

<b>Client :</b>	<b>Inukshuk Construction Ltd.</b>	<b>Date d'intervention :</b>	2019-08-30 to 2019-09-03
<b>Adresse/Address :</b>	1869 Upper Water St, Halifax, NS, B3J 1S9	<b>Intervention date :</b>	
<b>Contact :</b>	Marc Losier	<b>Date du rapport :</b>	2019-09-02
<b>Entrepreneur :</b>	Storage Tank Solutions	<b>Report date :</b>	
<b>Contractor :</b>		<b>N° dossier :</b>	<b>00197</b>
<b>Endroit du travail :</b>	Baker Lake, Nunavut	<b>File no :</b>	
<b>Job location :</b>		<b>Commande :</b>	
		<b>Order :</b>	

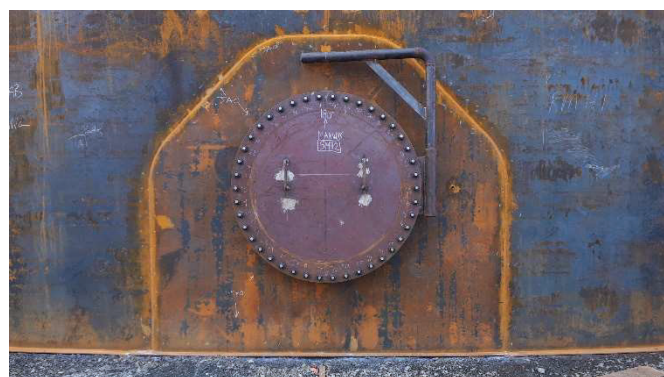


Photo #8: Manway (180 degree)



Photo #9: Nozzle SN6 (190 degree)



Photo #10: Nozzle SN5 (227 degree)



Photo #11: Nozzle SN6 (250 degree)



Photo #12: Manway (270 degree)



Photo #13: Nozzle SN6 (310 degree)

**Techniciens :**  
**Technicians :**

Michael Lafreniere

**Assistants:**

CSA W178.2 Level II  
CGSB 48.9712 UT-MT-PT Level II

**Approuvé par :**  
**Approved by :**

CSA W178.2

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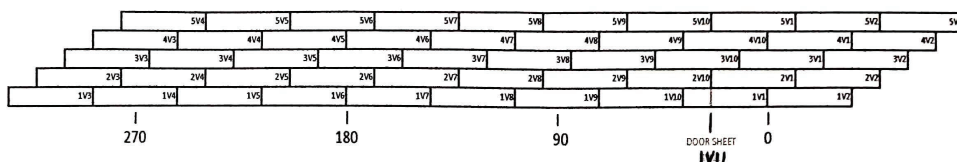
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		Order :	

## Tank #7 Baker Lake (AEM)



NDT TECHNICIAN WILL INITIAL EACH BOX WHEN WELD IS ACCEPTABLE

B ----> BOTTOM OF THE VERT (0-6") M ----> MIDDLE OF THE VERT (45"-51") T ----> TOP OF THE VERT (90"-96")

## VERTICAL SEAMS MAPPING UT

	B	M	T	FULL
1V1	UT FULL BECAUSE NOZZLE INTO VERT			
1V2				
1V3				
1V4				
1V5				
1V6	UT FULL BECAUSE NOZZLE INTO VERT			
1V7				
1V8				
1V9				
1V10				
1V11				

	B	T
2V1		
2V2		
2V3		
2V4		
2V5		
2V6		
2V7		
2V8		
2V9		
2V10		

	B	T
3V1		
3V2		
3V3		
3V4		
3V5		
3V6		
3V7		
3V8		
3V9		
3V10		

	B	T
4V1		
4V2		
4V3		
4V4		
4V5		
4V6		
4V7		
4V8		
4V9		
4V10		

	B	T
5V1		
5V2		
5V3		
5V4		
5V5		
5V6		
5V7		
5V8		
5V9		
5V10		

## HORIZONTAL SEAMS MAPPING UT

H1V2	30"-36"	
H1V8	42"-48"	

Middle door sheet

H2V3	24"-30"	
H2V9	36"-42"	

H3V1	60"-66"	
H3V7	42"-48"	

H4V5	24"-30"	
H4V9	36"-42"	

## MAG PARTICLE

SHELL MANHOLE 0°		SHELL MANHOLE NECK (SEAM) 0°		NOZZLE SN3 (x1)	
SHELL MANHOLE 90°		SHELL MANHOLE NECK (SEAM) 90°		NOZZLE SN4 (x1)	
SHELL MANHOLE 180°		SHELL MANHOLE NECK (SEAM) 180°		NOZZLE SN5 (x2)	
SHELL MANHOLE 270°		SHELL MANHOLE NECK (SEAM) 270°		NOZZLE SN6 (x6)	

STS Representative Signature:	<i>[Signature]</i>	Date:	Sept 2/19
Client Representative Signature:	<i>[Signature]</i>	Date:	Sept 2/19
NDT Representative Signature:	<i>[Signature]</i>	Date:	2019-09-02

MICHAEL LAFRENIERE  
CGSB 48.972 MT-PT-UT  
LEVEL II INSPECTOR  
CERT# 12977

## CLIENT QUALITY INSPECTION PLAN

Techniciens :  
Technicians :

Michael Lafreniere

Assistants:

Approuvé par :  
Approved by :

CSA W178.2 Level II  
CGSB 48.972 UT-MT-PT Level II

CSA W178.2

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Contact :	Marc Losier	N° dossier : File no :	00197
Entrepreneur : Contractor :	Storage Tank Solutions	Commande : Order :	
Endroit du travail : Job location :	Baker Lake, Nunavut		

Page 1 de/of 7

<b>INSPECTION VISUELLE</b> <b>VISUAL INSP.</b> <input type="checkbox"/>		<b>MAGNÉTOSCOPIE</b> <b>MAGNETIC PARTICLES</b> <input type="checkbox"/>		<b>RESSUAGE</b> <b>LIQUID PENETRANT</b> <input type="checkbox"/>		<b>ULTRASONS</b> <b>ULTRASONIC</b> <input checked="" type="checkbox"/>	
<b>DESCRIPTION :</b> <b>BAKER LAKE WHALE TAIL PROJECT – 10M LITERS TANK #7 (6170TNK42)</b>  Ultrasonic inspection on butt joints tank in accordance of API 650.  Reference Drawing No: 315-M6 Rev 1 (6 sheets) & 315-M10 Rev							
<b>INSPECTION VISUELLE / VISUAL INSP.</b>		<b>NORME : SPECIFICATION :</b>		<b>N° équip. : Equip. no :</b>			
<b>MAGNÉTOSCOPIE</b> <b>MAGNETIC PARTICLES</b>		<b>NORME : SPECIFICATION :</b>		<b>N° équip. : Equip. no :</b>			
Ampérage : Culasse/Yoke Amperage : Longitudinale <input type="checkbox"/> Longitudinal <input type="checkbox"/>		Continue <input type="checkbox"/> Continuous <input type="checkbox"/> Circulaire <input type="checkbox"/> Circular <input type="checkbox"/>		Résiduelle <input type="checkbox"/> Residual <input type="checkbox"/> C.A. <input type="checkbox"/> A.C. <input type="checkbox"/>		Humide <input type="checkbox"/> Wet <input type="checkbox"/> C.C. <input type="checkbox"/> D.C. <input type="checkbox"/>	
<b>RESSUAGE</b> <b>LIQUID PENETRANT</b>		<b>NORME : SPECIFICATION :</b>		<b>N° équip. : Equip. no :</b>			
Pénétrant/Penetrant :		Émulsifiant/Emulsifier :		Révélateur/Developer :			
Temps/Time :		Temps/Time :		Temps/Time :			
<b>ULTRASONS / ULTRASONIC</b>		<b>NORME : SPECIFICATION :</b>		<b>N° équip. : Equip. no :</b>			
ÉTALONNAGE/CALIBRATION :		API 650 & ASME Section V article 4					
Bloc/Block : IIW & ASME 19mm		Trou/Hole : 3/32		C.A.D. /D.A.C. : <input checked="" type="checkbox"/>			
<b>APPAREIL/EQUIPMENT :</b>		<b>Couplant : Echogel</b>		<b>Échelle/Sweep length : 0-150mm</b>			
Instrument : GE USM Go		Palpeur/Transducer : 0 degree, 1/2"Ø, 2.25Mhz & 70 Ø, 0.75 X0.625", 2.25Mhz					
N° équip./Equip. no : UT-42							
<b>RÉSULTATS/RESULTS :</b>  <b>TANK SPECIFICATIONS :</b> <ul style="list-style-type: none"><li>➤ Circumferential length: <b>105.332 m</b></li><li>➤ Height for each ring level: <b>2438 mm</b></li><li>➤ Plate thickness ring level 1 (bottom): <b>12.5 mm</b></li><li>➤ Plate thickness ring level 2: <b>9.5 mm</b></li><li>➤ Plate thickness ring level 3: <b>7.9 mm</b></li><li>➤ Plate thickness ring level 4: <b>7.9 mm</b></li><li>➤ Plate thickness ring level 5 (top): <b>6.4 mm</b></li></ul> After ultrasonic inspection, repairs of 3 spots and a re-inspection of these repairs, all the 112 spots were found acceptable as the standard. For more details, see the result as described in the table below and the photos attached  Note: Visual inspection was performed by client. The client takes the responsibility to process the inspections with manual ultrasonic test in lieu of radiographic test as describe in API 650 annex U							
<b>Techniciens : Technicians :</b>		<b>Assistants:</b>		<b>Approuvé par : Approved by :</b>			
Michael Lafreniere  CSA W178.2 Level II CGSB 48.9712 UT-MT-PT Level II						CSA W178.2	

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<b>Contact :</b>	Marc Losier	<b>Date du rapport :</b>	2019-09-02
<b>Entrepreneur :</b>	Storage Tank Solutions	<b>Report date :</b>	
<b>Contractor :</b>		<b>N° dossier :</b>	<b>00197</b>
<b>Endroit du travail :</b>	Baker Lake, Nunavut	<b>File no :</b>	
<b>Job location :</b>		<b>Commande :</b>	
		<b>Order :</b>	

ULTRASONIC INSPECTION TANK-- RESULT TABLE		
LOCALISATION	QUANTITY OF SPOTS	ULTRASONIC RESULTS
<b>Intersections (T) weld all rings level</b> (150mm vertical & 100mm horizontal)	<b>80 T spots</b> (All intersections between the 5 rings)	<b>Accepted</b> After 3 repairs accepted R-1*
<b>Vertical welds ring level 1</b> (150mm vertical)	<b>10 spots from bottom (0-150mm)</b> <b>10 spots in the middle (1143 to 1296mm)</b> <b>2 full welds inspected</b> The vertical welds 1V1 (position at 0) and 1V6 (position at 180) were 100% inspected due manways crossing	<b>Accepted</b>
<b>Horizontal welds all rings level</b> (150mm horizontal)	<b>8 spots</b> (2 random spots between each rings level)	<b>Accepted</b>
<b>Door plate ring level 1 (1V11)</b> (T intersection 150 x 100mm) Middle 150mm vertical Middle 150mm horizontal)	<b>1 T spot</b> <b>1 spot vertical from bottom (0-150mm)</b> <b>1 spot vertical in the middle (1143 to 1296mm)</b> <b>1 spot horizontal in the middle (1220 to 1370mm)</b>	<b>Accepted</b>

\*The repair spots requirements extensions were accomplished according to API 650 article 8.1.6.

<b>Techniciens :</b> <b>Technicians :</b>	Michael Lafreniere  CSA W178.2 Level II CGSB 48.9712 UT-MT-PT Level II	<b>Assistants:</b>	<b>Approuvé par :</b> <b>Approved by :</b>	CSA W178.2
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<b>Job location :</b>		<b>Commande :</b>	
		<b>Order :</b>	

O degree located on  
center Manway and  
turn clockwise



**Photo #1:**

**Overview**

**Baker lake whale tail project – 10m liters tank #7**

**Techniciens :**  
**Technicians :**

Michael Lafreniere

CSA W178.2 Level II  
CGSB 48.9712 UT-MT-PT Level II

**Assistants:**

**Approuvé par :**  
**Approved by :**

CSA W178.2

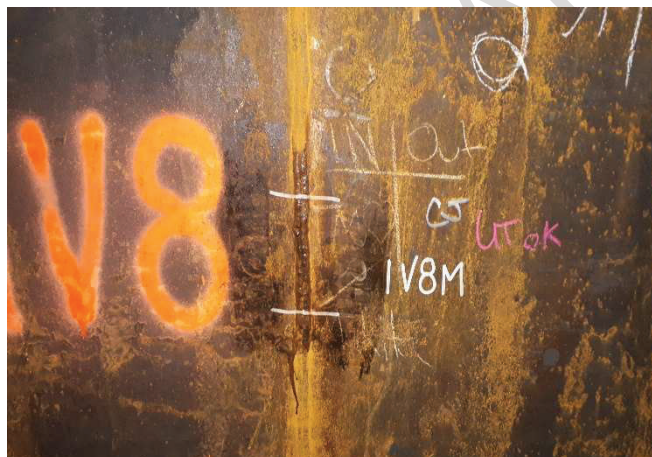
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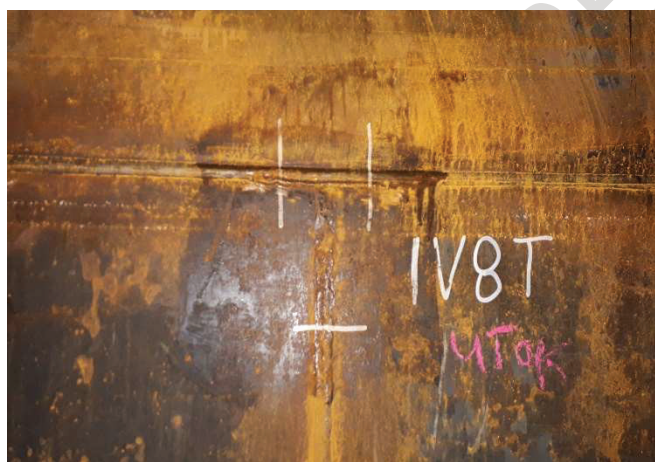
## TYPICAL SPOT LOCATIONS AND DIMENSIONS



**Photo #2:**  
Typical vertical spot from bottom  
(0-150mm)



**Photo #3:**  
Typical vertical spot in the middle  
(1143 to 1296mm)



**Photo #4:**  
Typical intersection T spot  
(150mm vertical & 100mm horizontal)



**Photo #5:**  
Typical horizontal spot  
(150mm length)

**Techniciens :**  
**Technicians :** Michael Lafreniere  
  
CSA W178.2 Level II  
CGSB 48.9712 UT-MT-PT Level II

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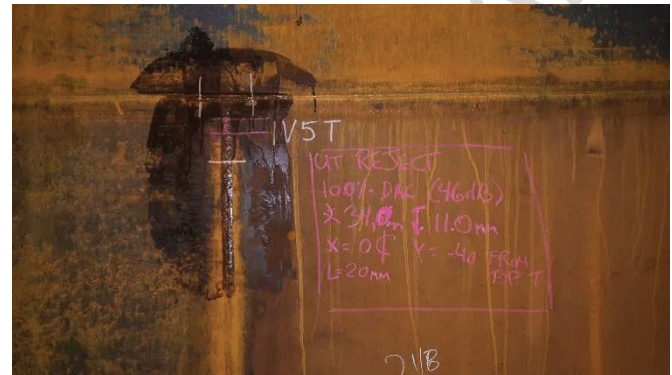


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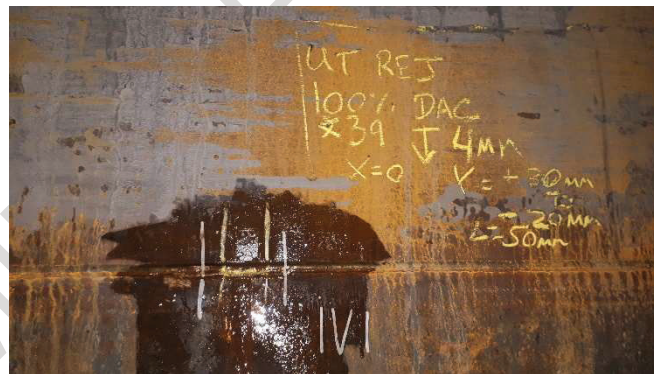
## ULTRASONIC REJECTABLE DEFECTS LOCATION



**Photo #6:**  
**Lack of fusion found**  
**T intersection ring level 4 - plate 1 - Top horizontal**  
**position**



**Photo #7:**  
**Lack of fusion found**  
**T intersection ring level 1 - plate 5 - Top vertical position**



**Photo 8:**  
**Lack of fusion found**  
**T intersection ring level 1 - plate 1 - Top horizontal position**

**Techniciens :**  
**Technicians :**  
Michael Lafreniere  
CSA W178.2 Level II  
CGSB 48.9712 UT-MT-PT Level II

**Assistants:**

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## ASME RESULT DETAILS

Line #	Indication #	Plate thickness (mm)	Angle	Face	Half-Skip#	Amplitude level compared to the CAD (%)	Length (mm)	Angular distance (mm)	Depth	Distance		Type	Evaluation	Remark
										From X (mm)	From Y (mm)			
1	1	6.4 to 7.9	70	A (top)	2	100% CAD	100	41	2	-8	-50 to +50 from top T	LOF*	REJ	Locate at the T intersection Ring level 4 Plate 1 Top horizontal position <b>ACCEPTED R-1</b>
2	1	9.5 to 12.5	70	B (Right)	2	100% CAD	20	34	11	0	-40 from top T	LOF*	REJ	Locate at the T intersection Ring level 1 Plate 5 Top vertical position <b>ACCEPTED R-1</b>
3	1	9.5 to 12.5	70	A (top)	2	100% CAD	50	39	4	0	-20 to +30 from top T	IRF**	REJ	Locate at the T intersection Ring level 1 Plate 1 Top vertical position <b>ACCEPTED R-1</b>

\*LOF: Lack of fusion

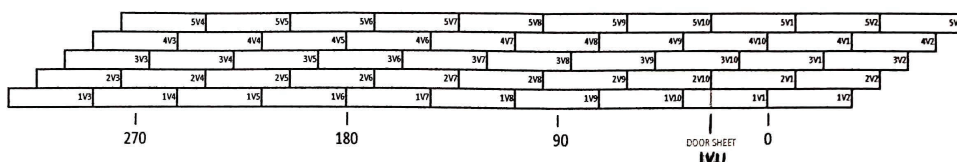
\*\*IRF: Incomplete root fusion

<b>Techniciens :</b>	Michael Lafreniere	<b>Assistants:</b>		<b>Approuvé par :</b>	
<b>Technicians :</b>	CSA W178.2 Level II CGSB 48.9712 UT-MT-PT Level II			<b>Approved by :</b>	CSA W178.2

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## Tank #7 Baker Lake (AEM)



NDT TECHNICIAN WILL INITIAL EACH BOX WHEN WELD IS ACCEPTABLE

B → BOTTOM OF THE VERT (0-6") M → MIDDLE OF THE VERT (45"-51") T → TOP OF THE VERT (90"-96")

## VERTICAL SEAMS MAPPING UT

	B	M	T	FULL
1V1	UT FULL BECAUSE NOZZLE INTO VERT			
1V2				
1V3				
1V4				
1V5				
1V6	UT FULL BECAUSE NOZZLE INTO VERT			
1V7				
1V8				
1V9				
1V10				
1V11				

	B	T
2V1		
2V2		
2V3		
2V4		
2V5		
2V6		
2V7		
2V8		
2V9		
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	B	T
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5V1		
5V2		
5V3		
5V4		
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5V6		
5V7		
5V8		
5V9		
5V10		

## HORIZONTAL SEAMS MAPPING UT

H1V2	30"-36"	
H1V8	42"-48"	
Middle door sheet		

H2V3	24"-30"	
H2V9	36"-42"	

H3V1	60"-66"	
H3V7	42"-48"	

H4V5	24"-30"	
H4V9	36"-42"	

## MAG PARTICLE

SHELL MANHOLE 0°	
SHELL MANHOLE 90°	
SHELL MANHOLE 180°	
SHELL MANHOLE 270°	

SHELL MANHOLE NECK (SEAM) 0°	
SHELL MANHOLE NECK (SEAM) 90°	
SHELL MANHOLE NECK (SEAM) 180°	
SHELL MANHOLE NECK (SEAM) 270°	

NOZZLE SN3 (x1)	
NOZZLE SN4 (x1)	
NOZZLE SN5 (x2)	
NOZZLE SN6 (x6)	

STS Representative Signature:	<i>[Signature]</i>	Date:	Sept 2/19
Client Representative Signature:	<i>[Signature]</i>	Date:	Sept 2/19
NDT Representative Signature:	<i>[Signature]</i>	Date:	2019-09-02

MICHAEL LAFRENIERE  
CGSB 48.972 MT-PT-UT  
LEVEL II INSPECTOR  
CERT# 12977

## CLIENT QUALITY INSPECTION PLAN

Techniciens :  
Technicians : Michael Lafreniere  
CSA W178.2 Level II  
CGSB 48.972 UT-MT-PT Level II

Assistants:

Approuvé par :  
Approved by :

CSA W178.2

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Calibration@AmSpecGroup.com

CAPACITIES GIVEN IN CUBIC METERS

GAUGE HEIGHT - 12.555 M

	0 M	cm	1 M	cm	2 M	cm	3 M	cm	4 M	cm	5 M	cm	6 M	cm	7 M	cm	8 M	cm	9 M
C R O W N	15.918	0.00	886.949	0.00	1,767.881	0.00	2,648.794	0.00	3,529.774	0.00	4,410.887	0.00	5,292.323	0.00	6,173.759	0.00	7,055.489	0.00	7,937.265
	22.215	0.01	895.762	0.01	1,776.689	0.01	2,657.603	0.01	3,538.584	0.01	4,419.702	0.01	5,301.138	0.01	6,182.574	0.01	7,064.307	0.01	7,946.083
	28.512	0.02	904.575	0.02	1,785.496	0.02	2,666.413	0.02	3,547.393	0.02	4,428.516	0.02	5,309.952	0.02	6,191.388	0.02	7,073.124	0.02	7,954.901
	35.930	0.03	913.388	0.03	1,794.303	0.03	2,675.223	0.03	3,556.203	0.03	4,437.330	0.03	5,318.766	0.03	6,200.202	0.03	7,081.942	0.03	7,963.719
	43.349	0.04	922.201	0.04	1,803.111	0.04	2,684.033	0.04	3,565.013	0.04	4,446.145	0.04	5,327.581	0.04	6,209.017	0.04	7,090.760	0.04	7,972.536
	51.419	0.05	931.014	0.05	1,811.918	0.05	2,692.843	0.05	3,573.823	0.05	4,454.959	0.05	5,336.395	0.05	6,217.831	0.05	7,099.578	0.05	7,981.354
	59.490	0.06	939.827	0.06	1,820.726	0.06	2,701.652	0.06	3,582.633	0.06	4,463.773	0.06	5,345.209	0.06	6,226.645	0.06	7,108.395	0.06	7,990.172
	68.031	0.07	948.640	0.07	1,829.533	0.07	2,710.462	0.07	3,591.442	0.07	4,472.588	0.07	5,354.024	0.07	6,235.460	0.07	7,117.213	0.07	7,998.990
	76.573	0.08	957.454	0.08	1,838.340	0.08	2,719.272	0.08	3,600.252	0.08	4,481.402	0.08	5,362.838	0.08	6,244.274	0.08	7,126.031	0.08	8,007.807
	85.330	0.09	966.267	0.09	1,847.148	0.09	2,728.082	0.09	3,609.062	0.09	4,490.217	0.09	5,371.652	0.09	6,253.088	0.09	7,134.849	0.09	8,016.625
	94.088	0.10	975.080	0.10	1,855.955	0.10	2,736.892	0.10	3,617.872	0.10	4,499.031	0.10	5,380.467	0.10	6,261.903	0.10	7,143.666	0.10	8,025.443
	102.893	0.11	983.893	0.11	1,864.762	0.11	2,745.701	0.11	3,626.682	0.11	4,507.845	0.11	5,389.281	0.11	6,270.717	0.11	7,152.484	0.11	8,034.261
	111.699	0.12	992.706	0.12	1,873.570	0.12	2,754.511	0.12	3,635.491	0.12	4,516.660	0.12	5,398.096	0.12	6,279.531	0.12	7,161.302	0.12	8,043.078
	120.503	0.13	1,001.519	0.13	1,882.377	0.13	2,763.321	0.13	3,644.301	0.13	4,525.474	0.13	5,406.910	0.13	6,288.346	0.13	7,170.120	0.13	8,051.896
	129.307	0.14	1,010.332	0.14	1,891.184	0.14	2,772.131	0.14	3,653.111	0.14	4,534.288	0.14	5,415.724	0.14	6,297.162	0.14	7,178.937	0.14	8,060.714
	138.109	0.15	1,019.145	0.15	1,899.992	0.15	2,780.941	0.15	3,661.921	0.15	4,543.103	0.15	5,424.539	0.15	6,305.979	0.15	7,187.755	0.15	8,069.532
	146.911	0.16	1,027.958	0.16	1,908.799	0.16	2,789.750	0.16	3,670.731	0.16	4,551.917	0.16	5,433.353	0.16	6,314.797	0.16	7,196.573	0.16	8,078.349
	155.712	0.17	1,036.771	0.17	1,917.606	0.17	2,798.560	0.17	3,679.540	0.17	4,560.731	0.17	5,442.167	0.17	6,323.614	0.17	7,205.391	0.17	8,087.167
	164.514	0.18	1,045.584	0.18	1,926.414	0.18	2,807.370	0.18	3,688.350	0.18	4,569.546	0.18	5,450.982	0.18	6,332.432	0.18	7,214.209	0.18	8,095.985
	173.316	0.19	1,054.397	0.19	1,935.221	0.19	2,816.180	0.19	3,697.160	0.19	4,578.360	0.19	5,459.796	0.19	6,341.250	0.19	7,223.026	0.19	8,104.803
	182.118	0.20	1,063.210	0.20	1,944.028	0.20	2,824.990	0.20	3,705.970	0.20	4,587.175	0.20	5,468.610	0.20	6,350.068	0.20	7,231.844	0.20	8,113.621
	190.920	0.21	1,072.023	0.21	1,952.836	0.21	2,833.799	0.21	3,714.780	0.21	4,595.989	0.21	5,477.425	0.21	6,358.885	0.21	7,240.662	0.21	8,122.438
	199.721	0.22	1,080.836	0.22	1,961.643	0.22	2,842.609	0.22	3,723.589	0.22	4,604.803	0.22	5,486.239	0.22	6,367.703	0.22	7,249.480	0.22	8,131.256
	208.523	0.23	1,089.649	0.23	1,970.450	0.23	2,851.419	0.23	3,732.399	0.23	4,613.618	0.23	5,495.054	0.23	6,376.521	0.23	7,258.297	0.23	8,140.074
	217.324	0.24	1,098.462	0.24	1,979.258	0.24	2,860.229	0.24	3,741.209	0.24	4,622.432	0.24	5,503.868	0.24	6,385.339	0.24	7,267.115	0.24	8,148.892
	226.125	0.25	1,107.275	0.25	1,988.065	0.25	2,869.039	0.25	3,750.019	0.25	4,631.246	0.25	5,512.682	0.25	6,394.156	0.25	7,275.933	0.25	8,157.709
	234.926	0.26	1,116.088	0.26	1,996.872	0.26	2,877.848	0.26	3,758.829	0.26	4,640.061	0.26	5,521.497	0.26	6,402.974	0.26	7,284.751	0.26	8,166.527
	243.727	0.27	1,124.901	0.27	2,005.680	0.27	2,886.658	0.27	3,767.638	0.27	4,648.875	0.27	5,530.311	0.27	6,411.792	0.27	7,293.568	0.27	8,175.345
	252.529	0.28	1,133.714	0.28	2,014.489	0.28	2,895.468	0.28	3,776.448	0.28	4,657.689	0.28	5,539.125	0.28	6,420.610	0.28	7,302.386	0.28	8,184.163
	261.330	0.29	1,142.527	0.29	2,023.298	0.29	2,904.278	0.29	3,785.258	0.29	4,666.504	0.29	5,547.940	0.29	6,429.428	0.29	7,311.204	0.29	8,192.980
	270.135	0.30	1,151.340	0.30	2,032.107	0.30	2,913.088	0.30	3,794.068	0.30	4,675.318	0.30	5,556.754	0.30	6,438.245	0.30	7,320.022	0.30	8,201.798
	278.940	0.31	1,160.153	0.31	2,040.917	0.31	2,921.897	0.31	3,802.878	0.31	4,684.132	0.31	5,565.568	0.31	6,447.063	0.31	7,328.839	0.31	8,210.616
	287.747	0.32	1,168.966	0.32	2,049.727	0.32	2,930.707	0.32	3,811.687	0.32	4,692.947	0.32	5,574.383	0.32	6,455.881	0.32	7,337.657	0.32	8,219.434
	296.555	0.33	1,177.779	0.33	2,058.537	0.33	2,939.517	0.33	3,820.497	0.33	4,701.761	0.33	5,583.197	0.33	6,464.699	0.33	7,346.475	0.33	8,228.251
	305.362	0.34	1,186.592	0.34	2,067.347	0.34	2,948.327	0.34	3,829.307	0.34	4,710.576	0.34	5,592.011	0.34	6,473.516	0.34	7,355.293	0.34	8,237.069
	314.169	0.35	1,195.404	0.35	2,076.156	0.35	2,957.137	0.35	3,838.117	0.35	4,719.390	0.35	5,600.826	0.35	6,482.334	0.35	7,364.111	0.35	8,245.887
	322.977	0.36	1,204.211	0.36	2,084.966	0.36	2,965.946	0.36	3,846.927	0.36	4,728.204	0.36	5,609.640	0.36	6,491.152	0.36	7,372.928	0.36	8,254.705
	331.784	0.37	1,213.018	0.37	2,093.776	0.37	2,974.756	0.37	3,855.736	0.37	4,737.019	0.37	5,618.455	0.37	6,499.970	0.37	7,381.746	0.37	8,263.523
	340.592	0.38	1,221.826	0.38	2,102.586	0.38	2,983.566	0.38	3,864.546	0.38	4,745.833	0.38	5,627.269	0.38	6,508.787	0.38	7,390.564	0.38	8,272.340
	349.399	0.39	1,230.633	0.39	2,111.396	0.39	2,992.376	0.39	3,873.356	0.39	4,754.647	0.39	5,636.083	0.39	6,517.605	0.39	7,399.382	0.39	8,281.158
	358.206	0.40	1,239.440	0.40	2,120.205	0.40	3,001.186	0.40	3,882.166	0.40	4,763.462	0.40	5,644.898	0.40	6,526.423	0.40	7,408.199	0.40	8,289.976
	367.014	0.41	1,248.248	0.41	2,129.015	0.41	3,009.995	0.41	3,890.976	0.41	4,772.276	0.41	5,653.712	0.41	6,535.241	0.41	7,417.017	0.41	8,298.794



#### CAPACITIES GIVEN IN CUBIC METERS


GAUGE HEIGHT - 12.555 M

	10 M	cm	11 M	cm	12 M	cm	13 M	cm	14 M	cm	15 M	cm	16 M	cm	17 M	cm	18 M	cm	19 M
0.00	8,819.046	0.00	9,700.832	0.00	10,580.472	0.00		0.00		0.00		0.00		0.00		0.00		0.00	
0.01	8,827.864	0.01	9,709.650	0.01	10,589.290	0.01		0.01		0.01		0.01		0.01		0.01		0.01	
0.02	8,836.682	0.02	9,718.468	0.02	10,598.108	0.02		0.02		0.02		0.02		0.02		0.02		0.02	
0.03	8,845.500	0.03	9,727.286	0.03	10,606.926	0.03		0.03		0.03		0.03		0.03		0.03		0.03	
0.04	8,854.317	0.04	9,736.104	0.04	10,615.744	0.04		0.04		0.04		0.04		0.04		0.04		0.04	
0.05	8,863.135	0.05	9,744.922	0.05	10,624.562	0.05		0.05		0.05		0.05		0.05		0.05		0.05	
0.06	8,871.953	0.06	9,753.740	0.06	10,633.380	0.06		0.06		0.06		0.06		0.06		0.06		0.06	
0.07	8,880.771	0.07	9,762.557	0.07	10,642.198	0.07		0.07		0.07		0.07		0.07		0.07		0.07	
0.08	8,889.589	0.08	9,771.375	0.08	10,651.016	0.08		0.08		0.08		0.08		0.08		0.08		0.08	
0.09	8,898.407	0.09	9,780.193	0.09	10,659.833	0.09		0.09		0.09		0.09		0.09		0.09		0.09	
0.10	8,907.225	0.10	9,789.011	0.10	10,668.651	0.10		0.10		0.10		0.10		0.10		0.10		0.10	
0.11	8,916.042	0.11	9,797.829	0.11	10,677.469	0.11		0.11		0.11		0.11		0.11		0.11		0.11	
0.12	8,924.860	0.12	9,806.647	0.12	10,681.932	0.12		0.12		0.12		0.12		0.12		0.12		0.12	
0.13	8,933.678	0.13	9,815.465	0.13		0.13		0.13		0.13		0.13		0.13		0.13		0.13	
0.14	8,942.496	0.14	9,824.283	0.14		0.14		0.14		0.14		0.14		0.14		0.14		0.14	
0.15	8,951.314	0.15	9,833.100	0.15		0.15		0.15		0.15		0.15		0.15		0.15		0.15	
0.16	8,960.132	0.16	9,841.918	0.16		0.16		0.16		0.16		0.16		0.16		0.16		0.16	
0.17	8,968.950	0.17	9,850.736	0.17		0.17		0.17		0.17		0.17		0.17		0.17		0.17	
0.18	8,977.768	0.18	9,859.554	0.18		0.18		0.18		0.18		0.18		0.18		0.18		0.18	
0.19	8,986.585	0.19	9,868.372	0.19		0.19		0.19		0.19		0.19		0.19		0.19		0.19	
0.20	8,995.403	0.20	9,877.190	0.20		0.20		0.20		0.20		0.20		0.20		0.20		0.20	
0.21	9,004.221	0.21	9,886.008	0.21		0.21		0.21		0.21		0.21		0.21		0.21		0.21	
0.22	9,013.039	0.22	9,894.825	0.22		0.22		0.22		0.22		0.22		0.22		0.22		0.22	
0.23	9,021.857	0.23	9,903.643	0.23		0.23		0.23		0.23		0.23		0.23		0.23		0.23	
0.24	9,030.675	0.24	9,912.461	0.24		0.24		0.24		0.24		0.24		0.24		0.24		0.24	
0.25	9,039.493	0.25	9,921.279	0.25		0.25		0.25		0.25		0.25		0.25		0.25		0.25	
0.26	9,048.310	0.26	9,930.097	0.26		0.26		0.26		0.26		0.26		0.26		0.26		0.26	
0.27	9,057.128	0.27	9,938.915	0.27		0.27		0.27		0.27		0.27		0.27		0.27		0.27	
0.28	9,065.946	0.28	9,947.733	0.28		0.28		0.28		0.28		0.28		0.28		0.28		0.28	
0.29	9,074.764	0.29	9,956.551	0.29		0.29		0.29		0.29		0.29		0.29		0.29		0.29	
0.30	9,083.582	0.30	9,965.368	0.30		0.30		0.30		0.30		0.30		0.30		0.30		0.30	
0.31	9,092.400	0.31	9,974.186	0.31		0.31		0.31		0.31		0.31		0.31		0.31		0.31	
0.32	9,101.218	0.32	9,983.004	0.32		0.32		0.32		0.32		0.32		0.32		0.32		0.32	
0.33	9,110.036	0.33	9,991.822	0.33		0.33		0.33		0.33		0.33		0.33		0.33		0.33	
0.34	9,118.853	0.34	10,000.640	0.34		0.34		0.34		0.34		0.34		0.34		0.34		0.34	
0.35	9,127.671	0.35	10,009.458	0.35		0.35		0.35		0.35		0.35		0.35		0.35		0.35	
0.36	9,136.489	0.36	10,018.276	0.36		0.36		0.36		0.36		0.36		0.36		0.36		0.36	
0.37	9,145.307	0.37	10,027.093	0.37		0.37		0.37		0.37		0.37		0.37		0.37		0.37	
0.38	9,154.125	0.38	10,035.911	0.38		0.38		0.38		0.38		0.38		0.38		0.38		0.38	
0.39	9,162.943	0.39	10,044.729	0.39		0.39		0.39		0.39		0.39		0.39		0.39		0.39	
0.40	9,171.761	0.40	10,053.547	0.40		0.40		0.40		0.40		0.40		0.40		0.40		0.40	
0.41	9,180.578	0.41	10,062.365	0.41		0.41		0.41		0.41		0.41		0.41		0.41		0.41	
0.42	9,189.396	0.42	10,071.183	0.42		0.42		0.42		0.42		0.42		0.42		0.42		0.42	
0.43	9,198.214	0.43	10,080.001	0.43		0.43		0.43		0.43		0.43		0.43		0.43		0.43	
0.44	9,207.032	0.44	10,088.818	0.44		0.44		0.44		0.44		0.44		0.44		0.44		0.44	
0.45	9,215.850	0.45	10,097.636	0.45		0.45		0.45		0.45		0.45		0.45		0.45		0.45	
0.46	9,224.668	0.46	10,106.454	0.46		0.46		0.46		0.46		0.46		0.46		0.46		0.46	
0.47	9,233.486	0.47	10,115.272	0.47		0.47		0.47		0.47		0.47		0.47		0.47		0.47	
0.48	9,242.303	0.48	10,124.090	0.48		0.48		0.48		0.48		0.48		0.48		0.48		0.48	
0.49	9,251.121	0.49	10,132.908	0.49		0.49		0.49		0.49		0.49		0.49		0.49		0.49	
0.50	9,259.939	0.50	10,141.726	0.50		0.50		0.50		0.50		0.50		0.50		0.50		0.50	
0.51	9,268.757	0.51	10,150.544	0.51		0.51		0.51		0.51		0.51		0.51		0.51		0.51	
0.52	9,277.575	0.52	10,159.361	0.52		0.52		0.52		0.52		0.52		0.52		0.52		0.52	
0.53	9,286.393	0.53	10,168.179	0.53		0.53		0.53		0.53		0.53		0.53		0.53		0.53	
0.54	9,295.211	0.54	10,176.997	0.54		0.54		0.54		0.54		0.54		0.54		0.54		0.54	
0.55	9,304.029	0.55	10,185.815	0.55		0.55		0.55		0.55		0.55		0.55		0.55		0.55	
0.56	9,312.846	0.56	10,194.633	0.56		0.56		0.56		0.56		0.56		0.56		0.56		0.56	
0.57	9,321.664	0.57	10,203.451	0.57		0.57		0.57		0.57		0.57		0.57		0.57		0.57	
0.58	9,330.482	0.58	10,212.269	0.58		0.58		0.58		0.58		0.58		0.58		0.58		0.58	
0.59	9,339.300	0.59	10,221.086	0.59		0.59		0.59		0.59		0.59		0.59		0.59		0.59	
0.60	9,348.118	0.60	10,229.904	0.60		0.60		0.60		0.60		0.60		0.60					



# 6120-C-265-001 MPEI

## QUALITY CONTROL REPORT

		<b>Vendor Document Status</b>	
<b>AGNICO EAGLE</b>			
1	<input type="checkbox"/>	Proceed to next submission and status.	
2	<input type="checkbox"/>	Proceed with exceptions as noted to next submission and status.	
3	<input type="checkbox"/>	Do not proceed. Revise as noted and resubmit next submission and status.	
4	<input checked="" type="checkbox"/>	Complete, no further submission required.	
By: <b>Bruno Roy</b>		Digitally signed by Bruno Roy Date: 2019.12.13 11:20:39 -05'00'	
<small>Review and authorization to fabricate are only for general conformance with the design concept of the Project as expressed in the Contract Documents. Sole responsibility for the accuracy and completeness of this document, including but not limited to dimensions and quantities, remains with the Supplier/Contractor. Agnico Eagle does not warrant the accuracy or completeness of any of the information contained herein, nor does Agnico Eagle authorize or approve any construction means, methods, techniques, sequences or any safety precautions or procedures.</small>			
Agnico Eagle No.		6120-C-265-001	R: ABF.QC.REPORT
<b>DOCUMENT FOR INFORMATION</b>			

- 1. WELDING PROCEDURE SPECIFICATION (WPS)**
- 2. WELDER QUALIFICATION TEST (WQT)**
  - 2.1 Camirand, Sébastien**
  - 2.2 Caouette, Francois**
  - 2.3 St-Hilaire, Joel**
- 3. PNEUMATIC PRESSURE TEST PROCEDURE.**
- 4. PNEUMATIC PRESSURE TEST RESULTS.**
- 5. MILLTEST & HEAT NUMBER DOCUMENTATION.**
- 6. VALVE & EQUIPMENT CERTIFICATION**





<b>ABF CONSTRUCTION</b> 138, Chemin des Boisés Val-d'Or, secteur Dubuisson, Qc, J9P 4N7	Désignation de la Méthode Provincial registration		Enregistrement provincial Provincial registration
	DMS / WPS	SMAW-P1-P1 Révision: 0	MTL 310.6
	RMS / PQR	SMAW-P1-P1-A	

Procédé(s) de soudage / Welding process

SMAW


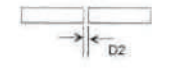

Manuel  
Manual

X

Semi-automatique  
Semi-automatic

Machine-auto  
Auto.machine

Joint(s) / Joints (QW-402)

Genre / Design	Carré, chanfreiné, angle Square, groove, fillet		  	<b>A1=30°±2½° (VAISSEAU / VESSEL)</b> <b>A1=37½°±2½° (TUYAUTERIE / PIPING)</b> <b>A2=20°±2° A3=10½°±2½° A4=45°±5½°</b> <b>D1=1/16" ± 1/16"</b> <b>D2=1/16" ± 1/16"</b> (SANS BARRE DE SOUTIEN / WITHOUT BACKING) <b>D2=3/16" ± 1/8"</b> (AVEC BARRE DE SOUTIEN / WITH BACKING) <b>D3= 0" + 5/32"</b>
Soutien / Backing	Oui / Yes	X		
	Non / No	X		
Matériau de soutien Backing material	Option	Soudure ou P1 Weld or P1		
Support de retenue Retainer	Aucun / None			
Autre / Other	Aucun / None			

Métaux de base / Base metal (QW-403)

Métaux de base P. No. / Base metal: P.No.	P1 (Gr. 1 ou / or 2)	à/to	P1 (Gr. 1 ou / or 2)
Gamme d'épaisseurs qualifiées pour le métal de base Base metal thickness range qualified	Chanfrein / Groove : 0.1685" à/to 0.587" maximum (Voir / See note 4) Angle / Fillet : Aucune limite / No limit		
Épaisseur maximale de la plus épaisse des passes de soudage Maximum thickness of any welding pass	0.250" maximum		
Autre / Others	Aucun / None		

Métaux d'apport / Filler metals (QW-404)

1 AWS N° / No	E-6010 SF A: 5.1 F-No. 3 A-No. 1 Dia: 3/32"-1/8"-5/32"
	E-7018-1 SF A: 5.1 F-No. 4 A-No. 1 Dia: 3/32"-1/8"-5/32"-3/16"-1/4"
Gamme des épaisseurs qualifiées pour le dépôt de soudage Weld metal thickness range qualified	Chanfrein / Groove (F3: 0.250" max.) (F4: 0.424" max.) Angle / Fillet : Aucune limite / No limit
Pièce insérée consommable / Consumable insert	Aucun / None
Poudre ou fil supplémentaire / Supplementary powder or wire	Aucun / None

Position / Positions (QW-405)

Position(s) du chanfrein / Position of groove	Toutes positions / All positions
Progression du soudage / Welding progression	Montant, descendant / Up, down
Position(s) de l'angle / Position(s) of fillet	Toutes positions / All positions

Préchauffage / Preheat (QW-406)

Température de préchauffage, maintien du préchauffage (Optionel) Preheat temperature, preheat temperature (Optional).	T ≤ 1½ in.: 50° F Min.	2½ in. < T ≤ 4 in.: 250° F Min.
	1½ in. < T ≤ 2½ in.: 150° F Min.	T > 4 in.: 300° F Min.
Température de l'interpasse / Interpass temperature	50° F Min.	
Autre / Other	Aucun / None	

Traitement thermique postchauffage / Postweld heat treatment (QW-407)

Gamme de températures / Temperature range	Aucun / None
Gamme de durée / Time range	Aucun / None
Note / Note	Aucun / None

Gaz / Gas (QW-408)

Composition du gaz de protection / Shielding gas composition	Aucun / None
Débit du gaz / Gas flow rate	Aucun / None
Composition du gaz de soutien / Backing gas composition	Aucun / None
Gaz de protection trainant / Training shielding gas composition	Aucun / None



**Caractéristiques électrique et technique / Electrical, technical characteristics (QW-409-QW-410)**

Métal d'apport / Filler metal				Courant / Current			
Procédé Process	Diamètre Diameter	Classification Classification	Position de soudage Weld position	Type, polarité Type, polarity	Gamme d'ampérage Amperage range	Gamme de voltage Voltage range	Gamme de vitesse Travel speede range
SMAW	3/32"	E-6010	Toutes / All	CC-DC / EP-RP	50-85	20-30	Variable / Variable
SMAW	1/8"	E-6010	Toutes / All	CC-DC / EP-RP	60-120	22-32	Variable / Variable
SMAW	5/32"	E-6010	Toutes / All	CC-DC / EP-RP	80-150	24-34	Variable / Variable
SMAW	3/32"	E-7018-1	Toutes / All	CC-DC / EP-RP	75-115	20-28	Variable / Variable
SMAW	1/8"	E-7018-1	Toutes / All	CC-DC / EP-RP	90-160	20-28	Variable / Variable
SMAW	5/32"	E-7018-1	Toutes / All	CC-DC / EP-RP	130-220	20-28	Variable / Variable
SMAW	3/16"	E-7018-1	Toutes / All	CC-DC / EP-RP	160-315	24-32	Variable / Variable
SMAW	1/4"	E-7018-1	Toutes / All	CC-DC / EP-RP	280-380	24-32	Variable / Variable
Courant pulsé / Pulse current				N/A			
Grosseur et type d'électrode de tungstène Tungsten electrode size and type				N/A			
Mode de transfert du métal / Mode of metal transfer GMAW / FCAW / MCAW				N/A			
Cordon droit ou oscillant String or weave bead				Droit ou oscillant / String or wave, Largeur / Width: 3 x dia. Electrode			
Procédé de gougeage arrière Method of back gouging				Meulage, scie, outil d'alléage / Grinding, saw, bit tool			
Nettoyage initial et entre les passes / Initial and interpass cleaning				Les surfaces à souder doivent être libres de graisse, d'huile, de peinture ou de matière pouvant nuire à la qualité de la soudure; brossage, meulage, ciseau pneumatique / All surfaces within one (1) inch from the welding joint and all edges shall be free from all traces of lubricants, cutting oils and foreign matter; brushing, grinding, chipping.			
Diamètre de la tuyère à gaz / Orifice or gas cup size				N/A			
Oscillation / Oscillation				Fréquence / Frequency: N/A			
Distance entre tuyère et pièce / Contact tube to work distance				N/A			
Passe unique ou multiple (par côté) / Multiple or single pass (per side)				Unique ou multiple / Single or multiple pass			
Électrode unique ou multiple / Multiple or single electrode				Unique / Single			
Gamme de vitesse d'alimentation de l'électrode / Electrode wire feed speed range				N/A			
Autre / Other				Aucun martelage permis / Peening is not permitted			

**Autres commentaires / Supplementary Comments**

1) Essais de pliage guidés / Guided bend tests	Voir rapport / See report 18C-088 1/3
2) Essais de traction / Tensile tests	Voir rapport / See report 18C-088 2/3
3) Essais de dureté / Hardness test	Non requis / Not required
4) Essais de résilience / Impact test	Lorsque les essais d'impact ne sont pas requis, les matériaux de base de tout groupe peuvent être soudés et la gamme d'épaisseur qualifiée est de 0.1685" à 0.587" selon ASME B31.3, table 323.3.1. / When impact test is not required, base material of all group may be welded and thickness range qualified is 0.1685" to 0.587" according to ASME B31.3 table 323.3.1
5) Analyse chimique / Chemical analysis	Non requis / Not required
6) Ferriscomètre / Ferriscometer	Non requis / Not required
7) Macrographie / Macro-examination	Non requis / Not required
8) Métallographie / Metallography	Non requis / Not required
9) Traitement thermique / Heat treatment	Non requis / Not required
10) Énergie de chaleur (J/in) / Heat input (J/in)	E-6011 : 22390 (J/in) max. / E-7018-1 : 28641 (J/in) max.
11) Critères d'acceptation / Acceptance criteria	ASME sect. VIII Div. 1 UG-84 B31.3 Art.323.3

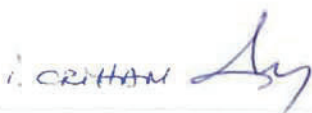
Signature du représentant de l'entreprise / Company representative signature

18C-088



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Vérifié par :




Date:

03 AVR. 2018





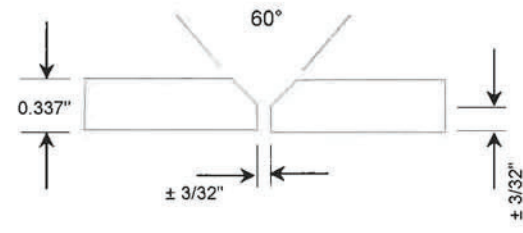
**RÉSULTAT DE LA MÉTHODE DE SOUDAGE (RMS)**  
**PROCEDURE QUALIFICATION RESULT (PQR)**

(Référence ASME Sections VIII & IX, ed. 2017 & ASME B31.3 ed. 2016)

NOTE: Les titres désignent les hommes et les femmes / Titles refer to men and women

ABF CONSTRUCTION		Désignation de la Méthode Procedure identification	Enregistrement provincial Provincial registration
138, Chemin des Boisés Val-d'Or, secteur Dubuisson, Qc, J9P 4N7		RMS PQR SMAW-P1-P1-A	MTL-310.6
Canada		DMS WPS SMAW-P1-P1 Rev.0	

Procédé(s) de soudage / Welding process			
SMAW	Manuel Manual	X	Semi-auto. Semi-auto. Machine-auto Auto.machine

Métaux de base / Base metals (QW-403)	Joint / Joint (QW-402)
SA-333 Gr. 6 à / to SA-350 LF2	
Épaisseur / Thickness	
Épaisseur de la couche la plus épaisse Thickness of the thicker pass	
Autre / Other	

Métaux d'apport / Filler metals (QW-404)					Positions / Positions (QW-405)
Classe / Class AWS	SFA. No.	F-No	A-No	Épaisseur du dépôt Weld thickness	Position du chanfrein Position of groove
E 6011	5.1	3	1	0.125"	6 G
E 7018	5.1	4	1	0.212"	Progression de soudage Welding progression
					Verticale montante / Vertical up
					Autre / Other
					Aucun / None

Préchauffage / Preheat (QW-406)		Traitement postchauffage / Postweld heat treatment (QW-407)	
Température de préchauffage Preheat temperature	50° F	Gamme de température Temperature range	Aucun / None
Température de l'interpasse Interpass temperature	50° F min.	Gamme de durée / Time range	.....
Autre / Other	Aucun / None	Autre / Other	Aucun / None

Gaz / Gas (QW-408)		Technique / Technique (QW-410)	
Composition du gaz de protection Shielding gas composition	Aucun / None	Cordon droit ou oscillant String or weave bead	Droit / String
Débit de gaz / Gas flow rate	.....	Oscillation / Oscillation	N/A
Composition gaz soutien Backing gas composition	Aucun / None	Passe unique ou multiple (par côté) Multiple or single pass (per side)	Côté A Multiple / Multiple
Débit de gaz / Gas flow rate	.....	Électrode unique ou multiple Multiple or single electrode	Unique / Single
Autre / Other	Aucun / None	Autre / Other	Aucun / None

Caractéristiques électrique et techniques / Electrical and technical characteristics (QW-409-410)										
Couche Layer	Procédé Process	Classification Classification	Diamètre Diameter	Type	Type	Polarité Polarity	Ampérage Amperage	Voltage Volt range	Gamme de vitesse Travel speed range	Débit de chaleur Heat input
1A	SMAW	E-6011	1/8"	CC/DC		EP/IRP	85	27	6,15 in/min.	22390 (J/in.)
2A	SMAW	E-7018-1	1/8"	CC/DC		EP/IRP	110	23	5,3 in/min.	28641 (J/in.)
3A	SMAW	E-7018-1	1/8"	CC/DC		EP/IRP	110	23	5,3 in/min.	28641 (J/in.)
4A	SMAW	E-7018-2	1/8"	CC/DC		EP/IRP	110	22	5,4 in/min.	26888 (J/in.)
5A	SMAW	E-7018-1	1/8"	CC/DC		EP/IRP	110	22	5,4 in/min.	26888 (J/in.)

**Essais à la traction / Tensile test (QW-150)**

Éprouvette Specimen	Largeur Width	Épaisseur Thickness	Surface Area	Charge ultime Ultimate total load	Limite de contrainte Ultimate unit stress	Nature, endroit de rupture Character, location of failure
1	0,756 in.	0,328 in.	0,2480 in <sup>2</sup>	19375 lbs	78135 PSI / 539 Mpa	Base material / Ductile
4	0,758 in.	0,335 in.	0,2539 in <sup>2</sup>	19475 lbs	76694 PSI / 529 Mpa	Base material / Ductile

**Essais de pliage guidé / Guide bend test (QW-160)**

Éprouvette / Specimen	Face / Face	Racine / Root	Côté / Side	Résultat / Result
2	x			Accepté / Accepted
3		x		Accepté / Accepted
5	x			Accepté / Accepted
6		x		Accepté / Accepted

**Essais de résilience / Toughness test (QW-170)**

Éprouvette Specimen	Endroit de l'entaille Notch location	Forme de l'entaille Notch type	Température d'éprouvette Specimen temperature	Energie de rupture Impact value	Expansion latérale Lateral expansion		Essai chute libre Drop weight	
					% cisaillement Shear	Millième Mills	Cassé Break	Non cassé No break
1	Soudure / Weld	v	- 45°C	95 J	60	81	✓	
2	Soudure / Weld	v	- 45°C	36 J	40	32	✓	
3	Soudure / Weld	v	- 45°C	89 J	60	71	✓	
1	ZAT / HAZ SA-333	v	- 45°C	87 J	70	74	✓	
2	ZAT / HAZ SA-333	v	- 45°C	89 J	60	75	✓	
3	ZAT / HAZ SA-333	v	- 45°C	49 J	50	43	✓	
1	ZAT / HAZ SA-350	v	- 45°C	124 J	85	77	✓	
2	ZAT / HAZ SA-350	v	- 45°C	119 J	85	80	✓	
3	ZAT / HAZ SA-350	v	- 45°C	153 J	100	84	✓	

**Analyse chimique / Chemical analysis**

C	Si	Mn	Ni	Cr	Nb	P	S	Fe	Cu	Mo	Ti	V	AL	B	Co	W	Be	Pb
Non requis / Not required																		

**Essais de dureté / Hardness test**

Non requis / Not required

**Essais effectués par / GROUPE MEQUALTECH / Test conducted by**



18C-088

Nous certifions que les renseignements concernant ce résultat sont exactes et que les essais de soudage ont été préparés, soudés et exécutés conformément aux exigences de la section IX du code ASME. We certify that statements in this record are correct and that the test weld prepared, weld and test in accordance with the requirement of ASME code IX.

**Nom du soudeur, symbole / Welder's name, stamp no.**

Joel St-Hilaire (J)

**Signature du représentant de l'entreprise / Company representative signature**

*[Signature]*

2018-03-

**Réservé aux autorités / Department use only**

Pièce soudée le:  
Welded on:

6 MARS 2018

Inspecteur:  
Inspector:

i.c. for M.M.

Résultats vérifiés:  
Verified on:

03 AVR. 2018

Inspecteur:  
Inspector:

i.c.







**RAPPORT D'ESSAI DE PLIAGE**  
**BEND TEST REPORT**

**CLIENT:** ABF CONSTRUCTION  
**ADRESSE / ADDRESS:** 138, Chemin des Boisés  
Val-d'Or (secteur Dubuisson), Qc  
J9P 4N7  
**CONTACT:** Rocky Pelletier

**BON DE COMMANDE / P.O. #:**  
**16651-20155**

**# TRAVAIL / JOB #:**  
**WPS# SMAW-P1-P1 Rev.0**

**PROCEDURE MEQUALTECH:**

**P4b-PLI-06**

**Rev.**

**0**

IDENTIFICATION	ACC.	REJ.	DÉFAUT / DEFECT	SENS DU PLIAGE / BEND DIRECTION		
				RACINE / ROOT	FACE	CÔTÉ / SIDE
PQR# SMAW-P1-P1 A	<input type="checkbox"/>	<input type="checkbox"/>				
Specimen #2	<input checked="" type="checkbox"/>	<input type="checkbox"/>			X	
Specimen #3	<input checked="" type="checkbox"/>	<input type="checkbox"/>		X		
Specimen #5	<input checked="" type="checkbox"/>	<input type="checkbox"/>			X	
Specimen #6	<input checked="" type="checkbox"/>	<input type="checkbox"/>		X		
	<input type="checkbox"/>	<input type="checkbox"/>				
	<input type="checkbox"/>	<input type="checkbox"/>				
	<input type="checkbox"/>	<input type="checkbox"/>				
	<input type="checkbox"/>	<input type="checkbox"/>				
	<input type="checkbox"/>	<input type="checkbox"/>				
	<input type="checkbox"/>	<input type="checkbox"/>				

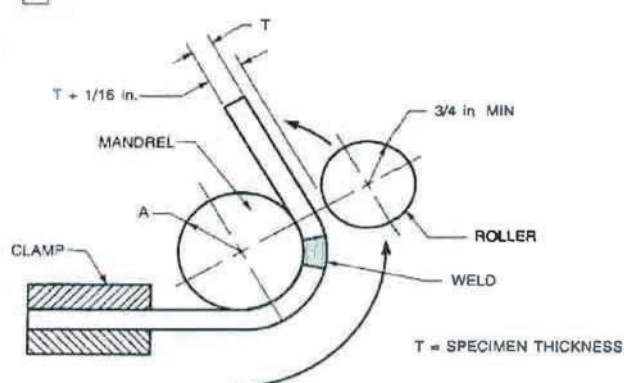
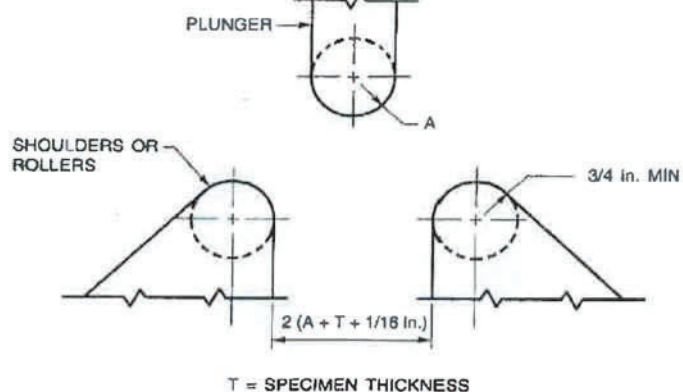
**MÉTHODE / METHOD**

**Rayon de Mandrin / Mandrel rad. (A)**

**0,67 inch**

**ANGLE DE PLIAGE / BEND ANGLE**

**180°**



**CRITÈRES D'ACCEPTATION / ACCEPTANCE CRITERIA:**

**ASME Section IX Edition 2017 - QW-163**

**RÉSULTATS / RESULTS:**



**CONFORME**



**NON-CONFORME**

**REMARQUE(S) / REMARK(S):**

**PQR# SMAW-P1-P1 A.**

**Pipe 4"X 0,337", SA-333 grade 6 to Flange SA-350 grade LF2.**

**Position 6G.**

The parts being tested are kept for a one month period after the results have been sent. Test results apply only to the parts being tested.

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**ESSAIS EFFECTUÉS PAR / TESTS PERFORMED BY:**

**Pascal Morin, ing.**

**Chef de service**

**2018-03-16**

**TECHNICIEN / TECHNICIAN**  
**OPÉRATEUR / OPERATOR**

**QUALIFICATION**

**DATE**







RAPPORT D'ESSAI DE TRACTION TENSILE TEST REPORT		CLIENT: <b>ABF CONSTRUCTION</b> ADRESSE / ADDRESS: <b>138, Chemin des Boisés Val-d'Or (secteur Dubuisson), Qc J9P 4N7</b> CONTACT: <b>Rocky Pelletier</b>	
BON DE COMMANDE / P.O. #:	# TRAVAIL / JOB #:	STANDARD D'ESSAI / STANDARD:	ASME SECTION IX
<b>16651-20155</b>	<b>WPS# SMAW-P1-P1 Rev.0</b>	Procédure Mequaltech procedure	<b>P4b-TRA-05</b>
INSTRUMENT:	MARQUE / TRADE MARK:	MODÈLE / MODEL#:	SÉRIE / SERIAL#:
	Tinius Olsen	Standard 60,000 Lbs	115,925
IDENTIFICATION ET RÉSULTATS / IDENTIFICATION AND RESULTS		ÉCHANTILLON / SAMPLE	
ÉPROUVETTE / SAMPLE:	#1	#4	
DIAMÈTRE INITIALE / INITIAL DIAMETER (IN):			
LARGEUR INITIALE / INITIAL WIDTH (IN):	0,756	0,758	
ÉPAISSEUR INITIALE / INITIAL THICKNESS (IN):	0,328	0,335	
SURFACE INITIALE / INITIAL SURFACE (square inches):	0,2480	0,2539	
CHARGE ULTIME / MAXIMUM LOAD (lbs):	19375	19475	
LIMITE D'ÉLASTICITÉ À 0,2% / 0,2% YIELD POINT (lbs):			
LIMITE D'ÉLASTICITÉ À 0,5% / 0,5% YIELD POINT (lbs):			
DIAMÈTRE FINALE / FINAL DIAMETER (IN):			
LARGEUR FINALE / FINAL WIDTH (IN):			
ÉPAISSEUR FINALE / FINAL THICKNESS (IN):			
SURFACE FINALE / FINAL SURFACE (square inches):			
CONTRAINTES ULTIME / ULTIMATE TENSILE STRENGTH (PSI):	78135	76694	
CONTRAINTES ULTIME / ULTIMATE TENSILE STRENGTH (Mpa):	539	529	
LIMITE D'ÉLASTICITÉ À 0,2% / 0,2% YIELD STRENGTH (PSI):			
LIMITE D'ÉLASTICITÉ À 0,2% / 0,2% YIELD STRENGTH (Mpa):			
LIMITE D'ÉLASTICITÉ À 0,5% / 0,5% YIELD STRENGTH (PSI):			
LIMITE D'ÉLASTICITÉ À 0,5% / 0,5% YIELD STRENGTH (Mpa):			
LONGUEUR INITIALE / INITIAL LENGTH (IN):			
LONGUEUR FINALE / FINAL LENGTH (IN):			
ALLONGEMENT / ELONGATION (%):			
STRICITION / REDUCTION OF AREA (%):			
RUPTURE / BREAK:	BASE MATERIAL	BASE MATERIAL	
FACIES DE RUPTURE / TYPE OF BREAK:	Ductile	Ductile	
CRITÈRES D'ACCEPTATION / ACCEPTANCE CRITERIA:	ASME Section IX Edition 2017 - QW-153		
RÉSULTATS / RESULTS:	<input checked="" type="checkbox"/> CONFORME	<input type="checkbox"/> NON-CONFORME	
REMARQUE(S) / REMARK(S): <b>PQR# SMAW-P1-P1 A.</b> <b>Pipe 4"X 0,337", SA-333 grade 6 to Flange SA-350 grade LF2.</b> <b>Position 6G.</b> The parts being tested are kept for a one month period after the results have been sent. Test results apply only to the parts being tested. This report can not be reproduced, except completely, without a written autorisation from the laboratory.			
ESSAIS EFFECTUÉS PAR / TESTS PERFORMED BY:			
Pascal Morin, ing. Chef de service		2018-03-16	
TECHNICIEN / TECHNICIAN OPÉRATEUR / OPERATOR	QUALIFICATION	DATE	





<b>RAPPORT D'ESSAI DE RÉSILIENCE</b> <b>IMPACT TEST REPORT</b>		<b>CLIENT:</b> ABF CONSTRUCTION <b>ADRESSE / ADDRESS:</b> 138, Chemin des Boisés Val-d'Or (secteur Dubuisson), Qc J9P 4N7 <b>CONTACT:</b> Rocky Pelletier	
<b>BON DE COMMANDE / P.O. #:</b> 16651-20155	<b># DE CONTRAT / JOB #:</b> <b>WPS# SMAW-P1-P1 Rev.0</b>	<b>PROCEDURE MEQUALTECH:</b>	<b>P4b-RES-03</b> Rev. <b>0</b>
<b>INSTRUMENT:</b>	<b>MARQUE / TRADE MARK:</b> Satec	<b>MODÈLE / MODEL#:</b> <b>SI-1C3</b>	<b># DE SÉRIE / SERIAL#:</b> <b>1628</b>
<b>DESCRIPTION DE LA PIÈCE OU PROCÉDÉS DE SOUDAGE / PART DESCRIPTION OR WELDING PROCESS DETAIL:</b> <b>PQR# SMAW-P1-P1 A - Pipe 4" X 0,337" (SA-333 grade 6) to Flange SA-350 grade LF2.</b>			
<b>TEMPÉRATURE:</b> <b>-45°C</b>	<b>RÉSULTATS/ RESULTS (FT.LBS OU/OR JOULES):</b>	<input type="checkbox"/> FT./LBS <input checked="" type="checkbox"/> JOULES	<b>DIMENSIONS:</b> <b>7 mm X 10 mm</b>
	<b>ÉNERGIE ABSORBÉE /</b> <b>ABSORBED ENERGY</b>	<b>EXPANSION LATÉRALE /</b> <b>LATERAL EXPANSION( Mils)</b>	<b>% DE CISAILLEMENT /</b> <b>SHEAR %</b>
			<b>CASSÉ / BREAK</b>
<b>WELD</b>			
	<b>95</b>	<b>81</b>	<b>60</b> <input checked="" type="checkbox"/>
	<b>36</b>	<b>32</b>	<b>40</b> <input checked="" type="checkbox"/>
	<b>89</b>	<b>71</b>	<b>60</b> <input checked="" type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>
<b>HAZ - Pipe SA-333 grade 6 side</b>			
	<b>87</b>	<b>74</b>	<b>70</b> <input checked="" type="checkbox"/>
	<b>89</b>	<b>75</b>	<b>60</b> <input checked="" type="checkbox"/>
	<b>49</b>	<b>43</b>	<b>50</b> <input checked="" type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>
<b>HAZ - Flange SA-350 grade LF2 side</b>			
	<b>124</b>	<b>77</b>	<b>85</b> <input checked="" type="checkbox"/>
	<b>119</b>	<b>80</b>	<b>85</b> <input checked="" type="checkbox"/>
	<b>153</b>	<b>84</b>	<b>100</b> <input checked="" type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>
<b>CRITERES D'ACCEPTATION / ACCEPTANCE CRITERIA:</b> <b>ASME B31.3-2016 Table 323.3.5 = 20 Joules minimum*</b>			
<b>RÉSULTATS / RESULTS:</b> <input checked="" type="checkbox"/>		<b>CONFORME</b> <input type="checkbox"/> <b>NON-CONFORME</b>	
<b>REMARQUE(S) / REMARK(S):</b> <b>*70% subsize specimens used: Acceptance criteria becomes 14 Joules minimum average.</b>			
The parts being tested are kept for a one month period after the results have been sent. Test results apply only to the parts being tested. This report can not be reproduced, except completely, without a written autorisation from the laboratory.			
<b>ESSAIS EFFECTUÉS PAR / TESTS PERFORMED BY:</b>  <b>Pascal Morin, ing.</b>		<b>Chef de service</b> <b>2018-03-16</b>	
<b>TECHNICIEN / TECHNICIAN</b> <b>OPÉRATEUR / OPERATOR</b>		<b>QUALIFICATION</b> <b>DATE</b>	







Note: Les titres désignent également les hommes et les femmes

**A. B. F Construction**

1310, Avenue Davy,  
Rouyn-Noranda,  
Québec Canada J9Y 0A8

Désignation de la DMS  
Using WPS No.

**SMAW-11-1**

Enregistrement provincial  
Provincial registration


**RN-72.6**

Nom du soudeur ou opérateur / Welder or operator's name

**CAMIRAND, SÉBASTIEN ( SC )**

Variables Variables		Inscrire valeurs Record actual values		Gamme qualifiée Qualification range	
QW-353 Procédé/less	Shielded metal arc welding	SMAW F3 Manuel / Manual	SMAW F4 Manuel / Manual	SMAW F3 Manuel / Manual	SMAW F4 Manuel / Manual
	Matériaux / Material	P1 à/to P1	P1 à/to P1	(P1 à/to P15F) (P34) (P41 à/to P49)	(P1 à/to P15F) (P34) (P41 à/to P49)
QW-403 Métaux de base Base metals	Diamètre / Diameter	2.375" D E / O D	2.375" D E / O D	≥ 1" D.E / O.D	≥ 1" D.E / O.D
	Chanf. épaisseur / Groove thick.	0.343"	0.343"	Aucune limite / No limit	Aucune limite / No limit
	Angle épais. / Fillet thickness	Tous / All	Tous / All	Aucune limite / No limit	Aucune limite / No limit
QW-408 Gas / Gaz	Gaz de soutien / Backing gas	N/A	N/A	N/A	N/A
QW-409 Électricité Electricity	Courant / Current	CC / DC	CC / DC	Tous / All	Tous / All
	Polarité / Polarity	EP / RP	EP / RP	Tous / All	Tous / All
	Mode transfert / Transfer mode	N/A	N/A	N/A	N/A
QW-404 Métaux d'apport Filler metals	No spec. / Spec No (SFA)	5.1	5.1	5.1 5.4 5.5	5.1 5.4 5.5
	AWS Classe / Class	F3 E-6010	F4 E-7018	F3	F1, F2, F4
	Dépôt soudure / Weld deposit	0.125"	0.218"	0.250" Maximum	0.436" Maximum
	Pièce insérée / Insert	Aucune / None	Aucune / None	N/A	N/A
QW-402 Joint	Soutien / Backing	Sans soutien Without backing	Avec soutien With backing	Avec ou sans soutien With or without backing	Avec soutien With backing
QW-405 Position	Position / Progression	6G Montant / Up	6G Montant / Up	Toutes positions-montant All positions-up	Toutes positions-montant All positions-up
QW-360 Machine	Automatique / Automatic	N/A	N/A	N/A	N/A

Résultat de pliage ou de radiographie / Guided bend or radiographic results

QW-191 Specimens	Pliage de côté Side bend	Pliage transversal Transverse bend	Pliage longitudinal Longitudinal bend	Radiographie Radiographic	ACCEPTÉ / QUALIFIED	REFUSÉ / REFUSED
				✓	ACCEPTÉ	
QW-194 Visu / el / al	Pénétration complète, fusion complète Complete joint penetration, complete fusion					
<div> <b>LABORATOIRE D'ESSAI</b> <b>MEQUALTECH</b> CNQC/ASNT-TC-1A Level II</div> <p>Nous certifions que les renseignements ci-dessus sont exacts et que les essais de soudage ont été préparés et exécutés conformément aux exigences de la section IX du Code ASME We certify that the statements in this record are correct and the test welds were prepared, welded and tested in accordance with the requirements of Section IX of the ASME Code.</p>						

Entreprise / Organization

**A. B. F Construction**

Organisme autorisé / Accredited organization

Soudé le:  
Welded on

**OCT 17 2019**

Inspecteur:  
Inspector:

Accepté:  
Accepted:

Vérifié le:  
Inspected on

Inspecteur:  
Inspector:

Refusé:  
Refused:

Note: Les titres désignent également les hommes et les femmes.

A. B. F Construction  
 127-A, Avenue Marcel-Baril,  
 Rouyn-Noranda  
 Québec Canada J9X-7B9

Désignation de la DMS  
 Using WPS No.

SMAW-11-1

Enregistrement provincial  
 Provincial registration


RN-72.6

Nom du soudeur ou opérateur / Welder or operator's name

CAOUCETTE FRANÇOIS (F)

Variables Variables		Inscrire valeurs Record actual values		Gamme qualifiée Qualification range	
QW-353 Procédé/ess	Shielded metal arc welding	SMAW F3 Manuel / Manual	SMAW F4 Manuel / Manual	SMAW F3 Manuel / Manual	SMAW F4 Manuel / Manual
	Matériaux / Material	P1 à/to P1	P1 à/to P1	(P1 à/to P15F) (P34) (P41 à/to P49)	(P1 à/to P15F) (P34) (P41 à/to P49)
QW-403 Métaux de base Base metals	Diamètre / Diameter	2.375" D.E / O.D	2.375" D.E / O.D	≥ 1" D.E / O.D	≥ 1" D.E / O.D
	Chanf. épaisseur / Groove thick.	0.343"	0.343"	Aucune limite / No limit	Aucune limite / No limit
	Angle épais. / Fillet thickness	Tous / All	Tous / All	Aucune limite / No limit	Aucune limite / No limit
QW-408 Gas / Gaz	Gaz de soutien / Backing gas	N/A	N/A	N/A	N/A
QW-409 Électricité Electricity	Courant / Current	CC / DC	CC / DC	Tous / All	Tous / All
	Polarité / Polarity	EP / RP	EP / RP	Tous / All	Tous / All
	Mode transfert / Transfer mode	N/A	N/A	N/A	N/A
QW-404 Métaux d'apport Filler metals	No spec. / Spec No (SFA)	5.1	5.1	5.1 5.4 5.5	5.1 5.4 5.5
	AWS Classe / Class	F3 E-6010	F4 E-7018	F3	F1, F2, F4
	Dépôt soudure / Weld deposit	0.125"	0.218"	0.250" Maximum	0.436" Maximum
	Pièce insérée / Insert	Aucune / None	Aucune / None	N/A	N/A
QW-402 Joint	Soutien / Backing	Sans soutien Without backing	Avec soutien With backing	Avec ou sans soutien With or without backing	Avec soutien With backing
QW-405 Position	Position / Progression	6G Montant / Up	6G Montant / Up	Toutes positions-montant All positions-up	Toutes positions-montant All positions-up
QW-360 Machine	Automatique / Automatic	N/A	N/A	N/A	N/A

Résultat de pliage ou de radiographie / Guided bend or radiographic results

QW-191 Specimens	Pliage de côté Side bend	Pliage transversal Transverse bend	Pliage longitudinal Longitudinal bend	Radiographie Radiographic	ACCEPTÉ / QUALIFIED	REFUSÉ / REFUSED
				✓	✓	
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<div> <b>LABORATOIRE D'ESSAI</b> <b>MEQUALTECH</b> ONG/MASNT-TC-1A Level II</div> <div>18M 4079-1 2018-09-21</div> <p>Nous certifions que les renseignements ci-dessus sont exacts et que les essais de soudage ont été préparés et exécutés conformément aux exigences de la section IX du Code ASME. We certify that the statements in this record are correct and the test welds were prepared, welded and tested in accordance with the requirements of Section IX of the ASME Code.</p>						

Entreprise / Organization

A. B. F Construction

Organisme autorisé / Accredited organization

Soudé le: 14 SEPT 2018  
 Welded on:  
 Vérifié le:  
 Inspected on:

Inspecteur:  
 Inspector:  
 Inspecteur:  
 Inspector:

Accepté:  
 Accepted:  
 Refusé:  
 Refused:



Note: Les titres désignent également les hommes et les femmes.

A. B. F Construction  
 1310, Avenue Davy,  
 Rouyn-Noranda  
 Québec Canada J9Y 0A8

Désignation de la DMS  
 Using WPS No.

Enregistrement provincial  
 Provincial registration

SMAW-11-1

RN-72.6

Nom du soudeur ou opérateur / Welder or operator's name

ST-HILAIRE JOEL ( J )

Variables Variables		Inscrire valeurs Record actual values		Gamme qualifiée Qualification range	
QW-353 Procédé/ess	Shielded metal arc welding	SMAW F3 Manuel / Manual	SMAW F4 Manuel / Manual	SMAW F3 Manuel / Manual	SMAW F4 Manuel / Manual
	Matériaux / Material	P1 à/to P1	P1 à/to P1	(P1 à/to P15F) (P34) (P41 à/to P49)	(P1 à/to P15F) (P34) (P41 à/to P49)
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	Angle épais. / Fillet thickness	Tous / All	Tous / All	Aucune limite / No limit	Aucune limite / No limit
QW-408 Gas / Gaz	Gaz de soutien / Backing gas	N/A	N/A	N/A	N/A
QW-409 Électricité Electricity	Courant / Current	CC / DC	CC / DC	Tous / All	Tous / All
	Polarité / Polarity	EP / RP	EP / RP	Tous / All	Tous / All
	Mode transfert / Transfer mode	N/A	N/A	N/A	N/A
	No spec. / Spec No (SFA)	5.1	5.1	5.1 5.4 5.5	5.1 5.4 5.5
QW-404 Métaux d'apport Filler metals	AWS Classe / Class	F3 E-6010	F4 E-7018	F3	F1, F2, F4
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	Pièce insérée / Insert	Aucune / None	Aucune / None	N/A	N/A
QW-402 Joint	Soutien / Backing	Sans soutien Without backing	Avec soutien With backing	Avec ou sans soutien With or without backing	Avec soutien With backing
QW-405 Position	Position / Progression	6G Montant / Up	6G Montant / Up	Toutes positions-montant All positions-up	Toutes positions-montant All positions-up
QW-360 Machine	Automatique / Automatic	N/A	N/A	N/A	N/A

Résultat de pliage ou de radiographie / Guided bend or radiographic results

QW-191 Specimens	Pliage de côté Side bend	Pliage transversal Transverse bend	Pliage longitudinal Longitudinal bend	Radiographie Radiographic	ACCEPTÉ / QUALIFIED	REFUSÉ / REFUSED
					✓	✓

QW-194 Pénétration complète, fusion complète  
 Visu / el / al Complete joint penetration, complete fusion.



ONGC/ASNT C-1A Level II

Nous certifions que les renseignements ci-dessus sont exacts et que les essais de soudage ont été préparés et exécutés conformément aux exigences de la section IX du Code ASME.  
 We certify that the statements in this record are correct and the test welds were prepared, welded and tested in accordance with the requirements of Section IX of the ASME Code.

Entreprise / Organization

A. B. F Construction

Organisme autorisé / Accredited organization

Soudé le: 14-SEPT - 2018  
 Welded on

Inspecteur: [Signature]  
 Inspector:

Accepté:  
 Accepted

Vérifié le:  
 Inspected on

Inspecteur:  
 Inspector:

Refusé:  
 Refused



**PROCEDURE FOR PNEUMATIC TESTING  
OF PIPING ASSEMBLY**  
*(PROCÉDURE D'ESSAIS SUR TUYAUTERIE  
PAR ÉPREUVE PNEUMATIQUE)*

**1.0 GOAL (But) :**

Defining the procedure for testing of piping assembly. *(Définir la procédure d'essais des assemblages de tuyauterie.)*

**2.0 APPLICATION (Domaine d'application) :**

This Procedure is intended to describe the pneumatic testing methodology for piping assemblies at Agnico-Eagle Div. Meadowbank Project, NU. *(Cette procédure s'applique à définir la méthodologie d'essai d'étanchéité des assemblages de tuyauterie à Agnico-Eagle Div. Meadowbank Project, NU.)*

**3.0 RESPONSABILITIES (Responsabilités) :**

Work is performed by ABF Mines inc., pipefitters performing the test are responsible for the quality and safety of their work. The foreman supervises and witnesses the quality and safety of the testing. AEM representative verifies and approves each test. *(Les travaux sont réalisés par ABF Mines Inc., les tuyauteurs qui réalisent les essais sont responsables de la qualité et de la sécurité de leurs travaux, le CTM supervise les travaux et témoigne de tous les essais. Le représentant d'AEM inc. vérifie et approuve les essais réalisés.)*

**4.0 METHODOLOGY (Méthodologie) :**

The work consists of testing on piping assemblies according to the present procedures by ABF Mines Inc. *(Les travaux consistent à la réalisation d'essais sur les assemblages de tuyauterie selon la présente procédure par ABF Mines inc.)*

**5.0 STEPS (Étapes):**

Advise 24hr prior to testing, the AEM supervisor in charge of the piping installation, of the time of test. *(Aviser par courriel 24 heures à l'avance le représentant d'AEM de l'exécution des essais pneumatiques.)*

Every piping assembly, subject to testing is inspected for any restriction. Piping is then coupled with appropriate instrument and pressure gage. *(Chaque ensemble de tuyauterie fabriqué et à inspecter, est inspecté pour toute obstruction de manière appropriée. Il est ensuite couplé adéquatement des raccords, nourrice, purge et d'instruments indicateurs de pression.)*

The area is cleared and barricaded with red (danger) tape at reasonable and secure distance. *(Le secteur est évacué, des rubans de délimitation rouge (Danger) sont installés à une distance raisonnable et sécuritaire.)*



The pressure for testing is determined on 1.2X the service pressure as per system specifications, every instrument below that set pressure is remove for testing. Maximum testing pressure allowed is 690kPa/100Psi. *(Les pressions d'essais sont déterminées à 1.2X la pression de service selon la spécification du système. Si une unité performe en deçà de cette pression d'utilisation, elle est isolé pour la durée du test. La pression maximale autorisée est de 690kPa/100Ps.)*

The pressure is raised in three (3) equal stages. With a 10 min. waiting period between each increase until maximum pressure is obtained. *(La pression maximale est obtenue en trois étapes, d'égale pression, avec 15 min. d'attente entre chaque augmentation de pression.)*

The testing pressure is maintained without pressure drop, nor leak, for a minimum of one hour. *(La pression d'essais est maintenue, sans baisse de pression, ni fuite, pendant une durée minimale d'une heure.)*

In case of pressure drop, potential leaks are spotted using soapy water (Snoop). Any leak is then isolated, purged and repaired. Pressure is then raised back to testing pressure for a full one (1) hour phase. *(En cas de baisse de pression, l'application d'un détecteur de fuite à base d'eau savonneuse (Snoop) est appliqué sur toute la surface des joints suspects. Toute fuite est isolée, la ligne purgée et réparée. La pression est rétablie dans tout le réseau pour une heure complète.)*

The testing is concluded by purging the air, this process is also used to remove all loose fine particles inside the system. Instruments of calibration are reinstalled. *(Après la conclusion de l'épreuve, l'air est purgé et les équipements de calibration réinstallés.)*

All parts of system then tested is identified as so on the quality control's P'nID. *(Les ensembles testés seront identifiés sur le diagramme de procédé réservé à cet effet)*

The inspection report is signed by participants and preserved for future reference. *(La fiche d'inspection signée sera classée et conservée dans le cartable à cet effet pour futures références.)*

## 6.0 ÉQUIPEMENTS :

- Appropriate Gauge *(Manomètres)*
- Temporary Piping *(Tuyauterie temporaire)*
- Fittings, Flanges, Blind-Flanges, Spectacle-blind, hoses and valves. *(Raccords, brides, brides pleines ou plaques d'obturation, boyau et robinet)*
- Vents *(Évents)*
- Compressor *(Compresseur)*
- Soapy water *(Eau Savonneuse)*

## RÉFÉRENCES

© Typical procedure Xenit Industries inc.



**AEM / MPEI fuel tank Baker Lake**

Project no. 6120-C-265-001

# Piping Pressure testing Report

[illegible]

Rep. ABF Arctic

Print

 Idref |

(Signature)

Rep. AEM

Identity

(date)
--------

(Signature)

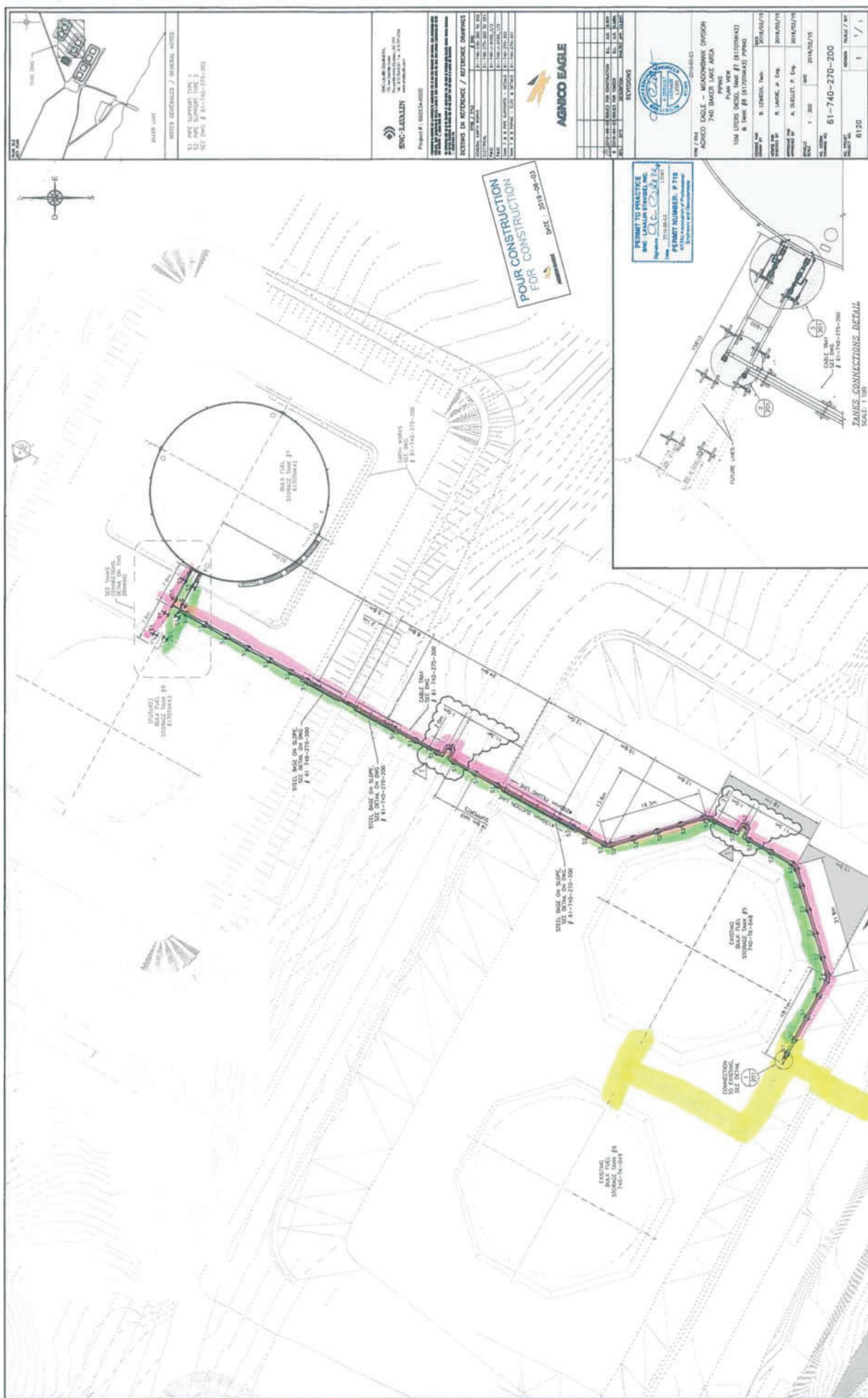
Rep. Gov. (If required)

(Print)

(date)

(Signature)





2010-09-14  
17h56





penel  
51-60-1002





2019-09-15.  
pen71





2019-09-15  
13:02





2019-09-15

14:30







2019-09-17  
11150

verblanc

11150





NORGEN  
IMI







MLTS\_6056-18731  
Heat# SEE BELOW



CORPORATION

4151 North Service Road, Burlington, ON L7L 4X6 (905) 335-5320

Date: 6/5/2019

## Mill Test Reports

Invoice: 1596625-00

PO: 4072649

Customer: 49300-001

A.B.F MINES INC (ROUYN NORANDA)  
LIVRER A EQUIPEMENT KN  
8254 RANG DU VIEUX PONT  
ROUYN-NORANDA, QC J9Y 0H4

Zinc	Heat#	Product	Description
2	176433	2530031	1 A333-6 STD BLK SMLS SRL
3	141352	2530074	2 A333-6 STD BLK SMLS SRL
4	610879	2530090	4 A333-6 STD BLK SMLS SRL
5	175147	2530104	6 A333-6 STD BLK SMLS SRL
5	178322	2530104	6 A333-6 STD BLK SMLS SRL
6	175142	2530112	8 A333-6 STD BLK SMLS SRL
6	175146	2530112	8 A333-6 STD BLK SMLS SRL
6	176433	2530112	8 A333-6 STD BLK SMLS SRL
6	177833	2530112	8 A333-6 STD BLK SMLS SRL

Heat codes followed by \*\* have been corrected, change may not show on the packing slip



Vallourec Soluções Tubulares do Brasil S.A.  
Barreiro Plant - Av. Olimio Meireles, 65  
ZIP 30640-010 - Belo Horizonte, MG



# Inspection Certificate

(According to DIN EN 10204.3.1)

Nº.: 0030030837 / 00

Sheet: 1 / 4

Customer: VALLOUREC CANADA INC

Country: Canada

Material Number: 276243

Work Order: 531796 / 10

Customer Order: VM-4682 - P.O 4038589-400

Inspection: Vallourec Soluções Tubulares do Brasil S.A.

PRODUCT: SEAMLESS STEEL PIPE, HOT FINISHED, PLAIN ENDS, NORMALIZED

DIMENSIONS: 33,40 mm X 3,38 mm SCHEDULE: 040 GRADE: GRADE 290 # GR 1 # 6 # B

STANDARD: CSA-Z245.1-14 - CATEGORY II

IN ACCORDANCE ALSO TO THE STANDARDS: ASTM A 333M - 16 ASTM A 999M - 18 # ASTM A 106M - 18 ASTM A 530M - 12 # ASTM A 53M - 12 # ASME SA-333M - 17 ASME SA-999M - 17 # ASME SA-106M - 17 ASME SA-530M - 17

CUSTOMER SPECIFICATION: CCTF GrB, 1.6290 Cat II SS, 20.11.2017

SURFACE PROTECTION: EXTERNAL: LACQUER PIPE ENDS PROTECTOR: PLASTIC CAP

TOLERANCES: OUTSIDE DIAMETER (PIPE BODY): -0,40 mm / +0,40 mm WALL THICKNESS: -0,42 mm / +0,68 mm

TOLERANCES (PIPE ENDS): OUTSIDE DIAMETER: -0,40 mm / +0,40 mm

LENGTH: RANDOM 5486,00 mm - 6706,00 mm

STANDARD MARKING: PAINT STENCILED IN THE PIPE BODY: 531796/10 MANUFACTURER CSA-Z245.1-14 33,40 X 3,38 290 CAT II SS S HN HEAT NUMBER ASTM A/ASME SA 333, 1/6 HF SCH 040 LT-46C ASTM A/ASME SA 106 B 20700 KPA ASTM A 53 B NPS 1" X SCH 40 VSB LOGO

SHIPPING MARKING: NACE MR 0175/NACE MR 0103 - MADE IN BRAZIL \* VM4682 / P.O # 4038589-00/ITEM-1 \* TORONTO \* CCTF

Heat	Pieces
176433	337
<b>Total</b>	<b>337</b>

THE PRODUCT IS SATISFACTORY IN THE FOLLOWING TESTS / INSPECTIONS: DIMENSIONAL # VISUAL # FLATTENING TEST # BENDING TEST # ENDS INSPECTION: UNTESTED ENDS CROPPED # HYDROSTATIC TEST: 20700,0 KPA 5 S # RESIDUAL MAGNETISM: MAX 30 GAUSS # ELECTROMAGNETIC TEST: CSAZ245.1-N10, LON/TRAN, OUT/INS # ULTRASONIC TEST FOR LAMINAR DEFECTS: ACC. CSA Z245.1-SOUR SERVICE #



# Inspection Certificate

(According to DIN EN 10204 3.1)

N°.: 0030030837 / 00

Sheet 2 / 4

## Chemical Composition (%)

Ceq: CSA-Z245.1-CE11

Process: Basic Oxygen Furnace, heats fully killed

Ceq: C+Mn/6+(Cr+Mo+V)/5 +(Ni+Cu)/15

CE1: Cr + Cu + Mo + Ni + V

	C	Mn	P	S	Si	Ni	Cr	Mo	Al	Cu	V	Nb	B	Ti	N	Ca	Ceq	CE1
Heat Analysis	Min	0,400			0,100													
	Max	1,350	0,025	0,025	0,500	0,400	0,300	0,120		0,400	0,080	0,020	0,0010	0,110			0,400	0,430
Product Analysis	Min	0,400			0,100													1,000
	Max	1,350	0,025	0,025	0,500	0,400	0,300	0,120		0,400	0,080	0,020	0,0010	0,110			0,400	0,430
Heat Control Lot																		1,000
176433 030003101210		0,10	1,27	0,012	0,004	0,28	0,03	0,06	0,01	0,029	0,070	0,004	0,015	0,0004	0,002	0,0099	0,0012	0,265
Check 1		0,11	1,29	0,011	0,004	0,29	0,03	0,06	0,01	0,029	0,074	0,005	0,017	0,0003	0,002	0,0098	0,0013	0,277
Check 2		0,10	1,29	0,011	0,004	0,29	0,03	0,06	0,01	0,029	0,074	0,005	0,017	0,0003	0,002	0,0088	0,0013	0,267
																		0,337
																		0,179

Ceq: Carbon Equivalent; CE: Carbon Equivalent; CE: Combined Elements;

## Tensile Test

Specimen Direction: Longitudinal

Method: Elong.Total Under Load 0,50 %

Gage Length: L0=2"

Wall Thickness: 3,38 mm

Temperature: Room Temperature

Type of Specimen

TS (MPa)

YS (MPa)

Area (MM2)

Required: Min

Max

E (%)

25

44

45

Heat Control Lot

176433 030003101210

321,3

349

477

44

YS-Yield Strength; TS-Tensile Strength; E-Elongation;

## Hardness Test Through Wall

Scale: HV

Individual

Required: Min

Max

246,0

Heat Control Lot

176433 030003101210

Q1

160,0

159,0

162,0

160,3

160,3

MW - Middle Wall;

MW1

160,0

159,0

162,0

160,3

160,3





# Inspection Certificate

(According to DIN EN 10204.3.1)

N°.: 0030030837 / 00

Sheet:3 / 4

## Impact Test

Test Specimen: CHARPY 10X55X2.5 V NOTCH

Direction: Longitudinal

Temperature: -55°C

Striker radius: 8 mm

AE1 (J)	AE2 (J)	AE3 (J)	AE4 (J)	AE5 (J)	AE Avg (J)	SA1 (%)	SA2 (%)	SA3 (%)	SA4 (%)	SA5 (%)	SA Avg (%)	LE1 (Mils)	LE2 (Mils)	LE3 (Mils)	LE Avg (Mils)
7	7	7	7	7	7	7	50	50	100	100	100	55	55	55	55
Required: Min Max															

Heat Control Lot

176433 030003101210

AE - Absorbed Energy; SA - Shear Area; LE - Lateral Expansion;

## Remarks:

1. MATERIAL IN ACCORDANCE WITH NACE MR 0175  
PAR. 3.2/ISO 15156-2, ANNEX A.2.1.2/NACE MR0103 PAR.2.1, ALL LATEST EDITIONS

2. SKU 2530031

3. THE WORKS OPERATE A QUALITY MANAGEMENT SYSTEM ACCORDING TO EUROPEAN DIRECTIVE 2014/68/UE ANNEX I PAR. 4.3 (CERTIFICATE 2016 BH MP 02-03 VALID UNTIL 12.05.2019).

- MATERIAL ACCORDING TO PED 2014/68/UE ANNEX I PAR. 7.5

"STEEL MADE BY BOF PROCESS"

4. - NO WELD REPAIR

- FREE OF MERCURY CONTAMINATION

- NO RADIOACTIVE CONTAMINATION

- FINE GRAIN PRACTICE

- FULLY KILLED STEEL

- MATERIAL FROM BRAZIL



**Inspection Certificate**  
(According to DIN EN 10204 3.1)

N°.: 0030030837 / 00

Sheet: 4 / 4

We hereby certify that this product has been manufactured and examined in accordance with all requirements of the standards and specifications and all the results are found to be satisfactory. This testimonial and certificate respectively is recorded by a computer system and is valid without signature. Alteration or use for others products are regarded as falsification of documents and will be subject to criminal jurisdiction.

QUALITY CONTROL DEPARTMENT

FAX: (55-31) 3328-2773

e-mail: luis.silva@vallourec.com

DATE

11.20.2018

ENG. LUIZ FERNANDO DA SILVA - CREA/MG 58834-D  
TECHNICAL RESPONSIBLE



Vallourec Soluções Tubulares do Brasil S.A.  
Barcelos Plant - Av. Olimpio Meireles, 65  
ZIU 306-40-010 - Belo Horizonte, MG



**Inspection Certificate**  
(According to DIN EN 10204.3.1)  
**Nº: 0030023868 / 00**

Sheet: 1 / 3

Customer: VALLOUREC CANADA INC

Country: Canada

Material Number: 273193  
Work Order: 509784 / 10  
Customer Order: VM4238/P.O # 4037205-00

Inspection: Vallourec Soluções Tubulares do Brasil S.A

PRODUCT: SEAMLESS STEEL PIPE, HOT FINISHED, BEVELED ENDS 30 DEG., NORMALIZED  
DIMENSIONS: 60.30 mm X 3.90 mm SCHEDULE: 040 GRADE: 290 # 6 # GR 1  
STANDARD: CSA-Z245.1-14 - CATEGORY II  
IN ACCORDANCE ALSO TO THE STANDARDS: ASTM A 333M - 16 ASTM A 995M - 16 # ASME SA-333M - 15  
SURFACE PROTECTION: EXTERNAL: LACQUER PIPE ENDS PROTECTOR: PLASTIC CAP  
TOLERANCES: OUTSIDE DIAMETER (PIPE BODY): -0.60 mm / +0.60 mm WALL THICKNESS: -0.49 mm / +0.78 mm  
LENGTH: RANDOM 5486.00 mm - 6706.00 mm  
STANDARD MARKING: Paint stenciled in the pipe body: 509784/10 MANUFACTURER CSA-Z245.1-14 60.30 X 3.90 290 CAT II SS 3 IN LENGTH HEAT NUMBER ASTM A1400 LT 46C NACE MR  
0175NACE MR 0103 VSIR LOGO  
SHIPPING MARKING: MADE IN BRAZIL \* VM4238 / P.O # 4037205-00 \* VANCOUVER  
TOLERANCES/PIPE ENDS: OUTSIDE DIAMETER: -0.40 mm / +0.80 mm

Heat	Pieces
141352	122
<b>Total</b>	<b>122</b>

THE PRODUCT IS SATISFACTORY IN THE FOLLOWING TESTS / INSPECTIONS: DIMENSIONAL # VISUAL # FLATTENING TEST # ENDS INSPECTION: UNTESTED ENDS CROPPED # HYDROSTATIC TEST: 20700.0 KPA  
5 S # RESIDUAL MAGNETISM: MAX 30 GAUSS # TESTE ELETROMAGNETICO: ACCORDING TO CSA Z245.1 # ULTRASONIC TEST FOR LAMINAR DEFECTS: ACC. CSA Z245.1-SOUR SERVICE #

### Chemical Composition (%)

Ceq: CSA-Z245.1-CEI1		CEI: Min/C														
Heat Analysis	Min	C	Mn	P	S	Si	Ni	Cr	Mo	Cu	V	Nb	B	Ti	Ceq	CEI
			0.400			0.100										
Product Analysis	Max	0.240	1.350	0.025	0.025	0.500	0.400	0.300	0.120	0.400	0.080	0.020	0.0010	0.110	0.400	
	Min		0.400			0.100										3.000
Heat Control Lot	Max	0.240	1.350	0.025	0.025	0.500	0.400	0.300	0.120	0.400	0.080	0.020	0.0010	0.110	0.400	
	Min															
Check 1		0.10	1.32	0.020	0.001	0.31	0.01	0.07	0.03	0.010	0.006	0.015	0.0002	0.002	0.342	13.390
		0.10	1.32	0.020	0.001	0.31	0.01	0.07	0.03	0.012	0.006	0.016	0.0002	0.002	0.343	12.951
Check 2		0.10	1.32	0.020	0.001	0.31	0.01	0.07	0.03	0.012	0.006	0.016	0.0002	0.002	0.343	12.816

Ceq: Carbon Equivalent; CE: Combined Elements;





# Inspection Certificate

(According to DIN EN 10204, 3, 1)

N°.: 0030023868 / 00

Sheet: 2 / 3

## Tensile Test

Specimen Direction: Longitudinal

Temperature: Room Temperature

Gage Length: 1.0±2"

Type of Specimen

Method: Elong. Total Under Load 0.50 %

YS (MPa) (NPA) TS (MPa) E (%)

290 415 625 26

Required: Min

Max

Heat Control Lot

141352 030002889902

STRIP WIDTH 19.05 MM

406

37

YS-Yield Strength; TS-Tensile Strength; E-Elongation;

Hardness Test Through Wall

Scale: HV

Individual AE2 AE3

Required: Min

Max

246.0

MW1

MW2

MW3

Avg

Q1 163.0 166.0 160.0 163.0

Heat Control Lot

141352 030002889902

MW - Middle Wall;

## Impact Test

Test Specimen: CHARPY 10X55X2.5 V

Direction: Longitudinal

Temperature: -57°C

Striking tip: 8 mm

NOTCH

AE1 AE2 AE3 AE4 AE5 AE Avg

(J) (J) (J) (J) (J) (J)

Required: Min

Max

4 4 4 4 5

Heat Control Lot

141352 030002889902

46

43

AE - Absorbed Energy;

Remarks:

1. MATERIAL IN ACCORDANCE WITH NACE MR 0175  
PAR. 3.2/ISO 15156-2, ANNEX A.2.1.2/NACE MR0103 PAR.2.1. ALL LATEST EDITIONS.

2. SKU 2530074



**Inspection Certificate**  
(According to DIN EN 10204.3.1)  
N°.: 0030023868 / 00

Sheet 3 / 3

3. - MATERIAL SOUR SERVICE AS DEFINED IN PARAGRAPH 16 OF CSA Z245.1.1, BUT WITHOUT HIC TEST

4. MATERIAL:
- NO WELD REPAIR
  - FREE OF MERCURY
  - FINE GRAIN PRACTICE
  - FULLY KILLED STEEL
  - MATERIAL FROM BRAZIL

We hereby certify that this product has been manufactured and examined in accordance with all requirements of the standards and specifications and all the results are found to be satisfactory. This testimonial and certificate respectively is recorded by a computer system and is valid without signature. Alteration or use for others products are regarded as falsification of documents and will be subject to criminal jurisdiction.

QUALITY CONTROL DEPARTMENT  
FAX: (55-31) 328-2617  
e-mail: guslavo.junior@vallourec.com

DATE: 08.14.2017  
DR. GUSTAVO ALVES JUNIOR  
TECHNICAL RESPONSIBLE

ECO TUBES: The tubes from Vallourec do Brasil S.A. are manufactured with steel which uses charcoal as a source of energy in its production. This coal comes from more than 100,000 ha of forest planted by Vallourec Florestal Ltda. With the acquisition of 4,6 tons of steel tubes from Vallourec do Brasil S.A., your company contributed to the reduction of the greenhouse effect, avoiding the accumulation of 8,3 tons of Carbon Dioxide CO2 in the atmosphere.

Benteler Steel/Tube GmbH  
Postfach 13 40  
33043 Paderborn  
Deutschland  
Tel.: + 49.5254.81-0 Fax: + 49.5254.13666



Steel/Tube

# ABNAHMEPRÜFZEUGNIS EN 10204-3.1

INSPECTION CERTIFICATE EN 10204-3.1  
CERTIFICAT DE RECEPTION EN 10204-3.1  
EN 10204:2005-01

Benteler Steel/Tube GmbH · Postfach 1340 · 33043 Paderborn · Deutschland

CCTF Corporation  
Unit 2 4151 North Service Road  
BURLINGTON, ON ON L7L 4X6  
CANADA

Dokument-Nr.: 65-1069887/001/E

Document No.:  
No. du document:

Kunden-Bestell-Nr.:  
Purchase Order No.:  
No. de commande du client:

Benteler Auftrags-Nr.: 1646606  
Benteler Order No.:  
No. de commande Benteler:

Versandanzzeigen-Nr.: 6591130  
Dispatch Note No.:  
No. d'avis d'expédition:

Produkt: NAHTLOSE STAHLROHRE  
Product: SEAMLESS STEEL TUBES  
Produit: TUBES D'ACIER SANS SOUDURE

Prüf-Nr.:  
Inspection No.:  
No. du certificat:

Hersteller:  
Manufacturer:  
Producteur:  
Herstellerzeichen:  
Manufacturer's brand:  
Marque du producteur:

Stempel des Abnahmebeauftragten: WA  
Stamp of the inspection representative:  
Poinçon du contrôleur:

Stahlschmelzungsverfahren: ELEKTROSTAHL  
Steelmaking process: ELECTRIC FURNACE  
Procédé d'élaboration de l'acier: FOUR ELECTRIQUE

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Warmrohrwerk Dinslaken  
[DIN EN ISO 9001, ISO/TS-16949 CERTIFIED BY TÜV NORD CERT]  
[PED 2014/68/EU CERTIFIED BY TÜV NORD SYSTEMS]



## Lieferbedingungen:

Terms of delivery: ASTM-A 106-2015, ASTM-A 333-2016-HF, ASME SA-106, ASME BPVC.II.A-2017, ASME SA-333-HF, ASME BPVC.II.A-2017, CSA Standard Z245.1-14 Category II, Sour Service, ANSI/NACE MR0175/ISO 15156-1: 2015, ANSI/NACE MR0175/ISO 15156-2: 2015

## Maße - Toleranzen:

Dimensions-tolerances: ASME SA-106, ASME BPVC.II.A-2017, ASTM-A 106-2015, ASME SA-999 ASME BPVC.II.A-2017, ASTM-A 999-2016

## Stahlsorte:

Steel grade: GRADE 1, GRADE 290, GRADE 6, GRADE B

## Nuance d'acier:

Normalized

## Lieferzustand:

## Delivery condition:

État de livraison:

## Produktkennzeichnung:

FS: BENTELER Z.245.1 - 14 - A / SA-106 / A / SA-333 B/1/6/290 CATEGORIE 2 SS HEAT-NO. LT

## Product marking:

50 SMLS HN DIMENSION TEST PRESSURE S6 WA GERMANY PO 4038177-00 / 2530090 DIMENSIONS

## Marquage du produit:

SCHEDULE

PS: HEAT-NO. DIMENSIONS SCHEDULE B/1/6/290 SS

AZ = Anzeichenbeschriftung, Eching ink marking, Geyure à l'encre PK = Farbmarkenzeichnung, color marking, marquage par couleur FSD = Farbstoffdrucker Color jet printer, imprimante à jet d'encre de couleur UK = Lasermarkenzeichnung, Laser marking, Marquage laser PKE = Etikettenmarkenzeichnung, tag marking, marquage sur étiquette PS = Prägestempel, die stamp, marquage par poinçonnage TS = Tintenstrahlmarkenzeichnung, ink jet spray marking, imprimante à jet d'encre



## Benteler Steel/Tube GmbH

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33043 Paderborn

Deutschland

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Steel/Tube

## ABNAHMEPRÜFZEUGNIS EN 10204-3.1

INSPECTION CERTIFICATE EN 10204-3.1

CERTIFICAT DE RECEPTION EN 10204-3.1

Dokument-Nr.: 65-1069887/001/E

Document No.:  
No. du document:Prüf-Nr.:  
Inspection No.:

No. du certificat:

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Pos.	Stück	Maße	Gesamtlänge	Gewicht	Schmelzen-Nr.	Prüfdruck	Rohr-Nr.-Gruppe	Vielfachlängen
Item	Number	Dimensions	Length total	Weight	Heat No.	Test pressure	Tube number group	Multiple lengths
Poste	Nombre	Dimensions	Longueur totale	Poids	No. de coulée	Pression d'épreuve	Série de no. des tubes	Longueurs multiples
		feet	feet	lbs		PSI		
0002	72	4" NPS * Sched. 40 20 FT - 22 FT	2530090 1570,90	17284	610879	2650	5	

## Schmelzenanalyse [%] / Heat analysis [%] / Analyse sur coulée [%]

Pos.	Schmelzen-Nr.	C	SI	MN	P	S	CR	MO	NI	CU	V	NB	TI	B
Item	Heat No.													
Poste	No. de coulée													
0002	610879	0,130	0,320	1,25	0,008	0,001	0,14	0,05	0,25	0,11	0,062	0,014	0,003	0,0003

1. Formel:  $CE_{IIV} = C + (Mn/6) + ((Cr + Mo + V)/5) + ((Cu + Ni)/15) < = 0,42 \%$ 2. Formel:  $CE_V = C + F * ((Mn/6) + (Si/24) + (Cu/15) + ((Cr + Mo + V + Nb)/5) + (5 * B)) < = 0,40 \%$ 3. Formel:  $Mn / C > = 3 / 1$ 4. Formel:  $Cr + Cu + Mo + Ni + V < = 1,00 \%$ 

## Formelergebnisse / Formula results / Résultats des formules

Pos.	Schmelzen-Nr.	1. Formel	2. Formel	3. Formel	4. Formel
Item	Heat No.	1.	2.	3.	4.
Poste	No. de coulée	1.	2.	3.	4.
0002	610879	0,415	0,369	9,615	0,622

## Produktanalyse [%] / Product analysis [%] / Analyse sur produit [%]

Pos.	Schmelzen-Nr.	C	SI	MN	P	S	CR	MO	NI	CU	V	NB	TI	B
Item	Heat No.													
Poste	No. de coulée													
0002	610879	0,130	0,320	1,21	0,004	0,003	0,15	0,06	0,26	0,09	0,067	0,017	0,005	0,0004

1. Formel:  $CE_{IIV} = C + (Mn/6) + ((Cr + Mo + V)/5) + ((Cu + Ni)/15) < = 0,42 \%$ 2. Formel:  $CE_V = C + F * ((Mn/6) + (Si/24) + (Cu/15) + ((Cr + Mo + V + Nb)/5) + (5 * B)) < = 0,40 \%$ 3. Formel:  $Mn / C > = 3 / 1$ 4. Formel:  $Cr + Cu + Mo + Ni + V < = 1,00 \%$

Benteler Steel/Tube GmbH  
Postfach 13 40  
33043 Paderborn  
Deutschland  
Tel.: + 49 5254 81-0 Fax: + 49 5254 13666



Steel/Tube

ABNAHMEPRÜFZEUGNIS EN 10204-3.1  
INSPECTION CERTIFICATE EN 10204-3.1  
CERTIFICAT DE RECEPTION EN 10204-3.1

Dokument-Nr.: 65-1069887/001/E

Prüf-Nr.:  
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No. du certificat:

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Formelergebnisse / Formula results / Résultats des formules

Pos.	Schmelzen-Nr	1. Formel	2. Formel	3. Formel	4. Formel
Item	Heat No.	1.	2.	3.	4.
Poste	No. de coulée	1.	2.	3.	4.
0002	610879	0,410	0,366	9,308	0,627

Prüfergebnisse / Test results / Résultats des essais

Die Rohre sind auf Dichtheit geprüft durch:

The tubes have been submitted to a leak tightness test by:  
Les tubes ont passé un contrôle d'étanchéité par:

Die Rohre wurden zerstörungsfrei geprüft:

The tubes are non destructive tested:  
Les tubes ont passé un essai non destructif:

Augensichtkontrolle:	PASSED	Maßkontrolle:	PASSED	Ringfaltversuch:	PASSED
Visual inspection:		Dimensions examination:		Flattening test:	
Examen visuel:		Vérification des dimensions:		Essai d'aplatissement:	

Ergebnisse der mechanischen Prüfung / Results of mechanical testing / Résultats des essais mécaniques

Die Probennahme erfolgte an Vielfachlängen.

The sampling was carried out on multiple lengths.

L'échantillonnage était réalisé aux longueurs multiples.

Zugversuch längs bei RT, Streifenprobe / Tensile test longitudinal at RT, Strip test specimen / Essai de traction longitudinale à TA, Bande decoupee sur tube

Pos.	Proben-Nr.	Schmelzen-Nr.	Probenabmessung	Streckgrenze	Zugfestigkeit	Dehnung
Item	Specimen No.	Heat No.	Specimen dimensions	Yield strength	Tensile strength	Elongation
Poste	No. de l'éprouv.	No. de coulée	Dimensions de l'éprouv.	Limite élastique	Résistance à la traction	Allongement
Anforderungen			mm	RT 0,5 %	Rm	A2"
Requirements				PSI	PSI	%
Exigences				42206-71794	60046-90504	MIN 32,00
0002	000001	610879	25,40 X 5,80	59175	77740	32,00
0002	000002	610879	25,40 X 6,10	58305	78320	32,00
0002	000003	610879	25,40 X 6,20	58885	77305	32,00
0002	000004	610879	25,40 X 6,20	59466	79336	34,00

1. Formel  
1. Formula  
1. Formule



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Steel/Tube

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# ABNAHMEPRÜFZEUGNIS EN 10204-3.1

INSPECTION CERTIFICATE EN 10204-3.1  
CERTIFICAT DE RECEPTION EN 10204-3.1

Dokument-Nr.: 65-1069887/001/E

Prof.-Nr.:  
Inspection No.:  
No. du certificat:

## Härteprüfung / Hardness test / Essai de dureté

Pos. Item	Proben-Nr. Specimen No.	Schmelzen-Nr. Heat No.	Härte Hardness
Poste	No. de l'éprouv.	No. de coulée	Dureté
Anforderungen Requirements Exigences	HRC	HB	HV
			HRB
			HBW
			MAX 200
0002	000001	610879	159
0002	000002	610879	158
0002	000003	610879	160
0002	000004	610879	156

## Kerbschlagbiegeversuch. Notched bar impact test / Essai de flexion par choc (résilience) [1 CHARPY\_V]

Probenlage: längs (L); Prüftemperatur: -51 °F

Specimen position: longitudinal (L); Test temperature: -51 °F

Position de l'éprouvette: longitudinal (L); Température d'essai: -51 °F

Pos.	Proben-Nr.	Schmelzen-Nr.	Probenabmessung Specimen dimensions	Kerbschlagarbeit Absorbed energy	Kerbschlagzähigkeit Impact strength	Verf.-Bruchanteil Shear fracture	Laterale Breitung Lateral expansion	Sprödbbruchanteil Brittle Fracture
Poste	No. de l'éprouv.	No. de coulée	Dimensions de l'éprouvette	Energie absorbée	Résistance au choc	Rupture ductile	Expansion latéral	Rupture Fragile
Anforderungen Requirements Exigences	Länge Length	Breite Width	Höhe Height	einzel single	mittel average	einzel single	einzel single	mittel average
	Longueur	Largeur	Hauteur	individuelle moyenne	individuelle moyenne	individuelle moyenne	individuelle moyenne	individuelle moyenne
	mm	mm	mm	J	J/cm <sup>2</sup>	%	mm	mm
	55	5,00	10,00	MIN 014		%	mm	mm
0002 000001	610879	55	5,00	10,00	88	70	2,20	
		5,00	10,00	89		70	2,10	
		5,00	10,00	85		70	2,00	2,10

Benteler Steel/Tube GmbH  
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Steel/Tube

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# ABNAHMEPRÜFZEUGNIS EN 10204-3.1

INSPECTION CERTIFICATE EN 10204-3.1  
CERTIFICAT DE RECEPTION EN 10204-3.1

Dokument-Nr.: 65-1069887/001/E

Document No.:  
No. du document:

Prüf-Nr.:  
Inspection No.:  
No. du certificat:

Kerbschlagbiegeversuch Notched bar impact test / Essai de flexion par choc (résilience) [2 CHARPY\_V]

Probenlage: quer (Q); Prüftemperatur: -51 °F

Specimen position: transversal (Q); Test temperature: -51 °F

Position de l'éprouvette: transversal (Q); Température d'essai: -51 °F

Pos. Proben-Nr. Schmelzen-Nr. Heat No.	Item Specimen No. Heat No.	Probenabmessung Specimen dimensions	Kerbschlagarbeit Absorbed energy	Kerbschlagzähigkeit Impact strength	Verf.-Bruchanteil Shear fracture	Laterale Breitung Lateral expansion	Sprödbbruchanteil Brittle Fracture
Poste No. de l'éprouv. No. de coulée		Dimensions de l'éprouvette	Energie absorbée	Résistance au choc	Rupture ductile	Expansion latérale	Rupture Fragile
Anforderungen Requirements Exigences	Länge Length Longueur	Breite Width Largeur	Höhe Height Hauteur	einzel single individuelle	mittel average moyenne	einzel single individuelle	mittel average moyenne

mm	mm	mm	J	J	J/cm <sup>2</sup>	%	%	mm	mm
55	5,00	10,00	MIN 014	MIN 020		MIN 50	MIN 60		
0002 000001	610879	55	5,00	10,00	35	60		1,20	
			5,00	10,00	32	60		1,10	
			5,00	10,00	33	60	60	1,00	1,10

Wärmebehandlung / Heat treatment / Traitement thermique

Normalizing temperature: 920 °C, Holding time: 5 min., Cooling: Air

Restmagnetismus / Demagnetize / Démagnétiser

demagnetized tubes; 1 measurement per 4 hours on both tube ends Two readings 180° apart around the circumference. Average value  
max 3.0 Millitesla (24 A/cm), individual value max 3.5 Millitesla (28 A/cm)

Vermerk / Remark / Remarque

NACE Standard: Hardness acc. to NACE Standard MR0175 HRC max. 22., The material meets the requirements of NACE MR0103, Region 3, in accordance to Figure 1 and Appendix A.2, ANSI/NACE MR0175/ISO 15156-2:2015; Certificate remarks: fully killed fine grained steel, This is to confirm that the seamless linepipe supplied by BENTELER and verified to CSA Standard Z245.1-14 meets the requirement for micro hardness of max. 248 HV 500 gf., No weld repair has been carried out, Sour Service, The Material is Aluminium deoxidized and inclusion shape controlled with Calcium-Silicon treatment, It is the end user's responsibility to ensure that all environmental requirements as well as the requirements regarding engineering, construction and operation of facilities are fulfilled in the country of use. Fit for purpose of the parts as well as homologation is not the scope of this contract., Steelmaking: BENTELER Steel Mill Lingen

Grain size: acc. to ASTM-E 112; Grain size and finer: 6

Verkäufer(in) / Sales Personnel / Personne chargée : Mr Dyka, Tel.: 05254/81-4265-204265, Fax: 204229



Benteler Steel/Tube GmbH  
Postfach 13 40  
33043 Paderborn  
Deutschland  
Tel.: + 49.5254.81-0 Fax: + 49.5254.13666



Steel/Tube

ABNAHMEPRÜFZEUGNIS EN 10204-3.1  
INSPECTION CERTIFICATE EN 10204-3.1  
CERTIFICAT DE RECEPTION EN 10204-3.1

65-1069887/001/E

Dokument-Nr.:  
Document No.:  
No. du document.

Prüf-Nr.:  
Inspection No.:  
No. du certificat.

Blatt:  
Page:  
Page: 6 / 6

Dinslaken, 13.04.2018, TEL.: 02064.623-5360 FAX: 02064.623-5390

Abnahmebeauftragter  
Inspection representative

Contrôleur

i. A. Patrick Hanraths / LABACH

Es wird bestätigt, daß die gelieferten Erzeugnisse den techn. Lieferbedingungen des Auftrages entsprechen. Dieses Dokument wurde mittels EDV erstellt und ist ohne Unterschrift rechtsgültig.  
We certify that the supplied products comply with the order specifications. This document was prepared by means of electronic data processing and is valid without signature.  
Nous attestons que les produits livrés sont conformes aux stipulations de la commande. Ce document a été établi par traitement électronique de l'information et est valide sans signature.



Vallourec Soluções Tubulares do Brasil S.A.  
Barricão Plant - Av. Olimio Mercês, 65  
ZIP 30640-010 - Belo Horizonte, MG



RINA  
ISO 9001:2015 CERTIFIED  
ISO 14001:2015 CERTIFIED  
ASME U2 STAMPED

# Inspection Certificate

(According to DIN EN 10204 J 1)

Nº.: 0030032296 / 00

Sheet: 1 / 4

Customer: VALLOUREC CANADA INC

Country: Canada

Material Number: 276430  
Work Order: 536721 / 20  
Customer Order: VM-4811/P.O.4038915-00

Inspection: Vallourec Soluções Tubulares do Brasil S.A.

PRODUCT: SEAMLESS STEEL PIPE, HOT FINISHED, BEVELED ENDS 30 DEG., NORMALIZED

DIMENSIONS: 168.30 mm X 7.11 mm GRADE: 290 # GR 1 # 6 # B

STANDARD: CSA-Z245.1-18 - CATEGORY II

IN ACCORDANCE ALSO TO THE STANDARDS: ASTM A 333M - 18 ASTM A 995M - 18 # ASTM A 106M - 18 ASTM A 53M - 18 # ASTM SA-333M - 17 # ASTM SA-106M - 17 # ASTM SA-530M - 17

CUSTOMER SPECIFICATION: CCTF GrB.1.6.290 Cat II SS, 20.11.2017

SURFACE PROTECTION: EXTERNAL: LACQUER PIPE ENDS PROTECTOR: PLASTIC CAP

TOLERANCES: OUTSIDE DIAMETER (PIPE BODY): -0.80 mm / +1.26 mm WALL THICKNESS: -0.89 mm / +1.07 mm

TOLERANCES (PIPE ENDS): OUTSIDE DIAMETER: -0.40 mm / +1.00 mm

LENGTH: RANDOM 5486.00 mm - 6706.00 mm

STANDARD MARKING: PAINT STENCILED IN THE PIPE BODY: 536721/20 MANUFACTURER CSA-Z245.1-18 168.30 X 7.11 290 CAT II M46C SS HN LENGTH HEAT NUMBER ASTM A/ASME SA 333. 1/6 HF SCH 040 LT -46C

ASTM A/ASME SA 106 B 18400 KPA WEIGHT ASTM A 53 B VSB LOGO

SHIPPING MARKING: NPS 6" X SCH 40 NACE MR 0175/NACE MR 0103 - MADE IN BRAZIL \* VM4811 / P.O # 4038915-00/ITEM-2 \* TORONTO \* CCTF

Heat	Pieces
175147	11
175724	24
178322	89
Total	124

THE PRODUCT IS SATISFACTORY IN THE FOLLOWING TESTS / INSPECTIONS: DIMENSIONAL # VISUAL # FLATTENING TEST # ENDS INSPECTION : UNTESTED ENDS CROPPED # HYDROSTATIC TEST: 18400.0 KPA  
5 S # RESIDUAL MAGNETISM: MAX 30 GAUSS # ELECTROMAGNETIC TEST : CSAZ245.1-N10.LON/TRAN.OUT/INS # ULTRASONIC TEST FOR LAMINAR DEFECTS: ACC. CSA Z245.1-SOUR SERVICE #





# Inspection Certificate

(According to DIN EN 10204.3.1)

N°.: 0030032296 / 00

Sheet 2 / 4

## Chemical Composition (%)

Ceq: CSA-Z245.1-CE1

Process: Basic Oxygen Furnace, heats fully killed

Ceq: C/Mn/6/(Cr+Mo+V)/5/(Ni+Cu)/15

CE1: Cr + Cu + Mo + Ni + V

	C	Mn	P	S	Si	N	Cr	Mo	Al	Cu	V	Nb	B	Ti	N	Cu	Ceq	CE1
Heat Analysis		Min			0,100													
	0,240	1,350	0,025	0,025	0,500	0,400	0,300	0,120		0,400	0,080	0,020	0,0010	0,110			0,400	0,430
Product Analysis		Min			0,100													
	0,240	1,350	0,025	0,025	0,500	0,400	0,300	0,120		0,400	0,080	0,020	0,0010	0,110			0,400	0,430
Heat Control Lot																		
175147 030003127653	0,12	1,31	0,010	0,007	0,30	0,01	0,04	0,01	0,027	0,025	0,004	0,016	0,0004	0,003	0,0055	0,0013	0,309	0,351
Check 1	0,12	1,29	0,010	0,005	0,29	0,01	0,04	0,01	0,028	0,024	0,004	0,017	0,0002	0,003	0,0050	0,0011	0,309	0,348
Check 2	0,12	1,29	0,010	0,006	0,28	0,01	0,04	0,01	0,027	0,023	0,004	0,016	0,0002	0,002	0,0050	0,0012	0,308	0,347
175724 030003127905	0,11	1,30	0,009	0,003	0,30	0,02	0,05	0,01	0,029	0,030	0,004	0,015	0,0004	0,002	0,0045	0,0015	0,284	0,347
Check 1	0,11	1,31	0,009	0,002	0,29	0,02	0,05	0,01	0,031	0,029	0,004	0,016	0,0002	0,002	0,0050	0,0013	0,285	0,346
Check 2	0,11	1,32	0,009	0,002	0,28	0,02	0,05	0,01	0,030	0,029	0,003	0,016	0,0002	0,002	0,0050	0,0013	0,287	0,346
178322 030003155671	0,10	1,28	0,012	0,003	0,29	0,04	0,06	0,02	0,028	0,080	0,004	0,016	0,0004	0,002	0,0071	0,0015	0,267	0,348
Check 1	0,10	1,29	0,013	0,003	0,29	0,04	0,06	0,02	0,030	0,083	0,002	0,017	0,0002	0,002	0,0071	0,0014	0,269	0,350
Check 2	0,10	1,27	0,011	0,004	0,30	0,04	0,06	0,02	0,029	0,082	0,004	0,015	0,0002	0,003	0,0075	0,0013	0,267	0,347

Ceq: Carbon Equivalent; Ceq: Carbon Equivalent; CE: Combined Elements;

## Tensile Test

Specimen Direction: Longitudinal

Method: Elong. Total Under Load 0,50 %

Temperatures: Room Temperature

Wall Thickness: 7,11 mm

Gauge Length: L<sub>0</sub>=2"

Type of Specimen

Required: Min  
Max

TS (MPa)

E (%)

YS (MPa)

Area (MM2)

Width (mm)

Heat Control Lot

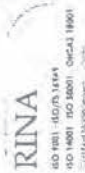
175147 030003140032

175724 030003127905

030003140031

178322 030003155671

YS-Yield Strength; TS-Tensile Strength; E-Elongation;



# Inspection Certificate

(According to DIN EN 10204.3.1)

N°.: 0030032296 / 00

Sheet: 3 / 4

## Hardness Test

Scale: HV

Max

Required: Min

Max 246,0

Heat Control Lot

175147 030003140032

175724 030003127905

030003140031

178322 030003155671

156,0 156,0

163,0 167,0

163,0 167,0

143,0 143,0

## Impact Test

Test Specimen: CHARPY 10X55X5 V NOTCH

Direction: Longitudinal

AE1 AE2 AE3

(J) (J) (J)

14 14 14

Temperature: -53°C

AE Avg AE4 AE5

(J) (J) (J)

14 50 50

Striker radius: 8 mm

SA5 SA4 SA3

(%) (%) (%)

100 100 100

SA Avg

(%)

60

LE1

(Mils)

64

LE2

(Mils)

64

LE3

(Mils)

66

LE Avg

(Mils)

67

Required: Min

Max

Heat Control Lot

175147 030003140032

175724 030003140031

178322 030003155671

122 123 123

122 122 122

142 151

123 100 100

122 100 100

146 100 100

100 100 100

64 64 79

64 65 67

64 67 67

66 75

AE - Absorbed Energy; SA - Shear Area; LE - Lateral Expansion;

## Impact Test

Test Specimen: CHARPY 10X55X5 FLATTENED

Direction: Transverse

AE1 AE2 AE3

(J) (J) (J)

14 14 14

Temperature: -46°C

AE Avg AE4 AE5

(J) (J) (J)

14 50 50

Striker radius: 8 mm

SA5 SA4 SA3

(%) (%) (%)

100 100 100

SA Avg

(%)

60

LE1

(Mils)

53

LE2

(Mils)

58

LE3

(Mils)

55

LE Avg

(Mils)

64

Required: Min

Max

Heat Control Lot

175147 030003140032

175724 030003140031

178322 030003155671

121 121 122

121 122 121

106 111 104

121 100 100

122 100 100

106 100 100

100 100 100

53 55 76

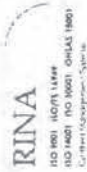
58 59 64

60 68

80 72 76

AE - Absorbed Energy; SA - Shear Area; LE - Lateral Expansion;





## Inspection Certificate

(According to DIN EN 10204 3.1)

N°.: 0030032296 / 00

Sheet 4 / 4

HEAT: 175147 CCTF SKU: 2530104 6 A333-6 STD BLK SMLS SRL Invoice: 1596625-00 PO: 4072649 6/5/2019 12:50:22 PM

### Remarks:

1. MATERIAL IN ACCORDANCE WITH NACE MR 0175 PAR. 3.2/ISO 15156-2, ANNEX A.2.1.2/NACE MR0103 PAR.2.1. ALL LATEST EDITIONS
2. SKU 2530104
3. THE WORKS OPERATE A QUALITY MANAGEMENT SYSTEM ACCORDING TO EUROPEAN DIRECTIVE 2014/68/UE ANNEX I PAR. 4.3 (CERTIFICATE 2016 RH:MP 02-03) VALID UNTIL 12.05 2019).

- MATERIAL ACCORDING TO PED 2014/68/UE ANNEX I PAR. 7.5

4. - NO WELD REPAIR
  - FREE OF MERCURY CONTAMINATION
  - NO RADIOACTIVE CONTAMINATION
  - FINE GRAIN PRACTICE
  - FULLY KILLED STEEL
  - MATERIAL FROM BRAZIL

NORMALIZED  
TEMPERATURE 892°C  
SOAKING TIME 40 MINUTES  
METHOD OF COOLING : AIR

We hereby certify that this product has been manufactured and examined in accordance with all requirements of the standards and specifications and all the results are found to be satisfactory. This testimonial and certificate respectively is recorded by a computer system and is valid without signature. Alteration or use for others products are regarded as falsification of documents and will be subject to criminal jurisdiction.

QUALITY CONTROL DEPARTMENT

FAX: (55-31) 3328-7773

e-mail:luiz.silva@vallourec.com

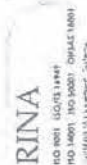
ENG. LUIZ FERNANDO DA SILVA - CREA/MG 58834-D  
TECHNICAL RESPONSIBLE

DATE

02.27.2019



Vallourec Soluções Tubulares do Brasil S.A.  
Barreiro Plant - Av. Olinto Meneses, 65  
ZIP 30640-010 - Belo Horizonte, MG



## Inspection Certificate

(According to DIN EN 10204 3.1)

Nº.: 0030032296 / 00

Sheet: 1 / 4

Customer: VALLOUREC CANADA INC

Country: Canada

Material Number: 276430

Work Order: 536721 / 20

Customer Order: VM-4811/P.O.4038915-00

Inspection: Vallourec Soluções Tubulares do Brasil S.A.

PRODUCT: SEAMLESS STEEL PIPE, HOT FINISHED, BEVELED ENDS 30 DEG., NORMALIZED

DIMENSIONS: 168.30 mm X 7.11 mm GRADE: 290 # GR 1 # 6 # B

STANDARD: CSA-Z245.1-18 - CATEGORY II

IN ACCORDANCE ALSO TO THE STANDARDS: ASTM A 333M - 18 ASTM A 995M - 18 # ASTM A 106M - 18 ASTM A 53M - 18 # ASTM SA 99M - 17 # ASTM SA-106M - 17 ASME SA

530M - 17

CUSTOMER SPECIFICATION: CCTF GrB.1.6.290 Cat II SS . 20.11.2017

SURFACE PROTECTION: EXTERNAL: LACQUER PIPE ENDS PROTECTOR: PLASTIC CAP

TOLERANCES: OUTSIDE DIAMETER (PIPE BODY): -0.80 mm / +1.26 mm WALL THICKNESS: -0.89 mm / +1.07 mm

TOLERANCES(PIPE ENDS): OUTSIDE DIAMETER: -0.40 mm / +1.60 mm

LENGTH: RANDOM 5486.00 mm - 6706.00 mm

STANDARD MARKING: PAINT STENCILED IN THE PIPE BODY: 536721/20 MANUFACTURER CSA-Z245.1-18 168.30 X 7.11 290 CAT II M46C SS S HN LENGTH HEAT NUMBER ASTM A/ASME SA 333, 1/6 HF SCH 040 LT -46C

ASTM A/ASME SA 106 B 18400 KPA WEIGHT ASTM A 53 B VSB LOGO

SHIPPING MARKING: NPS 6" X SCH 40 NACE MR 0175/NACE MR 0103 - MADE IN BRAZIL \* VM4811 / P.O # 4038915-00/ITEM-2 \* TORONTO \* CCTF

Heat	Pieces
175147	11
175724	24
178322	89
Total	124

THE PRODUCT IS SATISFACTORY IN THE FOLLOWING TESTS / INSPECTIONS: DIMENSIONAL # VISUAL # FLATTENING TEST # ENDS INSPECTION : UNTESTED ENDS CROPPED # HYDROSTATIC TEST: 18400.0 KPA  
5 S # RESIDUAL MAGNETISM: MAX 30 GAUSS # ELECTROMAGNETIC TEST : CSAZ245.1-N10.LON/TRAN.OUT/INS # ULTRASONIC TEST FOR LAMINAR DEFECTS: ACC. CSA Z245.1-SOUR SERVICE #





# Inspection Certificate

(According to DIN EN 10204 3.1)

N°: 0030032296 / 00

Sheet 2 / 4

## Chemical Composition (%)

Ceq: CSA-2245 1-CE11

Process: Basic Oxygen Furnace, heats fully killed

Ceq: C/Mn/6-(Cr+Mo+V)/5 (Ni+Cu)/15 CEI: Cr + Cu + Mo + Ni + V

	C	Mn	P	S	Si	Ni	Cr	Mo	Al	Cu	V	Nb	B	Ti	N	Cu	Ceq	Ceq	CEI
Heat Analysis					0,100														
Min	0,240	1,350	0,025	0,025	0,500	0,400	0,300	0,120	0,400	0,080	0,020	0,0010	0,110				0,400	0,430	1,000
Max																			
Product Analysis					0,100														
Min	0,240	1,350	0,025	0,025	0,500	0,400	0,300	0,120	0,400	0,080	0,020	0,0010	0,110				0,400	0,430	1,000
Max																			
Heat Control Lot																			
175147 030003127653	0,12	1,31	0,010	0,007	0,30	0,01	0,04	0,01	0,027	0,025	0,004	0,016	0,0004	0,003	0,0055	0,0013	0,309	0,351	0,044
Check 1	0,12	1,29	0,010	0,005	0,29	0,01	0,04	0,01	0,028	0,024	0,004	0,017	0,0002	0,003	0,0050	0,0011	0,309	0,348	0,088
Check 2	0,12	1,29	0,010	0,006	0,28	0,01	0,04	0,01	0,027	0,023	0,004	0,016	0,0002	0,002	0,0050	0,0012	0,308	0,347	0,086
175724 030003127905	0,11	1,30	0,009	0,003	0,30	0,02	0,05	0,01	0,029	0,030	0,004	0,015	0,0004	0,002	0,0045	0,0015	0,284	0,347	0,115
Check 1	0,11	1,31	0,009	0,002	0,29	0,02	0,05	0,01	0,031	0,029	0,004	0,016	0,0002	0,002	0,0050	0,0013	0,285	0,346	0,116
Check 2	0,11	1,32	0,009	0,002	0,28	0,02	0,05	0,01	0,030	0,029	0,003	0,016	0,0002	0,002	0,0050	0,0013	0,287	0,346	0,115
178322 030003155671	0,10	1,28	0,012	0,003	0,29	0,04	0,06	0,02	0,028	0,080	0,004	0,016	0,0004	0,002	0,0071	0,0015	0,267	0,348	0,201
Check 1	0,10	1,29	0,013	0,003	0,29	0,04	0,06	0,02	0,030	0,083	0,002	0,017	0,0002	0,002	0,0071	0,0014	0,269	0,350	0,197
Check 2	0,10	1,27	0,011	0,004	0,30	0,04	0,06	0,02	0,029	0,082	0,004	0,015	0,0002	0,003	0,0075	0,0013	0,267	0,347	0,203

Ceq: Carbon Equivalent; Ceq: Carbon Equivalent; CE: Combined Elements;

## Tensile Test

Specimen Direction: Longitudinal

Method: Elong-Total Under Load 0,50 %

Temperature: Room Temperature

Wall Thickness: 7,1 mm

Gauge Length: 1,0 m

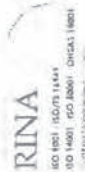
Type of Specimen

Required: Min

Mat

	Area (MM2)	YS (MPa)	TS (MPa)	E (%)
Heat Control Lot				
175147 030003140032	188,5	376	500	40
175724 030003127905	190,0	382	505	40
030003140031	188,8	371	486	39
178322 030003155671	186,2	369	500	39
	188,8	370	489	39
	189,2	373	492	40
	186,5	355	488	39
	185,9	360	492	40

YS-Yield Strength; TS-Tensile Strength; E-Elongation;



# Inspection Certificate

(According to DIN EN 10204.3.1)

N°: 0030032296 / 00

Sheet 3 / 4

## Hardness Test

Scale: HV

Min

Required: Min

Max 246,0

Heat Control Lot

175147 030003140032

175724 030003127905

030003140031

178322 030003155671

156,0 156,0

163,0 167,0

163,0 167,0

143,0 143,0

## Impact Test

Test Specimen: CHARPY 10X55X5 V NOTCH

Direction: Longitudinal

Temperature: -53°C

Striker radius: 8 mm

AE1	AE2	AE3	AE4	AE5	AE Avg	SA1	SA2	SA3	SA4	SA5	SA Avg	LE1	LE2	LE3	LE Avg
(J)	(J)	(J)	(J)	(J)	(J)	(J)	(%)	(%)	(%)	(%)	(%)	(Mils)	(Mils)	(Mils)	(Mils)
14	14	14	14	14	14	50	50	50	50	50	60	64	64	65	67

Required: Min

Max

Heat Control Lot

175147 030003140032

175724 030003140031

178322 030003155671

122 123 123

122 122 122

144 142 151

123 100 100

122 100 100

146 100 100

100 64 64

100 64 64

100 79 66

## Impact Test

Test Specimen: CHARPY V 10X55X5 FLATTENED

Direction: Transverse

Temperature: -46°C

Striker radius: 8 mm

AE1	AE2	AE3	AE4	AE5	AE Avg	SA1	SA2	SA3	SA4	SA5	SA Avg	LE1	LE2	LE3	LE Avg
(J)	(J)	(J)	(J)	(J)	(J)	(J)	(%)	(%)	(%)	(%)	(%)	(Mils)	(Mils)	(Mils)	(Mils)
14	14	14	14	14	14	50	50	50	50	50	60	64	64	65	67

Required: Min

Max

Heat Control Lot

175147 030003140032

175724 030003140031

178322 030003155671

121 121 122

121 122 121

106 111 104

121 100 100

122 100 100

106 100 100

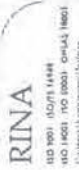
100 53 58

100 60 55

100 76 72

AE - Absorbed Energy; SA - Shear Area; LE - Lateral Expansion;





**Inspection Certificate**  
(According to DIN EN 10204, 3.1)

N°.: 0030032296 / 00

Sheet 4 / 4

**Remarks:**

1. MATERIAL IN ACCORDANCE WITH NACE MR 0175 PAR. 3.2/ISO 15156-2, ANNEX A.2.1.2/NACE MR0103 PAR. 2.1 ALL LATEST EDITIONS
2. SKU 2530104
3. THE WORKS OPERATE A QUALITY MANAGEMENT SYSTEM ACCORDING TO EUROPEAN DIRECTIVE 2014/68/EU ANNEX I PAR. 4.3 (CERTIFICATE 2016 BH MP 02-03) VALID UNTIL 12.05.2019).
- MATERIAL ACCORDING TO PED 2014/68/EU ANNEX I PAR. 7.5
4. - NO WELD REPAIR
  - FREE OF MERCURY CONTAMINATION
  - NO RADIOACTIVE CONTAMINATION
  - FINE GRAIN PRACTICE
  - FULLY KILLED STEEL
  - MATERIAL FROM BRAZIL

**NORMALIZED**

TEMPERATURE 892°C  
SOAKING TIME 40 MINUTES  
METHOD OF COOLING - AIR

We hereby certify that this product has been manufactured and examined in accordance with all requirements of the standards and specifications and all the results are found to be satisfactory. This testimonial and certificate respectively is recorded by a computer system and is valid without signature. Alteration or use for others products are regarded as falsification of documents and will be subject to criminal jurisdiction.

**QUALITY CONTROL DEPARTMENT**

FAX: (55-31) 3328-2773

e-mail: luiz.silva@vallourec.com

  
ENG. LUIZ FERNANDO DA SILVA - CREA/MG 58834-D  
TECHNICAL RESPONSIBLE

**DATE**

02.27.2019



Vallourec Soluções Tubulares do Brasil S.A.  
Barricão Plant - Av. Olinto Meireles, 65  
ZIP 30640-010 - Belo Horizonte, MG



RINA  
ISO 9001:2015 18447  
ISO 14001:2015 60061 OHSAS 18001  
Certified Management System

### Inspection Certificate

(According to DIN EN 10204 3.1)

Nº.: 0030030841 / 00

Sheet: 1 / 4

Customer: VALLOUREC CANADA INC

Country: Canada

Material Number: 274465

Work Order: 531796 / 50

Customer Order: VM-4682 - P.O. 4038589-00

Inspection: Vallourec Soluções Tubulares do Brasil S.A.

PRODUCT: SEAMLESS STEEL PIPE, HOT FINISHED, BEVELED ENDS 30 DEG., NORMALIZED

DIMENSIONS: 219,10 mm X 8,18 mm SCHEDULE: 040 GRADE: GRADE 290 # GR 1 # 6 # B

STANDARD: CSA-Z245.1-14 - CATEGORY II

IN ACCORDANCE ALSO TO THE STANDARDS: ASTM A 333M - 16 ASTM A 999M - 18 # ASTM A 106M - 18 ASTM A 530M - 12 # ASTM A 53M - 12 # ASME SA-333M - 17 ASME SA-999M - 17 # ASME SA-106M - 17 ASME SA-530M - 17

CUSTOMER SPECIFICATION: CCTF Gr.B.1.6.290 Cat II SS, 20.11.2017

SURFACE PROTECTION: EXTERNAL: LACQUER PIPE ENDS PROTECTOR: PLASTIC CAP

TOLERANCES: OUTSIDE DIAMETER (PIPE BODY): -0,80 mm / +1,60 mm WALL THICKNESS: -1,02 mm / +1,23 mm

TOLERANCES (PIPE ENDS): OUTSIDE DIAMETER: -0,40 mm / +1,60 mm

LENGTH: RANDOM 5486,00 mm - 6706,00 mm

STANDARD MARKING: PAINT STENCILED IN THE PIPE BODY: 531796/50 MANUFACTURER CSA-Z245.1-14 219,10 X 8,18 290 CAT II SS S IN LENGTH HEAT NUMBER ASTM A/ASME SA 333, 1/6 HF SCH 040 LT -46C ASTM A/ASME SA 106 B 16300 KPA WEIGHT ASTM A 53 B NPS 8" X SCH 40 VSB LOGO

SHIPPING MARKING: NACE MR 0175/NACE MR 0103 - MADE IN BRAZIL \* VM4682 / P.O # 4038589-00/ITEM-5 \* TORONTO \* CCTF

Heat	Pieces
175141	6
175142	8
176433	28
Total	42

THE PRODUCT IS SATISFACTORY IN THE FOLLOWING TESTS / INSPECTIONS: DIMENSIONAL # VISUAL # FLATTENING TEST # ENDS INSPECTION: UNTESTED ENDS CROPPED # HYDROSTATIC TEST: 16300,0 KPA 5 S # RESIDUAL MAGNETISM: MAX 30 GAUSS # ELECTROMAGNETIC TEST: CSAZ245.1-N101,0N/TRAN,OUT/INS # ULTRASONIC TEST FOR LAMINAR DEFECTS: ACC. CSA Z245.1-SOUR SERVICE #





# Inspection Certificate

(According to DIN EN 10204 3.1)

N°: 0030030841 / 00

Sheet 2 / 4

## Chemical Composition (%)

Ceq: CSA-Z245.1-CE11

Process: Basic Oxygen Furnace, heats fully killed

Ceq: C+Mn/6+(Cr+Mo+V)/5 -(Ni+Cu)/15

CEI: Cr + Cu + Mo + Ni + V

	C	Mn	P	S	Si	Ni	Cr	Mo	Al	Cu	V	Nb	B	Ti	N	Ca	Ceq	CEI
Heat Analysis	Min	0,400			0,100													
	Max	1,350	0,025	0,025	0,500	0,400	0,300	0,120		0,400	0,080	0,020	0,0010	0,110			0,400	0,430
Product Analysis	Min	0,400			0,100													
	Max	1,350	0,025	0,025	0,500	0,400	0,300	0,120		0,400	0,080	0,020	0,0010	0,110			0,400	0,430
Heat Control Lot																		
175141 030003103023		0,10	1,28	0,009	0,003	0,27	0,02	0,05	0,01	0,026	0,028	0,001	0,016	0,0005	0,001	0,0070	0,0019	0,262
Check 1		0,10	1,26	0,008	0,003	0,28	0,02	0,04	0,01	0,026	0,030	0,004	0,015	0,0003	0,001	0,0065	0,0016	0,258
Check 2		0,11	1,28	0,008	0,002	0,28	0,02	0,04	0,01	0,026	0,031	0,004	0,016	0,0002	0,001	0,0065	0,0016	0,270
175142 030003103024		0,11	1,29	0,010	0,004	0,28	0,02	0,05	0,01	0,030	0,025	0,001	0,015	0,0004	0,002	0,0077	0,0016	0,283
Check 1		0,11	1,28	0,011	0,003	0,28	0,03	0,06	0,01	0,031	0,021	0,005	0,016	0,0003	0,002	0,0072	0,0013	0,283
Check 2		0,11	1,29	0,009	0,003	0,28	0,02	0,04	0,01	0,029	0,025	0,004	0,015	0,0003	0,002	0,0075	0,0014	0,281
176433 030003103452		0,10	1,27	0,012	0,004	0,28	0,03	0,06	0,01	0,029	0,070	0,004	0,015	0,0004	0,002	0,0099	0,0012	0,265
Check 1		0,11	1,29	0,013	0,004	0,29	0,03	0,06	0,01	0,028	0,066	0,005	0,016	0,0003	0,002	0,0096	0,0013	0,277
Check 2		0,11	1,26	0,013	0,004	0,28	0,03	0,06	0,01	0,028	0,066	0,005	0,016	0,0002	0,002	0,0096	0,0013	0,273

Ceq: Carbon Equivalent; Ceq: Carbon Equivalent; CE: Combined Elements;

## Tensile Test

Specimen Direction: Longitudinal

Method: Elong. Total Under Load 0,50 %

Temperature: Room Temperature

Wall Thickness: 8,18 mm

Gage Length: L0=Z"

Type of Specimen

Required: Min  
Max

Heat Control Lot

175141 030003103023

175142 030003103024

176433 030003103452

STRIP WIDTH 38,1 MM  
STRIP WIDTH 38,1 MM  
STRIP WIDTH 38,1 MM  
STRIP WIDTH 38,1 MM  
STRIP WIDTH 38,1 MM  
STRIP WIDTH 38,1 MM

Area (MM2)	YS (MPa)	TS (MPa)	E (%)
336,8	360	472	41
348,7	389	455	40
318,9	395	502	42
330,1	401	490	40
328,0	396	508	43
341,8	410	495	40

YS-Yield Strength; TS-Tensile Strength; E-Elongation;



# Inspection Certificate

(According to DIN EN 10204 3.1)

N°: 0030030841 / 00

Sheet: 3 / 4

## Hardness Test

Scale: HV

Max

Required: Min

Max 246,0

Heat Control Lot

175141 030003103023

175142 030003103024

176433 030003103452

158,0 160,0

162,0 164,0

169,0 170,0

## Impact Test

Test Specimen: CHARPY 10X55X7,5 V NOTCH

Direction: Longitudinal

AE1 AE2 AE3

(J) (J) (J)

21 21 21

Required: Min

Max

Heat Control Lot

175141 030003103023

175142 030003103024

176433 030003103452

267 264 261

270 267 255

245 235 245

Temperature: -46°C

AE Avg AE Avg AE Avg

(J) (J) (J)

21 50 50

Required: Min

Max

264 100 100

264 100 100

242 100 100

Striker radius: 8 mm

SA5 SA Avg LE1

(%) (%) (Mils)

60

Required: Min

Max

100 75 75

100 80 80

100 80 80

SA4

(%)

SA3

(%)

SA2

(%)

SA1

(%)

SA Avg

(%)

SA5

(%)

SA4

(%)

SA3

(%)

SA2

(%)

SA1

(%)

SA Avg

(%)

SA5

(%)

SA4

(%)

SA3

(%)

SA2

(%)

## Impact Test

Test Specimen: CHARPY 10X55X6,67 V NOTCH

Direction: Transverse

AE1 AE2 AE3

(J) (J) (J)

18 18 18

Required: Min

Max

Heat Control Lot

175141 030003103023

175142 030003103024

176433 030003103452

196 208 213

203 179 187

160 187 156

Temperature: -46°C

AE Avg AE Avg AE Avg

(J) (J) (J)

18 50 50

Required: Min

Max

206 100 100

190 100 100

168 100 100

Striker radius: 8 mm

SA5 SA Avg LE1

(%) (%) (Mils)

60

Required: Min

Max

100 75 78

100 82 82

100 80 80

SA4

(%)

SA3

(%)

SA2

(%)

SA1

(%)

SA Avg

(%)

SA5

(%)

SA4

(%)

SA3

(%)

SA2

(%)

AE - Absorbed Energy; SA - Shear Area; LE - Lateral Expansion;

Remarks:

1. MATERIAL IN ACCORDANCE WITH NACE MR 0175

PAR. 3.2/ISO 15156-2, ANNEX A 2.1.2/NACE MR0103 PAR.2.1. ALL LATEST





**Inspection Certificate**  
(According to DIN EN 10204 3.1)

N°.: 0030030841 / 00

Sheet 4 / 4

HEAT: 175142 CCTF Sku: 2530112 8 A333-6 STD BLK SMLS SRL Invoice: 1596625-00 PO: 4072649 6/5/2019 12:50:24 PM

EDITIONS

2. SKU 2530112

3. THE WORKS OPERATE A QUALITY MANAGEMENT SYSTEM ACCORDING TO EUROPEAN  
DIRECTIVE 2014/68/UE ANNEX I PAR. 4.3 (CERTIFICATE 2016 BH MP 02-03  
VALID UNTIL 12.05.2019).  
- MATERIAL ACCORDING TO PED 2014/68/UE ANNEX I PAR. 7.5

"STEEL MADE BY BOF PROCESS"

- 4. - NO WELD REPAIR
- FREE OF MERCURY CONTAMINATION
- NO RADIOACTIVE CONTAMINATION
- FINE GRAIN PRACTICE
- FULLY KILLED STEEL
- MATERIAL FROM BRAZIL

We hereby certify that this product has been manufactured and examined in accordance with  
all requirements of the standards and specifications and all the results are found to be  
satisfactory. This testimonial and certificate respectively is recorded by a computer system and  
is valid without signature. Alteration or use for others products are regarded as falsification of  
documents and will be subject to criminal jurisdiction.

QUALITY CONTROL DEPARTMENT

FAX: (55-31) 3328-2773

e-mail: luis.silva@vallourec.com

DATE  
11.20.2018

ENG. LUIZ FERNANDO DA SILVA - CREA-MG 59834-D  
TECHNICAL RESPONSIBLE



Vallourec Soluções Tubulares do Brasil S.A.  
Direção Plant - Av. Orlino Mendes, 65  
Z/P 06640-010 - Belo Horizonte, MG



# Inspection Certificate

(According to DIN EN 10204.3.1)

Nº.: 0030031810 / 00

Sheet 1 - 4

Customer: VALLOURREC CANADA INC

Country: Canada

Material Number: 276624  
Work Order: 534782 / 80  
Customer Order: VN14748 - P.O 4038825-00

Inspection: Vallourec Soluções Tubulares do Brasil S.A.

PRODUCT: SEAMLESS STEEL PIPE, HOT FINISHED, BEVELED ENDS 30 DEG., NORMALIZED

DIMENSIONS: 219,10 mm X 8,18 mm SCHEDULE: 040 GRADE: 290 # GR 1 # 6 # B

STANDARD: CSA-Z245.1-18 - CATEGORY II

IN ACCORDANCE ALSO TO THE STANDARDS: ASTM A 333M - 16 ASTM A 999M - 18 = ASTM A 106M - 18 ASTM A 530M - 12 = ASTM A 53M - 12 = ASME SA-333M - 17 ASME SA-999M - 17 = ASME SA-106M - 17 ASME SA-530M - 17

CUSTOMER SPECIFICATION: CCTF GRB.1.6.290 Cat II SS, 20.11.2017

SURFACE PROTECTION: EXTERNAL: LACQUER PIPE ENDS PROTECTOR: PLASTIC CAP

TOLERANCES: OUTSIDE DIAMETER (PIPE BODY): -0,80 mm / -1,60 mm WALL THICKNESS: -1,02 mm / -1,23 mm

TOLERANCES: PIPE ENDS: OUTSIDE DIAMETER: -0,40 mm / -1,60 mm

LENGTH: RANDOM 5486,00 mm - 6706,00 mm

STANDARD MARKING: PAINT STENCILED IN THE PIPE BODY: 534782 80 MANUFACTURER CSA-Z245.1-18 219,10 X 8,18 290 CAT II N146C 55,5 IN LENGTH HEAT NUMBER ASTM A ASME SA 333, 1 6 HF SCH 040 LT -46C

ASTM A ASME SA 106 B 16300 KPA WEIGHT ASTM A 53 B NPS 8" X SCH 40 VSB LOGO

SHIPPING MARKING: NACE MR 0175/NACE MR 0103 - MADE IN BRAZIL - VN14748 / P.O 4038825-00 ITEM 48 - TORONTO - CCTF

Heat	Pieces
175146	12
177833	26
Total	38

THE PRODUCT IS SATISFACTORY IN THE FOLLOWING TESTS / INSPECTIONS: DIMENSIONAL # VISUAL # FLATTENING TEST # ENDS INSPECTION: UNTESTED ENDS CROPPED # HYDROSTATIC TEST 163000 KPA 5 S # RESIDUAL MAGNETIC FLUX 30 GAUSS # ELECTROMAGNETIC TEST: CSA Z245.1-N1010N:TRAN.001 INSS # ULTRASONIC TEST FOR LAMINAR DEFECTS: ACC. CSA Z245.1 SOUTHER SERVICE #





# Inspection Certificate

(According to DIN EN 10204 3.1)

N°: 0030031810 / 00

Sheet 2 - 4

## Chemical Composition (%)

Ceq: CSA-Z245, I-CE1

Process: Basic Oxygen Furnace, heats fully killed

Ceq: C-Mn/6+(Cr-Mo-V)/5-(Ni-Cu)/5

CE1: Cr-Cu+Mo+Ni+V

	C	Mn	P	S	Si	Ni	Cr	Mo	Al	Cu	V	Nb	B	Ti	N	Ca	Ceq	CE1
Heat Analysis																		
Min		0.400			0.100													
Max	0.240	1.350	0.025	0.025	0.500	0.400	0.300	0.120		0.400	0.080	0.020	0.0010	0.110			0.400	1.000
Product Analysis																		
Min		0.400			0.100													
Max	0.240	1.350	0.025	0.025	0.500	0.400	0.300	0.120		0.400	0.080	0.020	0.0010	0.110			0.400	1.000
Heat Control Lot																		
175146 030003113164	0.11	1.29	0.010	0.004	0.29	0.01	0.04	0.01	0.027	0.022	0.004	0.015	0.0004	0.002	0.0074	0.0012	0.281	0.338
Check 1	0.11	1.29	0.010	0.005	0.30	0.01	0.05	0.01	0.028	0.022	0.005	0.015	0.0005	0.002	0.0077	0.0012	0.284	0.340
Check 2	0.11	1.30	0.009	0.005	0.31	0.01	0.04	0.01	0.029	0.020	0.004	0.016	0.0002	0.002	0.0079	0.0014	0.283	0.339
177833 030003140903	0.11	1.29	0.010	0.004	0.28	0.03	0.07	0.01	0.029	0.090	0.004	0.014	0.0003	0.002	0.0067	0.0018	0.289	0.350
Check 1	0.11	1.28	0.011	0.003	0.27	0.03	0.07	0.01	0.030	0.090	0.003	0.015	0.0002	0.002	0.0064	0.0018	0.287	0.348
Check 2	0.10	1.28	0.011	0.003	0.27	0.03	0.07	0.01	0.030	0.090	0.003	0.015	0.0002	0.002	0.0067	0.0016	0.277	0.338

Ceq: Carbon Equivalent; Ceq: Carbon Equivalent; CE: Combined Elements

## Tensile Test

Specimen Direction: Longitudinal

Method: Elong. Total Under Load 0.50 %

Temperature: Room Temperature

Wall Thickness: 8.18 mm

Gauge Length: 10-2"

Type of Specimen

E

T.S

(MPa)

Y.S

(MPa)

Area

(MM<sup>2</sup>)

Required: Min

Max

Heat Control Lot

175146 030003113164

STRIP WIDTH 38 MM

324.3

41

502

35

625

177833 030003140903

STRIP WIDTH 38 MM

329.7

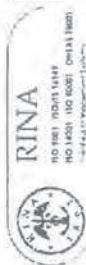
40

515

35

625

YS-Yield Strength; TS-Tensile Strength; E-Elongation;



# Inspection Certificate

(According to DIN EN 10204.3.1)

N°.: 0030031810 / 00

Sheet: 3 / 4

## Hardness Test

Scale: HV

Max

Required: Min

Max 246.0

Heat Control Lot

175146 030003113164

177833 030003140903

## Impact Test

Test Specimen: CHARPY 10N55N 5 V NOTCH

Direction: Longitudinal

Temperature: -16°C

Striker radius: 8 mm

AE1	AE2	AE3	AE4	AE5	AE Avg	SA1	SA2	SA3	SA4	SA5	SA Avg	LE1	LE2	LE3	LE Avg
(J)	(J)	(J)	(J)	(J)	(J)	(%)	(%)	(%)	(%)	(%)	(%)	(Mbs)	(Mbs)	(Mbs)	(Mbs)
21	21	21	21	21	21	50	50	50	50	50	50	60	60	60	60

Required: Min

Max

Heat Control Lot

175146 030003113164

177833 030003140903

AE - Absorbed Energy; SA - Shear Area; LE - Lateral Expansion;

## Impact Test

Test Specimen: CHARPY 10N55N 6.7 V NOTCH

Direction: Transverse

Temperature: -16°C

Striker radius: 8 mm

AE1	AE2	AE3	AE4	AE5	AE Avg	SA1	SA2	SA3	SA4	SA5	SA Avg	LE1	LE2	LE3	LE Avg
(J)	(J)	(J)	(J)	(J)	(J)	(%)	(%)	(%)	(%)	(%)	(%)	(Mbs)	(Mbs)	(Mbs)	(Mbs)
18	18	18	18	18	18	50	50	50	50	50	50	60	60	60	60

Required: Min

Max

Heat Control Lot

177833 030003140903

AE - Absorbed Energy; SA - Shear Area; LE - Lateral Expansion;

## Remarks:

1. MATERIAL IN ACCORDANCE WITH NACE MR 0175

PAR. 3.2/ISO 15156-2, ANNEX A.2.1.2/NACE MR0103 PAR.2.1, ALL LATEST

EDITIONS

2. SKO 2530112

3. THE WORKS OPERATE A QUALITY MANAGEMENT SYSTEM ACCORDING TO EUROPEAN





# Inspection Certificate

(According to DIN EN 10204 3.1)

Nº.: 0030031810 / 00

Sheet: 4 4

DIRECTIVE 2014/68/EU ANNEX I PAR. 4.3 (4) CERTIFICATE 2016 (H) MP 02-03

VALID UNTIL: 12.05.2019.

- MATERIAL ACCORDING TO PHE 2014 68 (4) ANNEX I PAR. 7.5

- 4 - NO WELD REPAIR
- FREE OF MERCURY CONTAMINATION
- NO RADIOACTIVE CONTAMINATION
- FINE GRAIN PRACTICE
- FULLY KILLED STEEL
- MATERIAL FROM BRAZIL

We hereby certify that this product has been manufactured and examined in accordance with all requirements of the standards and specifications and all the results are found to be satisfactory. This testimonial and certificate respectively is recorded by a computer system and is valid without signature. Attention or use for others products are regarded as falsification of documents and will be subject to criminal jurisdiction.

QUALITY CONTROL DEPARTMENT

FAX: (55-31) 3328-2773

e-mail: rina@vallourec.com

DATE:  
01.22.2019

  
ENG. LUTZ FERNANDO DA SILVA - CREA - MG 58844-0  
TECHNICAL RESPONSIBLE



Vallourec Soluções Tubulares do Brasil S.A.  
Barreiro Plant - Av. Olinio Meireles, 65  
ZIP 30640-010 - Belo Horizonte, MG



# Inspection Certificate

(According to DIN EN 10204.3.1)

Nº.: 0030030841 / 00

Sheet: 1 / 4

Customer: VALLOUREC CANADA INC

Country: Canada

Material Number: 274465  
Work Order: 531796 / 50  
Customer Order: VM-4682 - P O 4038589-00

Inspection: Vallourec Soluções Tubulares do Brasil S.A.

PRODUCT: SEAMLESS STEEL PIPE, HOT FINISHED, BEVELLED ENDS 30 DEG., NORMALIZED

DIMENSIONS: 219.10 mm X 8.18 mm SCHEDULE: 040 GRADE: GRADE 290 # GR 1 # 6 # B

STANDARD: CSA-Z245.1-14 - CATEGORY II

IN ACCORDANCE ALSO TO THE STANDARDS: ASTM A 333M - 16 ASTM A 999M - 18 # ASTM A 106M - 18 ASTM A 530M - 12 # ASTM A 53M - 12 # ASME SA-333M - 17 ASME SA-106M - 17 ASME SA-530M - 17

CUSTOMER SPECIFICATION: CCTF Gr.B.1.6.290 Cat II SS., 20.11.2017

SURFACE PROTECTION: EXTERNAL: LACQUER PIPE ENDS PROTECTOR: PLASTIC CAP

TOLERANCES: OUTSIDE DIAMETER (PIPE BODY): -0,80 mm / +1,60 mm WALL THICKNESS: -1,02 mm / +1,23 mm

TOLERANCES (PIPE ENDS): OUTSIDE DIAMETER: -0,40 mm / +1,60 mm

LENGTH: RANDOM 5486,00 mm - 6706,00 mm

STANDARD MARKING: PAINT STENCILED IN THE PIPE BODY: 531796/50 MANUFACTURER CSA-Z245.1-14 219.10 X 8.18 290 CAT II SS S HN LENGTH HEAT NUMBER ASTM A/ASME SA 333. 1/6 HF SCH 040 LT -46C ASTM A/ASME SA 106 B 16300 KPA WEIGHT ASTM A 53 B NPS 8" X SCH 40 VSB LOGO

SHIPPING MARKING: NACE MR 0175/NACE MR 0103 - MADE IN BRAZIL • VM4682 / P.O # 4038589-00/ITEM-5 • TORONTO • CCTF

Heat	Pieces
175141	6
175142	8
176433	28
Total	42

THE PRODUCT IS SATISFACTORY IN THE FOLLOWING TESTS / INSPECTIONS: DIMENSIONAL # VISUAL # FLATTENING TEST # ENDS INSPECTION : UNTESTED ENDS CROPPED # HYDROSTATIC TEST: 16300,0 KPA  
5 S # RESIDUAL MAGNETISM: MAX 30 GAUSS # ELECTROMAGNETIC TEST : CSAZ245.1-N10.10N/TRAN/OUT/INS # ULTRASONIC TEST FOR LAMINAR DEFECTS: ACC. CSA Z245.1-SOUR SERVICE #

Ceq: CSA-Z245.1-CELL

Process: Basic Oxygen Furnace, heats fully killed

$$C_{eq} = C + Mn/6 + (Cr + Mo + V)/5 - (Ni + Cu)/15$$
$$\text{CEI: Cr} + \text{Cu} + \text{Mo} + \text{Ni} + \text{V}$$

	C	Mn	P	S	Si	Ni	Cr	Mo	Al	Cu	V	Nb	B	Ti	N	Ca	Ceq	Ceq	CEI
Heat Analysis	Min	0.400			0.100														
	Max	0.240	1.350	0.025	0.025	0.500	0.400	0.300	0.120	0.400	0.080	0.020	0.0010	0.110			0.400	0.430	1.000
Product Analysis	Min	0.400			0.100														
	Max	0.240	1.350	0.025	0.025	0.500	0.400	0.300	0.120	0.400	0.080	0.020	0.0010	0.110			0.400	0.430	1.000
Heat Control Lot																			
175141 030003103023	0.10	1.28	0.009	0.003	0.27	0.02	0.05	0.01	0.026	0.028	0.001	0.016	0.0005	0.001	0.0070	0.0019	0.262	0.329	0.109
Check 1	0.10	1.26	0.008	0.003	0.28	0.02	0.04	0.01	0.026	0.030	0.004	0.015	0.0003	0.001	0.0065	0.0016	0.258	0.324	0.104
Check 2	0.11	1.28	0.008	0.002	0.28	0.02	0.04	0.01	0.026	0.031	0.004	0.016	0.0002	0.001	0.0065	0.0016	0.270	0.338	0.105
175142 030003103024	0.11	1.29	0.010	0.004	0.28	0.02	0.05	0.01	0.030	0.025	0.001	0.015	0.0004	0.002	0.0077	0.0016	0.283	0.340	0.106
Check 1	0.11	1.28	0.011	0.003	0.28	0.03	0.06	0.01	0.031	0.021	0.005	0.016	0.0003	0.002	0.0072	0.0013	0.283	0.342	0.126
Check 2	0.11	1.29	0.009	0.003	0.28	0.02	0.04	0.01	0.029	0.025	0.004	0.015	0.0003	0.002	0.0075	0.0014	0.281	0.339	0.099
176433 030003103452	0.10	1.27	0.012	0.004	0.28	0.03	0.06	0.01	0.029	0.070	0.004	0.015	0.0004	0.002	0.0099	0.0012	0.265	0.333	0.174
Check 1	0.11	1.29	0.013	0.004	0.29	0.03	0.06	0.01	0.028	0.066	0.005	0.016	0.0003	0.002	0.0096	0.0013	0.277	0.346	0.171
Check 2	0.11	1.26	0.013	0.004	0.28	0.03	0.06	0.01	0.028	0.066	0.005	0.016	0.0002	0.002	0.0096	0.0013	0.273	0.341	0.171

Ceq: Carbon Equivalent; Ceq: Carbon Equivalent; CE: Combined Elements;

### Tensile Test

**Specimen Direction: Longitudinal**

Method:Elong.Total Under Load 0,50 %

Temperature: Room Temperature

Wall Thickness: 8.18 mm

Gage Length:  $L_0=2"$

Required: Min

Max

Heat Control Lot

75141 030003103023

STRIP WIDTH 38.1 MM

336,8

360

472

41

75142 030003103024

STRIP WIDTH 38.1 MM

330.1

401

490

40

YS-Yield Strength; TS-Tensile Strength; E-Elongation;





# **Inspection Certificate** (According to DIN EN 10204.3.1)

N°.: 0030030841 / 00

Sheet: 3 / 4

## **Hardness Test**

Scale: HV

Max

Required: Min

Max 246,0

Heat Control Lot

175141 030003103023

175142 030003103024

176433 030003103452

## **Impact Test**

Test Specimen: CHARPY 10X55X7.5 V NOTCH

Direction: Longitudinal

AE1 AE2 AE3

(J) (J) (J)

21 21 21

Required: Min

Max

Heat Control Lot

175141 030003103023

175142 030003103024

176433 030003103452

AE - Absorbed Energy; SA - Shear Area; LE - Lateral Expansion;

## **Impact Test**

Test Specimen: CHARPY 10X55X6.67 V NOTCH

Direction: Transverse

AE1 AE2 AE3

(J) (J) (J)

18 18 18

Required: Min

Max

Heat Control Lot

175141 030003103023

175142 030003103024

176433 030003103452

AE - Absorbed Energy; SA - Shear Area; LE - Lateral Expansion;

## **Remarks:**

1. MATERIAL IN ACCORDANCE WITH NACE MR 0175
- PAR. 3.2/ISO 15156-2, ANNEX A.2.1.2/NACE MR0103 PAR.2.1. ALL LATEST

Striker radius: 8 mm

SA5 SA Avg LE1

(%) (%) (Mils)

60

SA4

(%)

SA3

(%)

SA2

(%)

SA1

(%)

AE Avg

(J)

AE5

(J)

AE4

(J)

AE3

(J)

AE2

(J)

AE1

(J)

SA5

(%)

SA Avg

(%)

LE1

(Mils)

LE2

(Mils)

LE3

(Mils)

LE Avg

(Mils)

Striker radius: 8 mm

SA5 SA Avg LE1

(%) (%) (Mils)

60

SA4

(%)

SA3

(%)

SA2

(%)

SA1

(%)

AE Avg

(J)

AE5

(J)

AE4

(J)

AE3

(J)

AE2

(J)

AE1

(J)

SA5

(%)

SA Avg

(%)

LE1

(Mils)

LE2

(Mils)

LE3

(Mils)

LE Avg

(Mils)



**Inspection Certificate**  
(According to DIN EN 10204 3.1)

N°.: 0030030841 / 00

Sheet 4 / 4

EDITIONS

2. SKU 2530112

3. THE WORKS OPERATE A QUALITY MANAGEMENT SYSTEM ACCORDING TO EUROPEAN DIRECTIVE 2014/68/EU ANNEX I PAR. 4.3 (CERTIFICATE 2016 BH MP 02-03 VALID UNTIL 12.05.2019).  
- MATERIAL ACCORDING TO PED 2014/68/EU ANNEX I PAR. 7.5

"STEEL MADE BY BOF PROCESS"

4. - NO WELD REPAIR  
- FREE OF MERCURY CONTAMINATION  
- NO RADIOACTIVE CONTAMINATION  
- FINE GRAIN PRACTICE  
- FULLY KILLED STEEL  
- MATERIAL FROM BRAZIL

We hereby certify that this product has been manufactured and examined in accordance with all requirements of the standards and specifications and all the results are found to be satisfactory. This testimonial and certificate respectively is recorded by a computer system and is valid without signature. Alteration or use for others products are regarded as falsification of documents and will be subject to criminal jurisdiction.

QUALITY CONTROL DEPARTMENT

FAX: (55-31) 3328-2773

e-mail: luis.silva@vallourec.com

ENG. LUIZ FERNANDO DA SILVA - CREA/ANG SRR34-D  
TECHNICAL RESPONSIBLE

DATE  
11.20.2018



Vallourec Soluções Tubulares do Brasil S.A.  
Barreiro Plant - Av. Orlino Meireles, 65  
ZIP: 30640-010 - Belo Horizonte, MG



# Inspection Certificate

(According to DIN EN 10204.3.1)

Nº.: 0030031810 / 00

Sheet: 1 - 4

Customer: VALLER-REC CANADA INC

Country: Canada

Material Number: 276624

Work Order: 534782 / 80

Customer Order: VM-4748 - P.O. 4038825-00

Inspector: Vallourec Soluções Tubulares do Brasil S.A.

PRODUCT: SEAMLESS STEEL PIPE, HOT FINISHED, BEVELED ENDS 30 DEG., NORMALIZED

DIMENSIONS: 219.10 mm X 8.18 mm SCHEDULE; 040 GRADE; 290 # GR. 1 # 6 # B

STANDARD: CSA-Z245.1-18 - CATEGORY II

IN ACCORDANCE ALSO TO THE STANDARDS: ASTM A 333M - 16; ASTM A 995M - 18; ASTM A 106M - 18; ASTM A 53M - 12; ASTM A 53M - 12; # ASME SA-333M - 17; ASME SA-995M - 17; ASME SA-106M - 17; ASME SA-53M - 17

CUSTOMER SPECIFICATION: CCTF GR.B.1.6.290 Cui II SS, 20.11.2017

SURFACE PROTECTION: EXTERNAL: LACQUER PIPE ENDS PROTECTOR; PLASTIC CAP

TOLERANCES: OUTSIDE DIAMETER (PIPE BODY): -0.80 mm / +1.60 mm WALL THICKNESS: -1.02 mm / +1.23 mm

TOLERANCES: PIPE ENDS: OUTSIDE DIAMETER: -0.40 mm / +1.60 mm

LENGTH: RANDOM 5486.00 mm - 6706.00 mm

STANDARD MARKING: PAINT STENCILED IN THE PIPE BODY: 534782 80 MANUFACTURER CSA-Z245.1-18 219.10 X 8.18 290 CUI II M46C 55 S IN LENGTH HEAT NUMBER ASTM A/ASME SA 333.1 6 HF SCH 40 LT 40C

ASTM A ASME SA 106 B 16300 KPA WEIGHT ASTM A 53 B NPS 8" X SCH 40 VSB LOGO

SHIPPING MARKING: NACE MR 0175/NACE MR 0103 - MADE IN BRAZIL \* VM4748 / P.O. # 4038825-00 ITEM-8 \* TORONTO \* CCTF

Heat	Pieces
175146	12
177833	26
Total	38

THE PRODUCT IS SATISFACTORY IN THE FOLLOWING TESTS / INSPECTIONS: DIMENSIONAL # VISUAL # FLATTENING TEST # ENDS INSPECTION # UNTESTED ENDS CROPPED # HYDROSTATIC TEST 16300.0 KPA 5 S # RESIDUAL MAGNETISM: MAX 30 GAUSS # ELECTROMAGNETIC TEST CSA-Z245.1-18 LONGITUDINAL TRANS. CUT INS # ULTRASONIC TEST FOR LAMINAR DEFECTS: ACC. CSA Z245.1-18 SOUR SERVICE #





# Inspection Certificate

(According to DIN EN 10204.3.1)

N°.: 0030031810 / 00

Sheet: 2 - 4

## Chemical Composition (%)

Ceq: CSA/245/1-CE11

Process: Basic Oxygen Furnace, heats fully killed

Ceq: C-Mn/6-(Cr-Mo-V)-Ni-Cu/15 CE1: Cr-Cu-Mo-Ni-V

	C	Mn	P	S	Si	Ni	Cr	Mo	Al	Cu	V	Nb	B	Ti	N	Ca	Ceq	CEI
Heat Analysis	Min	0.400			0.100													
	Max	1.350	0.025	0.025	0.500	0.001	0.300	0.120		0.400	0.080	0.020	0.0010	0.110			0.400	0.430
Product Analysis	Min	0.400			0.100													
	Max	1.350	0.025	0.025	0.500	0.001	0.300	0.120		0.400	0.080	0.020	0.0010	0.110			0.400	0.430
Heat Control Lot																		
175146 030003113164		1.29	0.010	0.004	0.29	0.01	0.04	0.01	0.027	0.022	0.004	0.015	0.0003	0.002	0.0074	0.0012	0.281	0.338
Check 1		1.29	0.010	0.005	0.30	0.01	0.05	0.01	0.028	0.022	0.005	0.015	0.0005	0.002	0.0077	0.0012	0.284	0.340
Check 2		1.30	0.009	0.005	0.31	0.01	0.04	0.01	0.029	0.020	0.004	0.016	0.0002	0.002	0.0079	0.0014	0.283	0.339
177833 030003140903		1.29	0.010	0.004	0.28	0.03	0.07	0.01	0.029	0.000	0.004	0.014	0.0003	0.002	0.0067	0.0018	0.289	0.350
Check 1		1.28	0.011	0.003	0.27	0.03	0.07	0.01	0.030	0.000	0.003	0.015	0.0002	0.002	0.0064	0.0018	0.287	0.348
Check 2		1.28	0.011	0.003	0.27	0.03	0.07	0.01	0.030	0.000	0.003	0.015	0.0002	0.002	0.0067	0.0016	0.277	0.338

Ceq: Carbon Equivalent; Ceq: Carbon Equivalent; CE: Combined Elements;

## Tensile Test

Specimen Direction: Longitudinal

Method: Elong/Total Under Load (0.50 %)

Temperature: Room Temperature

Wall Thickness: 8.18 mm

Gauge Length: 10.2"

	Required: Min	Max	Type of Specimen	Area (MM <sup>2</sup> )	YS (MPa)	TS (MPa)	E (%)
Heat Control Lot							
175146 030003113164			STRIP WIDTH 38 MM	324.3	383	502	41
			STRIP WIDTH 38 MM	329.7	399	515	40
177833 030003140903			STRIP WIDTH 38.1 MM	305.2	420	519	42
			STRIP WIDTH 38.1 MM	300.7	425	525	40

YS: Yield Strength; TS: Tensile Strength; E: Elongation;



# Inspection Certificate

(According to DIN EN 10204.3.1)

N°.: 0030031810 / 00

Sheet: 3 / 4

## Hardness Test

Scale: HV

Max  
Required: Min  
Max 246,0

Heat Control Lot  
175146 030003113164 148,0 150,0  
177833 030003140903 152,0 155,0

## Impact Test

Test Specimen: CHARPY 10X55X7.5 V NOTCH

Direction: Longitudinal  
AE1 AE2 AE3  
(J) (J) (J)

Temperature: -16°C  
AE Avg AE Avg AE Avg  
(J) (J) (J)

Striker radius: 8 mm  
SA5 SA4 SA3  
(%) (%) (%)

SA Avg LE1 LE2 LE3  
(Mils) (Mils) (Mils)

Required: Min 21 21 21  
Max

Heat Control Lot  
175146 030003113164 270 275 262  
177833 030003140903 275 263 270

AE - Absorbed Energy; SA - Shear Area; LE - Lateral Expansion;

## Impact Test

Test Specimen: CHARPY 10X55X6.67 V NOTCH

Direction: Transverse  
AE1 AE2 AE3  
(J) (J) (J)

Temperature: -16°C  
AE Avg AE Avg AE Avg  
(J) (J) (J)

Striker radius: 8 mm  
SA5 SA4 SA3  
(%) (%) (%)

SA Avg LE1 LE2 LE3  
(Mils) (Mils) (Mils)

Required: Min 18 18 18  
Max

Heat Control Lot  
177833 030003140903 210 186 174

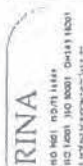
AE - Absorbed Energy; SA - Shear Area; LE - Lateral Expansion;

## Remarks:

1. MATERIAL IN ACCORDANCE WITH NACE MR 0175  
PAR. 3.2/ISO 15156-2, ANNEX A.2.1.2/NACE MR0103 PAR.2.1. ALL LATEST EDITIONS

2. SKU 2530112

3. THE WORKS OPERATE A QUALITY MANAGEMENT SYSTEM ACCORDING TO EUROPEAN



**Inspection Certificate**  
(According to DIN EN 10204 3.1)

Nº.: 0030031810 / 00

Sheet: 4 - 4

DIRECTIVE 2014/68/EU, ANNEX I PAR. 4.3 (CERTIFICATE 2016 B1 MIP 02-03)  
VALID UNTIL 12/05/2019.

- MATERIAL ACCORDING TO PED 2014/68/EU ANNEX I PAR. 7.5

- 4. - NO WELD REPAIR
- FREE OF MERCURY CONTAMINATION
- NO RADIOACTIVE CONTAMINATION
- FINE GRAIN PRACTICE
- FULLY KILLED STEEL
- MATERIAL FROM BRAZIL

We hereby certify that this product has been manufactured and examined in accordance with all requirements of the standards and specifications and all the results are found to be satisfactory. This testimonial and certificate respectively is recorded by a computer system and is valid without signature. Alteration or use for others products are regarded as falsification of documents and will be subject to criminal jurisdiction.

QUALITY CONTROL DEPARTMENT

FAX: (55-31) 3328-2773

e-mail: [skis@vallourec.com](mailto:skis@vallourec.com)

DATE  
01.22.2019

  
ENG. LUIZ FERNANDO DA S. (L.A.S.) - CREA: AMG 58834-D  
TECHNICAL RESPONSIBLE





CORPORATION

Date: 6/11/2019

4151 North Service Road, Burlington, ON L7L 4X6 (905) 335-5320

## Mill Test Reports

Invoice: 1596643-01  
PO: 2610087

Customer: 27403-261  
EQUIPEMENT KN  
POUR ABF MINES  
8254 RANG DU VIEUX PONT  
ROUYN-NORANDA, QC J9Y 0H4

Line	Heat#	Product	Description
3	61b01013 **	7561296	8 STD LR 45 WELD ELL A420WPL6
10	18/38332	7583949	8 300 RF WN FLG STD A350LF2



Thai Benkan Co., Ltd.  
58 Soi Wadnana, Bangkok, Prapachong,  
Samutprakan, 10130 Thailand.

# INSPECTION CERTIFICATE

Purchaser :

TO EN10204 3.1

D M Y Certificate No.  
08/08/2018 T = 2018020878

Purchase Order No. Job No.

E-No.	Specification for Material Made from Seamless Pipe	Specification for Inspection	Visual Examination	Dimensional Inspection														
ME-587	A234-18/SA234-17 Gr.WPB/M420-16/SA420-17 Gr.WPL6 CSA Z46.11-17 GR241 CAT B MKC 95	ASME B16.9-2012,B16.25-2017	Good	Good														
MFG. No.	Product & Size	(T=1)	Quantity	Hardness Actual Data														
81B01013	756 / 296	45 EL WPB/MWPL6 8 STD	50	HBW 123,128,128														
		Material Heat No.	Boron (%)															
		J6K1169	Ti= 1	0.0001														
Specifi- cation	Chemical Composition %												*2 Tension Test		transverse		HARDNESS MAX 197 HB : 1200	
	C	Si	Mn	P	S	Cu	Ni	Cr	Mo	Al	V	Nb	C.E.	Y S	TS	E	Impact Test (J) longitudinal 10 X 6.7 X 2V AT -46 °C	
	X	X	X	X	X	X	X	X	X	X	X	X	X					
	100	100	100	1000	1000	100	100	100	100	1000	1000	1000	100		MPa	%		
														240	415	30	116	
Min.		15	50															
Max.	23	40	135	35	40	40	40	30	12		80	20	40		585		127 AVE 111	
	12	27	127	13	1	1	3	11	1		0	0	38	295	452	48	90	

NORMALIZING 810 C X 40 MINUTES. COOLED IN STILL AIR

(Note 1) : Specification of Tl Composition (%) : Max 11 (Ti x 100)

Material according to ANSI/AACE MR0175/ISO 15156-2-2015 Annex A & MR0103-2015 (SSC Region 3)

\*Fully killed and fine grain practice\*\* Steel making process : Basic Oxygen\* Tensile test with longitudinal specimen and 50 mm. gauge length.

C.E. = C+Mn/6+(Cr+Mo+V)/5+(Ni+Cu)/15

MAGNETIC PARTICLE EXAMINATION FOR TEE ONLY :

We hereby certify that the product described herein has been manufactured in accordance with the specifications concerned and also with the purchaser's requirements and that the test results shown herein are correct.

\* 1 : "T" symbolized wall thickness in mm. \* 2 : YS Yield strength TS = Tensile strength T = Elongation

*[Signature]*  
Rungnua Kampradon

Quality Assurance Manager  
Thai Benkan Co., Ltd.



<b>COMPANY WITH MANAGEMENT SYSTEM CERTIFIED BY DNV GL</b> = ISO 9001 = = ISO 14001 =	 <b>METALFAR PRODOTTI INDUSTRIALI SPA</b> 23861 CESANA BRIANZA (LC) - ITALY VIA G. PARINI, 28 PHONE + 39 031 855441 - FAX +39 031 855149 certificate@metalfaritaly.com	<b>COMPANY WITH MANAGEMENT SYSTEM CERTIFIED BY DNV GL</b> = ISO 9001 = = ISO 14001 =																																																																																				
<b>INSPECTION CERTIFICATE EN 10204:2004 / 3.1</b>																																																																																						
<b>SILBO INDUSTRIES</b> 50 CHESTNUT RIDGE ROAD SUITE 204 07645 MONTVALE N.J.		Nr. 2018-C_MFF-04299    Data / Dated 31.10.2018																																																																																				
Dest. CA		Ordine / PO 69051/BG Item 015 DDT / Delivery note 2018-3E301-0004398 Packing List 2018-3E401-0004238 Fattura / Invoice 2018-3E401-0004238 Nr. rif. / Our ref. 2017-3E201-0003478-0015																																																																																				
Cod. colata Heat Code	Nr. colata Heat Nr	Quantita Quantity																																																																																				
18/38332	7583949	50,00																																																																																				
Descrizione Description W/N 300 RF 8" STD LF2CL1																																																																																						
Mat. in acc. a / Mat. in acc. to ASTM A 350M - 18, ASME SA 350 M - 17, ASME CODE SECT. II, PART A, ED. 2017 ASTM A350 LF2 CL1 ASTM A105M - 18, ASME SA105M-17, ASME CODE SECT. II, PART A, ED. 2017 NACE MR-0175/2015 ISO 15156 Part 2 - Annex A - SOUR SERVICE NACE MR-0103/2015 ISO 17495- SOUR SERVICE CSA Z245.12-17 GRADE 248 CAT.II SOUR SERVICE CSA Z245.12-17 GRADE 248 CAT.I SOUR SERVICE Q.A.S. IN ACCORD. WITH PRESS. EQUIPM. DIRECT. 2014/68/EU (PED) ANNEX I, PARAGRAPH 4.3 CERT. 4687-2014-CE-ITA-DNV GL																																																																																						
Ann. mat. / Mat. remarks FULLY KILLED STEEL AND FINE GRAIN PRACTICED GRAIN SIZE - 7 OR FINER NO WELD REPAIR																																																																																						
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>Elementi / Elements</th> <th>C</th> <th>Si</th> <th>Mn</th> <th>S</th> <th>P</th> <th>Cr</th> <th>Ni</th> <th>Mo</th> <th>Ti</th> <th>Cu</th> <th>V</th> <th>Nb</th> <th>N</th> </tr> <tr> <td>LADLE ANALYSIS</td> <td>0.185</td> <td>0.220</td> <td>1.090</td> <td>0.008</td> <td>0.009</td> <td>0.110</td> <td>0.050</td> <td>0.010</td> <td>0.016</td> <td>0.160</td> <td>0.002</td> <td>0.001</td> <td>0.008</td> </tr> <tr> <td>PRODUCT ANALYSIS</td> <td>0.184</td> <td>0.228</td> <td>1.096</td> <td>0.007</td> <td>0.012</td> <td>0.116</td> <td>0.055</td> <td>0.013</td> <td>0.019</td> <td>0.164</td> <td>0.004</td> <td>0.002</td> <td>0.007</td> </tr> <tr> <td></td> <td>Al</td> <td>B</td> <td>Ce</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>CE</td> <td></td> <td>F1</td> <td>F2</td> <td>PREN</td> </tr> <tr> <td>LADLE ANALYSIS</td> <td>0.025</td> <td>0.0004</td> <td>0.002</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>0.407</td> <td></td> <td>0.332</td> <td>0.120</td> <td>-</td> </tr> <tr> <td>PRODUCT ANALYSIS</td> <td>0.027</td> <td>0.0000</td> <td>0.002</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>0.408</td> <td></td> <td>0.352</td> <td>0.129</td> <td>-</td> </tr> </table>			Elementi / Elements	C	Si	Mn	S	P	Cr	Ni	Mo	Ti	Cu	V	Nb	N	LADLE ANALYSIS	0.185	0.220	1.090	0.008	0.009	0.110	0.050	0.010	0.016	0.160	0.002	0.001	0.008	PRODUCT ANALYSIS	0.184	0.228	1.096	0.007	0.012	0.116	0.055	0.013	0.019	0.164	0.004	0.002	0.007		Al	B	Ce						CE		F1	F2	PREN	LADLE ANALYSIS	0.025	0.0004	0.002						0.407		0.332	0.120	-	PRODUCT ANALYSIS	0.027	0.0000	0.002						0.408		0.352	0.129	-
Elementi / Elements	C	Si	Mn	S	P	Cr	Ni	Mo	Ti	Cu	V	Nb	N																																																																									
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CE=C+(Mn/6+Si/24+Cu/15+Ni/20+(Cr+Mo+V+Nb)/5+5B)    F1=Cu+Ni+Cr+Mo+V    F2=Cr+Mo																																																																																						
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>Provetta Test specimen</th> <th>Forma Shape</th> <th>*C<sup>23</sup></th> <th>Sneramento &gt; 0,2% Yield Strength &gt; 0,2%</th> <th>Sneramento &gt; 1,0% Yield Strength &gt; 1,0%</th> <th>Rottura Tensile</th> <th>Allungamento Elongation</th> <th>Contrazione Reduction of area</th> </tr> <tr> <td>Sez./Sect mm2    Gauge L mm    f=O-2=□</td> <td></td> <td></td> <td>MPa</td> <td>MPa</td> <td>MPa</td> <td>%</td> <td>%</td> </tr> <tr> <td>126,60    50,80    1    20</td> <td></td> <td></td> <td>335,0</td> <td>-</td> <td>530,0</td> <td>37,0</td> <td>69,0</td> </tr> </table>			Provetta Test specimen	Forma Shape	*C <sup>23</sup>	Sneramento > 0,2% Yield Strength > 0,2%	Sneramento > 1,0% Yield Strength > 1,0%	Rottura Tensile	Allungamento Elongation	Contrazione Reduction of area	Sez./Sect mm2    Gauge L mm    f=O-2=□			MPa	MPa	MPa	%	%	126,60    50,80    1    20			335,0	-	530,0	37,0	69,0																																																												
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<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th colspan="2">DUREZZA / HARDNESS</th> <th colspan="4">RESILIENZA / IMPACT TEST</th> </tr> <tr> <td>HBW</td> <td>Tipo/Type</td> <td>Provetta / Test Specimen</td> <td>*C<sup>23</sup></td> <td>1-Joule</td> <td>2-Joule</td> <td>3-Joule</td> </tr> <tr> <td>162,0    166,0    160,0</td> <td>KV</td> <td>10x10 mm</td> <td>-46</td> <td>57</td> <td>60</td> <td>50</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>Media/Average</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>55,7</td> </tr> </table>			DUREZZA / HARDNESS		RESILIENZA / IMPACT TEST				HBW	Tipo/Type	Provetta / Test Specimen	*C <sup>23</sup>	1-Joule	2-Joule	3-Joule	162,0    166,0    160,0	KV	10x10 mm	-46	57	60	50							Media/Average							55,7																																																		
DUREZZA / HARDNESS		RESILIENZA / IMPACT TEST																																																																																				
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Dim in acc. a / Dim. acc. to ASME/ANSI B16.5 -2017 ; ASME/ANSI B36.10M -2015 ; ASME/ANSI B16.25 -2017																																																																																						
Finitura / Roughness ASME/ANSI B46.1 -2009 125-250 µin AARH																																																																																						
Marcatura in acc. Marking in acc. to	ANSI/MSS SP-25-2018	Origine Origin of Steel ITALY																																																																																				

Note / Notes 100% MANUFACTURED IN ITALY

Introduction of flanges on the furnace at temperature below 200°C.  
 Heating of piece of 150°C. every hour till 930°C  
 Holding time: 1 hour/ Inch. - min 2 hours - Cooled in still air  
 Test specimen orientation: Longitudinal

UFFICIO CONTROLLO QUALITA' QUALITY CONTROL DEPARTMENT 	ENTE UFFICIALE DI COLLAUDO INSPECTION AUTHORITY	MARCHIO PRODUZIONE MANUFACTURER'S SYMBOL 
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MLTS\_6056-18732  
Heat# SEE BELOW



CORPORATION

4151 North Service Road, Burlington, ON L7L 4X6 (905) 335-5320

Date: 6/14/2019

## Mill Test Reports

Invoice: 1597082-00

PO: 2610096

Customer: 27403-261

A.B.F MINES/2985080

1310 AVE DAVY

REF 18777-6056

ROUYN NORANDA, QC J9Y 0A8



Line	Heat#	Product	Description
1	956v	7561733	8 STD WELD TEE A420WPL6
2	508105d	7586891	8 150 RF WN FLG STD A350LF2
3	508101C	7585666	8 300 RF BLIND FLG A350LF2
4	886v	7561288	6 STD LR 45 WELD ELL A420WPL6
5	18c1054	7561725	6 STD WELD TEE A420WPL6
6	508105g	7586832	6 150 RF WN FLG STD A350LF2
7	b03459	7585585	6 150 RF BLIND FLG A350LF2

Heat codes followed by \*\* have been corrected, change may not show on the packing slip





# CERTIFICATE OF INSPECTION & TEST (EN 10204 3.1)



**ST&H CORPORATION**  
 OFFICE - 74, Jwadongsunhwan-ro, Haeundae-gu, Busan, Korea  
 PLANT - 11, Eogokgongdan 2-gil, Yangsan-si, Kyungnam, Korea  
 Tel : +82.51.744-4680(5 line) Fax : +82.51.744-4670  
 E-mail : qm@stnhcorp.com



Certificate No. MJH0165-02/07 Date : DEC. 20. 2018  
 Customer CCTF CORPORATION  
 Contract No. 4038929-00  
 Spec. For Material ASTM A105N-18, ASME SA105N-17, ASTM A350 LF2 CL1-18, ASME SA350 LF2 CL1-17, NACE MR0175/ISO 15156-2:2015, NACE MR0103/ISO 17495-1:2016  
 Heat Treatment 930°C NORMALIZED & A/C  
 Dimensional inspection ASME B16.5 - 2017  
 Certified to ISO9001/ISO14001:2015, PED2014/68/EC by LRQA

ITEM / SIZE	Q'ty	Heat No./ Batch No.	Size of Test Specimen		Tension Test				Hardness Test (HB)	Charpy Impact Test (10X10mm Specimen Size)				
			D mm	GL mm	Y.S MPa	T.S MPa	E.L %	R.A %		Indiv. 16J	Ave. 20J	Notch V	Temp. -46°C	
									Max					Min
						12.5	50.0					187		
7586502	5	508105C	12.5	50.0	330	522	33	73	150	155	136	154	142	144
300LBS WN RF XH 6"	20	508105C	12.5	50.0	330	522	33	73	150	155	136	154	142	144
7586891	20	508105D	12.5	50.0	330	522	33	73	150	155	136	154	142	144
300LBS WN RF STD 4"	25	508105D	12.5	50.0	330	522	33	73	150	155	136	154	142	144
7586867	25	508105D	12.5	50.0	330	522	33	73	150	155	136	154	142	144
7585496	35	508105D	12.5	50.0	330	522	33	73	150	155	136	154	142	144
BLANK			BLANK			BLANK			BLANK					

Heat No./ Batch No.	Max Min	Chemical Composition (%)												NDE		
		C	Si	Mn	P	S	Ni	Cr	Mo	Cu	V	Nb	CE	UT	MT	PT
508105C	H 0.159 P 0.160	0.300 0.150	0.234 0.244	1.260 1.250	0.011 0.014	0.003 0.003	0.019 0.017	0.077 0.079	0.005 0.006	0.017 0.018	0.001 0.001	0.004 0.004	0.388 0.387			
508105D	H 0.159 P 0.160	0.244 0.244	1.250 1.250	0.014 0.011	0.003 0.003	0.019 0.017	0.077 0.079	0.005 0.006	0.017 0.018	0.001 0.001	0.004 0.004	0.388 0.387				
BLANK																

REMARK \* H : Heat Analysis P : Product Analysis

*[Signature]*



We hereby certify that the material herein has been made and tested in accordance with the above specification and also with the requirements called for by the above order.

Witnessed by / H. J. LEE  
 Manager of Q.A Dept. / JAY KIM  
 ST&H CORPORATION



**CERTIFICATE OF INSPECTION & TEST (EN 10204 3.1)****ST** **ST&H CORPORATION**

OFFICE - 74, Jwadongsunhwan-ro, Haeundae-gu, Busan, Korea  
 PLANT - 11, Eogokgongdan 2-gil, Yangsan-si, Kyungnam, Korea  
 Tel : +82.51.744-4680(5 line) Fax : +82.51.744-4670  
 E-mail : qm@stnhcorp.com



CE  
 RPS DESIGN / 01

Certificate No. MJH0137-07/11

Date : DEC. 19, 2018

Customer CCTF CORPORATION

Contract No. 4038743-00

Spec. For Material ASTM A105N-18, ASME SA105N-17, ASTM A350 LF2 CL1-18, ASME SA350 LF2 CL1-17, NACE MR0175/ISO 15156-2:2015, NACE MR0103/ISO 17495-1:2016

Heat Treatment 930°C NORMALIZED &amp; A.C

Certified to ISO9001 / ISO14001:2015, PED2014/68/EC by LRQA  
 Dimensional inspection ASME B16.5 - 2017

ITEM / SIZE	Q'ty	Heat No./ Batch No.	Size of Test Specimen		Tension Test				Hardness Test (HB)		Charpy Impact Test (10X10mm Specimen Size)				
			D mm	GL mm	Y.S MPa	T.S MPa	E.L %	R.A %	Test (HB)	Indiv. 16J	Ave. 20J	Notch V	Temp. -46°C		
					Max	Min	Test Result (J)								
					12.5	50.0	250	485	22.0					30.0	
7585585	40	508101C	12.5	50.0	339	525	34	78	159	162	188	165	195	183	
7585666	25	508101C	12.5	50.0	339	525	34	78	159	162	188	165	195	183	
7580185	20	508101C	12.5	50.0	339	525	34	78	159	162	188	165	195	183	
7580219	20	508101F	12.5	50.0	339	525	34	78	159	162	188	165	195	183	
7586507	50	508101F	12.5	50.0	339	525	34	78	159	162	188	165	195	183	
7586508	25	508101F	12.5	50.0	339	525	34	78	159	162	188	165	195	183	
7586509	70	508101F	12.5	50.0	339	525	34	78	159	162	188	165	195	183	
7580218	25	508101F	12.5	50.0	339	525	34	78	159	162	188	165	195	183	
BLANK			BLANK		BLANK				BLANK		BLANK				

Heat No./ Batch No.	Max Min	Chemical Composition (%)											NDE			
		C	Si	Mn	P	S	Ni	Cr	Mo	Cu	V	Nb	CE	UT	MT	PT
508101C	H	0.160	0.207	1.250	0.009	0.007	0.020	0.091	0.002	0.024	0.001	0.004	0.390			
	P	0.164	0.220	1.250	0.009	0.005	0.013	0.092	0.002	0.022	0.003	0.004	0.394			
508101F	H	0.160	0.207	1.250	0.009	0.007	0.020	0.091	0.002	0.024	0.001	0.004	0.390			
	P	0.164	0.220	1.250	0.009	0.005	0.013	0.092	0.002	0.022	0.003	0.004	0.394			
BLANK																

REMARK \* H : Heat Analysis P : Product Analysis



*[Signature]*

We hereby certify that the material herein has been made and tested in accordance with the above specification and also with the requirements called for by the above order.

Witnessed by / H. J. LEE

Manager of QA Dept. / JAY KIM

ST-801-14-02

ST&amp;H CORPORATION



# INSPECTION CERTIFICATE

Customer : CCTF CORPORATION  
 Product : SEAMLESS LOW TEMPERATURE CARBON STEEL BUTT WELD FITTINGS  
 Spec : ASTM A420-16/ASME SA420-15 WPL6, CSA Z245.11-17 Gr 241 Cat II -45C SS NACE MR0175/ISO 15156-2 Region 3-15 & NACE MR0103-16, ASTM A234-18/ASME SA234-15 WPB

ACCORDANCE WITH EN 10204-3.1  
 CHUP HSIN ENTERPRISE CO., LTD.  
 17, TUNG LI ROAD, HSIAO KANG DISTRICT, KAOHSIUNG CITY, TAIWAN, R.O.C.  
 TEL:(07)831-9157 FAX:(07)821-7500, 831-2942

Certificate No : 00700220-0110  
 Order No : 4039057-00  
 Date : 2019/03/19

Raw Material		Specification for Inspection				Visual Inspection		Dimensional Inspection							
ASTM A106 GR.B/GREEN PIPE FOR A333-6		ASME B16.9-2012				PASS		PASS							
Item	Description	Quantity	Heat ID	Heat No	Raw Material Certificate No.	NDE MT	Impact Test			Ave. J					
							Test Temp °C	Size of specimen mm	Charpy V-Notch Impact Value J						
123	45 E L/R WPL6 STD 756	35	886V	1834886V	HENGYANG C201841289-1		-45	10 X 5.0 X 55	56	62	60				
131	RED TEE WPL6 STD 2624	10	885V	1834885V	HENGYANG C201841281-1	PASS	-45	10 X 5.0 X 55	54	48	51.33				
132	RED TEE WPL6 STD 2602	15	885V	1834885V	HENGYANG C201841281-1	PASS	-45	10 X 5.0 X 55	54	48	51.33				
135	TEE WPL6 XS 1938	8	A248	18322248	BAOSTEEL BGSAG1803080005100	PASS	-45	10 X 10 X 55	128	142	140				
136	TEE WPL6 XS 1946	2	E274	34274H	BAOSTEEL BGSQGL804040002900	PASS	-45	10 X 10 X 55	162	184	174.67				
Specifi- cation	Chemical Composition%										Heat Treatment		REMARK		
	C	Si	Mn	P	S	Cu	Ni	Cr	Mo	V	Nb	C.E		Tensile Test	
	X100	X100	X100	X1000	X1000	X100	X100	X100	X100	X1000	X1000	X100	P.S.I	%	HB
Min.	15	50										35000	60000	30	
Max.	30	40	135	35	40	40	40	30	12	80	20	50	95000		197
123	13	31	98	11	1	5	2	6	1	1	<1	31	49044	68100	42.5
131	13	31	100	11	2	5	2	6	2	<1	<1	31	47738	67600	37.0
132	13	31	100	11	2	5	2	6	2	<1	<1	31	47738	67600	37.0
135	13	15	74	6	4	4	2	4	1	<1	<1	27	39322	63600	40.0
136	15	18	89	9	4	1	3	4	<1	<1	1	31	38306	68100	35.5
NORM. 910 Cx0.5HR AC															

C.E. = C+Mn / 6 + (Cr+Mo+V)/5 + (Ni+Cu)/15

We hereby certify that the material herein described has been manufactured, sampled, tested and inspected in accordance with, and was found to meet, the requirements of above specifications and purchaser's order.

K. Y. Tsai  
 Chief of Quality Assurance Section





# INSPECTION CERTIFICATE

PURCHASER SEYBOLD INT'L CORP.  
 STANDARD ASTM A420 WPL6-16  
 ASME SA420 WPL6-04  
 CSA Z245.11-17 Gr.290 CAT II Sour Service  
 MATERIALS ASTM A333-6  
 INSP SPEC ASME B16.9 -12

8. MEI-CHUNG RD. NIAO-SONG,  
 KAOHSIUNG 83301, TAIWAN  
 TEL: 886-77310527-8  
 FAX: 886-77315887

DATE: 2019-01-07  
 ORDER NO: 7014596/4038286-00  
 P.I. NO: 18B05-1  
 CERTIFI NO: 181212-1

ACCORDING TO EN10204/DIN50049/3.1

ITEM NO.	PRODUCT & SIZE	QUANTITY PCS	MFG NO.	VISUAL & DIMENSIONAL INSPECTION	HARDNESS MAX. 197 HB	HEAT TREATMENT (NOTE)	MAGNETIC PARTICLE EXAMINATION	IMPACT TEST (J)												
35	TEE 6"WPL6 STD  7561725	25	18C1054	GOOD	132-143	N	GOOD	10 x 5.0 x 2V AT -45 °C 112.4 115.3 129.7 119.1												
ITEM NO.	MATERIAL CHARGE NO.	CHEMICAL COMPOSITION %												PHYSICAL TEST						
		C	Si	Mn	P	S	Cu	Ni	Cr	Mo	V	Nb	Ti	B	Y S	T S	E	**	*CE	*CEQ
		STANDARD	MIN.	MAX.																
35	J4LB254	11	26	130	14	3	1	100	25	13	100	2	1		42.0	60.0	27.0		50	50
								2	12	1	<1	<1	2	<1	44.1	66.9	30.9	L	35	29

(NOTE): A-HOT FORMED WITH FINAL TEMPERATURE BETWEEN 630°C - 980°C. AIR COOLING.  
 N-NORMALIZING AT TEMPERATURE 880°C X0.5HR. AIR COOLING. S-STRESS RELIEF AT TEMPERATURE 650°C X0.5HR.  
 NACE MR0175-2015/ISO15156-1 NACE MR0103-2015/ISO17945: SATISFACTORY  
 WE HEREBY CERTIFY THAT THE PRODUCT DESCRIBED HEREIN HAS BEEN MANUFACTURED IN ACCORDANCE WITH THE SPECIFICATIONS CONCERNED AND ALSO WITH THE PURCHASER'S REQUIREMENTS AND THAT THE TEST RESULTS SHOWN HEREIN ARE CORRECT.  
 \* TYPE OF SPECIMEN: STRIP (WIDTH: 1 in. / GAUGE LENGTH: 2 in.) \*\* SAMPLING DIRECTION: L=LONGITUDINAL, T=TRANSVERSE  
 \*( $\frac{Fe}{Fe+Mn+6+(Cr+Ni+V)/5} + \frac{Cu+Ni}{15} + \frac{Nb}{20} + \frac{Ti}{5} + \frac{Mo}{5} + \frac{V}{5} + \frac{Nb}{5}$ )

**Ou L Lan**

MANAGER OF Q.A. DEPT.





# CERTIFICATE OF INSPECTION & TEST (EN 10204 3.1)



**ST&H CORPORATION**  
 OFFICE - 74, Jwadongsunhwan-ro, Haeundae-gu, Busan, Korea  
 PLANT - 11, Eogokgongdan 2-gil, Yangsan-si, Kyungnam, Korea  
 Tel : +82.51.744-4680(5 line) Fax : +82.51.744-4670  
 E-mail : qm@stnhcorp.com



Certificate No. MJH0290-01/05  
 Customer CCTF CORPORATION  
 Contract No. 4039095-00

Date : FEB. 14. 2019

Spec. For Material ASTM A105N-18, ASME SA105N-17, ASTM A350 LF2 CL1-18, ASME SA350 LF2 CL1-17, NACE MR0175/ISO 15156-2:2015, NACE MR0103/ISO 17495-1:2016  
 Heat Treatment 930°C NORMALIZED & A.C

Certified to ISO9001/ ISO14001:2015, PED2014/68/EC by LRQA  
 Dimensional inspection ASME B16.5 - 2017

ITEM / SIZE	Q'ty	Heat No./ Batch No.	Size of Test Specimen		Tension Test				Hardness Test (HB)	Charpy Impact Test (10X10mm Specimen Size)											
			D mm	GL mm	Max	Y.S MPa	T.S MPa	E.L %		R.A %	Test Result (J)										
											16J	20J	Ave.	Notch V	Temp. -46°C						
																Indiv.	16J	20J	Ave.	Notch V	Temp. -46°C
7585585	20	803459	12.5	50.0	330	520	34	76	156	80	75	86	80								
7585860	10	803459	12.5	50.0	330	520	34	76	156	80	75	86	80								
7580218	20	803459	12.5	50.0	330	520	34	76	156	80	75	86	80								
7580202	2	803459	12.5	50.0	330	520	34	76	156	80	75	86	80								
7586502	5	803459	12.5	50.0	330	520	34	76	156	80	75	86	80								
7586824	50	803459	12.5	50.0	330	520	34	76	156	80	75	86	80								
7586832	30	803459	12.5	50.0	330	520	34	76	156	80	75	86	80								
7586891	20	803459	12.5	50.0	330	520	34	76	156	80	75	86	80								
7583949	10	803459	12.5	50.0	330	520	34	76	156	80	75	86	80								
7585321	20	803459	12.5	50.0	330	520	34	76	156	80	75	86	80								
Chemical Composition (%)											NDE										
Heat No./ Batch No.	C	Si	Mn	P	S	Ni	Cr	Mo	Cu	V	Nb	CE		UT	MT	PT					
	Max Min	0.300 0.150	0.300 0.150	1.350 0.600	0.035 0.008	0.040 0.008	0.400 0.080	0.300 0.120	0.400 0.020	0.080 0.020	0.020										

## Chemical Composition (%)

Heat No./ Batch No.	Max Min	Chemical Composition (%)											NDE			
		C	Si	Mn	P	S	Ni	Cr	Mo	Cu	V	Nb	CE	UT	MT	PT
		0.300	0.300	1.350	0.035	0.040	0.400	0.300	0.120	0.400	0.080	0.020				
			0.150	0.600												

B03459 H 0.163 0.226 1.230 0.012 0.002 0.057 0.138 0.017 0.147 0.001 0.006  
 P 0.162 0.224 1.240 0.011 0.002 0.054 0.136 0.014 0.138 0.001 0.001  
 BLANK

REMARK \* H : Heat Analysis P : Product Analysis



*[Signature]*

We hereby certify that the material herein has been made and tested in accordance with the above specification and also with the requirements called for by the above order.

Witnessed by / H. J. LEE

Manager of Q.A Dept. / JAY KIM

ST-801-14-02

ST&H CORPORATION



MLTS\_6056-18777  
Heat# SEE BELOW



CORPORATION

5407 53rd Avenue, Edmonton, AB T6B 3G2 (780) 463-8700

Date: 6/14/2019

## Mill Test Reports

Invoice: 5736215-00

PO: WT

Customer: 498

A.B.F. MINES/2985080 CANADA

1310 AVE DAVY

REF 18777-6056

ROUYN-NORANDA, QC J9Y 0A8

Line	Heat#	Product	Description
1	61k01m028	7561296	8 STD LR 45 WELD ELL A420WPL6
1	61m01m049	7561296	8 STD LR 45 WELD ELL A420WPL6
1	61n01m031-1	7561296	8 STD LR 45 WELD ELL A420WPL6
2	b21a8	7583949	8 300 RF WN FLG STD A350LF2

**Heat codes** followed by \*\* have been corrected, change may not show on the packing slip



Purchaser: CCTF CORPORATION

## INSPECTION CERTIFICATE

TO EN10204 3.1



Thai Benkan Co., Ltd.  
58 Soi Watrunoi, Bangru, Prapadaeng,  
Samutprakan, 10130 Thailand.

Purchase Order No. 4901180-00  
Job No.

D M Y Certificate No.  
09/11/2018 T - 2018031531

E-No.	Specification for Material Made from Seamless Pipe	Specification for Inspection	Visual Examination	Dimensional Inspection														
TA-162	ASTM A420-16 / ASME SA420-17 Gr.WPL6 CSA Z45.11-17 Gr.241 CAT B WELC Sour Service	ASME B16.9-2012,B16.25-2017	Good	Good														
MFG. No.	Product & Size (T*1)	Quantity	Hardness Actual Data															
61K01M028	45 EL WPL6 8 STD	10	HBW:115-145															
		Material Heat No.	Item No.															
		184740	7561296															
Specifi- cation	Chemical Composition %													*2 Tension Test	transverse		HARDNESS MAX 197 HB : 0000	
	C	Si	Mn	P	S	Cu	Ni	Cr	Mo	Al	V	Nb	C.E.	Y S	T S	E		
	X 100	X 100	X 100	X 1000	X 1000	X 100	X 100	X 100	X 100	X 1000	X 1000	X 1000	X 100	MPa.				%
Min.		15	50											241	415	30	120	Impact Test (J) longitudinal 10 X 6.7 X 2V AT -45 °C  AVE. 127
Max.	30	35	135	35	40	40	40	30	12		80	20			585		129	
	15	21	105	9	5	6	4	5	2		1	1	35	305	481	41	131	

NORMALIZING 910 C X 40 MINUTES. COOLED IN STILL AIR

The product was manufactured, sampled, tested, and inspected as specified in this Standard and the purchase order, and was found to have met such requirements.

The material meet ANSI/NACE MR0175/ISO15156-2 (Region 3) :2015 &amp; MR0103-2015

C.E. = C+Mn/6+(Cr+Mo+V)/5+(Ni+Cu)/15

MAGNETIC PARTICLE EXAMINATION FOR THE ONLY :

We hereby certify that the product described herein has been manufactured in accordance with the specifications concerned and also with the purchaser's requirements and that the test results shown herein are correct.

\* 1 : "T" symbolized wall thickness in mm. \* 2 : YS Yield strength TS = Tensile strength E = Elongation  
Form T7-6/11

Rungnapa Kemphanon

Quality Assurance Manager

Thai Benkan Co., Ltd.

Purchaser : CCTF CORPORATION

## INSPECTION CERTIFICATE

TO EN10204 3.1

**BENKAN.**

Thai Benkan Co., Ltd.  
58 Soi Watkrumji, Bangkru, Prapadaeng,  
Samutprakan, 10130 Thailand.

Purchase Order No.  
4901220-00

Job No.

D M Y Certificate No.  
09/11/2018 T - 2018031547

E-No.	Specification for Material Made from Seamless Pipe	Specification for Inspection	Visual Examination	Dimensional Inspection													
TA-169	ASTM A420-16 / ASME SA420-17 Gr.WPL6 CSA Z45.11-17 Gr.241 CAT B MISC Sour Service	ASME B16.9-2012,B16.25-2017	Good	Good													
MFG. No.	Product & Size	(T:*)	Quantity	Hardness Actual Data													
61M01M049	45 EL WPL6 8 STD		10	HBW:115-145													
	Material Heat No.	Item No.															
	J8K4597	7561296															
	*2 Tension Test transverse																
Specifi- cation	Chemical Composition %													HARDNESS MAX 197HB : GOOD			
	C	Si	Mn	P	S	Cu	Ni	Cr	Mo	Al	V	Nb	C.E.		Y S	T S	E
X	100	X	X	X	X	X	X	X	X	X	X	X	X	MPa.			%
Min.		15	50											241	415	30	161
Max.	30	35	135	35	40	40	40	30	12		80	20			585		174
	12	27	128	11	1	2	2	11	1		0	0	36	286	458	48	183
																	173
																	AVE.

NORMALIZING 810 C X 40 MINUTES. COOLED IN STILL AIR

The product was manufactured, sampled, tested, and inspected as specified in this Standard and the purchase order, and was found to have met such requirements.

The material meet ANSI/NACE MR0175/ISO15156-2 (Region 3) :2015 &amp; MR0103-2015

C.E. = C+Mn/6+(Cr+Mo+V)/5+(Ni+Cu)/15

MAGNETIC PARTICLE EXAMINATION FOR TEE ONLY :

We hereby certify that the product described herein has been manufactured in accordance with the specifications concerned and also with the purchaser's requirements and that the test results shown herein are correct.

\* 1 : "T" symbolized wall thickness in mm. \* 2 : YS Yield strength TS = Tensile strength E = Elongation

Form T7-611

Bangsupa Kaupitakon  
Quality Assurance Manager

Thai Benkan Co., Ltd.



Purchaser : CCTF CORPORATION

## INSPECTION CERTIFICATE

TO EN10204 3.1

**BENKAN.**

Thai Benkan Co., Ltd.  
58 Soi Watkrusi, Bangkru, Prapadaeng,  
Samutprakan, 10130 Thailand.

Purchase Order No. 4801278-00 Job No.

D M Y Certificate No.  
11/12/2018 T - 2018031649

E-No.		Specification for Material Made from Seamless Pipe		Specification for Inspection		Visual Examination		Dimensional Inspection											
TA-194		ASTM A420-16 / ASME SA420-17 Gr.WPL6 CSA Z46.11-17 Gr.241 CAT B WISC Sour Service		ASME B16.9-2012,B16.25-2017		Good		Good											
MFG. No.	Product & Size			(T:*)1		Quantity		Hardness Actual Data											
61N01M031-1		45 EL WPL6 8 STD					9/10		HBW:115-145										
		Material Heat No.		Item No.															
		185081		7561296															
		Chemical Composition %												*2 Tension Test		transverse		HARDNESS MAX 197 HB : GOOD	
Specifi- cation	C	Si	Mn	P	S	Cu	Ni	Cr	Mo	Al	V	Nb	C.E.	Y S	T S	E	Impact Test (J) 10 X 7.5 X 2V AT -46 °C		
	X 100	X 100	X 100	X 1000	X 1000	X 100	X 100	X 100	X 100	X 1000	X 1000	X 1000	X 100	MPa.		%			
Min.		15	50											241	415	30	115		
Max.	30	35	135	35	40	40	40	30	12		80	20			585		118	AVE. 118	
	16	25	108	10	4	6	4	5	2		1	1	36	309	480	40	120		

NORMALIZING 910 C X 40 MINUTES. COOLED IN STILL AIR

The material meet ANSI/NACE MR0175/ISO15156-2 (Region 3) :2015 &amp; MR0103-2015

The product was manufactured, sampled, tested, and inspected as specified in this Standard and the purchase order, and was found to have met such requirements.

C.E. = C+Mn/6+(Cr+Mo+V)/5+(Ni+Cu)/15

MAGNETIC PARTICLE EXAMINATION FOR TEE ONLY :

We hereby certify that the product described herein has been manufactured in accordance with the specifications concerned and also with the purchaser's requirements and that the test results shown herein are correct.

\* 1 : "T" symbolized wall thickness in mm. \* 2 : YS Yield strength TS = Tensile strength E = Elongation  
Form TZ-6/1

Ratana Karmkarn

Quality Assurance Manager

Thai Benkan Co., Ltd.



CLIENTE / Customer / Client  
CCTF CORPORATION (ONTARIO)  
4151 NORTH SERVICE RD.  
UNIT 2  
BURLINGTON, ONTARIO  
L7L4X6 - CANADA  
CAN

# CERTIFICADO DE INSPECCION

Inspection Certificate - Certificat de Réception

UNE EN 10204.06 / 3.1  
ISO 10474:15 / 3.1

FECHA: 27/06/2018

N.º No.

195066

HOJA: 2

PRODUCTO  
Article - Produit

FLANGES

SU PEDIDO N.º  
Your Order No.  
Votre Cde. N.º

43038605-00 TORONTO

DE  
of - de 28/05/2018

NORMAS APLICABLES  
Requirements - Normes Applicables

ASME B16.5-17

MARCA DEL FABRICANTE  
Mark of factory  
Marque du fabricant



Packing 140699

MATERIAL CORRESPONDIENTE ASME SA350LF2CL1-2-17, ASTM A350LF2CL1-2-17

MODO DE FUSION (\*)  
Steel Making - Elaboration de l'acier  
E = Elec. Y = Oxígeno básico

NACE MR0175/ISO15156-02/03-15 & NACE MR0103/ISO17495-15  
Clause 7.2.1.4, Annex A.2 and SSC Region 3.  
CSA-Z245.12-17 GR248 CAT II-SS (WN & BLIND FLANGES ONLY)

PARTIDA Item Poste	CANTIDAD Quantity Quantité	DESCRIPCION Description Description	LOTE	OBSERVACIONES Remarks Observations	COLADA N.º Heat No. N.º Coudée	RESISTENCIA T. Strength Resist. Rupt. N/mm2	LONGITUD Length Longueur m	ESTRICCION Red. Area Striction %	RESILIENCIA Impact test Resilience Joules	CHARPY V 10x10mm MEDIA Average Moyenne J/m2	DUREZA Hardness Dureté HBW
39 7580201	30	WN 1.1/2 150LB XS/80 RF A350LF2	24Y16	NE	A45A6	517	26.00	45.00	58	62	152
45 7581005	1	BLIND 14 150LB RF A350LF2	02M18G	NE	25AV8	522	30.20	62.80	59	64	150
46 7581006	1	BLIND 16 150LB RF A350LF2	06J803	NE	69AV8	507	30.40	58.20	60	60	147
48 7581006	1	BLIND 16 150LB RF A350LF2	19D17	NE	B64A7	499	33.30	66.70	45	42	144
48 7583949	1	WN 8 300LB STD/40 RF A350LF2	16Y816	NE	97AV8	517	29.80	60.70	75	71	150
48 7583949	7	WN 8 300LB STD/40 RF A350LF2	04J802	NE	B21A8	515	32.60	67.30	69	67	148
52 7582780	3	BLIND 8 600LB RF A350LF2	22Y827	NE	73AV8	511	36.30	69.80	58	52	147
52 7582780	3	BLIND 8 600LB RF A350LF2	23Y809	NE	73AV8	502	38.10	70.10	90	62	146

## COMPOSICION QUIMICA - STEEL MAKER'S LADLE ANALYSIS - ANALYSE CHIMIQUE

COLADA N.º Heat No. N.º Coudée	C %	Si %	Mn %	P %	S %	Cr %	Ni %	Mo %	Nb %	V %	Cu %	Al %	Ti %	B %	CEq %
25AV8	0.190	0.230	1.050	0.005	0.007	0.068	0.090	0.014	0.002	0.004	0.180	0.025	0.002	0.0003	0.40
69AV8	0.184	0.200	1.115	0.012	0.003	0.055	0.147	0.017	0.001	0.001	0.138	0.033	0.001	0.0001	0.40
73AV8	0.190	0.193	1.073	0.011	0.003	0.062	0.075	0.015	0.001	0.001	0.112	0.037	0.002	0.0001	0.40
97AV8	0.190	0.220	1.110	0.005	0.007	0.045	0.072	0.012	0.003	0.005	0.150	0.027	0.002	0.0003	0.40
A45A6	0.195	0.222	0.994	0.007	0.008	0.053	0.103	0.024	0.000	0.001	0.212	0.028	0.001	0.0005	0.40
B21A8	0.170	0.190	1.060	0.011	0.004	0.110	0.090	0.009	0.004	0.000	0.180	0.029	0.001	0.0004	0.39
B64A7	0.190	0.170	1.030	0.011	0.004	0.100	0.060	0.008	0.007	0.006	0.150	0.041	0.001	0.0002	0.40

(\*) OBSERVACIONES.

N.º NORMALIZED AT 900 C AND ALLOWED TO COOL IN STILL AIR.

Remarks  
Observations

Las dimensiones y la condición superficial se hallaron satisfactorias.  
Dimension and surface condition were found acceptable.  
Les dimensions et états de surface sont satisfaisants.

Los materiales citados cumplen las normas aplicables.  
Manufacturing requirements are satisfied.  
Les normes applicables sont respectées.

EL INSPECTOR  
Works Inspector - L'inspecteur



ULMA FORJAS COOP  
Dpto. de Garantía de Calidad  
Quality Assurance Dept.

MLTS\_6056-18929

Heat# B03238 A07A9 B011568B B05432B



CORPORATION

4151 North Service Road, Burlington, ON L7L 4X6 (905) 335-5320

Date: 8/8/2019

## Mill Test Reports

Invoice: 1599344-00

PO: 2610155

Customer: 27403-261

A.B.F. MINES/2985080

1310 AVE DAVY

ROUYN-NORANDA, QC J9Y 0A8

Line	Heat#	Product	Description
1	b03238	7586832	6 150 RF WN FLG STD A350LF2
2	a07a9	7586824	4 150 RF WN FLG STD A350LF2
3	b01568b	7586509	6 150 RF SO FLG A350LF2
4	b05432b	7586508	4 150 RF SO FLG A350LF2

**Heat codes** followed by \*\* have been corrected, change may not show on the packing slip



## CERTIFICATE OF INSPECTION &amp; TEST (EN 10204 3.1)

ST&amp;H CORPORATION

OFFICE - 74, Jwadongsunhwan-ro, Haendae-gu, Busan, Korea  
 PLANT - 11, Eogokgongdan 2-gil, Yangsan-si, Kyungnam, Korea  
 Tel : +82.51.744-4680(5 line) Fax : +82.51.744-4670  
 E-mail : qm@stnhcorp.com



CE

RPS 040209 / 01

Certificate No. MJH0103-10/16

Date : AUG. 27. 2018

Customer CCTF CORPORATION

Contract No. 4038603-00

Spec. For Material ASTM A105N-14, ASME SA105N-17, ASTM/ASME A/SA350 LF2 CL1-17, NACE MR0175/ISO 15156-2:2015, NACE MR0103/ISO 17495-1:2016

Heat Treatment 930°C NORMALIZED &amp; A.C

Dimensional inspection ASME B76.5 - 2017

Certified to ISO9001 / ISO14001:2015, PED2014/68/EC by LRQA

ITEM / SIZE	Q'ty	Heat No./ Batch No.	Size of Test Specimen		Tension Test					Hardness Test (HB)		Charpy Impact Test (10X10mm Specimen Size)			
			D mm	GL mm	Y.S MPa	T.S MPa	E.L %	R.A %	Test (HB)	Indiv. 16J	Ave. 20J	Natch V	Temp. -46°C		
12.5	50.0	Max	Min	250	485	22.0	30.0	Test Result (J)				Ave.(J)			
7586502	2	B03238	12.5	50.0		375	545	35	67.5	151	153	118	145	68	110
7586824	50	B03238	12.5	50.0		375	545	35	67.5	151	153	118	145	68	110
7586832	50	B03238	12.5	50.0		375	545	35	67.5	151	153	118	145	68	110
7585267	10	B03238	12.5	50.0		375	545	35	67.5	151	153	118	145	68	110
7580014	5	B03238	12.5	50.0		375	545	35	67.5	151	153	118	145	68	110
7587735	2	B03238	12.5	50.0		375	545	35	67.5	151	153	118	145	68	110
7585259	10	B03238	12.5	50.0		375	545	35	67.5	151	153	118	145	68	110
7581040	25	B03238	12.5	50.0		375	545	35	67.5	151	153	118	145	68	110
7581007	2	B03776	12.5	50.0		375	540	38	74.5	152	154	135	80	118	111
7580205	2	B03776	12.5	50.0		375	540	38	74.5	152	154	135	80	118	111

## Chemical Composition (%)

Heat No./ Batch No.	Max Min	C	Si	Mn	P	S	Ni	Cr	Mo	Cu	V	Nb	NDE			
		0.300 0.150	0.300 0.150	1.350 0.600	0.035 0.035	0.040 0.040	0.400 0.400	0.300 0.300	0.120 0.120	0.400 0.400	0.080 0.080	0.020 0.020	CE	UT	MT	PT
B03238	H	0.176	0.201	1.060	0.015	0.004	0.032	0.077	0.004	0.050	0.001	0.001	0.374			
	P	0.178	0.216	1.060	0.016	0.002	0.036	0.073	0.007	0.050	0.002	0.001	0.376			
	H	0.172	0.220	1.290	0.013	0.007	0.012	0.045	0.006	0.008	0.004	0.019	0.399			
B03776	P	0.174	0.220	1.290	0.011	0.003	0.012	0.044	0.006	0.008	0.001	0.015	0.400			
BLANK																

REMARK \* H : Heat Analysis P : Product Analysis

We hereby certify that the material herein has been made and tested in accordance  
 with the above specification and also with the requirements called for by the above order.

ST-801-14-02

Witnessed by / H. J. LEE

Manager of QA Dept. / JAY KIM

ST&amp;H CORPORATION





CLIENTE / Customer / Client  
CCTF CORPORATION (ONTARIO)  
4151 NORTH SERVICE RD.  
UNIT 2  
BURLINGTON, ONTARIO  
L7L4X6 - CANADA  
CAN

# CERTIFICADO DE INSPECCION

UNE EN 10204.06 / 3.1  
Inspection Certificate - Certificat de Réception ISO 10474.15 / 3.1

FECHA: 21/05/2019 N.º 203034 HOJA: 2  
Date: Page:

PRODUCTO SU PEDIDO N.º  
Article - Produit Your Order No. 4039198-00  
Votre Cde. N.º

FLANGES

ASME B16.5-17

NORMAS APLICABLES  
Requirements - Normes Applicables

MATERIAL CORRESPONDIENTE ASME SA350LF2CL1-2-17, ASTM A350LF2CL1-2-18

MODO DE FUSION (\*)  
Steel Making - Elaboration de l'acier  
E = Elec. Y = Oxígeno básico

NACE MR0175/ISO15156-02/03-15 & NACE MR0103/ISO17495-15  
Clause 7.2.1.4, Annex A.2 and SSC Region 3.  
CSA-Z245.12-17 GR248 CAT II-SS (WN & BLIND FLANGES ONLY)

PARTIDA Item Poste	CANTIDAD Quantity Quantité	DESCRIPCION Description Description	LOTE	OBSERVACIONES Remarks Observations (*)	COLADA N.º Heat No. N.º Coulee	RESISTENCIA Y. Strength Flasul Rupt N/mm2	ELONGACION Elongation Lo-50mm/Aq %	ESTRICCION Red Area Sintion %	RESILIENCIA Impact test Resilience Joules	CHARPY V 10x10mm MEDIA Average Moyenne °C	DUREZA Hardness Dureté HBW
15 7586824	56	WN 4 150LB STD/40 RF A350LF2	18M912	NE	A07A9	502	300	71.53	102	99	146 148
22 7585496	24	WN 6 300LB STD/40 RF A350LF2	01F901	NE	B88A8	494	301	74.27	125	55	136 138
30 7586646	10	BLIND 2 500LB RF A350LF2	09A901	NE	A63A9	512	314	72.40	112	100	140 146

## COMPOSICION QUIMICA - STEEL MAKER'S LADLE ANALYSIS - ANALYSE CHIMIQUE

COLADA N.º Heat No. Ladle - L Product - P	C %	Si %	Mn %	P %	S %	Cr %	Ni %	Mo %	Nb %	V %	Cu %	Al %	Ti %	B %	CEq %	Origin of Steel
A07A9 L	0.192	0.206	1.138	0.008	0.004	0.037	0.050	0.017	0.000	0.002	0.053	0.034	0.001	0.0002	0.40	Germany
B88A8 L	0.182	0.206	1.153	0.010	0.005	0.050	0.057	0.014	0.001	0.002	0.061	0.026	0.001	0.0004	0.40	Germany
A63A9 L	0.189	0.223	1.151	0.011	0.005	0.049	0.055	0.012	0.001	0.002	0.094	0.028	0.002	0.0002	0.40	Germany

(\*) OBSERVACIONES:  
Remarks  
Observations

N NORMALIZED AT 900 C AND ALLOWED TO COOL IN STILL AIR.



SGI 1922164 Management Systems certified by LRQA

SGI 6000236

Certified acc. PED 97/23/EC-AD2000-WO  
PED 14/68/UE  
by TÜV Rheinland  
N.º 01 202 EIO 02 7443

MARCA DEL FABRICANTE

Mark of factory  
Marque du fabricant

Packing 148506

DEPARTAMENTO QUALITY ASSURANCE

Section  
Département

- Las dimensiones y la condición superficial se hallaron satisfactorias.  
- Dimension and surface condition were found acceptable.  
- Les dimensions et états de surface sont satisfaisants.

- Los materiales citados cumplen las normas aplicables.  
- Manufacturing requirements are satisfied.  
- Les normes applicables sont respectées.

EL INSPECTOR  
Works Inspector - L'Inspecteur



ULMA FORJAS S. COOP.

Dpto. de Garantía de calidad  
Quality Assurance Dept.

**CERTIFICATE OF INSPECTION & TEST (EN 10204 3.1)**

**ST&H CORPORATION**  
 OFFICE - 74, Jwadongsunhwan-ro, Haeundae-gu, Busan, Korea  
 PLANT - 11, Eogokgongdan 2-gil, Yangsan-si, Kyungnam, Korea  
 Tel : +82.51.744-4680(5 line) Fax : +82.51.744-4670  
 E-mail : qm@stnhcorp.com



Certificate No. MJH0427-06/08  
 Customer CCTF CORPORATION  
 Contract No. 4039342-00

Date : JUN. 17. 2019

Spec. For Material ASTM A105N-18, ASME SA105N-17, ASTM A350 LF2 CL1-18, ASME SA350 LF2 CL1-17, NACE MR0175/ISO15156-2:2015, NACE MR0103/ISO17945:2015  
 Heat Treatment 930°C NORMALIZED & A.C

Certified to ISO9001/ ISO14001:2015, PED2014/68/EC by LRQA

Dimensional inspection ASME B16.5 - 2017

ITEM / SIZE				Q'ty	Heat No./ Batch No.	Size of Test		Tension Test				Hardness		Charpy Impact Test (10X10mm Specimen Size)				
						Specimen		Y.S MPa	T.S MPa	E.L %	R.A %	Test (HB)	Indiv. 16J	Ave. 20J	Notch V	Temp. -46°C	Ave.(J)	
						D	GL											
						mm	mm	Max	Min	250	485	22.0						30.0
12.5	50.0																	
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12.5																		

**Chemical Composition (%)**

Heat No./ Batch No.	C	Si	Mn	P	S	Ni	Cr	Mo	Cu	V	Nb	NDE			
	Max	Min	1.350	0.035	0.040	0.400	0.300	0.120	0.400	0.080	0.020	CE	UT	MT	PT
H	0.172	0.243	1.290	0.011	0.004	0.026	0.094	0.017	0.020	0.001	0.001	0.412			
P	0.177	0.250	1.300	0.012	0.005	0.029	0.101	0.015	0.020	0.002	0.001	0.420			
H	0.177	0.212	1.270	0.009	0.003	0.010	0.061	0.004	0.009	0.001	0.012	0.403			
P	0.180	0.229	1.280	0.009	0.002	0.012	0.038	0.006	0.012	0.001	0.015	0.403			
BLANK															

REMARK \* H : Heat Analysis P : Product Analysis \* C:Mn = 1≤5



*[Signature]*

We hereby certify that the material herein has been made and tested in accordance with the above specification and also with the requirements called for by the above order.

Witnessed by / H. J. LEE

Manager of Q.A Dept. / JAY KIM

ST-801-14-02

ST&amp;H CORPORATION



# CERTIFICATE OF INSPECTION & TEST (EN 10204 3.1)



**ST&H CORPORATION**  
 OFFICE - 74, Jwadongsunhwan-ro, Haeundae-gu, Busan, Korea  
 PLANT - 11, Eogokgongdan 2-gil, Yangsan-si, Kyungnam, Korea  
 Tel : +82.51.744-4680(5 line) Fax : +82.51.744-4670  
 E-mail : qm@stnhcorp.com



Certificate No. MJH0427-07/08

Date : JUN. 17. 2019

Customer CCTF CORPORATION

Contract No. 4039342-00

Spec. For Material ASTM A105N-18, ASME SA105N-17, ASTM A350 LF2 CL1-18, ASME SA350 LF2 CL1-17, NACE MR0175/ISO15156-2:2015, NACE MR0103/ISO17945:2015

Heat Treatment 930°C NORMALIZED &amp; A.C

Dimensional inspection ASME B16.5 - 2017

Certified to ISO9001/ ISO14001:2015, PED2014/68/EC by LRQA

ITEM / SIZE				Size of Test Specimen		Tension Test				Hardness Test (HB)	Charpy Impact Test (10X10mm Specimen Size)				
Heat No./ Batch No.	Q'ty	Heat No./ Batch No.	D mm	GL mm	Y.S MPa	T.S MPa	E.L %	R.A %	Test (HB)	Indiv. 16J	Ave. 20J	Notch V	Temp. -46°C		
														Max	Min
			12.5	50.0	250	485	22.0	30.0	187						
			12.5	50.0	Min				137						
7589925	2	801979E	12.5	50.0	344	541	35	75.5	150	152	60	65	59	61	
7580216	15	805432B	12.5	50.0	357	515	41	76	150	154	89	86	99	91	
7586504	25	805432B	12.5	50.0	357	515	41	76	150	154	89	86	99	91	
7586507	50	805432B	12.5	50.0	357	515	41	76	150	154	89	86	99	91	
7586508	80	805432B	12.5	50.0	357	515	41	76	150	154	89	86	99	91	
7587602	25	805432B	12.5	50.0	357	515	41	76	150	154	89	86	99	91	
7587603	25	805432B	12.5	50.0	357	515	41	76	150	154	89	86	99	91	
7587600	250	805432B	12.5	50.0	357	515	41	76	150	154	89	86	99	91	
7587604	50	805432B	12.5	50.0	357	515	41	76	150	154	89	86	99	91	
7587601	25	805432B	12.5	50.0	357	515	41	76	150	154	89	86	99	91	
Chemical Composition (%)															
Heat No./ Batch No.	C	Si	Mn	P	S	Ni	Cr	Mo	Cu	V	Nb	NDE			
	Max	0.300	0.300	0.035	0.040	0.400	0.300	0.120	0.400	0.080	0.020	CE	UT	MT	PT
	Min	0.150	0.600												

## Chemical Composition (%)

Heat No./ Batch No.	Max Min	C	Si	Mn	P	S	Ni	Cr	Mo	Cu	V	Nb	NDE			
		0.300 0.150	0.300 0.150	1.350 0.600	0.035 0.035	0.040 0.040	0.400 0.400	0.300 0.300	0.120 0.120	0.400 0.400	0.080 0.080	0.020 0.020	CE	UT	MT	PT
801979E	H 0.177 P 0.180	0.212 0.229	0.212 0.229	1.270 1.280	0.009 0.009	0.003 0.002	0.010 0.012	0.061 0.038	0.004 0.006	0.009 0.012	0.001 0.001	0.012 0.015	0.403 0.403			
805432B	H 0.175 P 0.178	0.251 0.249	0.251 0.249	1.250 1.250	0.014 0.014	0.003 0.003	0.010 0.011	0.010 0.011	0.003 0.004	0.016 0.015	0.001 0.001	0.001 0.001	0.387 0.391			
BLANK																

REMARK \* H : Heat Analysis P : Product Analysis \* C:Mn = 1±5

We hereby certify that the material herein has been made and tested in accordance with the above specification and also with the requirements called for by the above order.

 Witnessed by / H. J. LEE  
 Manager of Q.A Dept. / JAY KIM  
 ST&H CORPORATION


ST-801-14-02



# CERTIFIED MILL TEST REPORT



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LOG NO. F00000000100245

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BONNEY FORGE CORPORATION

P.O. BOX 330 • 14496 CROGHAN PIKE • MOUNT UNION, PA 17066-0330

(814) 542-2545 • (800) 345-7546 • FAX (814) 542-4906

www.bonneyforge.com

CUSTOMER: CCTF CORPORATION

DATE 10/04/2017

CUSTOMER

BONNEY ORDER NO. B000229128

ORDER NO.: 4037926-00

SHIP TO: CCTF CORPORATION (BURLINGTON)

4151 NORTH SERVICE ROAD

UNIT 2

BURLINGTON ON L7L 4X6

Canada

ITEM		QUANTITY	LOT NO.	GRADE OR SPECIFICATION NO CHEMICAL ANALYSIS, PHYSICAL PROPERTIES, REMARKS:						
3	50	50196	36-3X1 3M LF2 FLEX T	SA/A350 LF2 CL1						
7690075			Al 0.032 C 0.200 Co 0.002 Cr 0.040 Cu 0.030 Mn 1.050 Mo 0.003 Nb 0.014 Ni 0.020 P 0.005 S 0.019 Si 0.270 V 0.003 CE(Long Formula) = 0.39 T/S(PSI) 71,610 Y/S(PSI) 47,449 EL(%) 36.85 RA(%) 57.04 Brinell 135 BHN 135 BHN Charpy -50 F 77/66/56 (Ft-Lbs) Average 66.30							
5	50	50076	36-11/2X3/4 3M LF2 FLEX S	SA/A350 LF2 CL1						
7690149			Al 0.027 C 0.200 Co 0.004 Cr 0.050 Cu 0.100 Mn 0.970 Mo 0.016 Nb 0.013 Ni 0.060 P 0.011 S 0.019 Si 0.220 V 0.003 CE(Long Formula) = 0.39 T/S(PSI) 76,500 Y/S(PSI) 53,000 EL(%) 31.00 RA(%) 64.00 Brinell 159 BHN 146 BHN Charpy -50 F 42/58/45 (Ft-Lbs) Average 48.30							
6	50	50196	36-3X1 3M LF2 FLEX S	SA/A350 LF2 CL1						
7690199			Al 0.032 C 0.200 Co 0.002 Cr 0.040 Cu 0.030 Mn 1.050 Mo 0.003 Nb 0.014 Ni 0.020 P 0.005 S 0.019 Si 0.270 V 0.003 CE(Long Formula) = 0.39 T/S(PSI) 71,610 Y/S(PSI) 47,449 EL(%) 36.85 RA(%) 57.04 Brinell 135 BHN 135 BHN Charpy -50 F 77/66/56 (Ft-Lbs) Average 66.30							

We certify that the data on this sheet is a true copy taken from our records of material furnished us by the production mill, or as obtained by additional laboratory checks.

by

*Kylee Ruiz*

Kylee Ruiz

QUALITY PROCESS MANAGER

CMTR: REV2

## CERTIFIED MILL TEST REPORT



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BONNEY FORGE CORPORATION

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(814) 542-2545 • (800) 345-7546 • FAX (814) 542-4906

www.bonneyforge.com

CUSTOMER: CCTF CORPORATION

DATE 10/04/2017

CUSTOMER

BONNEY ORDER NO. B000229128

ORDER NO.: 4037926-00

SHIP TO: CCTF CORPORATION (BURLINGTON)

4151 NORTH SERVICE ROAD

UNIT 2

BURLINGTON ON L7L 4X6

Canada

ITEM	QUANTITY	LOT NO.	GRADE OR SPECIFICATION NO
			CHEMICAL ANALYSIS, PHYSICAL PROPERTIES, REMARKS
1.			THE FITTINGS SUPPLIED ARE IN ACCORDANCE WITH PURCHASE ORDER SPECIFICATIONS.
2.			CERTIFYING TO ASTM A350 LF2 07 REVISION.
3.			THE MATERIAL OF THE FITTINGS SUPPLIED IS ASTM A350-LF2 BUT MEETS THE REQUIREMENTS OF ASME SA350-LF2.
4.			THE CHARPY V-NOTCH IMPACT TEST WAS PERFORMED AT -50 DEGREES FAHRENHEIT IN ACCORDANCE WITH A350-LF2.
5.			THE MATERIAL SUPPLIED AS A350 LF2 CL1 MEETS THE REQUIREMENTS OF BOTH NACE MRO103-2007 AND NACE MRO175/ISO 15156-2.
6.			THE MATERIAL SUPPLIED WAS NORMALIZED IN ACCORDANCE WITH ASTM A350 HEAT TREATING REQUIREMENTS.
7.			THE PRODUCT SUPPLIED WAS INSPECTED IN ACCORDANCE WITH EN 10204:2004 EDITION TYPE 3.1 INSPECTION DOCUMENT. (EUROPEAN STANDARD)
8.			THE UNIT OF MEASURE FOR TENSILE AND YIELD (0.2%) STRENGTH ARE REPORTED IN PSI.
9.			ELONGATION TEST RESULTS ARE OBTAINED USING STANDARD ROUND SPECIMEN, 2 INCH OR 50 MM GAGE LENGTH.

We certify that the data on this sheet is a true copy taken from our records of material furnished us by the production mill, or as obtained by additional laboratory checks.

by

*Kylee Ruiz*

Kylee Ruiz

QUALITY PROCESS MANAGER

CMTR: REV2





CORPORATION

4151 North Service Road, Burlington, ON L7L 4X6 (905) 335-5320

Date: 8/13/2019

## Mill Test Reports

Invoice: 1599535-00

PO: 2610160-00

Customer: 27403-261

A.B.F. MINES

1310 AVE DAVY

ROUYN-NORANDA, QC J9Y 0A8

Line	Heat#	Product	Description
1	b01568b	7583949	8 300 RF WN FLG STD A350LF2
2	b03238	7586832	6 150 RF WN FLG STD A350LF2
3	50313 **	7690199	1 X 3-36 3000 SOL A350LF2

# CERTIFICATE OF INSPECTION & TEST (EN 10204 3.1)



**ST&H CORPORATION**  
 OFFICE - 74, Jwadongsunhwan-ro, Haeundae-gu, Busan, Korea  
 PLANT - 11, Eogokgongdan 2-gil, Yangsan-si, Kyungnam, Korea  
 Tel : +82.51.744-4680(5 line) Fax : +82.51.744-4670  
 E-mail : qm@stnhcorp.com



CE  
 KPS 20000 / 01

Certificate No. MJH0427-06/08  
 Customer CCTF CORPORATION  
 Contract No. 4039342-00

Date : JUN. 17, 2019

Spec. For Material ASTM A105N-18, ASME SA105N-17, ASTM A350 LF2 CL1-18, ASME SA350 LF2 CL1-17, NACE MR0175/ISO15156-2:2015, NACE MR0103/ISO17945:2015  
 Heat Treatment 930°C NORMALIZED & A.C

Certified to ISO9001/ ISO14001:2015, PED2014/68/EC by LRQA  
 Dimensional Inspection ASME B16.5 - 2017

ITEM / SIZE	Q'ty	Heat No./ Batch No.	Size of Test Specimen		Tension Test					Hardness Test (HB)	Charpy Impact Test (10X10mm Specimen Size)					
			D mm	GL mm	Y.S MPa	T.S MPa	E.L %	R.A %	Indiv. 16J		Ave. 20J	Notch V	Temp. -46°C			
			12.5	50.0	Max	Min	250	485	22.0	30.0	187	Test Result (J)				
												Ave.(J)				
7580219	15	8015688	12.5	50.0			356	515	39	76	147	154	83	78	81	80
7580220	25	8015688	12.5	50.0			356	515	39	76	147	154	83	78	81	80
7586509	70	8015688	12.5	50.0			356	515	39	76	147	154	83	78	81	80
7580218	12	8015688	12.5	50.0			356	515	39	76	147	154	83	78	81	80
7580200	15	8015688	12.5	50.0			356	515	39	76	147	154	83	78	81	80
7586832	45	8015688	12.5	50.0			356	515	39	76	147	154	83	78	81	80
7583949	40	8015688	12.5	50.0			356	515	39	76	147	154	83	78	81	80
7580203	4	801979E	12.5	50.0			344	541	35	75.5	150	152	60	65	59	61
7580204	5	801979E	12.5	50.0			344	541	35	75.5	150	152	60	65	59	61
7580205	2	801979E	12.5	50.0			344	541	35	75.5	150	152	60	65	59	61

Heat No./ Batch No.	Chemical Composition (%)												NDE		
	C	Si	Mn	P	S	Ni	Cr	Mo	Cu	V	Nb	CE	UT	MT	PT
	Max	0.300	0.300	1.350	0.035	0.040	0.400	0.300	0.120	0.400	0.080	0.020			
	Min	0.150	0.600												
8015688	H	0.172	0.243	1.290	0.011	0.004	0.026	0.094	0.017	0.020	0.001	0.001	0.412		
	P	0.177	0.250	1.300	0.012	0.005	0.029	0.101	0.015	0.020	0.002	0.001	0.420		
	H	0.177	0.212	1.270	0.009	0.003	0.010	0.061	0.004	0.009	0.001	0.012	0.403		
801979E	P	0.180	0.229	1.280	0.009	0.002	0.012	0.038	0.006	0.012	0.001	0.015	0.403		

REMARK \* H : Heat Analysis P : Product Analysis \* C.Mn = 1±5

*[Signature]*



We hereby certify that the material herein has been made and tested in accordance with the above specification and also with the requirements called for by the above order.

Witnessed by / H. J. LEE

Manager of Q.A Dept. / JAY KIM

ST-801-14-02

ST&H CORPORATION



# CERTIFICATE OF INSPECTION & TEST (EN 10204 3.1)

**ST**
**ST&H CORPORATION**

OFFICE - 74, Jwadongsunhwan-ro, Haeundae-gu, Busan, Korea  
 PLANT - 11, Eogokgongdan 2-gil, Yangsan-si, Kyungnam, Korea  
 Tel : +82.51.744-4680(5 line) Fax : +82.51.744-4670  
 E-mail : qm@stnhcorp.com


**CE**

KQS 040204 / 01

Certificate No. MJH0103-10/16 Date : AUG. 27. 2018

Customer CCTF CORPORATION

Contract No. 4038603-00

Spec. For Material ASTM A105N-14, ASME SA105N-17, ASTM/ASME A/SA350 LF2 CL1-17, NACE MR0175/ISO 15156-2:2015, NACE MR0103/ISO 17495-1:2016

Heat Treatment 930°C NORMALIZED &amp; A.C

Certified to ISO9001/ ISO14001:2015, PED2014/68/EC by LRQA

Dimensional inspection ASME B16.5 - 2017

ITEM / SIZE	Q'ty	Heat No./ Batch No.	Size of Test Specimen				Tension Test				Hardness Test (HB)	Charpy Impact Test (10X10mm Specimen Size)				
			D mm		GL mm	Max	Y.S MPa	T.S MPa	E.L %	R.A %		Indiv. 16J	Ave. 20J	Notch V	Temp. -46°C	
Test Result (J)																
Ave.(J)																

7586502	150LBS TH RF 6"	2	803238	12.5	50.0		375	545	35	67.5	151	153	118	145	68	110
7586824	150LBS WN RF STD 4"	50	803238	12.5	50.0		375	545	35	67.5	151	153	118	145	68	110
7586832	150LBS WN RF STD 6"	50	803238	12.5	50.0		375	545	35	67.5	151	153	118	145	68	110
7585267	150LBS WN RF XH 4"	10	803238	12.5	50.0		375	545	35	67.5	151	153	118	145	68	110
7580014	300LBS SO RF 4"	5	803238	12.5	50.0		375	545	35	67.5	151	153	118	145	68	110
7587735	300LBS SO RF 6"	2	803238	12.5	50.0		375	545	35	67.5	151	153	118	145	68	110
7585259	600LBS WN RF STD 3"	10	803238	12.5	50.0		375	545	35	67.5	151	153	118	145	68	110
7581040	600LBS WN RF XH 3"	25	803238	12.5	50.0		375	545	35	67.5	151	153	118	145	68	110
7581007	150LBS BL RF 18"	2	803776	12.5	50.0		375	540	38	74.5	152	154	135	80	118	111
7580205	150LBS SO RF 20"	2	803776	12.5	50.0		375	540	38	74.5	152	154	135	80	118	111

Heat No./ Batch No.	Chemical Composition (%)										NDE						
	C	Si	Mn	P	S	Ni	Cr	Mo	Cu	V	Nb	CE			UT	MT	PT
	Max	Min															
	0.300	0.300	1.350	0.035	0.040	0.400	0.300	0.120	0.400	0.080	0.020						
		0.150	0.600														

## Chemical Composition (%)

Heat No./ Batch No.	Max Min	C	Si	Mn	P	S	Ni	Cr	Mo	Cu	V	Nb	NDE			
		0.300	0.150	1.350	0.035	0.040	0.400	0.300	0.120	0.400	0.080	0.020	CE	UT	MT	PT
803238	H	0.176	0.201	1.050	0.015	0.004	0.032	0.077	0.004	0.050	0.001	0.001	0.374			
	P	0.178	0.216	1.050	0.016	0.002	0.036	0.073	0.007	0.050	0.002	0.001	0.376			
	H	0.172	0.220	1.290	0.013	0.007	0.012	0.045	0.006	0.008	0.004	0.019	0.399			
803776	P	0.174	0.220	1.290	0.011	0.003	0.012	0.044	0.006	0.008	0.001	0.015	0.400			
BLANK																

REMARK \* H : Heat Analysis P : Product Analysis



We hereby certify that the material herein has been made and tested in accordance with the above specification and also with the requirements called for by the above order.

Witnessed by / H. J. LEE

Manager of Q.A Dept. / JAY KIM

ST-801-14-02

ST&amp;H CORPORATION

**CERTIFIED MILL TEST REPORT**

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Page 1 of 2

BONNEY FORGE CORPORATION

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(814) 542-2545 • (800) 345-7546 • FAX (814) 542-4906

www.bonneyforge.com

CUSTOMER: CCTF CORPORATION

DATE 07/13/2018

CUSTOMER

BONNEY ORDER NO. B000243044

ORDER NO.: 4038733-00

SHIP TO: CCTF CORPORATION (BURLINGTON)  
4151 NORTH SERVICE ROAD  
UNIT 2  
BURLINGTON ON L7L 4X6  
Canada

ITEM	QUANTITY	LOT NO.	GRADE OR SPECIFICATION NO.	
			CHEMICAL ANALYSIS, PHYSICAL PROPERTIES, REMARKS:	
3	50	50200	36-3/4 X 1/2 3M LF2 FLEX T	SA/A350 LF2 CL1
7690072			Al 0.024 C 0.200 Co 0.002 Cr 0.030 Cu 0.050 Mn 1.040 Mo 0.005 Nb 0.012 Ni 0.020 P 0.006 S 0.022 Si 0.230 V 0.003 CE(Long Formula) = 0.39 T/S(Psi) 71,500 Y/S(Psi) 48,100 EL(%) 35.00 RA(%) 69.00 Brinell Hardness 137 BHN 135 BHN Charpy -50 F 78/55/52 (Ft-Lbs) Average 61.70	
4	50	50313	36-3X1 3M LF2 FLEX S	SA/A350 LF2 CL1
7690199			Al 0.036 C 0.200 Co 0.002 Cr 0.060 Cu 0.080 Mn 1.000 Mo 0.006 Nb 0.014 Ni 0.030 P 0.006 S 0.023 Si 0.240 V 0.003 CE(Long Formula) = 0.39 T/S(Psi) 73,427 Y/S(Psi) 48,233 EL(%) 35.25 RA(%) 61.22 Brinell Hardness 135 BHN 135 BHN Charpy -50 F 27/28/33 (Ft-Lbs) Average 29.30	
5	100	50295	36-11/2X3/4 3M LF2 FLEX S	SA/A350 LF2 CL1
7690149			Al 0.021 C 0.200 Co 0.002 Cr 0.030 Cu 0.080 Mn 1.020 Mo 0.007 Nb 0.011 Ni 0.030 P 0.005 S 0.023 Si 0.260 V 0.003 CE(Long Formula) = 0.39 T/S(Psi) 73,778 Y/S(Psi) 50,401 EL(%) 36.55 RA(%) 65.23 Brinell Hardness 135 BHN 135 BHN Charpy -50 F 43/68/39 (Ft-Lbs) Average 50.00	

We certify that the data on this sheet is a true copy taken from our records of material furnished us by the production mill, or as obtained by additional laboratory checks.

by

Kylee Ruiz

QUALITY PROCESS MANAGER

CMTR: REV2



## CERTIFIED MILL TEST REPORT

LOG NO. F00000000110349

Page 2 of 2

BONNEY FORGE CORPORATION

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All The Time.

CUSTOMER: CCTF CORPORATION

DATE 07/13/2018

CUSTOMER

BONNEY ORDER NO. B000243044

ORDER NO.: 4038733-00

SHIP TO: CCTF CORPORATION (BURLINGTON)

4151 NORTH SERVICE ROAD

UNIT 2

BURLINGTON ON L7L 4X6

Canada

ITEM QUANTITY LOT NO.

GRADE OR SPECIFICATION NO.  
CHEMICAL ANALYSIS, PHYSICAL PROPERTIES, REMARKS:

1. THE FITTINGS SUPPLIED ARE IN ACCORDANCE WITH PURCHASE ORDER SPECIFICATIONS.
2. CERTIFYING TO ASTM A350 LF2 17 REVISION.
3. THE MATERIAL OF THE FITTINGS SUPPLIED IS ASTM A350-LF2 BUT MEETS THE REQUIREMENTS OF ASME SA350-LF2.
4. THE CHARPY V-NOTCH IMPACT TEST WAS PERFORMED AT -50 DEGREES FAHRENHEIT IN ACCORDANCE WITH A350-LF2.
5. THE MATERIAL SUPPLIED AS A350 LF2 CL1 MEETS THE REQUIREMENTS OF BOTH NACE MRO103/ISO 17945 - 2015 & NACE MRO175/ISO 15156-2 - 2015 EDITION.
6. THE MATERIAL SUPPLIED WAS NORMALIZED IN ACCORDANCE WITH ASTM A350 HEAT TREATING REQUIREMENTS.
7. THE PRODUCT SUPPLIED WAS INSPECTED IN ACCORDANCE WITH EN 10204:2004 EDITION TYPE 3.1 INSPECTION DOCUMENT. (EUROPEAN STANDARD)
8. THE UNIT OF MEASURE FOR TENSILE AND YIELD (0.2%) STRENGTH ARE REPORTED IN PSI.
9. ELONGATION TEST RESULTS ARE OBTAINED USING STANDARD ROUND SPECIMEN, 2 INCH OR 50 MM GAGE LENGTH.

We certify that the data on this sheet is a true copy taken from our records of material furnished us by the production mill, or as obtained by additional laboratory checks.

by

Kylee Ruiz

Kylee Ruiz

QUALITY PROCESS MANAGER

CMTR: REV2



# BOTH-WELL STEEL FITTINGS CO., LTD.

NO.303, REN-SIN ROAD, REN-WU DISTRICT, KAOHSIUNG CITY, TAIWAN, R.O.C.(81460)  
TEL : (886)7-3711536, 3710497, 3720260 FAX : (886)7-371-3864, 3713882  
WEB SITE : <http://www.bothwell.com.tw> E-Mail : [box@bothwell.com.tw](mailto:box@bothwell.com.tw)

An ISO 9001 : 2015 Registered Manufacturer

## MILL TEST & INSPECTION CERTIFICATE

ACCORDING TO EN 10204 3.1

CUSTOMER : SEYBOLD INTERNATIONAL CORP.

PAGE : 19

CERT NO : 180410

INVOICE NO : 5200011852

DATE : 02/12/2018

ORDER NO : 7013926

L/C NO :

ORIGIN : TAIWAN

ITEM	RAW HEAT NO. HEAT NO.	QTY	DESC/ GRADE OR SPECIFICATION NO. CHEMICAL COMPOSITION % MECHANICAL PROPERTIES.
108	355196 YB0001	100 PCS	UNION NUT (CT) - BODY (RD) LF2 CL1 (N) 1-1/2" 3000# S/W SQ3UI.5-BW C: 0.18 Si: 0.25 Mn: 1.05 P: 0.014 S: 0.005 Cu: 0.04 Cr: 0.07 Ni: 0.03 Mo: 0.01 V: 0.003 Nb: 0.003 N: 0.0099 Ti: 0.002 CE: 0.38 TS(KSI): 73.8 YS 0.2%(KSI): 55.5 EL(%): 32.5 RA(%): 69.1 HARDNESS 1(HBW): 141 HARDNESS 2(HBW): 143 IMPACT TEST -46°C (-50.8°F) 1: 48 J 2: 87 J 3: 67 J AVG: 67 J

1/2" 3000 FS SW  
union A350LF2

### REMARK :

THE MATERIAL SUPPLIED IDENTIFIED AS ASTM A350 - 15, ASME SA350 - 2015ED LF2 CL 1

THE FITTING SUPPLIED IDENTIFIED AS MSS SP-83 - 2014

THE PRODUCT SUPPLIED WAS INSPECTED IN ACCORDANCE WITH SPECIFICATION SURFACE & DIM. : GOOD

STANDARD : CHEMICAL COMPOSITION % & MECHANICAL PROPERTIES.

	C	Si	Mn	P	S	Cu	Cr	Ni	Mo	V	Cb(Nb)
MIN	-	0.15	0.60	-	-	-	-	-	-	-	-
MAX	0.30	0.30	1.35	0.035	0.040	0.40	0.30	0.40	0.12	0.08	0.02
	N	Al	Ti	Zr	CE	TS(KSI)	YS(KSI)	YS 0.2%(KSI)	EL(%)	R of A(%)	HARDNESS(HBW)
MIN	-	-	-	-	-	70	-	36	22	30	-
MAX	-	-	-	-	0.47	95	-	-	-	-	197

HEAT TREATMENT : NORMALIZED 900°C(1652°F) A.C.

CONFORM TO NACE MR0175-15/ISO 15156-15/MR0103-15

FULLY KILLED AND FINE GRAIN PRACTICE

FREE FROM RADIATION CONTAMINATION

REF#90817ABW

WE CERTIFY THE ABOVE MENTIONED FITTINGS HAVE BEEN MANUFACTURED,  
SAMPLED, TESTED, AND INSPECTED IN ACCORDANCE WITH THE  
SPECIFICATIONS SHOWN

*C.C. Huang*  
Q.C. MANAGER

*C.L. Ko*  
INSPECTOR





# 柏緯鐵工股份有限公司

高雄縣仁武鄉烏林村仁心路 303 號

**BOTH-WELL STEEL FITTINGS CO., LTD.**

NO.303, JEN-HSIN ROAD JEN-WU HSIANG

KAHSIUNG HSIEN, TAIWAN R.O.C.(81480)

TEL: 886-7-371-0497, 371-1536, 372-0260

web site : <http://www.bothwell.com.tw> e-mail: [bothwell@www.bothwell.com.tw](mailto:bothwell@www.bothwell.com.tw) or [box@mail.bothwell.com.tw](mailto:box@mail.bothwell.com.tw)

An ISO 9001:2000 Registered Manufacturer

ISO 9001

BUREAU VERITAS  
Certification

N° TW00091Q



FAX: 886-7-371-3864, 371-3882

## MILL TEST & INSPECTION CERTIFICATE

ACCORDING TO EN10204/DIN50049/3.1.B

ORIGIN: TAIWAN

CUSTOMER: WEIFANG STEEL CANADA LTD.

INVOICE NO: BW089706095



DATE: 12/10/08

CERT NO: 83363-2

ORDER NO: AG0031-LF2

L/C NO:

PAGE: 4

ITEM	BOTH WELL HT.CD.	RAW MATERIAL HEAT NO.	DESCRIPTION								QUANTITY	SPECIFICATION: ASTM A350 -04a ASME SA350 -E04 LF2-Class1  DIMENSION: ASME B16.11-2005  SURFACE: BY VISUAL...GOOD			
014	Y050	X1651	TEE 3/4" 3000# NPT								300 PC				
023	Y050	X1651	FULL CPLG 1-1/2" 3000# NPT								1000 PC				
029	Y050	X1651	HALF CPLG 1-1/2" 3000# NPT								300 PC				
035	Y050	X1651	CAP 1-1/2" 3000# NPT								400 PC				
036	Y050	X1651	CAP 2" 3000# NPT								600 PC				
070	Y047	X1653	90D ELBOW 2" 3000# S/W								110 PC				
070	Y047	X1653	90D ELBOW 2" 3000# S/W								50 PC				
ITEM	BOTH WELL HT.CD	CHEMICAL COMPOSITION (%)													
		C	Si	Mn	P	S	Cu	Cr	Ni	Mo	V	Cb(Nb)	N		
Min		-	0.150	0.600	-	-	-	-	-	-	-	-	-		
Max		0.300	0.300	1.350	0.035	0.040	0.400	0.300	0.400	0.120	0.080	0.020	-		
014	Y050	0.200	0.190	1.040	0.007	0.001	0.030	0.060	0.030	0.010	0.001	0.000	-		
023	Y050	0.200	0.190	1.040	0.007	0.001	0.030	0.060	0.030	0.010	0.001	0.000	-		
029	Y050	0.200	0.190	1.040	0.007	0.001	0.030	0.060	0.030	0.010	0.001	0.000	-		
035	Y050	0.200	0.190	1.040	0.007	0.001	0.030	0.060	0.030	0.010	0.001	0.000	-		
036	Y050	0.200	0.190	1.040	0.007	0.001	0.030	0.060	0.030	0.010	0.001	0.000	-		
070	Y047	0.200	0.220	1.050	0.012	0.001	0.040	0.190	0.040	0.020	0.010	0.000	-		
070	Y047	0.200	0.220	1.050	0.012	0.001	0.040	0.190	0.040	0.020	0.010	0.000	-		
ITEM	BOTH WELL HT.CD	MECHANICAL TEST					Remark:								
		Tensile Strength (KSI)	Yield Strength (KSI)	Elon- Gation (%)	R of A (%)	Hardness (AVG.) (HB)	CONFORM TO NACE MR0175-2003/MR0103 STEEL MAKING PROCESS : ELECTRIC FURNACE HEAT TREATED(°C) NORMALIZED:900°C TEMPERED:620°C IMPACT VALUE(CHARPY) -50°F(-46.0°C) HEAT NO. HT.CD. JOULE(J) AVG.(J) X1653 Y047 285 272 257 271.333 X1651 Y050 242 188 175 201.667								
Min		70.0	36.0	22.0	30.0	-									
Max		95.0	-	-	-	197									
014	Y050	79.7	60.7	34.6	76.2	151	WE CERTIFY THE ABOVE MENTIONED FITTINGS HAVE BEEN MANUFACTURED AND TESTED IN ACCORDANCE WITH THE SPECIFICATIONS SHOWN  <div> Q.C. MANAGER CHIN CHENG HSIEH</div> <div> INSPECTOR CHUN CHIEH HUANG</div>								
023	Y050	79.7	60.7	34.6	76.2	151									
029	Y050	79.7	60.7	34.6	76.2	151									
035	Y050	79.7	60.7	34.6	76.2	151									
036	Y050	79.7	60.7	34.6	76.2	151									
070	Y047	78.1	58.1	36.2	80.3	144									
070	Y047	78.1	58.1	36.2	80.3	144									





**CapProducts, Ltd.**  
25 Winnipeg St  
Vanastra, ON N0M 1L0

**Phoenix \* Capitol \* Camco**  
**CapProducts**

**Certified Material Test Report**

*Commanding a Higher Standard<sup>sm</sup>*

Printed: 8/20/2019

**Customer**

EMCO DISTRIBUTION GROUP  
PO BOX 5300 STATION A  
LONDON, ON N6A 4N7

Certified: 12/18/2018

P.O. 2610174-00

Tag 3050060

Heat No 174321

Heat Code 87AH

Phoenix Order # 1481945

Material ASTM A333 GR6 2015/ASME SA333 GR6 2015 Edition

**Part Number**

15111512CSA

**Description**

1-1/2X6 XHSML BK STL NIPL A333 GR6 CSA

**Chemical Properties**

C	Mn	P	S	Si	Cu	Ni	Cr	C Eq. Long	
0.1300	1.3200	0.0090	0.0050	0.3100	0.0390	0.0200	0.0600	0.3687	
Mo	V	Co	Al	Cb	N	Pb	Sn	Ta	Ti
0.0100	0.0040			0.0180					0.0020

**Additional Chemical Properties**

B					Cr + Cu + Ni	
0.00030					0.1190	

**Mechanical Properties**

Tensile (PSI)	Yield (PSI)	Elong. % in 2 in. or 4D	R of A	HBW	HBW2
72,374	55,985	37.0%		150	0

**Charpy Minimum Impact - ft/lbs**

Test 1	Test 2	Test 3	Average	Test Temp.
48	41	49	46.00	-54

\* Bend test passed.

We hereby certify that these parts were manufactured, sampled, tested, and inspected in accordance with the product specifications stated and were found to meet the requirements.

We further certify that this material was inspected using independent inspectors conforming to the requirements of EN 10204 3.1. These products meet the requirements of the latest editions of NACE MR0175, NACE MR0103, and ISO 15156. No weld repair has been performed on these products. This material was not exposed to mercury or any other metal alloy that is liquid at ambient temperatures during processing or while in our possession.

**Comments:**

Flattening test passed. Ultrasonic test passed.

Charpy V Impact Tested at -54° C. Specimen size - 10 x 3.33 mm

Hot finished, Normalized





**CapProducts, Ltd.**  
25 Winnipeg St  
Vanastra, ON N0M 1L0

**Phoenix \* Capitol \* Camco**  
**CapProducts**

**Certified Material Test Report**

*Commanding a Higher Standard<sup>sm</sup>*

Printed: 8/20/2019

Certified: 06/07/2019

**Customer**

EMCO DISTRIBUTION GROUP  
PO BOX 5300 STATION A  
LONDON, ON N6A 4N7

P.O. 2610174-00

Tag 3050060

Heat No 608622

Heat Code 87HU

Phoenix Order # 1481945

Material ASTM A333 GR6 2015/ASME SA333 GR6 2015 Edition

**Part Number**

15111512CSA

**Description**

1-1/2X6 XHSML BK STL NIPL A333 GR6 CSA

**Chemical Properties**

C	Mn	P	S	Si	Cu	Ni	Cr	C Eq. Long	
0.1300	0.7200	0.0140	0.0030	0.2000	0.0900	0.0700	0.0900	0.2833	
Mo	V	Co	Al	Cb	N	Pb	Sn	Ta	Ti
0.0200	0.0030			0.0140					0.0020

**Additional Chemical Properties**

Boron					Cr + Cu + Ni	
0.00010					0.2500	

**Mechanical Properties**

Tensile (PSI)	Yield (PSI)	Elong. % in 2 in. or 4D	R of A	HBW	HBW2
64,107	44,672	34.0%		134	0

**Charpy Minimum Impact - ft/lbs**

Test 1	Test 2	Test 3	Average	Test Temp.
44	44	46	44.67	-55

\* Hydro test passed. at 3000 psi.

\* Bend test passed.

We hereby certify that these parts were manufactured, sampled, tested, and inspected in accordance with the product specifications stated and were found to meet the requirements.

We further certify that this material was inspected using independent inspectors conforming to the requirements of EN 10204 3.1. These products meet the requirements of the latest editions of NACE MR0175, NACE MR0103, and ISO 15156. No weld repair has been performed on these products. This material was not exposed to mercury or any other metal alloy that is liquid at ambient temperatures during processing or while in our possession.

**Comments:**

Flattening test passed.

Charpy V Impact Tested at -55° C. Specimen size - 10 x 4 mm.

Normalized

18353-6086



**CapProducts, Ltd.**  
25 Winnipeg St  
Vanastra, ON N0M 1L0

**Phoenix \* Capitol \* Camco**  
**CapProducts**

## Certified Material Test Report

*Commanding a Higher Standard<sub>sm</sub>*

Printed: 8/20/2019

**Customer**

EMCO DISTRIBUTION GROUP  
PO BOX 5300 STATION A  
LONDON, ON N6A 4N7

Certified: 06/07/2019

P.O. 2610174-00

Tag 3050060

Heat No 608622

Heat Code 87HU

Phoenix Order # 1481945

Material ASTM A333 GR6 2015/ASME SA333 GR6 2015 Edition

**Part Number**

15111512CSA

**Description**

1-1/2X6 XHSML BK STL NIPL A333 GR6 CSA

**Chemical Properties**

C	Mn	P	S	Si	Cu	Ni	Cr	C Eq. Long	
0.1300	0.7200	0.0140	0.0030	0.2000	0.0900	0.0700	0.0900	0.2833	
Mo	V	Co	Al	Cb	N	Pb	Sn	Ta	Ti
0.0200	0.0030			0.0140					0.0020

**Additional Chemical Properties**

Boron					Cr + Cu + Ni
0.00010					0.2500

**Mechanical Properties**

Tensile (PSI)	Yield (PSI)	Elong. % in 2 in. or 4D	R of A	HBW	HBW2
64,107	44,672	34.0%		134	0

**Charpy Minimum Impact - ft/lbs**

Test 1	Test 2	Test 3	Average	Test Temp.
44	44	46	44.67	-55

\* Hydro test passed. at 3000 psi.

\* Bend test passed.

We hereby certify that these parts were manufactured, sampled, tested, and inspected in accordance with the product specifications stated and were found to meet the requirements.

We further certify that this material was inspected using independent inspectors conforming to the requirements of EN 10204 3.1. These products meet the requirements of the latest editions of NACE MR0175, NACE MR0103, and ISO 15156. No weld repair has been performed on these products. This material was not exposed to mercury or any other metal alloy that is liquid at ambient temperatures during processing or while in our possession.

**Comments:**

Flattening test passed.

Charpy V Impact Tested at -55° C. Specimen size - 10 x 4 mm.

Normalized

MLTS\_6056-18953-1  
Heat# 608622, 174321





**CapProducts, Ltd.**  
25 Winnipeg St  
Vancouver, ON N0M 1L0

**Phoenix \* Capitol \* Camco**  
**CapProducts**

## Certified Material Test Report

*Commanding a Higher Standard<sub>sm</sub>*

Printed: 8/20/2019

**Customer**

EMCO DISTRIBUTION GROUP  
PO BOX 5300 STATION A  
LONDON, ON N6A 4N7

Certified: 12/18/2018

P.O. 2610174-00

Tag 3050060

Heat No 174321

Heat Code 87AH

Phoenix Order # 1481945

Material ASTM A333 GR6 2015/ASME SA333 GR6 2015 Edition

**Part Number**

15111512CSA

**Description**

1-1/2X6 XHSM BK STL NIPL A333 GR6 CSA

**Chemical Properties**

C	Mn	P	S	Si	Cu	Ni	Cr
0.1300	1.3200	0.0090	0.0050	0.3100	0.0390	0.0200	0.0600

C Eq. Long
0.3687

Mo	V	Co	Al	Cb	N	Pb	Sn	Ta	Ti
0.0100	0.0040			0.0180					0.0020

**Additional Chemical Properties**

B				
0.00030				

Cr + Cu + Ni
0.1190

**Mechanical Properties**

Tensile (PSI)	Yield (PSI)	Elong. % in 2 in. or 4D	R of A	HBW	HBW2
72,374	55,985	37.0%		150	0

**Charpy Minimum Impact - ft/lbs**

Test 1	Test 2	Test 3	Average	Test Temp.
48	41	49	46.00	-54

\* Bend test passed.

We hereby certify that these parts were manufactured, sampled, tested, and inspected in accordance with the product specifications stated and were found to meet the requirements.

We further certify that this material was inspected using independent inspectors conforming to the requirements of EN 10204

3.1. These products meet the requirements of the latest editions of NACE MR0175, NACE MR0103, and ISO 15156. No weld repair has been performed on these products. This material was not exposed to mercury or any other metal alloy that is liquid at ambient temperatures during processing or while in our possession.

**Comments:**

Flattening test passed. Ultrasonic test passed.

Charpy V Impact Tested at -54° C. Specimen size - 10 x 3.33 mm

Hot finished, Normalized



CORPORATION

4151 North Service Road, Burlington, ON L7L 4X6 (905) 335-5320

Date: 9/9/2019

## Mill Test Reports

Invoice: 1600715-00

PO: 2610192

Customer: 27403-261

A.B.F. MINES/2985080 CANA 261  
1310 AVE DAVY

ROUYN NORANDA, QC J9Y 0A8

Line	Heat#	Product	Description
1	b03459	7585585	6 150 RF BLIND FLG A350LF2



## CERTIFICATE OF INSPECTION &amp; TEST (EN 10204 3.1)



**ST&H CORPORATION**  
 OFFICE - 74, Jwadongsunhwan-ro, Haeundae-gu, Busan, Korea  
 PLANT - 11, Eogokgongdan 2-gil, Yangsan-si, Kyungnam, Korea  
 Tel : +82.51.744-4680(5 line) Fax : +82.51.744-4670  
 E-mail : qm@stnhcorp.com



Certificate No. MJH0290-01/05

Date : FEB. 14, 2019

Customer CCTF CORPORATION

Contract No. 4039095-00

Spec. For Material ASTM A105N-18, ASME SA105N-17, ASTM A350 LF2 CL1-18, ASME SA350 LF2 CL1-17, NACE MR0175/ISO 15156-2:2015, NACE MR0103/ISO 17495-1:2016

Heat Treatment 930°C NORMALIZED &amp; A.C

Dimensional Inspection ASME B16.5 - 2017

Certified to ISO9001 / ISO14001:2015, PED2014/68/EC by LROA

ITEM / SIZE	Q'ty	Heat No./ Batch No.	Size of Test Specimen		Tension Test					Hardness Test (HB)	Charpy Impact Test (10X10mm Specimen Size)				
			D mm	GL mm	Y.S MPa	T.S MPa	E.L %	R.A %	Indiv. 16J		Ave. 20J	Notch V	Temp. -46°C		
12.5	50.0	Max	Min	250	485	22.0	30.0	Test Result (J)							
7585585	20	B03459	12.5	50.0		330	520	34	76	150	156	80	75	86	80
7585860	10	B03459	12.5	50.0		330	520	34	76	150	156	80	75	86	80
7580218	20	B03459	12.5	50.0		330	520	34	76	150	156	80	75	86	80
7580202	2	B03459	12.5	50.0		330	520	34	76	150	156	80	75	86	80
7586502	5	B03459	12.5	50.0		330	520	34	76	150	156	80	75	86	80
7586824	50	B03459	12.5	50.0		330	520	34	76	150	156	80	75	86	80
7586832	30	B03459	12.5	50.0		330	520	34	76	150	156	80	75	86	80
7586891	20	B03459	12.5	50.0		330	520	34	76	150	156	80	75	86	80
7583949	10	B03459	12.5	50.0		330	520	34	76	150	156	80	75	86	80
7585321	20	B03459	12.5	50.0		330	520	34	76	150	156	80	75	86	80

Heat No./ Batch No.	Max Min	Chemical Composition (%)												NDE			
		C	Si	Mn	P	S	Ni	Cr	Mo	Cu	V	Nb	CE		UT	MT	PT
		0.300	0.300	1.350	0.035	0.040	0.400	0.300	0.120	0.400	0.080	0.020					
			0.150	0.600													

BLANK

REMARK \* H : Heat Analysis P : Product Analysis

We hereby certify that the material herein has been made and tested in accordance with the above specification and also with the requirements called for by the above order.

ST-801-14-02

Witnessed by / H. J. LEE

Manager of Q.A Dept. / JAY KIM

ST&amp;H CORPORATION









NEWCO® | OIC® | DOUGLAS CHERO™

13127 Trinity Dr., Stafford, TX 77477  
Tel: 281-302-4900 Fax: 281-302-4801

Item No: B3080030F\*LCCW27B\*\*\*\*\*GA  
Size/Type: 8" / Swing Check  
Quantity: 1  
Country of Origin: China  
FigNo: 33P--LCC4/2-NC

# Material Test Report

Cameron Newco is a 9001 certified registered company  
CRN: OC7998.5C - EN 10204-3.1

06/17/19

Cert No: 1087586

Customer: EMCO  
Customer Number: 32043  
Customer PO: 2610091-00  
Cameron SO: QRC SO# 1007020  
Project Name:  
Valve Serial No:  
Description: 300# RF A352-LCC (TRIM 12) BC SWING CHECK  
NACE  
Customer Tag No:

MLTS\_6056-18734  
Cert# 1087586

Inspection			
Dimension: Passed			
Visual: Passed			
Valve Materials meet the requirements for NACE MR0103 and NACE MR0175			
Item	Test Pressure (PSI)	Duration (sec)	Test Result
Shell	7.757	120	Passed
Backseat	-	-	-
Seat Hydro	5.688	120	Passed
Seat Air	-	-	-

Standard: API 598 / ASME B16.34

Heat No: N9183W

Material Code: A352 LCC

Spec:	C	Cr	Cu	Mn	Mo	Ni	P	S	Si	V
Chem Comp (%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Min:	0.25	0.50	0.30	1.20	0.20	0.50	0.040	0.05	0.60	0.03
Max:	0.180	0.040	0.018	1.040	0.002	0.014	0.021	0.010	0.520	0.004
Val:	0.180	0.040	0.018	1.040	0.002	0.014	0.021	0.010	0.520	0.004

Heat No: LF2-B025

Material Code: A350 LF2

Spec:	C	Cr	Cu	Mn	Mo	Ni	P	S	Si	V
Chem Comp (%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Min:	0.30	0.30	0.40	1.35	0.12	0.02	0.040	0.035	0.04	0.30
Max:	0.220	0.200	0.210	0.900	0.070	0.000	0.020	0.010	0.013	0.010
Val:	0.220	0.200	0.210	0.900	0.070	0.000	0.020	0.010	0.013	0.010

Physical Props	Tensile KSI	Yield KSI	Elong %	Reduct %	Hard (HB)	Impact Tests @-50 deg F	lb/ftc
	70.0	36.0	22.0	30.0	1.0		# 1: 36
							# 2: 35
	95.0	999.9	100.0	100.0	197.0		# 3: 47
	81.2	38.4	35.0	50.0	170.0		Avg: 36

Physical Props	Tensile KSI	Yield KSI	Elong %	Reduct %	Hard (HB)	Impact Tests @-50 deg F	lb/ftc
	70.0	36.0	22.0	30.0	1.0		# 1: 36
	95.0	999.9	100.0	100.0	197.0		# 2: 35
	81.2	38.4	35.0	50.0	170.0		# 3: 47
							Avg: 36

Comments: Cameron declares that the parts above are in accordance with applicable material specification and purchase order requirements.  
No Asbestos is contained in this product. Packing: | Gasket: Graphite Spiral Wound (316)  
Valves covered in this certificate are in full compliance with purchase order requirements and specifications.

MTR created by: DR

Signature

06/17/19



NEWCO® | OIC® | DOUGLAS CHERO™

13127 Trinity Dr., Stafford, TX 77477  
Tel: 281-302-4900 Fax: 281-302-4801

Item No: B3080030P\*LCCW27B\*\*\*\*\*GA  
Size/Type: 8" / Swing Check  
Quantity: 1  
Country of Origin: China  
FigNo: 33F--LCC4/2-NC

# Material Test Report

Cameron Newco is a 9001 certified registered company  
CRN: OC7998.5C - EN 10204-3.1

06/17/19

Cert No: 1087587

Customer: EMCO  
Customer Number: 32043  
Customer PO: 2610091-00  
Cameron SO: QRC SO# 1007020  
Project Name:  
Valve Serial No:  
Description: 300# RF A352-LCC (TRIM 12) BC SWING CHECK  
NACE  
Customer Tag No:

MLTS\_6056-18734  
Cert# 1087587

## Pressure Test Result

Item	Test Pressure (PSI)	Duration (sec)	Test Result
Shell	7.757	120	Passed
Backseat	-	-	-
Seat Hydro	5.688	120	Passed
Seat Air	-	-	-

Dimension: Passed

Visual: Passed

Valve Materials meet the requirements for NACE MR0103 and NACE MR0175

Standard: API 598 / ASME B16.34

## Part: Body Type 3.1

Heat Treatment: QUENCHING+TEMPERING

## Material Code: A352 LCC

Notes:

Spec:	C	Cr	Cu	Mn	Mo	Ni	P	S	SI	V
Chem Comp (%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Min:	0.25	0.50	0.30	1.20	0.20	0.50	0.040	0.05	0.60	0.03
Max:	0.190	0.025	0.015	1.090	0.004	0.014	0.023	0.009	0.550	0.005

## Part: Bonnet/Cap Type 3.1

Heat Treatment: QUENCHING+TEMPERING

## Material Code: A350 LF2

Notes:

Spec:	C	Cr	Cu	Mn	Mo	Nb	Ni	P	S	SI	V
Chem Comp (%)	0.00	0.00	0.00	0.60	0.00	0.00	0.00	0.001	0.00	0.15	0.00
Min:	0.30	0.30	0.40	1.35	0.12	0.02	0.40	0.035	0.04	0.30	0.08
Max:	0.220	0.200	0.210	0.900	0.070	0.000	0.220	0.010	0.013	0.210	0.010

## Heat No: N9158W

Physical Props	Tensile KSI	Yield KSI	Elong %	Reduct %	Hard (HB)	Impact Tests @50 deg F	lb/ftc # 1: 30 # 2: 20 # 3: 23 Avg: 25
70.0	39.9	22.0	35.0	100.0	100.0		
85.6	999.9	100.0	100.0	225.0	225.0		
	59.5	33.0	66.0	180.0	180.0		

## Heat No: LF2-B025

Physical Props	Tensile KSI	Yield KSI	Elong %	Reduct %	Hard (HB)	Impact Tests @50 deg F	lb/ftc # 1: 36 # 2: 45 # 3: 47 Avg: 36
70.0	36.0	22.0	30.0	1.0	1.0		
95.0	999.9	100.0	100.0	197.0	197.0		
81.2	38.4	35.0	50.0	170.0	170.0		

Comments: Cameron declares that the parts above are in accordance with applicable material specification and purchase order requirements.  
No Asbestos is contained in this product. Packing: 1 Gasket Graphite Spiral Wound (316)  
Valves covered in this certificate are in full compliance with purchase order requirements and specifications.

MTR created by: DR

Signature

06/17/19