		Pass	WT	TU	estructive T
ET HydroTest End ASTM E309 1370 psi/5s Condition Pass Pass Plain End		Pass	ASTM E213	TU	esting
HydroTest End 1370 psi/5s Condition Pass Plain End		Pass	ASTM E309	L3	
End Condition Plain End	100000	Pass	1370 psi/5s	HydroTest	
	0	Plain End	Condition	End	

	BSM-0914	Heat		
Vacuum Degas; Fully Killed	Blast Furnace; EAF; Ladle Refining;	Steelmaking Method		
Product	Heat	Analysis	8	
0.21	0.21	0		
0.90	0.87	Mn		
0.027	0.023	P		
0.027 0.016	0.023 0.013	S		Chemica
0.28	0.31	Si		Chemical Analysis (wt%)
0.07	0.07	Cr		(wt%)
0.01	0.01	Cu		
0.00	1	Mo		
0.04	0.04	Z.		
0.003	-	<		
0.003	ı	∄		
0.001		Nb		
0.0002	1	В		
0.38	1	(IIW)	Œ	
0.39	1	(CSA)	Œ	

BSM-0914	Heat		
0914	at		
Heat	Test Type		
Ferrite & Pearlite	Microstructure		
79	HRBW	Hardness	
Pass	Flattening Test		Mechanical
Longitudinal; 38.1mm x WT	50mm GL	Tension Test	ical Properties
44,700	psi	Yield (Rt0.5)	
72,500	psi	Tensile (Rm)	
0.62	(Rt0.5/Rm)	Τ/γ	
49	%	Elongation (A)	

BSM-0914	Heat	
	Standard	Test
•	Sample Details	Impact Test
ı	O.	Temp
1	٦	
1	Ĺ	Impact
ï	J	Energy
ı	AVG	
r	%	
ı	%	% Shear
r	%	ıear
ī.	AVG	
r	mm	
ř.	mm	Lateral Ex
	mm	pansion
i	AVG	

Additional Details:

and that the results meet the corresponding requirements. Inc. in accordance with API 5L-44th Ed., ASTM/ASME A/SA106-2011, A/SA53-2012, and the purchase order requirements, ✓ 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. ✓ This pipe product meets the sour service requirements of NACE MR0175/ISO 15156-2:2009 Annex A2 for Region 3 Sour

No weld repairs have been performed on this product.

 $\checkmark$  This certificate represents a quality control system that is compliant with EN 10204:2004 Type 3.1. This product has not come into contact with mercury during the Bri-Steel Manufacturing processes

Mill Test Certificate approved by:

Kenton Dechant, P.Eng. 2013 May 3

Manager of Quality and R&D



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Product: Seamless Carbon Steel Pipe

Product Heat Number: BSM-0914

May 16, 2013

Production Method:

As-rolled

Product Size: **NPS 20 XS** 

Production Date:

Hot Expansion **Product Heat Treatment:** 

Product Standards: ASME B36.10-2004, API 5L-44th Ed. Grade B PSL1, ASTM/ASME A/SA106-2011 Grade B/C NDE, A/SA53-2012 Grade B Type S, NACE MR0175-2009, MR0103-2010

Product Markings: BRI-STEEL MFG <API> 5L-0898 API 5L GR B PSL1 ASTM/ASME A/SA106 GR B/C A/SA53 GR B NPS 20 XS 0.5 inchWT HEAT BSM-0914 (PIPE # LENGTH MASS) 104.11b/ft NDE 1260 PSI SMLS NACE MR0175 2013/05 MADE IN CANADA.

	BSM-0914	Heat		
	Heat	Test Type		
	NPS 20 XS 0.5 in.WT	Product Size		Product Detail
	6	Pieces		S
	DRL	Length		
	104.10	lb/ft	Mass	
	<5	μR/hr	Geiger	
	<20	Gauss	Res.Mag.	
2000	Pass	Insp.	Visual	
	Pass	OD		Non-E
	Pass	TW	TU	Destructive 1
	Pass	ASTM E213 A	TU	[esting
	Pass	STM	ET	
	Pass	E309 1260 psi/5s	HydroTest	10.00
	32.5° Bevel	Condition	End	

1000		BSM	I	T
		BSM-0914	Heat	
	Vacuum Degas; Fully Killed	Blast Furnace; EAF; Ladle Refining;	Steelmaking Method	
	Product	Heat	Analysis	
	0.21	0.21	C	
	0.90	0.87	Mn	
	0.027	0.023	P	
	0.027   0.016	0.013	S	Chemical Analysis (wt%)
	0.28	0.31	Si	Analysis
	0.07	0.07	Cr	(wt%)
	0.01	0.01	Cu	
	0.00	t	Mo	
	0.04	0.04	Z.	
	0.003	-	٧	
	0.003	-	Ti	
	0.001	4.	Nb	
	0.0002	·	В	
	0.38		(IIW)	3
	0.39	1	(CSA)	3

				Mechan	Mechanical Properties				
			Hardness		Tension Test	Yield (Rt0.5)	Tensile (Rm)	T/Y	Elongation (A)
Heat	Test Type	Microstructure	HRBW	Flattening Test	50mm GL	psi	psi.	(Rt0.5/Rm)	%
BSM-0914	Heat	Ferrite & Pearlite	79	Pass	Longitudinal; 38.1mm x WT	44,700	72,500	0.62	49

BSM-0914	Heat	
1	Standard	Test
1	Sample Details	Impact Test
ī	Oe	Temp
ı	_	
ì	_	Impact
r	ے	Energy
1	AVG	
F	%	
ř.	%	% Shear
r	%	ear
1	AVG	
1	mm	
1	mm	ateral Ex
1	mm	pansion
1	AVG	

## Additional Details:

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- Service, and NACE MR0103-2010 Section 2.1. √ This pipe product meets the sour service requirements of NACE MR0175/ISO 15156-2:2009 Annex A2 for Region 3 Sour
- ✓ No weld repairs have been performed on this product.
- This product has not come into contact with mercury during the Bri-Steel Manufacturing processes
- $\checkmark$  This certificate represents a quality control system that is compliant with EN 10204:2004 Type 3.1.

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