

MARCH 28, 2002

**WELDING STANDARDS
to CSA W47.1**

CWB APPROVAL

ENGINEERS STAMP

**3 SUPPLEMENTARY WELD
INFORMATION**



3.A Fillet Welds

8. Fillet welds shall not terminate at corners of parts of members but shall be returned continuously, full size around the corner for a length equal to twice the weld size where such return can be made in the same plane.
9. The minimum fillet size as measured shall be shown in the table below (Table 3-1). Except that the weld size need not exceed the thickness of the thinner part joined unless a larger size is required by calculated stress. For this exception particular care shall be taken to provide sufficient heat input to ensure weld soundness.

When welding attachments to members which do not carry calculated stress, the requirements of the table below need not apply.

TABLE 3-1 MINIMUM FILLET SIZE

MATERIAL THICKNESS OF THICKER PART JOINED IN MILLIMETERS (INCHES)	MINIMUM SIZE OF FILLET WELD IN MILLIMETERS (INCHES)	
To 12mm (1/2") Inclusive	5mm (3/16")	
Over 12mm (1/2") to 20mm (3/4")	6mm (1/4")	
Over 20mm (3/4")	8mm (5/16")	Single Pass welds Must be used

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**3 SUPPLEMENTARY WELD
INFORMATION**



3.b Groove Welds

1. A complete penetration groove weld is defined as one made from one side on a backing bar or on both sides combined with back gouging to provide complete penetration and fusion of weld and base metal throughout the depth of the joint.
2. The effective area of a groove weld shall be the effective weld length multiplied by the effective throat thickness.
3. The effective throat thickness of a complete joint penetration groove weld shall be the thickness of the thinner part joined. (No increase is permitted for weld reinforcement.).
4. The minimum groove depth of single partial joint penetration groove welds or on each side of double partial joint penetration groove welds shall be in accordance with the Table 3.2 on page 12.
5. For details of Plug and Slot Welds refer to section 4.4.2 of CSA W59-M1989
6. For details of Flare Grooves and their effective throats refer to Section 4.3.1.6 of CSA W59-M1989

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3 SUPPLEMENTARY WELD
INFORMATION



**MINIMUM GROOVE DEPTH FOR PARTIAL
JOINT PENETRATION GROOVE WELDS
(NOT COMBINED WITH FILLET WELDS)
TABLE 3-2**

THICKNESS OF THICKER PART JOINED IN MILLIMETERS	MINIMUM GROOVE DEPTH	
	Groove Angle At Root	Groove Angle At Root
	> 45 < 60 (V, Bevel Grooves)	> 60 (V, bevel J-,U-Grooves)
To 12mm (1/2") Inclusive	8mm (5/16")	5mm (3/16")
Over 12mm (1/2") to 20mm (3/4") Inclusive	10mm (3/8")	6mm (1/4")
Over 20mm (3/4") to 40mm (1 1/2") Inclusive	12mm (1/2")	8mm (5/16")
Over 40mm (1 1/2") to 60mm (2 1/4") Inclusive	14mm (9/16")	10mm (3/8")
Over 60mm (2 1/4") Inclusive	16mm (5/8")	12mm (1/2")

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**3 SUPPLEMENTARY WELD
INFORMATION**



3.b Groove Welds

5. The effective throat thickness of a partial joint penetration groove weld for joints with no root openings shall be the depth of camfer less 3mm (1/8") for grooves having an included angle at the root of the groove less than 60 but not less than 45 .
6. The effective throat thickness of a partial joint penetration groove weld shall be the depth of camfer for grooves having an included angle at the root of the groove of 60 or greater.
7. The effective throat thickness of a partial joint penetration groove weld reinforced with a fillet weld shall be the shortest distance between the root of the groove and the surface of the fillet less 3mm (1/8") where such reduction is required by Paragraph (5).
8. For hollow structural sections the effective throat thickness of Flare-V and Flare-Bevel Groove welds shall be established by the contractor. Unless otherwise approved by the engineer, this shall be done by means of trial welds for each set of procedural conditions shall then be sectioned and measured to establish welding techniques which will ensure that the design throat thickness is achieved in production.

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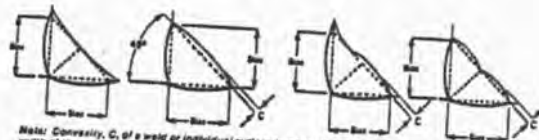
ENGINEERS STAMP

4 SHOP STANDARDS



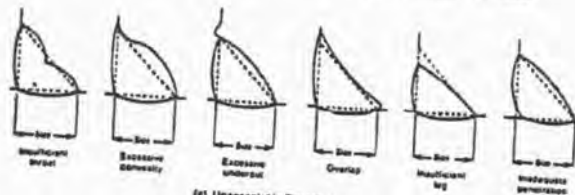
4.a Acceptable and Unacceptable Weld Profiles

TABLE - 1

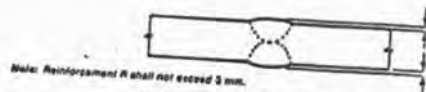


(a) Desirable Fillet Weld Profiles

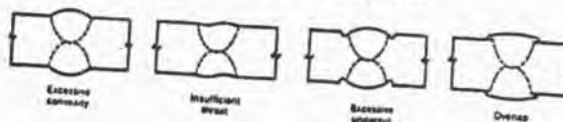
(b) Acceptable Fillet Weld Profiles



(c) Unacceptable Fillet Weld Profiles



(d) Acceptable Groove Weld Profiles in Butt Joints



(e) Unacceptable Groove Weld Profiles in Butt Joints

Notes:
(1) The faces of fillet welds may be slightly convex, flat, or slightly concave. Except at outside corner joints, the convexity shall not exceed $0.07 \times$ width of face or bead $+ 1.5$ mm.
(2) The finishing passes of all groove welds in butt joints shall provide a reinforcement at the centre of weld not exceeding 3 mm. The reinforcement shall be built up uniformly from the surface of the parent metal to a maximum at the centre of the weld. There shall be no valley or groove along the edge or in the centre of the weld. The deposited metal shall be smooth and uniform in cross-section.

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**WELDING STANDARDS
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4 SHOP STANDARDS



4.b Splicing

1. Connections or splices in beams or girders when made by groove welds shall be complete penetration groove welds, unless otherwise approved by the Engineer.
2. Splices of tension members made by groove welds shall be complete joint penetration groove welds unless otherwise approved by the Engineer.
3. All shop splices in each component of a cover-plated or built-up member shall be made before such component part is welded to other component parts of the member.
4. Tension butt joints in plates of different material thickness or widths shall be made in such a manner that the slope through the transition zone is not steeper than 1 in 2 1/2. The transition shall be accomplished by chamfering the thicker part, tapering the wider part, sloping the weld metal, or by any combination of these.
5. Compression butt joints do not require a transition zone in members of different thickness or width, if approved by the Engineer.

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4.c Preparation of Material (From CSA W59-M1989 Clause 5.3)

1. Surfaces and edges to be welded shall be smooth, uniform and free from fins, cracks and other defects that would adversely affect the quality or strength of the weld. Surfaces to be welded shall also be free, within 50 mm (2") of any weld locations, from loose or thick scale (except for tightly adhering small islands of scale), slag, loose rust, paint, grease, moisture and other foreign material that will prevent welding to meet acceptance levels of this standard or produce objectionable fumes.
2. Preparation of edges for welding shall be smooth and regular and shall be left free of slag. The edges resulting from cutting shall be smoothed when necessary to provide a surface equivalent to that specified in Clause 5.3 (CSA W59) (Pre-ceeding paragraph). All re-entrant corners shall be shaped, notch-free, to a radius of at least 15mm. All cutting shall follow closely the lines prescribed. Oxygen gouging not to be used on quenched and tempered steels.
3. For reference to occassional notches and their repair see Clause 5.3.2 CSA W59-M1989 and for planar edge discontinuities refer to Clause 5.3.3 CSA W59-M1989

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4 SHOP STANDARDS



4.d Assembly Practices

1. The parts to be joined by fillet welds shall be brought into as close contact as practicable, (see Clause 54.1 of CSA W59-M1989) and in no event shall be separated by more than 5mm (3/16"). If the separation is 1mm (1/32") or greater, the size of the fillet weld shall be increased by the amount of the separation. The separation between faying surfaces of lap joints and of butt joints landing on a backing shall not exceed 2mm (1/16"). Where irregularities in rolled shapes or plates after straightening, do not permit contact within the above limits, the procedure necessary to bring the material within these limits shall be subject to the approval of the Engineer. The use of fillers is prohibited except as specified on the drawings or as specially approved by the Engineer, and made in accordance with Clause 4.5 CSA W59-M1989.

Abutting parts to be joined by groove welds shall be carefully aligned. Where the parts are effectively restrained against bending due to eccentricity in alignment, an offset not exceeding 10% of the thickness of the thinner part joined, but in no case more than 3mm (1/8"), may be permitted as a departure from the theoretical alignment. In correcting misalignment in such cases, the parts shall not be drawn into a greater slope than 1 in 25. Measurement of offset shall be based upon midplane of parts unless otherwise shown on the drawings.

Members to be welded shall be brought into correct alignment and held safely in position until welding has been completed. Suitable allowances shall be made for warpage and shrinkage.

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4 SHOP STANDARDS



4.e Allowable Workmanship Tolerances from Detailed Drawings

Dimensions of the cross-section of groove welded joints which vary from those on the detail drawings by more than the following workmanship tolerances shall be corrected as per Appendix C, Clause C1.1 (f) (CSA W59), or referred to the Engineer for approval.

	Root Not Gouged	Root Gouged
a) Root Face of Joint	+/- 2mm (1/16")	Not limited
b) Root Opening of Joints without steel backing	+/- 2mm (1/16")	+ 2mm (1/16") - 3mm (1/8")
Root Opening of Joints with steel backing	+ 6mm (1/4") - 2mm (1/16")	Not applicable Not applicable
Root openings wider than permitted by the above tolerances but not greater than twice the thickness of the thinner part of 20mm maximum be built up by welding to acceptable dimensions prior to the joining if the parts by welding.		
c) Groove angle of Joint	+10 Degrees - 5 degrees	+10 Degrees - 5 degrees

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4 SHOP STANDARDS



4.f Control of Distortion and Shrinkage Stresses

1. Insofar as practicable, all welds shall be deposited in a sequence that will balance the applied heat of welding while the welding progresses.

Before the start of welding on a member or structure in which shrinkage stresses or distortion is likely to effect the adequacy of the structure, the program for welding sequence and distortion control shall be developed by the Contractor and submitted to the Engineer for approval.

The direction of the general progression in welding on a member shall be from points where the parts are relatively fixed in position with respect to each other toward points where they have a greater relative freedom of movement.

Joints expected to have large shrinkage shall normally be welded before joints expected to have lesser shrinkage and with as little restraint as possible.

All shop splices in each component of a coverplated or built-up member shall be made before such component part is welded to other component parts of the member. With the approval of the Engineer, long girders or girder section may be made by shop splicing sub-sections, each made in accordance with this Clause (Clause 5.4, CSA W59 - M1989).

For conditions of severe external shrinkage restraint refer to clause 5.1.7 (CSA W59-M1989).

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4 SHOP STANDARDS



4.g Quality of Welds

1. Welds shall have no cracks
2. Welds shall be free from overlap
3. Undercut shall not exceed the permissible values as given in Clauses 11.5.4 and 12.5.4 of CSA W59-M1989 for statically and Dynamically Loaded structures respectively.
4. The minimum acceptable quality of welds, including visual examination, shall confirm to clause 11.5.4 for Statically Loaded Structures, and Clause 12.5.4 for Dynamically Loaded Structures.

ICL Project #: 313

Location: Amaruk Mine, NU

Client Project #: 6115-C-260-001

Field Erected Fuel Storage Tank Handover Package

Floor

Contents

1. MTR Floor Plates
2. Weld Map, Visual Report
3. Vacuum Box Test Report
4. Floor Levelness Report

SSAB

Test Certificate

12400 Highway 43 North, Axis, Alabama 36505, US

Form TC1: Revision 3: Date 7 Feb 2018

Customer: SAMUEL, SON & CO. LTD 1250 APPLEBY LINE BURLINGTON ON L7L5G6		Customer P.O. No.: C44793C & 41-542074		Mtl Order No.: 41-542075-01		Shipping Manifest : AT271198																							
		Product Description: CSA G40.21(2013) 38WT/260WT - CAT 5;LCVN 15FT.LBS,TCVN13FT.LBS@-45F/A673-P ALLOYS API650(12TH ED) TABLE 4-1 GR.IIIA				Ship Date: 18 Aug 18 Cert Date: 18 Aug 18		Cert No: 081679042 (Page 1 of 1)																					
		Size: 0.250 X 96.00 X 433.0 (IN)				Heat Treat Type: NORMALIZED																							
Tested Pieces			Tensiles					Charpy Impact Tests																					
Heat Id	Piece Id	Tested Thickness	Tst Loc	YS (KSI)	UTS (KSI)	%RA	Elong % 2in 8in	Tst Dir	Hardness	Abs. Energy(FTLB) 1 2 3 Avg				% Shear 1 2 3 Avg			Tst Tmp	Tst Dir	Tst Siz (mm)	BDWTT Tmp %Shr									
E8H063	E57	0.255 (DISCRT)	L C	55	76		25	T		25	31	25	27				-50F	T	5.0										
										25	31	25	27				-50F	L	5.0										
Chemical Analysis																													
Heat Id	C	Mn	P	S	Si	TotAl	SolAl	Cu	Ni	Cr	Mo	Co	V	Ti	B	N	ORGN												
E8H063	.19	.92	.010	.001	.25	.028	.027	.31	.16	.11	.04	.000	.003	.011	.0001	.0075	USA												
KILLED STEEL MERCURY IS NOT A METALLURGICAL COMPONENT OF THE STEEL AND NO MERCURY WAS INTENTIONALLY ADDED DURING THE MANUFACTURE OF THIS PRODUCT. KILLED STEEL, PRODUCED TO A FINE GRAIN PRACTICE MTR EN 10204:2004 INSPECTION CERTIFICATE 3.1 COMPLIANT CHARPY FULL SIZE EQUIVALENT = ABSORBED ENERGY AVG X 10 / TEST SIZE IN MM NORMALIZED PLATES. HEATED AT 1665F FOR 14 MINUTES. TEST COUPONS TAKEN FROM HEAT TREATED PLATE. PRODUCTS SHIPPED: E8H063 E57 6801772 PCES: 1, LBS: 2947																													
(U) Cust Part # :										WE HEREBY CERTIFY THAT THIS MATERIAL WAS TESTED IN ACCORDANCE WITH, AND MEETS THE REQUIREMENTS OF, THE APPROPRIATE SPECIFICATION										Justin Ward +1 251 662 4400 SENIOR METALLURGIST - PRODUCT									

B 554424



Test Certificate

12400 Highway 43 North, Axis, Alabama 36505, US

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Customer: SAMUEL, SON & CO. LTD 1250 APPLEBY LINE BURLINGTON ON L7L5G6	Customer P.O.No.: C44793C & 41-542074 Product Description: CSA G40.21(2013) 38WT/260WT - CAT 5LCVN 15FT.LBS,TCVN13FT.LBS@-45F/A673-P ALLOYS API650(12TH ED) TABLE 4-1 GR.IIIA Size: 0.250 X 96.00 X 433.0 (IN)	Mill Order No. 41-542075-01 Shipping Manifest: AR269652 Ship Date: 26 Jul 18 Cert Date: 26 Jul 18 Cert No: 081674771 (Page 1 of 1) Heat Treat Type: NORMALIZED
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										1	2	3	Avg	1	2	3	Avg						
E8G082	D09	0.255 (DISCRT)	C	51	72		27	T		36	38	35	36					-50F	L	5.0			
			C							27	32	32	30					-50F	T	5.0			

Chemical Analysis																		Heat Id	ORGN
E8G082	.18	.94	.009	<.001	.25	.025	.024	.17	.12	.08	.03	.000	.003	.011	.0001	.0070			USA

KILLED STEEL
MERCURY IS NOT A METALLURGICAL COMPONENT OF THE STEEL AND NO MERCURY WAS INTENTIONALLY ADDED DURING THE MANUFACTURE OF THIS PRODUCT.
KILLED STEEL, PRODUCED TO A FINE GRAIN PRACTICE
MTR EN 10204:2004 INSPECTION CERTIFICATE 3.1 COMPLIANT
CHARPY FULL SIZE EQUIVALENT = ABSORBED ENERGY AVG X 10 / TEST SIZE IN MM
NORMALIZED PLATES. HEATED AT 1665F FOR 14 MINUTES.
TEST COUPONS TAKEN FROM HEAT TREATED PLATE.

PRODUCTS SHIPPED:

E8G082 D09	6799178	PCES:	1, LBS:	2947	E8G082 D09	6799182	PCES:	1, LBS:	2947
E8G082 D09	6799181	PCES:	1, LBS:	2947	E8G082 D09	6799183	PCES:	1, LBS:	2947
E8G082 D09	6799184	PCES:	1, LBS:	2947	E8G082 D09	6799185	PCES:	1, LBS:	2947
E8G082 D09	6799171	PCES:	1, LBS:	2947	E8G082 D09	6799176	PCES:	1, LBS:	2947
E8G082 D09	6799173	PCES:	1, LBS:	2947	E8G082 D09	6799180	PCES:	1, LBS:	2947
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E8G082 D09	6799177	PCES:	1, LBS:	2947	E8G082 D09	6799172	PCES:	1, LBS:	2947

B538523

(P) Cust Part #: _____ WE HEREBY CERTIFY THAT THIS MATERIAL WAS TESTED IN ACCORDANCE WITH, AND MEETS THE REQUIREMENTS OF, THE APPROPRIATE SPECIFICATION _____ Justin Ward +1 251 662 4400 SENIOR METALLURGIST - PRODUCT



Test Certificate

Form TC1: Revision 3: Date 7 Feb 2018

12400 Highway 43 North, Axis, Alabama 36505, US

Customer: SAMUEL, SON & CO. LTD 1250 APPLEBY LINE BURLINGTON ON L7L5G6		Customer P.O.No.: C44317C & 41-535283		Mill Order No.: 41-535284-01		Shipping Manifest: AR264983												
		Product Description: CSA G40.21(2013) 38WT/260WT - CAT 4.LCVN 15FT.LBS.@-50F(20J @ -45C) ALLOYS API650(12TH ED) TABLE 4-1 GR.IIIA				Ship Date: 08 May 18 Cert Date: 08 May 18		Cert No: 081662460 (Page 1 of 2)										
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Tested Pieces:				Tensiles:				Charpy Impact Tests										
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E8E014	D01	0.255 (DISCRT)	C 57	78			25	T		35 38 43 39		-50F	L	5.0				
E8E014	D02	0.255 (DISCRT)	C 57	78			23	T		60 34 39 44		-50F	L	5.0				
E8E014	D03	0.256 (DISCRT)	C 56	77			24	T		37 33 54 41		-50F	L	5.0				
Heat																		
Id	C	Mn	P	S	Si	Tot Al	Sol Al	Cu	Chemical Analysis							ORG		
E8E014	.18	.92	.011	.001	.26	.027	.026	.34	Ni	Cr	Mo	Cb	V	Ti	B	N	USA	
KILLED STEEL MERCURY IS NOT A METALLURGICAL COMPONENT OF THE STEEL AND NO MERCURY WAS INTENTIONALLY ADDED DURING THE MANUFACTURE OF THIS PRODUCT. KILLED STEEL, PRODUCED TO A FINE GRAIN PRACTICE MTR EN 10204:2004 INSPECTION CERTIFICATE 3.1 COMPLIANT CHARPY FULL SIZE EQUIVALENT = ABSORBED ENERGY AVG X 10 / TEST SIZE IN MM NO WELD REPAIR HAS BEEN PERFORMED ON THIS MATERIAL. NORMALIZED PLATES. HEATED AT 1665F FOR 14 MINUTES. TEST COUPONS TAKEN FROM HEAT TREATED PLATE. PRODUCTS SHIPPED:																		
E8E014 D02 6781822 PCES: 1, LBS: 2042 E8E014 D02 6781815 PCES: 1, LBS: 2042																		
E8E014 D02 6781814 PCES: 1, LBS: 2042 E8E014 D02 6781832 PCES: 1, LBS: 2042																		
E8E014 D02 6781825 PCES: 1, LBS: 2042 E8E014 D02 6781823 PCES: 1, LBS: 2042																		
E8E014 D02 6781816 PCES: 1, LBS: 2042 E8E014 D02 6781841 PCES: 1, LBS: 2042																		
E8E014 D02 6781834 PCES: 1, LBS: 2042 E8E014 D02 6781828 PCES: 1, LBS: 2042																		
E8E014 D02 6781817 PCES: 1, LBS: 2042 E8E014 D02 6781818 PCES: 1, LBS: 2042																		
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E8E014 D02 6781835 PCES: 1, LBS: 2042 E8E014 D02 6781833 PCES: 1, LBS: 2042																		
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(P) Cust Part #:								WE HEREBY CERTIFY THAT THIS MATERIAL WAS TESTED IN ACCORDANCE WITH, AND MEETS THE REQUIREMENTS OF, THE APPROPRIATE SPECIFICATION									Justin Ward +1 251 662 4400 SENIOR METALLURGIST - PRODUCT	



Test Certificate

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12400 Highway 43 North, Axis, Alabama 36505, US

Customer: SAMUEL, SON & CO. LTD 1250 APPLEBY LINE BURLINGTON ON L7L5G6				Customer P.O.No.: C44317C & 41-535283				Mill Order No. 41-535284-01				Shipping Manifest: AR264983									
				Product Description: CSA G40.21(2013) 38WT/260WT - CAT 4,LCVN 15FT.LBS.@-50F(20J @ -45C) ALLOYS API650(12TH ED) TABLE 4-1 GR.IIIA								Ship Date: 08 May 18 Cert Date: 08 May 18				Cert No: 081662460 (Page 2 of 2)					
				Size: 0.250 X 120.0 X 240.0 (IN)								Heat Treat Type: NORMALIZED									
Tested Pieces:				Tensiles:						Charpy Impact Tests											
Heat Id	Piece Id	Piece Dimensions	Tst Loc	YS (KSI)	UTS (KSI)	%RA	Elong % 2in 8in	Tst Dir	Hardness	Abs. Energy(FTLB)				% Shear				Tst Tmp	Tst Dir	Tst Siz (mm)	BDWTT Tst %Shr
										1	2	3	Avg	1	2	3	Avg				
E8E014 D02 6781830 PCES: 1, LBS: 2042 E8E014 D02 6781820 PCES: 1, LBS: 2042																					
(P) Cust Part #:										WE HEREBY CERTIFY THAT THIS MATERIAL WAS TESTED IN ACCORDANCE WITH, AND MEETS THE REQUIREMENTS OF, THE APPROPRIATE SPECIFICATION											
										Justin Ward +1 251 662 4400 SENIOR METALLURGIST - PRODUCT											



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Tested Pieces:				Tensiles:					Charpy Impact Tests													
Heat Id	Piece Id	Piece Dimensions	Tst Loc	YS (KSI)	UTS (KSI)	%RA	Elong % 2in 8in	Tst Dir	Hardness	Abs. Energy(FTLB) 1 2 3 Avg				% Shear 1 2 3 Avg				Tst Tmp	Tst Dir	Tst Siz (mm)	BDWTT Tmp %Shr	
E8E014	D03	0.256 (DISCRT)	C	56	77		24	T		37	33	54	41					-50F	L	5.0		

Chemical Analysis																		Heat Id	ORGN
E8E014		C	Mn	P	S	Si	Tot Al	Sol Al	Cu	Ni	Cr	Mo	Cb	V	Ti	B	N		USA
		.18	.92	.011	.001	.26	.027	.026	.34	.18	.11	.03	.001	.005	.012	.0001	.0061		

KILLED STEEL
MERCURY IS NOT A METALLURGICAL COMPONENT OF THE STEEL AND NO MERCURY WAS INTENTIONALLY ADDED DURING THE MANUFACTURE OF THIS PRODUCT.
KILLED STEEL, PRODUCED TO A FINE GRAIN PRACTICE
MTR EN 10204:2004 INSPECTION CERTIFICATE 3.1 COMPLIANT
CHARPY FULL SIZE EQUIVALENT = ABSORBED ENERGY AVG X 10 / TEST SIZE IN MM
NO WELD REPAIR HAS BEEN PERFORMED ON THIS MATERIAL.
NORMALIZED PLATES. HEATED AT 1665F FOR 14 MINUTES.
TEST COUPONS TAKEN FROM HEAT TREATED PLATE.

PRODUCTS SHIPPED:

E8E014 D03	6781927	PCES:	1, LBS:	3863	E8E014 D03	6781923	PCES:	1, LBS:	3863
E8E014 D03	6781929	PCES:	1, LBS:	3863	E8E014 D03	6781922	PCES:	1, LBS:	3863
E8E014 D03	6781921	PCES:	1, LBS:	3863	E8E014 D03	6781920	PCES:	1, LBS:	3863
E8E014 D03	6781919	PCES:	1, LBS:	3863	E8E014 D03	6781928	PCES:	1, LBS:	3863
E8E014 D03	6781925	PCES:	1, LBS:	3863	E8E014 D03	6781924	PCES:	1, LBS:	3863
E8E014 D03	6781926	PCES:	1, LBS:	3863	E8E014 D03	6781918	PCES:	1, LBS:	3863
E8E014 D03	6781917	PCES:	1, LBS:	3863	E8E014 D03	6781916	PCES:	1, LBS:	3863

4359503

(P)

Cust Part #:

WE HEREBY CERTIFY THAT THIS MATERIAL WAS
TESTED IN ACCORDANCE WITH, AND MEETS THE
REQUIREMENTS OF, THE APPROPRIATE SPECIFICATION

Justin Ward +1 251 662 4400
SENIOR METALLURGIST - PRODUCT

Inukshuk Construction Limited

Industrial Contracting  Project Management

PO Box 654
Rankin Inlet, NU X0C 0G0
T 867.645.4030 F 867.645.4064

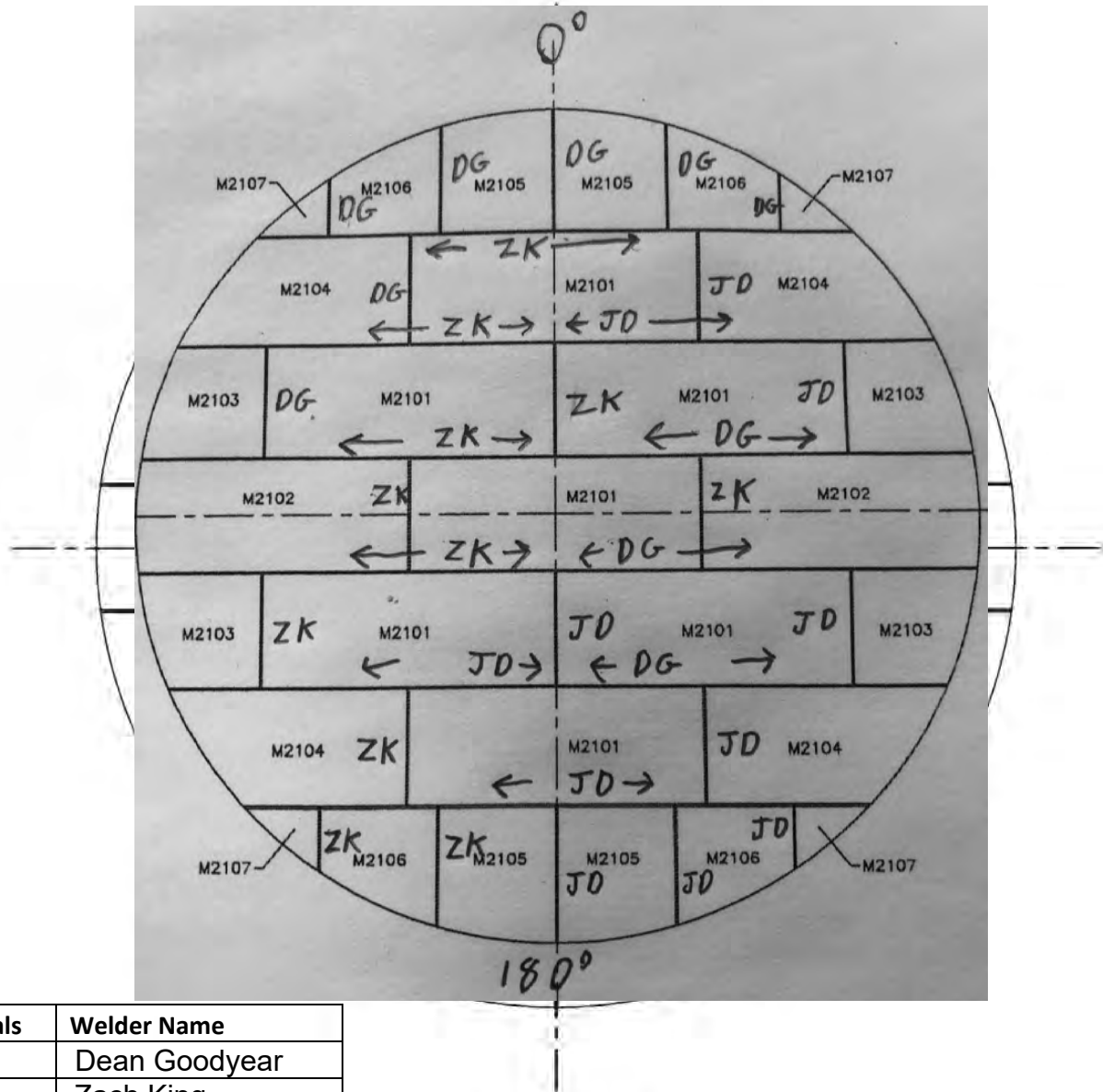
ICL Project #: 313

Location: Amaruk Mine, NU

Client Project #: 6115-C-260-001

FLOOR – WELD MAP

Circle or highlight joints and identify welder by initials as per table below.



FLOOR LAYOUT

Initials	Welder Name
DG	Dean Goodyear
ZK	Zach King
JD	Justin Dredge

ICL Project #: 313

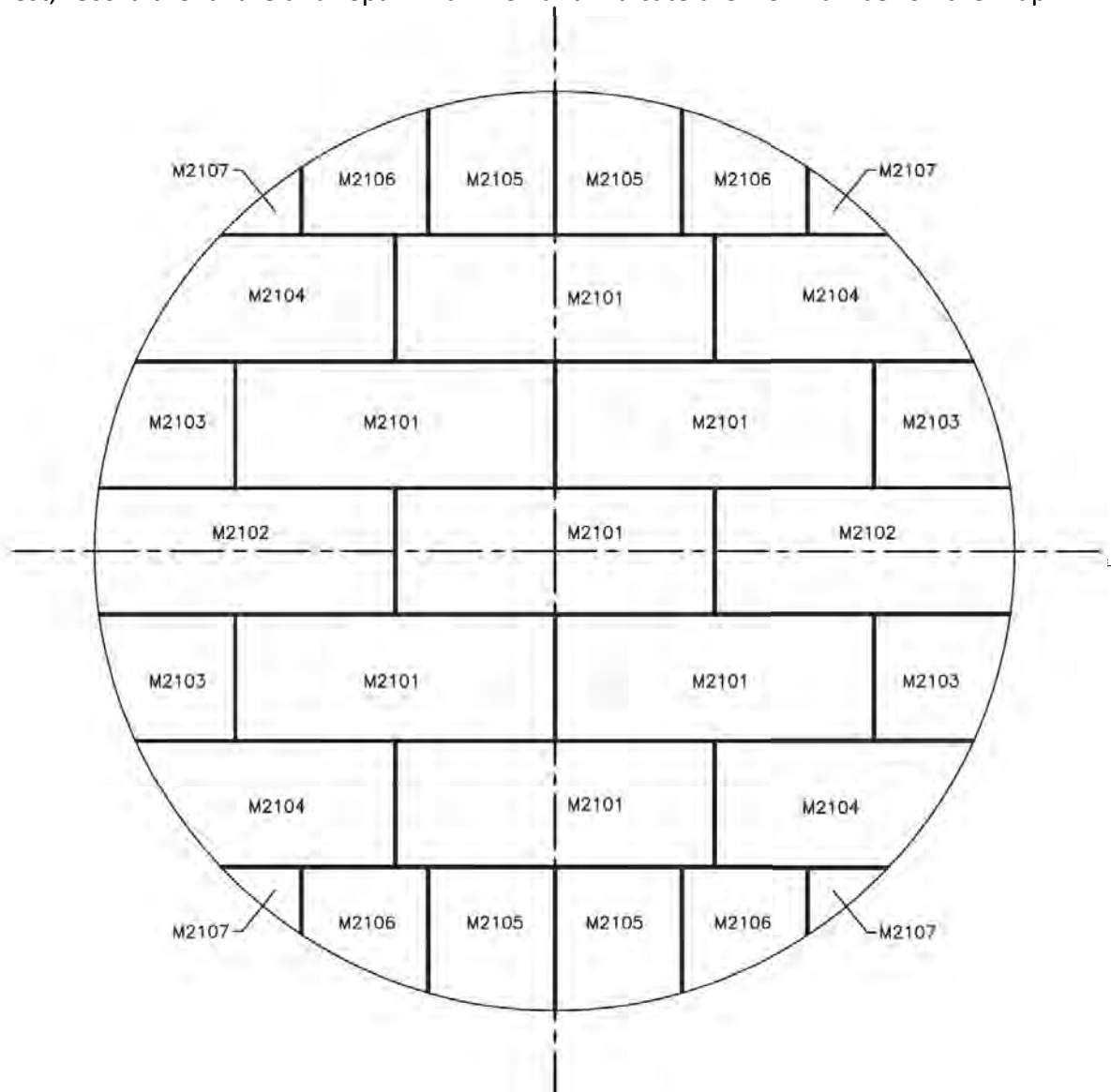
Location: Amaruk Mine, NU

Client Project #: 6115-C-260-001

FLOOR – VACUUM BOX TEST REPORT

Notes: _____

Indicate test points and any areas that failed testing below. If any joints failed the Vacuum Box Test, record the failure and repair in an NCR and indicate the NCR number on the map:



FLOOR LAYOUT

Supervisor Signature: _____

Date: _____

Inukshuk Construction Limited

Industrial Contracting  Project Management

PO Box 654
Rankin Inlet, NU X0C 0G0
T 867.645.4030 F 867.645.4064

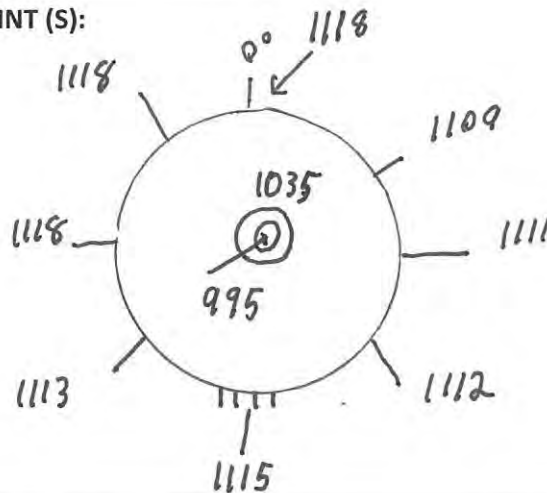
PRESSURE TEST CERTIFICATE

SITE: amarog,
pad K 6.5 million
DATE: June 14 2019

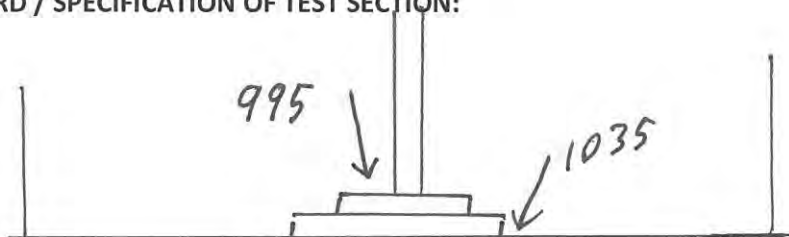
WORK ORDER # _____
TITLE: _____

1. DESCRIPTION OF PIPE AND LOCATION:

2. SKETCH INDICATING TEST POINT (S):



3. PIPE STANDARD / SPECIFICATION OF TEST SECTION:



ICL Project #: 313

Location: Amaruk Mine, NU

Client Project #: 6115-C-260-001

Field Erected Fuel Storage Tank Handover Package

Floor to Shell

Contents

1. Weld Map, Visual Report – Initial Pass
2. Weld Map, Visual Report – Final Pass
3. Leak (Diesel) Test Report

BILL OF MATERIALS

MARK	QTY.	DESCRIPTION	MATERIAL	MTR	WT #s
M1101	7	PLATE - 1/4" THK - 8' x 20'	G40.21-260W	NO	11,435
M1102	2	PLATE - 1/4" THK - 8' x 18'-9" SEE DETAIL	G40.21-260W	YES	3,083
M1103	4	PLATE - 1/4" THK - 8' x 8'-7" SEE DETAIL	G40.21-260W	YES	2,804
M1104	4	PLATE - 1/4" THK - 8' x 16'-3" SEE DETAIL	G40.21-260W	YES	5,309
M1105	4	PLATE - 1/4" THK - 8' x 9'-0" SEE DETAIL	G40.21-260W	YES	2,840
M1106	4	PLATE - 1/4" THK - 8' x 7'-11" SEE DETAIL	G40.21-260W	YES	2,586
M1107	4	PLATE - 1/4" THK - 5'-2" x 4'-4" SEE DETAIL	G40.21-260W	YES	492

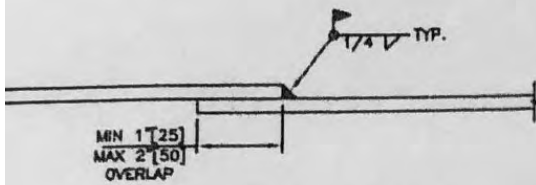
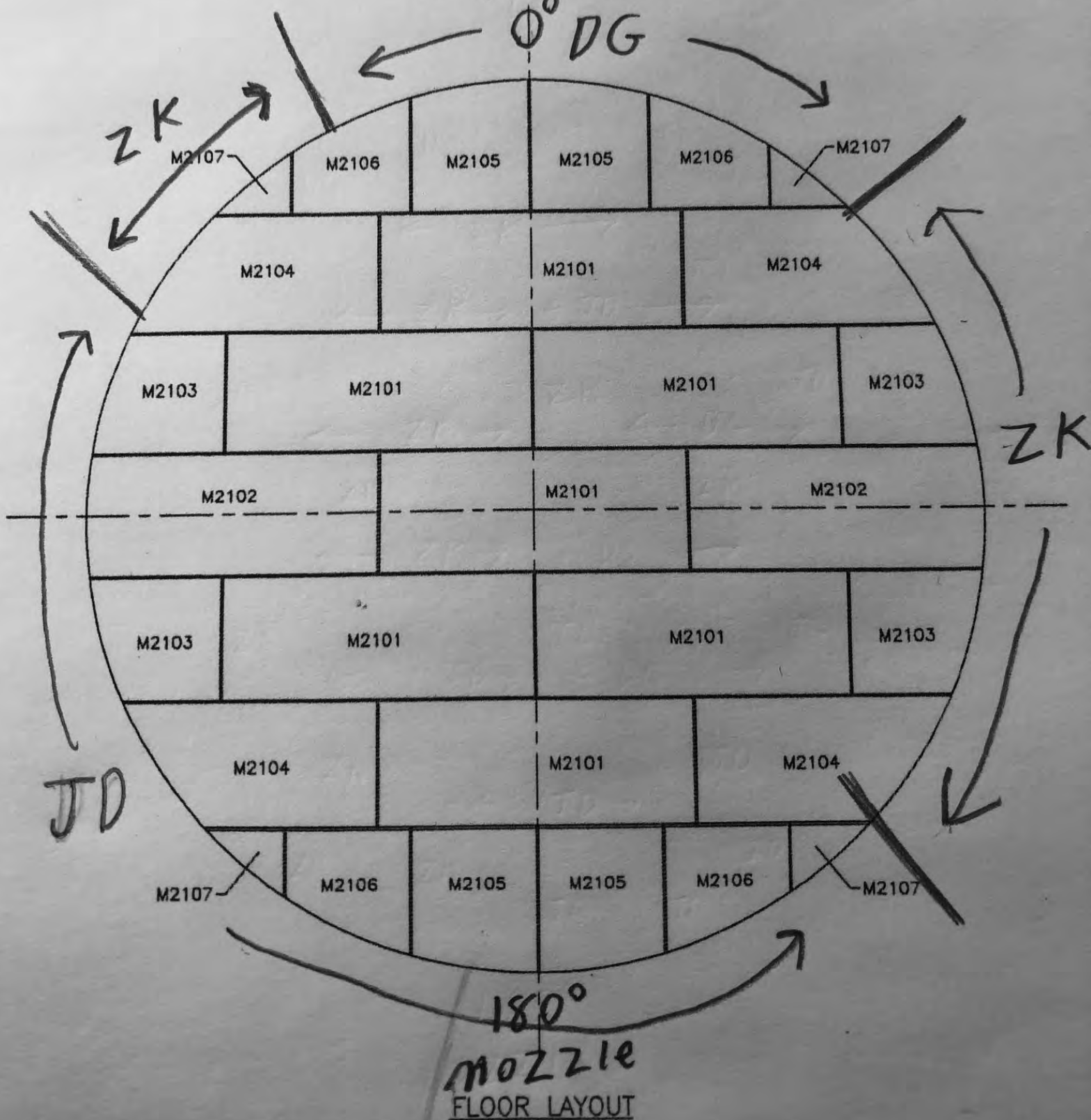


PLATE OVERLAP DETAIL

Inside Weld Floor
to shell



BILL OF MATERIALS

MARK	QTY.	DESCRIPTION	MATERIAL	MTR	WT #s
M1101	7	PLATE - 1/4" THK - 8' x 20'	G40.21-260W	NO	11,435 LBS
M1102	2	PLATE - 1/4" THK - 8' x 18'-8" SEE DETAIL	G40.21-260W	YES	3,083 LBS
M1103	4	PLATE - 1/4" THK - 8' x 8'-7" SEE DETAIL	G40.21-260W	YES	2,804 LBS
M1104	4	PLATE - 1/4" THK - 8' x 16'-3" SEE DETAIL	G40.21-260W	YES	5,309 LBS
M1105	4	PLATE - 1/4" THK - 8' x 9'-0" SEE DETAIL	G40.21-260W	YES	2,840 LBS
M1106	4	PLATE - 1/4" THK - 8' x 7'-11" SEE DETAIL	G40.21-260W	YES	2,586 LBS
M1107	4	PLATE - 1/4" THK - 5'-2" x 4'-4" SEE DETAIL	G40.21-260W	YES	492 LBS

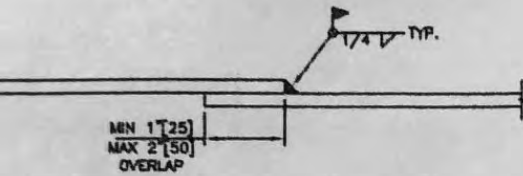
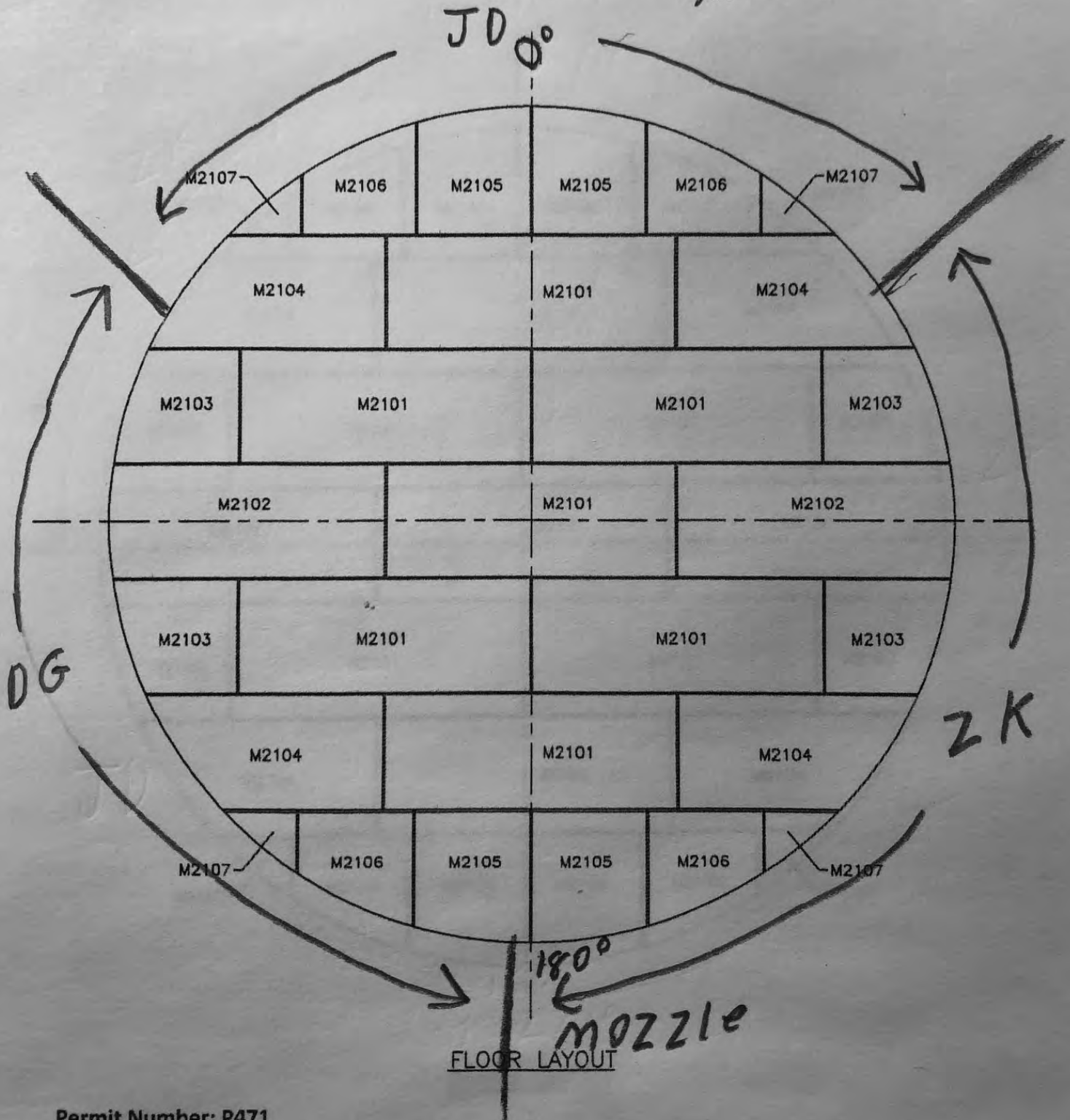


PLATE OVERLAP DETAIL

outside weld
shell to floor



Permit Number: P471



K BROWN CONTRACTING LTD.

DATE

FLOOR LAYOUT

PO Box 654
Rankin Inlet, NU X0C 0G0
T 867.645.4030 F 867.645.4064

PRESSURE TEST CERTIFICATE

SITE: Qmaruq WORK ORDER # _____
Pad K 1.5 million TITLE: _____
 DATE: May 28 2019

1. DESCRIPTION OF PIPE AND LOCATION:

1.5 million L Tank

2. SKETCH INDICATING TEST POINT (S):

Two Licks
grind out
and remolded



3. PIPE STANDARD / SPECIFICATION OF TEST SECTION:

Diesel test on welded from
Floor to Shell

BILL OF MATERIALS

PO Box 654
Rankin Inlet, NU X0C 0G0
T 867.645.4030 F 867.645.4064

4. TESTING MEDIA:

4. TESTING MEDIA: Diesel Test on First Pass on weld on Floor to Shell inside

5. CALCULATED PRESSURE / ACTUAL PRESSURE AT LOWEST ELEVATION:

[illegible]

Include all pressure, temperature and pressure valve recording charts where applicable. Charts to be signed and approved by Engineer before acceptance. The location and course of any leaks or failures and description of repair action(s) taken to be included on additional sheets. All certificates to be submitted to Engineer for each Test Section.

CONTRACTOR REPRESENTATIVE

Sheldon Burry

(Print Name)

(Print Name)
E. J. Davis

(Signature)

May 28 2019

(Date)

ENGINEER / REPRESENTATIVE

PERAY CHOMICKI

(Print Name)

(Print Name)
Perry Charnick

(Signature)

01 JUNE 2019

(Date)

ICL Project #: 313

Location: Amaruk Mine, NU

Client Project #: 6115-C-260-001

Field Erected Fuel Storage Tank Handover Package

Shell

Contents

1. MTR Shell Plates
2. Roundness Dimension Report
3. Weld Map, Visual Report
4. Plumbness & Local Deviations (Peaking and Banding)
5. Leak (Diesel) Test Report
6. UT Report / Log / Map

SSAB

Test Certificate

12400 Highway 43 North, Axis, Alabama 36505, US

Form TC1: Revision 3: Date 7 Feb 2018

Customer: SAMUEL, SON & CO. LTD 1250 APPLEBY LINE BURLINGTON ON L7L5G6		Customer P.O. No.: C44793C & 41-542074		Mill Order No.: 41-542075-01		Shipping Manifest : AT271198															
		Product Description: CSA G40.21(2013) 38WT/260WT - CAT 5;LCVN 15FT.LBS,TCVN13FT.LBS@-45F/A673-P ALLOYS API650(12TH ED) TABLE 4-1 GR.IIIA				Ship Date: 18 Aug 18 Cert Date: 18 Aug 18		Cert No: 081679042 (Page 1 of 1)													
		Size: 0.250 X 96.00 X 433.0 (IN)				Heat Treat Type: NORMALIZED															
Tested Pieces			Tensiles				Charpy Impact Tests														
Heat Id	Piece Id	Tested Thickness	Tst Loc	YS (KSI)	UTS (KSI)	%RA	Elong % 2in 8in	Tst Dir	Hardness	Abs. Energy(FTLB)				% Shear				Tst Tmp	Tst Dir	Tst Siz (mm)	BDWTT Tmp %Shr
E8H063	E57	0.255 (DISCRT)	L C	55	76		25	T		1	2	3	Avg	1	2	3	Avg	-50F -50F	T L	5.0 5.0	
										25	31	25	27								
Chemical Analysis																					
Heat Id	C	Mn	P	S	Si	TotAl	SolAl	Cu	Ni	Cr	Mo	Co	V	Ti	B	N	ORGN				
E8H063	.19	.92	.010	.001	.25	.028	.027	.31	.16	.11	.04	.000	.003	.011	.0001	.0075	USA				
KILLED STEEL MERCURY IS NOT A METALLURGICAL COMPONENT OF THE STEEL AND NO MERCURY WAS INTENTIONALLY ADDED DURING THE MANUFACTURE OF THIS PRODUCT. KILLED STEEL, PRODUCED TO A FINE GRAIN PRACTICE MTR EN 10204:2004 INSPECTION CERTIFICATE 3.1 COMPLIANT CHARPY FULL SIZE EQUIVALENT = ABSORBED ENERGY AVG X 10 / TEST SIZE IN MM NORMALIZED PLATES. HEATED AT 1665F FOR 14 MINUTES. TEST COUPONS TAKEN FROM HEAT TREATED PLATE. PRODUCTS SHIPPED: E8H063 E57 6801772 PCES: 1, LBS: 2947																					
(U) Cust Part # :										WE HEREBY CERTIFY THAT THIS MATERIAL WAS TESTED IN ACCORDANCE WITH, AND MEETS THE REQUIREMENTS OF, THE APPROPRIATE SPECIFICATION										Justin Ward +1 251 662 4400 SENIOR METALLURGIST - PRODUCT	

B 554424



Test Certificate

12400 Highway 43 North, Axis, Alabama 36505, US

Form TC1: Revision 3: Date 7 Feb 2018

Customer: SAMUEL, SON & CO. LTD 1250 APPLEBY LINE BURLINGTON ON L7L5G6	Customer P.O.No.: C44793C & 41-542074 Product Description: CSA G40.21(2013) 38WT/260WT - CAT 5,LCVN 15FT.LBS,TCVN13FT.LBS@-45F/A673-P ALLOYS API650(12TH ED) TABLE 4-1 GR.IIIA Size: 0.250 X 96.00 X 433.0 (IN)	Mill Order No. 41-542075-01 Shipping Manifest: AR269652 Ship Date: 26 Jul 18 Cert Date: 26 Jul 18 Cert No: 081674771 (Page 1 of 1) Heat Treat Type: NORMALIZED
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Tested Pieces:				Tensiles:					Charpy Impact Tests														
Heat Id	Piece Id	Piece Dimensions	Tst Loc	YS (KSI)	UTS (KSI)	%RA	Elong % 2in 8in	Tst Dir	Hardness	Abs. Energy(FTLB)				% Shear				Tst Tmp	Tst Dir	Tst Siz (mm)	BDWTT Tmp %Shr		
										1	2	3	Avg	1	2	3	Avg						
E8G082	D09	0.255 (DISCRT)	C	51	72		27	T		36	38	35	36					-50F	L	5.0			
			C							27	32	32	30					-50F	T	5.0			

Chemical Analysis																		ORGN
Heat Id	C	Mn	P	S	Si	Tot Al	Sol Al	Cu	Ni	Cr	Mo	Cb	V	Ti	B	N		USA
E8G082	.18	.94	.009	<.001	.25	.025	.024	.17	.12	.08	.03	.000	.003	.011	.0001	.0070		

KILLED STEEL
MERCURY IS NOT A METALLURGICAL COMPONENT OF THE STEEL AND NO MERCURY WAS INTENTIONALLY ADDED DURING THE MANUFACTURE OF THIS PRODUCT.
KILLED STEEL, PRODUCED TO A FINE GRAIN PRACTICE
MTR EN 10204:2004 INSPECTION CERTIFICATE 3.1 COMPLIANT
CHARPY FULL SIZE EQUIVALENT = ABSORBED ENERGY AVG X 10 / TEST SIZE IN MM
NORMALIZED PLATES. HEATED AT 1665F FOR 14 MINUTES.
TEST COUPONS TAKEN FROM HEAT TREATED PLATE.
PRODUCTS SHIPPED:

E8G082 D09	6799178	PCES:	1, LBS:	2947	E8G082 D09	6799182	PCES:	1, LBS:	2947
E8G082 D09	6799181	PCES:	1, LBS:	2947	E8G082 D09	6799183	PCES:	1, LBS:	2947
E8G082 D09	6799184	PCES:	1, LBS:	2947	E8G082 D09	6799185	PCES:	1, LBS:	2947
E8G082 D09	6799171	PCES:	1, LBS:	2947	E8G082 D09	6799176	PCES:	1, LBS:	2947
E8G082 D09	6799173	PCES:	1, LBS:	2947	E8G082 D09	6799180	PCES:	1, LBS:	2947
E8G082 D09	6799175	PCES:	1, LBS:	2947	E8G082 D09	6799174	PCES:	1, LBS:	2947
E8G082 D09	6799177	PCES:	1, LBS:	2947	E8G082 D09	6799172	PCES:	1, LBS:	2947

B538523

(P)	Cust Part #:	WE HEREBY CERTIFY THAT THIS MATERIAL WAS TESTED IN ACCORDANCE WITH, AND MEETS THE REQUIREMENTS OF, THE APPROPRIATE SPECIFICATION	Justin Ward +1 251 662 4400 SENIOR METALLURGIST - PRODUCT
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Test Certificate

Form TC1: Revision 3: Date 7 Feb 2018

12400 Highway 43 North, Axis, Alabama 36505, US

Customer: SAMUEL, SON & CO. LTD 1250 APPLEBY LINE BURLINGTON ON L7L5G6		Customer P.O.No.: C44317C & 41-535283		Mill Order No.: 41-535284-01		Shipping Manifest: AR264983											
		Product Description: CSA G40.21(2013) 38WT/260WT - CAT 4.LCVN 15FT.LBS.@-50F(20J @ -45C) ALLOYS API650(12TH ED) TABLE 4-1 GR.IIIA				Ship Date: 08 May 18 Cert Date: 08 May 18		Cert No: 081662460 (Page 1 of 2)									
		Size: 0.250 X 120.0 X 240.0 (IN)				Heat Treat Type: NORMALIZED											
Tested Pieces:				Tensiles:				Charpy Impact Tests									
Heat Id	Piece Id	Piece Dimensions	Tst Loc	YS (KSI)	UTS (KSI)	%RA	Elong % 2in 8in	Tst Dir	Hardness	Abs. Energy(FTLB) 1 2 3 Avg	% Shear 1 2 3 Avg	Tst Tmp	Tst Dir	Tst Siz (mm)	BDWTT Tmp %Shr		
E8E014	D01	0.255 (DISCRT)	C 57	78			25	T		35 38 43 39		-50F	L	5.0			
E8E014	D02	0.255 (DISCRT)	C 57	78			23	T		60 34 39 44		-50F	L	5.0			
E8E014	D03	0.256 (DISCRT)	C 56	77			24	T		37 33 54 41		-50F	L	5.0			
Heat																	
Id	C	Mn	P	S	Si	Tot Al	Sol Al	Cu	Chemical Analysis							ORG	
E8E014	.18	.92	.011	.001	.26	.027	.026	.34	Ni	Cr	Mo	Cb	V	Ti	B	N	USA
KILLED STEEL MERCURY IS NOT A METALLURGICAL COMPONENT OF THE STEEL AND NO MERCURY WAS INTENTIONALLY ADDED DURING THE MANUFACTURE OF THIS PRODUCT. KILLED STEEL, PRODUCED TO A FINE GRAIN PRACTICE MTR EN 10204:2004 INSPECTION CERTIFICATE 3.1 COMPLIANT CHARPY FULL SIZE EQUIVALENT = ABSORBED ENERGY AVG X 10 / TEST SIZE IN MM NO WELD REPAIR HAS BEEN PERFORMED ON THIS MATERIAL. NORMALIZED PLATES. HEATED AT 1665F FOR 14 MINUTES. TEST COUPONS TAKEN FROM HEAT TREATED PLATE. PRODUCTS SHIPPED:																	
E8E014 D02 6781822 PCES: 1, LBS: 2042 E8E014 D02 6781814 PCES: 1, LBS: 2042 E8E014 D02 6781825 PCES: 1, LBS: 2042 E8E014 D02 6781816 PCES: 1, LBS: 2042 E8E014 D02 6781834 PCES: 1, LBS: 2042 E8E014 D02 6781817 PCES: 1, LBS: 2042 E8E014 D02 6781826 PCES: 1, LBS: 2042 E8E014 D02 6781835 PCES: 1, LBS: 2042 E8E014 D03 6781821 PCES: 1, LBS: 2042 E8E014 D01 6781811 PCES: 1, LBS: 2042 E8E014 D02 6781843 PCES: 1, LBS: 2042 E8E014 D01 6781819 PCES: 1, LBS: 2042 E8E014 D02 6781846 PCES: 1, LBS: 2042 E8E014 D02 6781842 PCES: 1, LBS: 2042 E8E014 D02 6781837 PCES: 1, LBS: 2042 E8E014 D02 6781829 PCES: 1, LBS: 2042 E8E014 D02 6781838 PCES: 1, LBS: 2042 E8E014 D02 6781815 PCES: 1, LBS: 2042 E8E014 D02 6781832 PCES: 1, LBS: 2042 E8E014 D02 6781823 PCES: 1, LBS: 2042 E8E014 D02 6781841 PCES: 1, LBS: 2042 E8E014 D02 6781828 PCES: 1, LBS: 2042 E8E014 D02 6781818 PCES: 1, LBS: 2042 E8E014 D02 6781824 PCES: 1, LBS: 2042 E8E014 D02 6781833 PCES: 1, LBS: 2042 E8E014 D01 6781813 PCES: 1, LBS: 2042 E8E014 D02 6781845 PCES: 1, LBS: 2042 E8E014 D02 6781827 PCES: 1, LBS: 2042 E8E014 D01 6781812 PCES: 1, LBS: 2042 E8E014 D02 6781844 PCES: 1, LBS: 2042 E8E014 D02 6781839 PCES: 1, LBS: 2042 E8E014 D02 6781831 PCES: 1, LBS: 2042 E8E014 D02 6781840 PCES: 1, LBS: 2042 E8E014 D02 6781836 PCES: 1, LBS: 2042																	
(P) Cust Part #:									WE HEREBY CERTIFY THAT THIS MATERIAL WAS TESTED IN ACCORDANCE WITH, AND MEETS THE REQUIREMENTS OF, THE APPROPRIATE SPECIFICATION								
									Justin Ward +1 251 662 4400 SENIOR METALLURGIST - PRODUCT								



Test Certificate

Form TC1: Revision 3: Date 7 Feb 2018

12400 Highway 43 North, Axis, Alabama 36505, US

Customer: SAMUEL, SON & CO. LTD 1250 APPLEBY LINE BURLINGTON ON L7L5G6				Customer P.O.No.: C44317C & 41-535283				Mill Order No. 41-535284-01				Shipping Manifest: AR264983									
				Product Description: CSA G40.21(2013) 38WT/260WT - CAT 4,LCVN 15FT.LBS.@-50F(20J @ -45C) ALLOYS API650(12TH ED) TABLE 4-1 GR.IIIA								Ship Date: 08 May 18 Cert Date: 08 May 18				Cert No: 081662460 (Page 2 of 2)					
				Size: 0.250 X 120.0 X 240.0 (IN)								Heat Treat Type: NORMALIZED									
Tested Pieces:				Tensiles:						Charpy Impact Tests											
Heat Id	Piece Id	Piece Dimensions	Tst Loc	YS (KSI)	UTS (KSI)	%RA	Elong % 2in 8in	Tst Dir	Hardness	Abs. Energy(FTLB)				% Shear				Tst Tmp	Tst Dir	Tst Siz (mm)	BDWTT Tmp %Shr
										1	2	3	Avg	1	2	3	Avg				
E8E014 D02 6781830 PCES: 1, LBS: 2042 E8E014 D02 6781820 PCES: 1, LBS: 2042																					
(P) Cust Part #:										WE HEREBY CERTIFY THAT THIS MATERIAL WAS TESTED IN ACCORDANCE WITH, AND MEETS THE REQUIREMENTS OF, THE APPROPRIATE SPECIFICATION											
										Justin Ward +1 251 662 4400 SENIOR METALLURGIST - PRODUCT											



Test Certificate

12400 Highway 43 North, Axis, Alabama 36505, US

Form TC1: Revision 3: Date 7 Feb 2018

Customer: SAMUEL, SON & CO. LTD 1250 APPLEBY LINE BURLINGTON ON L7L5G6	Customer P.O.No.: C44317C & 41-535283 Product Description: CSA G40.21(2013) 38WT/260WT - CAT 4,LCVN 15FT.LBS.@-50F(20J @ -45C) ALLOYS API650(12TH ED) TABLE 4-1 GR.IIIA Size: 0.250 X 120.0 X 454.0 (IN)	Mill Order No. 41-535284-03 Shipping Manifest: AR264983 Ship Date: 08 May 18 Cert Date: 08 May 18 Cert No: 081662458 (Page 1 of 1) Heat Treat Type: NORMALIZED
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Tested Pieces:				Tensiles:					Charpy Impact Tests													
Heat Id	Piece Id	Piece Dimensions	Tst Loc	YS (KSI)	UTS (KSI)	%RA	Elong % 2in 8in	Tst Dir	Hardness	Abs. Energy(FTLB) 1 2 3 Avg				% Shear 1 2 3 Avg				Tst Tmp	Tst Dir	Tst Siz (mm)	BDWTT Tmp %Shr	
E8E014	D03	0.256 (DISCRT)	C	56	77		24	T		37	33	54	41					-50F	L	5.0		

Chemical Analysis																		Heat Id	ORGN
E8E014		C	Mn	P	S	Si	Tot Al	Sol Al	Cu	Ni	Cr	Mo	Cb	V	Ti	B	N		USA
		.18	.92	.011	.001	.26	.027	.026	.34	.18	.11	.03	.001	.005	.012	.0001	.0061		

KILLED STEEL
MERCURY IS NOT A METALLURGICAL COMPONENT OF THE STEEL AND NO MERCURY WAS INTENTIONALLY ADDED DURING THE MANUFACTURE OF THIS PRODUCT.
KILLED STEEL, PRODUCED TO A FINE GRAIN PRACTICE
MTR EN 10204:2004 INSPECTION CERTIFICATE 3.1 COMPLIANT
CHARPY FULL SIZE EQUIVALENT = ABSORBED ENERGY AVG X 10 / TEST SIZE IN MM
NO WELD REPAIR HAS BEEN PERFORMED ON THIS MATERIAL.
NORMALIZED PLATES. HEATED AT 1665F FOR 14 MINUTES.
TEST COUPONS TAKEN FROM HEAT TREATED PLATE.

PRODUCTS SHIPPED:

E8E014 D03	6781927	PCES:	1, LBS:	3863	E8E014 D03	6781923	PCES:	1, LBS:	3863
E8E014 D03	6781929	PCES:	1, LBS:	3863	E8E014 D03	6781922	PCES:	1, LBS:	3863
E8E014 D03	6781921	PCES:	1, LBS:	3863	E8E014 D03	6781920	PCES:	1, LBS:	3863
E8E014 D03	6781919	PCES:	1, LBS:	3863	E8E014 D03	6781928	PCES:	1, LBS:	3863
E8E014 D03	6781925	PCES:	1, LBS:	3863	E8E014 D03	6781924	PCES:	1, LBS:	3863
E8E014 D03	6781926	PCES:	1, LBS:	3863	E8E014 D03	6781918	PCES:	1, LBS:	3863
E8E014 D03	6781917	PCES:	1, LBS:	3863	E8E014 D03	6781916	PCES:	1, LBS:	3863

4359503

(P)

Cust Part #:

WE HEREBY CERTIFY THAT THIS MATERIAL WAS
TESTED IN ACCORDANCE WITH, AND MEETS THE
REQUIREMENTS OF, THE APPROPRIATE SPECIFICATION

Justin Ward +1 251 662 4400
SENIOR METALLURGIST - PRODUCT

PRESSURE TEST CERTIFICATE

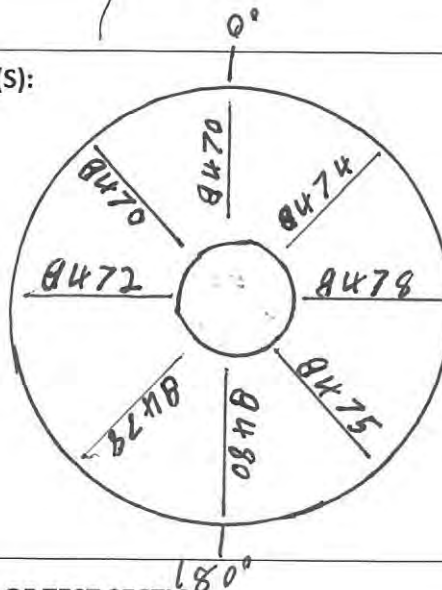
SITE: anarug WORK ORDER # _____
Pad K 1.5 million TITLE: _____
 DATE: June 16 2019

1. DESCRIPTION OF PIPE AND LOCATION:

measurement from center column to shell

2. SKETCH INDICATING TEST POINT (S):

*Center column
16" outside*

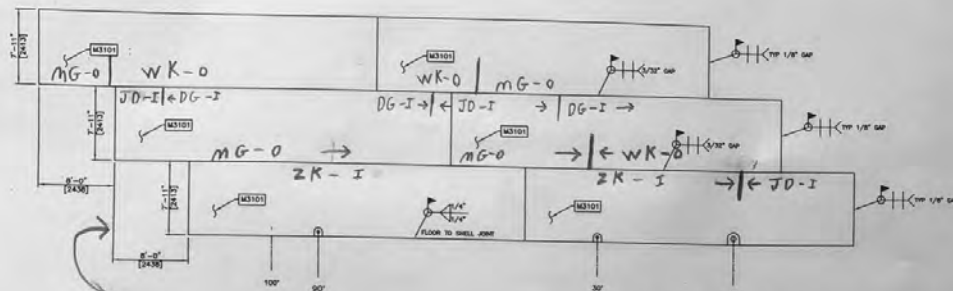


3. PIPE STANDARD / SPECIFICATION OF TEST SECTION:

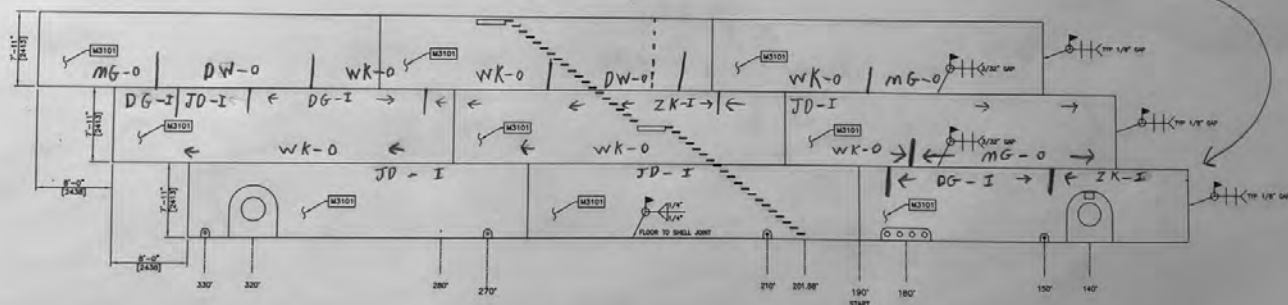
Shell - Roundness Report

BILL OF MATERIALS					
MARK	QTY.	DESCRIPTION	MATERIAL	UNIT	WT.
M3101	10	PLATE 3/16" THK x 7'-11" x 55'-10 53/64"	Q40.21-280W	YES	3.60T EACH

MATERIAL FOR ONE(1) SHOWN, ONE(1) REQUIRED.



weld map for Horizontal



SHELL LAYOUT DETAIL

NOTES:

- 1) SHELL PLATE DOES NOT REQUIRE SHAPING (ROLLING) PER API-650 FIGURE 6.1.
- 2) ALL SHELL PLATE SHALL BE API-650 GROUP III SPECIFICATIONS, 260W FK&FG.
- 3) ALL SHELL PLATE SHALL BE STACKED WITH COMMON CENTER LINE.
- 4) THE INITIAL INSIDE WELD PASS OF THE SHELL TO FLOOR JOINT SHALL HAVE ALL SLAG REMOVED FROM THE SURFACE OF THE WELD AND EXAMINED FOR ITS ENTIRE CIRCUMFERENCE BOTH VISUALLY AND MPI.
- 5) RT EXAMINATION OF FULL PENETRATION SQUARE BUTT WELDS, REFER TO RT STRETCH OUT DRAWING.
- 6) THE REVERSE SIDE OF DOUBLE WELDED SQUARE BUTT JOINTS SHALL BE THOROUGHLY CLEANED BY GRINDING BEFORE WELDING.

Dany
Lafia
mmc

Signature
Dany Lafatia
Date: 2018.05.24
15:56:13 -0500

K BROWN CONTRACTING LTD.

SHELL PLATE DETAIL

NEW AMARUQ 1.5M LITER TANK

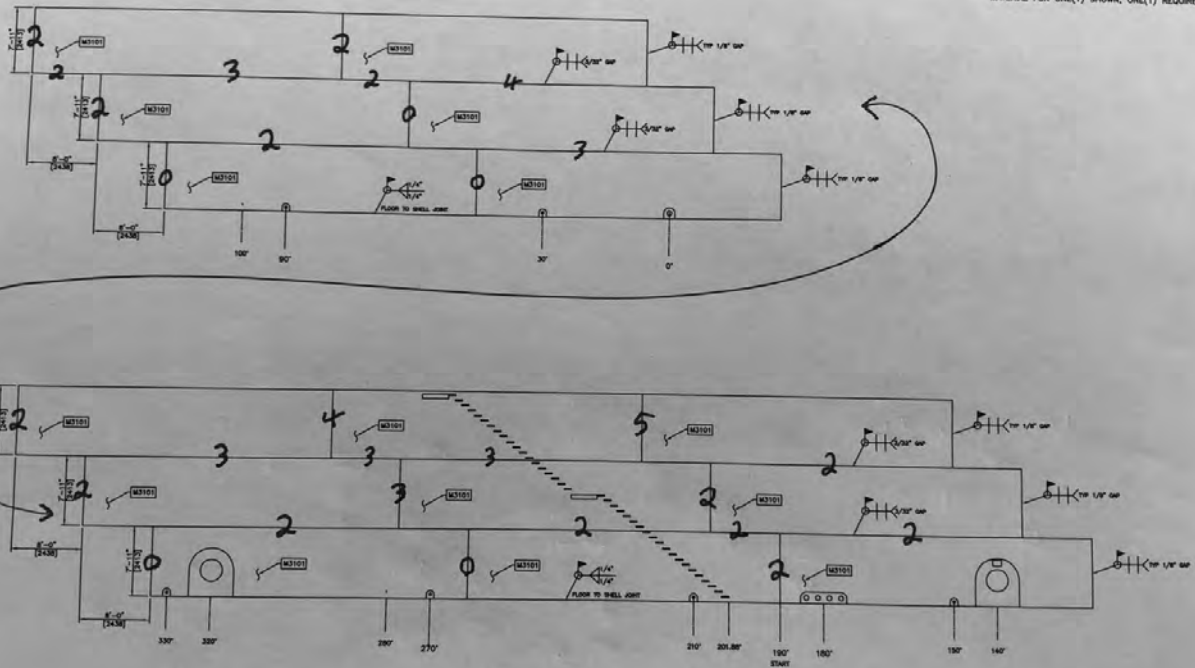
3/32" x 1'-0" MOSHER ENGINEERING 013-M3 1 OF 4

THIS DOCUMENT IS THE SOLE & EXCLUSIVE PROPERTY OF K BROWN CONTRACTING LTD.

Piking and Banding

BILL OF MATERIALS					
MARK	QTY	DESCRIPTION	MATERIAL	MTS	WT
M2101	18	PLATE 5/16" THK x 7'-11" x 35'-10 5/8"	SA508-2	20000	100
					3.657 EACH

MATERIAL FOR ONE(1) SHOWN, ONE(1) REQUIRED.



SHELL LAYOUT DETAIL

NOTES:

- 1) SHELL PLATE DOES NOT REQUIRE SHAPING (ROLLING) PER API-650 FIGURE 6.1.
- 2) ALL SHELL PLATE SHALL BE API-650 GROUP III SPECIFICATIONS, 260W FK&FG.
- 3) ALL SHELL PLATE SHALL BE STACKED WITH COMMON CENTER LINE.
- 4) THE INITIAL INSIDE WELD PASS OF THE SHELL TO FLOOR JOINT SHALL HAVE ALL SLAG REMOVED FROM THE SURFACE OF THE WELD AND EXAMINED FOR ITS ENTIRE CIRCUMFERENCE BOTH VISUALLY AND MPI.
- 5) RT EXAMINATION OF FULL PENETRATION SQUARE BUTT WELDS, REFER TO RT STRETCH OUT DRAWING.
- 6) THE REVERSE SIDE OF DOUBLE WELDED SQUARE BUTT JOINTS SHALL BE THOROUGHLY CLEANED BY GRINDING BEFORE WELDING.

Dany Lafla mme	Signature: Dany Lafla Date: 2018.05.24 103613-04307	K BROWN CONTRACTING LTD. SHELL PLATE DETAIL NEW AMARUO 1.5M LITER TANK	
		A 20-MAY-18 ME 09 ISSUED FOR APPROVAL 3/32" = 1'-0" MOSHER ENGINEERING 013-M3 1 OF 4 A	REVISIONS THIS DOCUMENT IS THE SOLE & EXCLUSIVE PROPERTY OF K. BROWN CONTRACTING LTD.

Industrial Contracting  Project Management

Rankin Inlet, NU X0C 0G0
T 867.645.4030 F 867.645.4064

PRESSURE TEST CERTIFICATE

SITE: Amarog WORK ORDER # _____

Pad K 1.5 million L TITLE:

DATE: June 16 2019

1. DESCRIPTION OF PIPE AND LOCATION:

DESCRIPTION OF PIPE AND LOCATION:
Diesel test on verts an Horizontal on tenth
Shell

2. SKETCH INDICATING TEST POINT (S):



3. PIPE STANDARD / SPECIFICATION OF TEST SECTION:

Inukshuk Construction Limited
Industrial Contracting  Project Management

PO Box 654
Rankin Inlet, NU X0C 0G0
T 867.645.4030 F 867.645.4064

4. TESTING MEDIA:

ING MEDIA: Diesel on the welds on
the shell

5. CALCULATED PRESSURE / ACTUAL PRESSURE AT LOWEST ELEVATION:

[illegible]

Include all pressure, temperature and pressure valve recording charts where applicable. Charts to be signed and approved by Engineer before acceptance. The location and course of any leaks or failures and description of repair action(s) taken to be included on additional sheets. All certificates to be submitted to Engineer for each Test Section.

CONTRACTOR REPRESENTATIVE

CONTRACTOR REPRESENTATIVE
Sheldon Burdy

Print Name _____

(Signature)

(Signature)

June 16 2019
(Date)

(Date)

ENGINEER

Mart-Arché Beaudet

(Print Name)

(Signature)

(Signature)

0/13/2019
(Date)

(Date _____)



Client Name	Mosher Engineering LTD	PO No.		Team Job No.	5089-0196
Work Location	Amaruq, Nunavut Canada	Client Job No.	Tank 313	Report No.	CR-546
Code / Specification / CED	API -650	Technique No.	Annex U	Date of Exam	June 17-21,2019
Acceptance / CED	Annex Ultrasonic inspection in Lieu of RT	Procedure	UT-ASME,1 5200 Rev2		

Part / Assy No.	313 Amaruq Fuel Tank	Material	C/S	Qty Inspected	See below	Qty Accepted	See Below
DWG No.		Material Length		Heat No.	NA	Qty Rejected	

Type of Fabrication	☐ Piping	☐ Vessel	☐ Tank	☒ Weld	☐ Casting	☐ Forging	☒ Plate	☐ Other	☒ Surface Acceptable for Inspection
---------------------	---------------------------------	---------------------------------	-------------------------------	--	----------------------------------	----------------------------------	---	--------------------------------	---

Inspection Scope
To perform UT shear wave on the following items:

12 Random locations on vertical welds

Plate Thickness- 6.0mm

Technician	Corey Randall	Reg. No.	9567	Client Final Acceptance	Signature	Date
Signature		Expiry Date	15/03/2021	Authorized Inspector	Signature	Date
Certification	CGSB: ☒ Level 2 ☐ Level 3	SNT-TC-1A: ☐ Level 2 ☐ Level 3		CSA Supervisors Review	Signature	Date

ULTRASOUND EXAMINATION REPORT

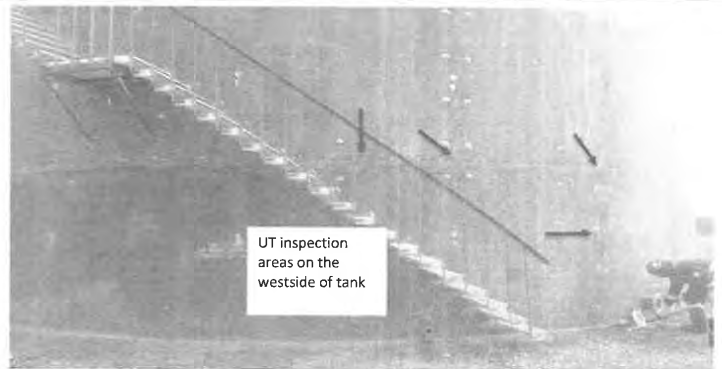
Client Name	Mosher Engineering LTD	PO No.		Team Job No.	5089-0196
Work Location		Client Job No.		Report No.	CR-546
Code / Specification / CED	API -650	Technique No.	Annex U	Date of Exam	June 17-21,2019
Acceptance / CED	Annex Ultrasonic inspection in Lieu of RT	Procedure	UT.ASME.1 5200 Rev2		

Inspection Results

No rejectable indications found at time of inspection.

See attached Drawing for all inspection locations

Additional Optional Information - Sketches, Graphs etc.



Signature and Certification

Technician	Reg. No.	9567	Client Final Acceptance	Signature	Date
Signature	Expiry Date	15/03/2021	Authorized Inspector	Signature	Date
Certification	CGSB: ☒ Level 2 ☐ Level 3	SNT-TC-1A: ☐ Level 2 ☐ Level 3	CSA Supervisors Review	Signature	Date

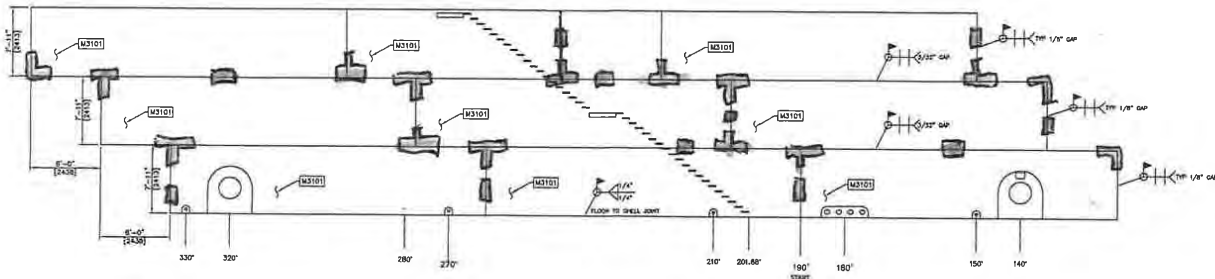
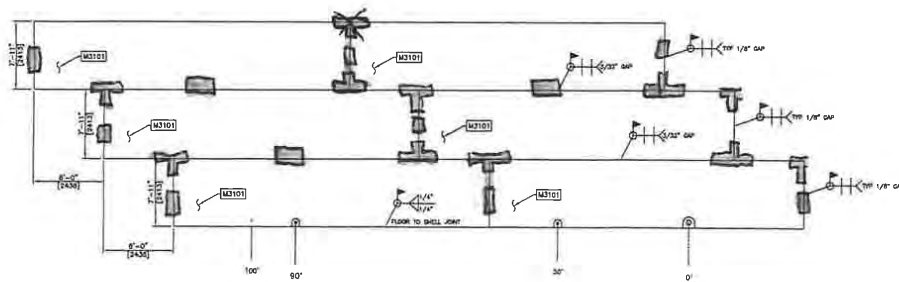
TANK 313 AMARQ 2019

UT LOCATIONS

EACH LOCATION IS APPROX. 12-14" IN LENGTH

BILL OF MATERIALS					
MARK	QTY.	DESCRIPTION	MATERIAL	WTS	WT
M3101	15	PLATE 5/16" THK x 7'-11" x 35'-10 53/64"	Q40.21-250WT	YES	3,822' EACH

MATERIAL FOR ONE(1) SHOWN, ONE(1) REQUIRED.



SHELL LAYOUT DETAIL

NOTES:

- 1) SHELL PLATE DOES NOT REQUIRE SHAPING (ROLLING) PER API-650 FIGURE 6.1.
- 2) ALL SHELL PLATE SHALL BE API-650 GROUP III SPECIFICATIONS, 260W FK&FG.
- 3) ALL SHELL PLATE SHALL BE STACKED WITH COMMON CENTER LINE.
- 4) THE INITIAL INSIDE WELD PASS OF THE SHELL TO FLOOR JOINT SHALL HAVE ALL SLAG REMOVED FROM THE SURFACE OF THE WELD AND EXAMINED FOR ITS ENTIRE CIRCUMFERENCE BOTH VISUALLY AND MPI.
- 5) RT EXAMINATION OF FULL PENETRATION SQUARE BUTT WELDS, REFER TO RT STRETCH OUT DRAWING.
- 6) THE REVERSE SIDE OF DOUBLE WELDED SQUARE BUTT JOINTS SHALL BE THOROUGHLY CLEANED BY GRINDING BEFORE WELDING.

Dany Lafa mme Supervisor maintenence de Dany Lafa mme DN: cc-Dany Lafa mme Date 2019.05.24 10:50:13 -0400	K BROWN CONTRACTING LTD.	
	SHELL PLATE DETAIL	
	ITEM	
	DESCRIPTION	
	REVISIONS	
	THIS DOCUMENT IS THE SOLE & EXCLUSIVE PROPERTY OF K BROWN CONTRACTING LTD.	

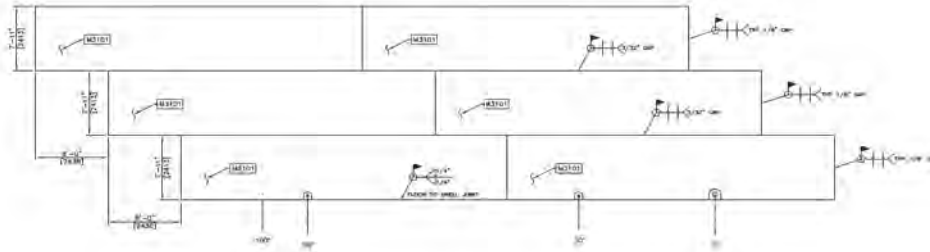
ICL Project #: 313

Location: Amaruk Mine, NU

Client Project #: 6115-C-260-001

SHELL – WELD MAP / VISUAL INSPECTION

Circle or highlight joints and identify welder by initials as per table below.



ICL Project #: 313

Location: Amaruk Mine, NU

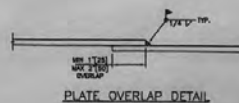
Client Project #: 6115-C-260-001

Field Erected Fuel Storage Tank Handover Package

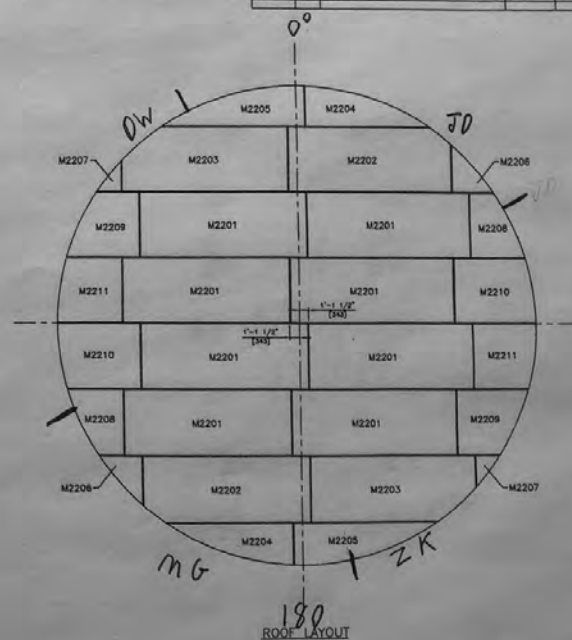
Compression Ring

Contents

1. Weld Map



Roof
To
Rim
angle



Permit Number: P471

[illegible]

ICL Project #: 313

Location: Amaruk Mine, NU

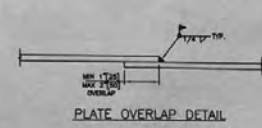
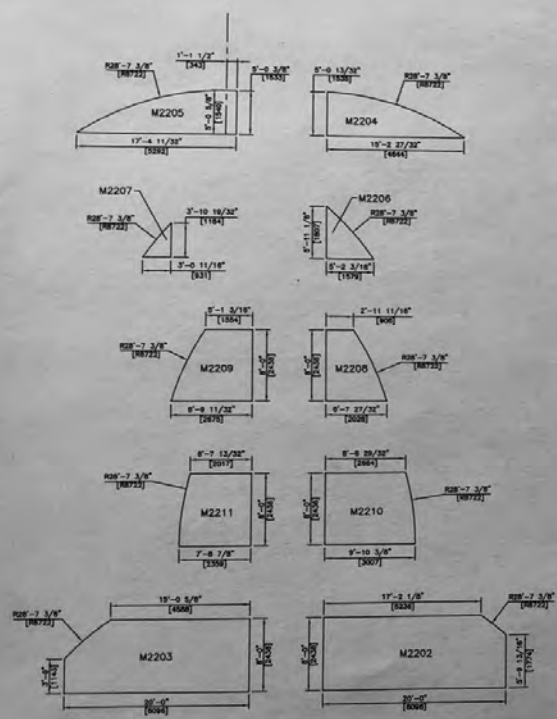
Client Project #: 6115-C-260-001

Field Erected Fuel Storage Tank Handover Package

Roof

Contents

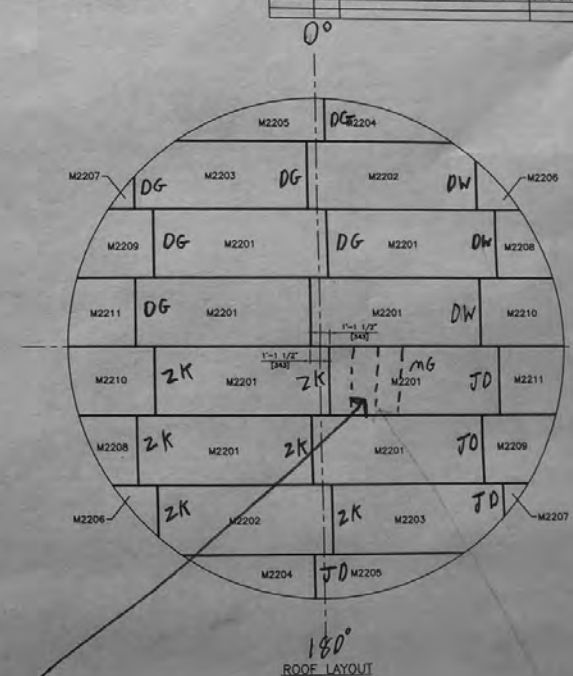
1. Weld Map
2. Vacuum Box Test Report



BILL OF MATERIALS					
MARK	QTY.	DESCRIPTION	MATERIAL	WTR	WT
M2201	8	PLATE - 1/4" THK - 6' x 20'	Q40.21-D20W	80	13,600 LBS
M2202	2	PLATE - 1/4" THK - 6' x 20' SEE DETAIL	Q40.21-D20W	80	3,327 LBS
M2203	2	PLATE - 1/4" THK - 6' x 20' SEE DETAIL	Q40.21-D20W	80	3,327 LBS
M2204	2	PLATE - 1/4" THK - 6' x 18'-0" SEE DETAIL	Q40.21-D20W	80	803 LBS
M2205	1	PLATE - 1/4" THK - 6' x 8'-0" SEE DETAIL	Q40.21-D20W	80	933 LBS
M2206	2	PLATE - 1/4" THK - 6' x 7'-11" SEE DETAIL	Q40.21-D20W	80	933 LBS
M2207	2	PLATE - 1/4" THK - 6' x 7'-11" SEE DETAIL	Q40.21-D20W	80	933 LBS
M2208	2	PLATE - 1/4" THK - 6' x 7'-11" SEE DETAIL	Q40.21-D20W	80	933 LBS
M2209	2	PLATE - 1/4" THK - 6' x 7'-11" SEE DETAIL	Q40.21-D20W	80	933 LBS
M2210	2	PLATE - 1/4" THK - 6' x 7'-11" SEE DETAIL	Q40.21-D20W	80	933 LBS
M2211	2	PLATE - 1/4" THK - 6' x 7'-11" SEE DETAIL	Q40.21-D20W	80	933 LBS
M2212	2	PLATE - 1/4" THK - 6' x 7'-11" SEE DETAIL	Q40.21-D20W	80	933 LBS
M2213	2	PLATE - 1/4" THK - 6' x 7'-11" SEE DETAIL	Q40.21-D20W	80	933 LBS

Short
runs

Three
4'x8'
Sheet
mG welded
up



180°
ROOF LAYOUT

Permit Number: P471

		K BROWN CONTRACTING LTD. ROOF LAYOUT NEW AMARUO 1.5M LITER TANK 3/32" = 1'-0" MOSHER ENGINEERING 315-M 2 OF 2 0 THIS DOCUMENT IS THE SOLE & EXCLUSIVE PROPERTY OF K BROWN CONTRACTING LTD.	
0 28 JUN-18 ME KB ISSUED FOR CONSTRUCTION A 13 MAY-18 ME KB ISSUED FOR REVISIONS		REVISIONS	

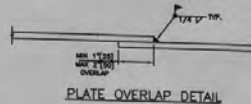
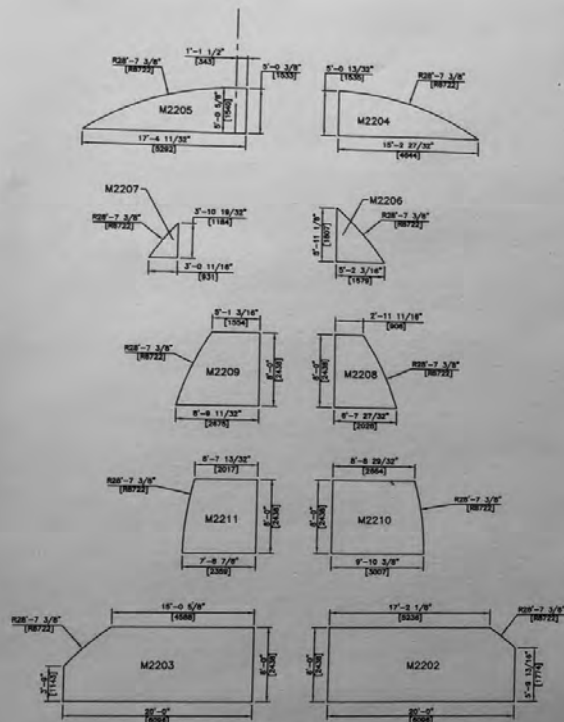
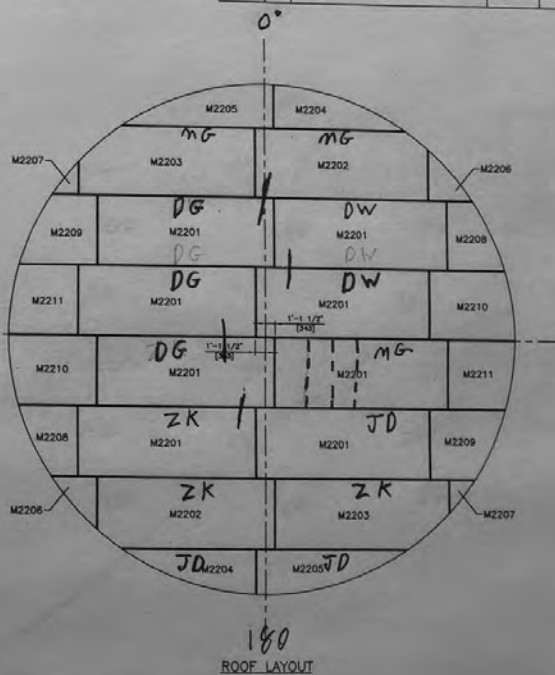


PLATE OVERLAP DETAIL

1009
runs



BILL OF MATERIALS

MARK	QTY	DESCRIPTION	MATERIAL	MTN	\$/
M2201	8	PLATE - 1/4" THK - 8' x 20'	Q40-21-200W	80	1,600.00
M2202	2	PLATE - 1/4" THK - 8' x 20' SEE DETAIL	Q40-21-200W	40	800.00
M2203	2	PLATE - 1/4" THK - 8' x 20' SEE DETAIL	Q40-21-200W	40	800.00
M2204	2	PLATE - 1/4" THK - 8' x 18'-0" SEE DETAIL	Q40-21-200W	40	800.00
M2205	2	PLATE - 1/4" THK - 8' x 8'-0" SEE DETAIL	Q40-21-200W	40	800.00
M2206	2	PLATE - 1/4" THK - 8' x 7'-11" SEE DETAIL	Q40-21-200W	40	800.00
M2207	2	PLATE - 1/4" THK - 8' x 7'-11" SEE DETAIL	Q40-21-200W	40	800.00
M2208	2	PLATE - 1/4" THK - 8' x 7'-11" SEE DETAIL	Q40-21-200W	40	800.00
M2209	2	PLATE - 1/4" THK - 8' x 7'-11" SEE DETAIL	Q40-21-200W	40	800.00
M2210	2	PLATE - 1/4" THK - 8' x 7'-11" SEE DETAIL	Q40-21-200W	40	800.00
M2211	2	PLATE - 1/4" THK - 8' x 7'-11" SEE DETAIL	Q40-21-200W	40	800.00
M2212	2	PLATE - 1/4" THK - 8' x 7'-11" SEE DETAIL	Q40-21-200W	40	800.00

Permit Number: P471



NO.	DATE	BY	DESCRIPTION
1	25 JUN 2018	KB	ISSUED FOR CONSTRUCTION
2	13 MAY 2018	KB	ISSUED FOR APPROVAL

K BROWN CONTRACTING LTD	
ROOF LAYOUT	
AEM AMARIQ 1.5M LITER TANK	
SCALE	3/32" = 1'-0"
THIS DOCUMENT IS THE SOLE & EXCLUSIVE PROPERTY OF K BROWN CONTRACTING LTD	



PO Box 854
Rankin Inlet, NU X0C 0G0
T 867.645.4030 F 867.645.4064

PRESSURE TEST CERTIFICATE

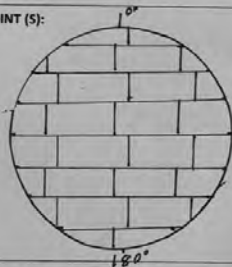
SITE: amaruq WORK ORDER # _____
Pad K 4.5 million
 DATE: June 18 - 2019 TITLE: _____

1. DESCRIPTION OF PIPE AND LOCATION:

1.5 million £ funds

2. SKETCH INDICATING TEST POINT (5):

vacuum.
test -15 PSI



3. PIPE STANDARD / SPECIFICATION OF TEST SECTION:

welded joints of ~~Rock~~
vacuum test at -15 PSI
and soapy water

PO Box 654
Rankin Inlet, NU X0C 0G0
T 867.645.4030 F 867.645.4064

4. TESTING MEDIA: vacuum test at -15 PSI
with soapy water

5. CALCULATED PRESSURE / ACTUAL PRESSURE AT LOWEST ELEVATION:

[illegible]

Include all pressure, temperature and pressure valve recording charts where applicable. Charts to be signed and approved by Engineer before acceptance. The location and course of any leaks or failures and description of repair action(s) taken to be included on additional sheets. All certificates to be submitted to Engineer for each Test Section.

CONTRACTOR REPRESENTATIVE

(Print Name)

(Print Name)

115

June 18 - 2019

(Date)

ENGINEER

Sense Request

(Print Name)

06-09-2019

(Date _____)

ICL Project #: 313

Location: Amaruk Mine, NU

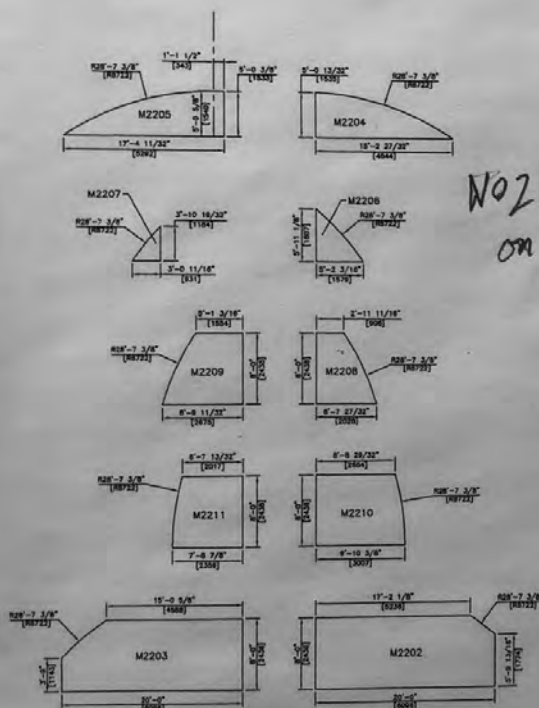
Client Project #: 6115-C-260-001

Field Erected Fuel Storage Tank Handover Package

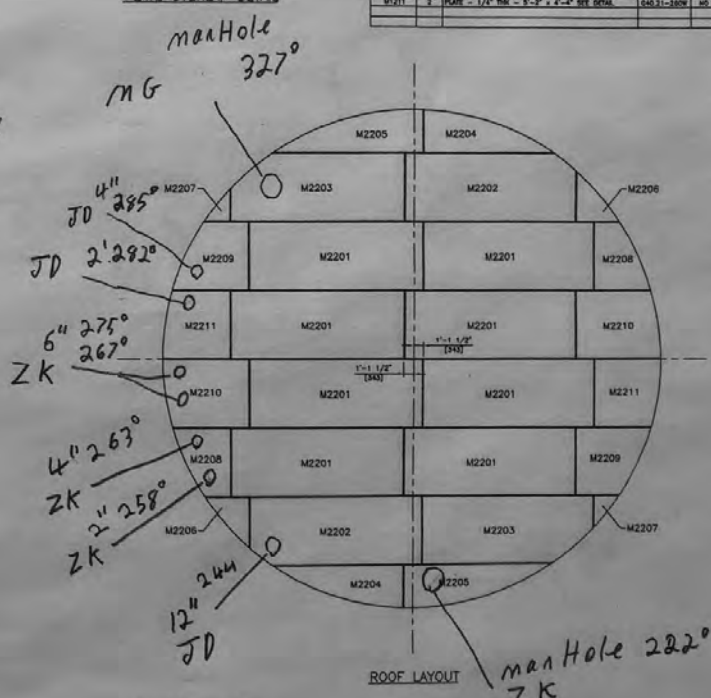
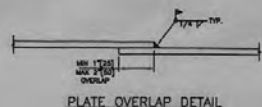
Nozzles

Contents

1. Weld Maps
2. Leak Test Report – Shell Nozzle Repad Air Test
3. MPI Report



Nozzles
on Roof



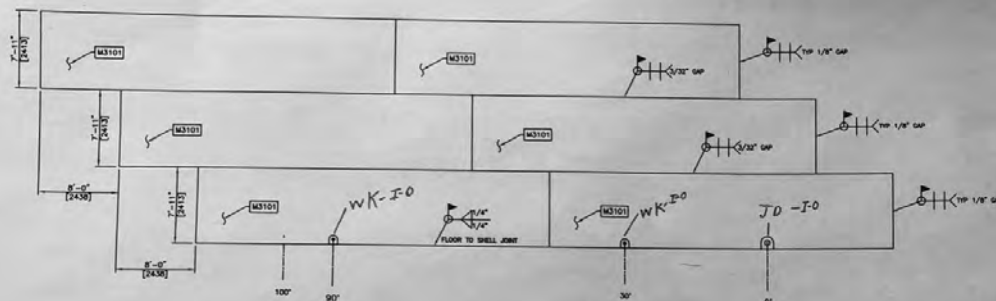
BILL OF MATERIALS					
MATERIAL	QTY.	DESCRIPTION	WATERGAL	WTR	WT
M2201	2	PLATE - 1/4" THK - 8' x 20'	040.21-200W	NO	15.540 LBS
M2202	2	PLATE - 1/4" THK - 8' x 20' SEE DETAIL	040.21-200W	NO	15.537 LBS
M2203	2	PLATE - 1/4" THK - 8' x 20' SEE DETAIL	040.21-200W	NO	15.538 LBS
M2204	2	PLATE - 1/4" THK - 8' x 20' SEE DETAIL	040.21-200W	NO	15.538 LBS
M2205	2	PLATE - 1/4" THK - 8' x 20' SEE DETAIL	040.21-200W	NO	15.538 LBS
M2206	2	PLATE - 1/4" THK - 8' x 20' SEE DETAIL	040.21-200W	NO	15.538 LBS
M2207	2	PLATE - 1/4" THK - 8' x 20' SEE DETAIL	040.21-200W	NO	15.538 LBS
M2208	2	PLATE - 1/4" THK - 8' x 20' SEE DETAIL	040.21-200W	NO	15.538 LBS
M2209	2	PLATE - 1/4" THK - 8' x 20' SEE DETAIL	040.21-200W	NO	15.538 LBS
M2210	2	PLATE - 1/4" THK - 8' x 20' SEE DETAIL	040.21-200W	NO	15.538 LBS
M2211	2	PLATE - 1/4" THK - 8' x 20' SEE DETAIL	040.21-200W	NO	15.538 LBS

Permit Number: P471

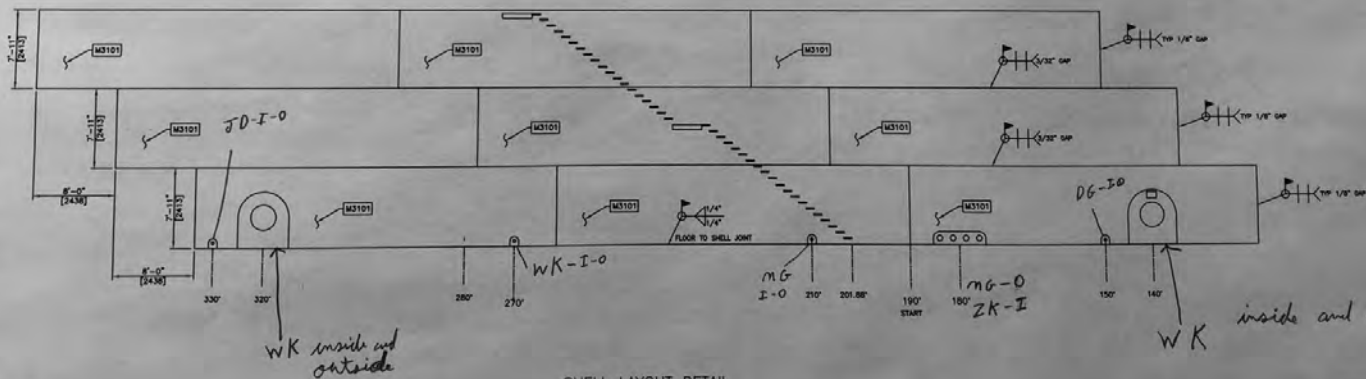
		K BROWN CONTRACTING LTD. ROOF LAYOUT AEM AMARUO 1.5M LITER TANK 1/2" = 1'-0" MOSEER ENGINEERING 113-M 2 OF 2 0 THIS DOCUMENT IS THE SOLE & EXCLUSIVE PROPERTY OF K BROWN CONTRACTING LTD.	
25-Jun-2018 25-Jun-2018		REVISIONS	

BILL OF MATERIALS				
MARK	QTY.	DESCRIPTION	MATERIAL	WTS
M3101	15	PLATE 5/16" THK x 7'-11" x 39'-10 3/32"	SA516-70	YES
				2,827 LB

MATERIAL FOR ONE(1) SHOWN, ONE(1) REQUIRED.



Weld nozzle to shell



SHELL LAYOUT DETAIL

ES:
SHELL PLATE DOES NOT REQUIRE SHAPING (ROLLING) PER API-650 FIGURE 6.1.
ALL SHELL PLATE SHALL BE API-650 GROUP III SPECIFICATIONS, 260W FK&FG.
ALL SHELL PLATE SHALL BE STACKED WITH COMMON CENTER LINE.
THE INITIAL INSIDE WELD PASS OF THE SHELL TO FLOOR JOINT SHALL HAVE ALL SLAG REMOVED FROM THE SURFACE OF THE WELD AND EXAMINED FOR ITS ENTIRE CIRCUMFERENCE BOTH VISUALLY AND MPI.
RT EXAMINATION OF FULL PENETRATION SQUARE BUTT WELDS, REFER TO RT STRETCH OUT DRAWING.
THE REVERSE SIDE OF DOUBLE WELDED SQUARE BUTT JOINTS SHALL BE THOROUGHLY CLEANED BY GRINDING BEFORE WELDING.

Dany Laflamme		K BROWN CONTRACTING	
Signature numérique de Dany Laflamme CPE, c.é. Dany Laflamme Date: 2018.05.24 10:56:11 -0400		SHELL PLATE DETAIL	
A 20-MAY-18 ME KB		AEM AMARUQ 1.5M LITER TANK	
ISSUED FOR APPROVAL		3/32" = 1'-0" MOSHER ENGINEERING 013-M3 1	
REVISIONS		THIS DOCUMENT IS THE SOLE & EXCLUSIVE PROPERTY OF K BROWN	



WN
WN

N5-E

1.2.2

L

U

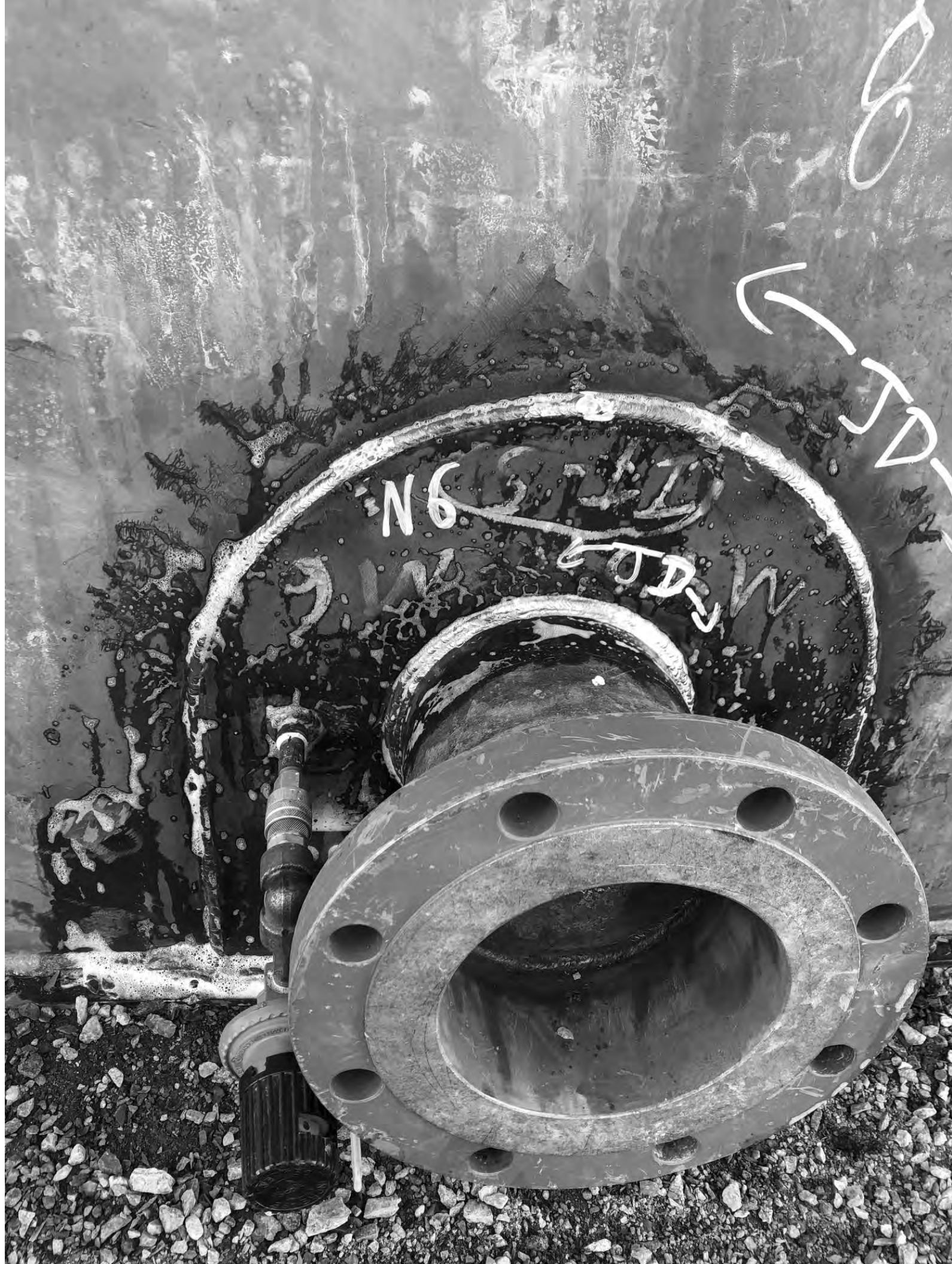
S. 18501



W/K

N5-E









Industrial Services
TISI Canada Inc.

MAGNETIC PARTICLE EXAMINATION REPORT - Portable

Client Name	Mosher Engineering Ltd.	P.O. No.		Team Job No.	5089-0196
Work Location	Amaruq, Nunavut Canada	Client Job No.	Tank 313	Report No.	CR 2019-547
Code / Specification / CED	API-650	Technique No.	MT-ASME.1.5200 Rev2	Date of Exam	06/18/19
Acceptance / CED	API-650	Procedure	MT-ASME.1.5200 Rev2		
Part Description					
Part / Assy No.	Tank 313 Amaruq	Material	CS	Qty Inspected	See Below
DWG No.		Material Thickness		Heat No.	
Type of Fabrication					
☐ Piping ☐ Vessel ☐ Tank ☒ Weld ☐ Casting ☐ Forging ☒ Plate ☒ Other Bolts ☒ Surface Acceptable for Inspection					
Inspection Parameters					
Magnetic Equipment:	AC YOKE	S/N:	7176	Calibration Date:	15/6/2019
Daily Yoke Verification	☐ Yes	Weight S/N:		Prod Spacing Amps:	☒ AC ☐ DC ☒ Continuous ☐ Residual
Testing Medium	Product: Magnaflux	Type:	☐ Fluorescent ☒ Dry Powder	Colour Contrast	Colour: Yellow
Testing Medium	Product:	Type:	☐ Fluorescent ☐ Dry Powder	Colour Contrast	Colour:
Bath Concentration	☐ Fluorescent ☒ Non-Fluorescent	ml / 100ml		Aerosol	Part Temperature:
Demagnetization			☐ Yes ☐ No	Number of Oersteds:	
Lighting Equipment					
Black Light Equipment used:			White Light Equipment used: SPRCTROLINE		
Black Light Meter S/N:	Cal. Date:	Due Date:	Light Meter S/N:	Cal. Date:	Due Date:
Black Light Sensor S/N:	Cal. Date:	Due Date:	Light Sensor S/N:	Cal. Date:	Due Date:
Black Light Intensity at the time of inspection: $\mu W / cm^2$			White Light Intensity at the time of inspection: fc		
Min. Black Light intensity to be > 1000 $\mu W / cm^2$: ☐ at examination surface			Min. White Light Intensity to be > 100 fc : ☒ at examination surface		
☐ Ambient White Light in Darkened Area < 2 fc at inspection surface					
Inspection Scope					
Magnetic particle inspection was performed on the following items:					
Shell to Floor weld(Cap on both inside and outside was inspected)					
19 Nozzles shell attachment welds(Nozzle attachment welds were inspected both inside and outside except roof nozzles external only)					
External doubler plate attachment welds					
Center column plate to floor attachment weld					
Vertical shell weld to floor(Aprox 1 foot of each weld was inspected)					
Stairs step attachment welds (10%)					
Stairs angle iron attachment welds (4 Locations)					
Man cover swing arm attachment welds(2 manways)					
Signature and Certification					
Technician	Corey Randell	Reg. No.	9567	Client Final Acceptance	Signature
Signature		Expiry Date	03/15/21	Authorized Inspector	Signature
Certification	CGSB: ☒ Level 2 ☒ Level 3	SNT-TC-1A:	☐ Level 2 ☐ Level 3	CSA Supervisors Review	Signature
					Date

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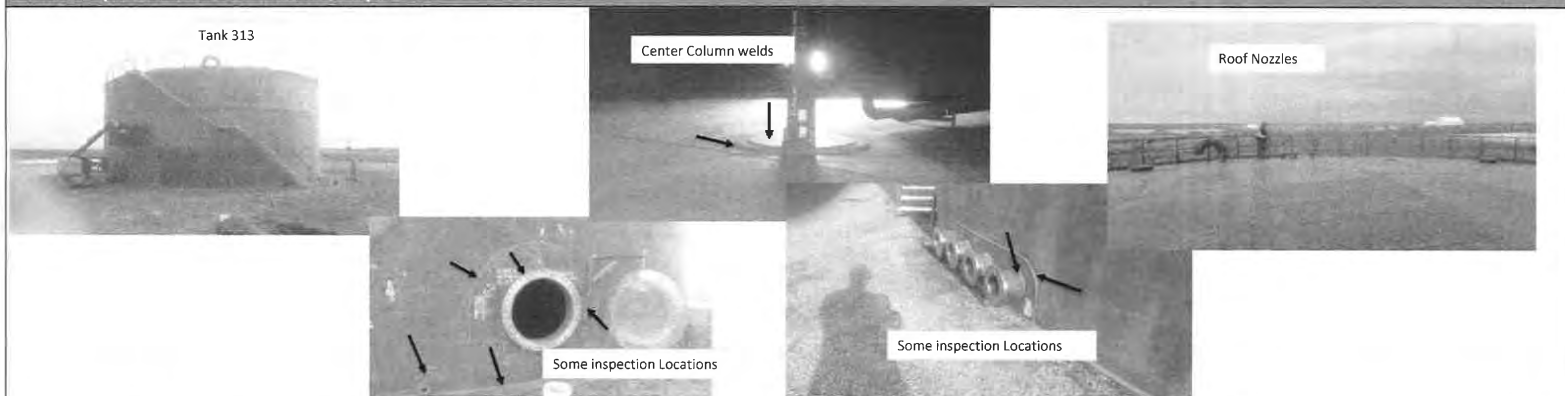
Inspection Results

At the time of inspection no rejectable indications were noted.

See attached pictures for more details

See attached drawing for all shell inspection locations

Additional Optional Information - Sketches, Graphs etc.



Signature and Certification

Technician	Corey Randell	Reg. No.	9567	Client Final Acceptance	Signature	Date
Signature		Expiry Date	03/15/21	Authorized Inspector	Signature	Date
Certification	CGSB: ☒ Level 2 ☒ Level 3	SNT-TC-1A:	☐ Level 2 ☐ Level 3	CSA Supervisors Review	Signature	Date

TANK 313AMARUQ 2019

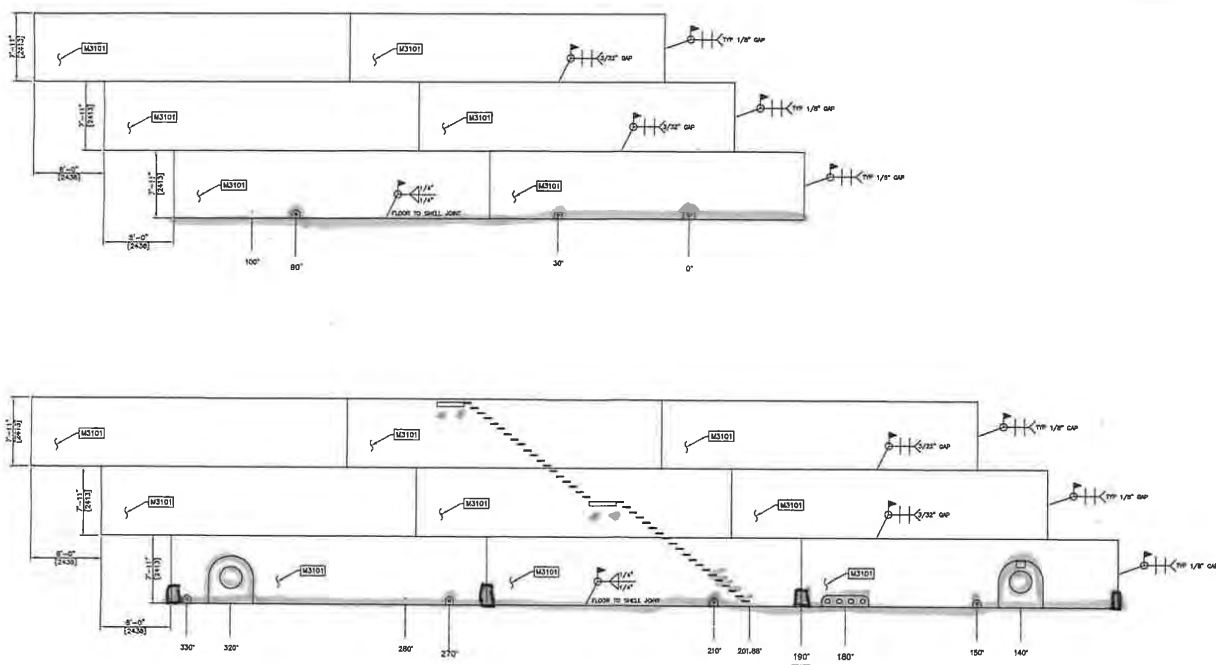
MT LOCATIONS

EACH NOZZLE WAS INSPECTED INSIDE AND OUT SIDE

BILL OF MATERIALS

MARK	QTY	DESCRIPTION	MATERIAL	WTH	WT
M3101	15	PLATE 5/16" THK x 7'-11" x 33'-10 53/64"	SA100C-280WT	YES	3,482.5000

MATERIAL FOR ONE(1) SHOWN, ONE(1) REQUIRED.



SHELL LAYOUT DETAIL

NOTES:

- 1) SHELL PLATE DOES NOT REQUIRE SHAPING (ROLLING) PER API-650 FIGURE 6.1.
- 2) ALL SHELL PLATE SHALL BE API-650 GROUP III SPECIFICATIONS, 260W FK&FG.
- 3) ALL SHELL PLATE SHALL BE STACKED WITH COMMON CENTER LINE.
- 4) THE INITIAL INSIDE WELD PASS OF THE SHELL TO FLOOR JOINT SHALL HAVE ALL SLAG REMOVED FROM THE SURFACE OF THE WELD AND EXAMINED FOR ITS ENTIRE CIRCUMFERENCE BOTH VISUALLY AND MPI.
- 5) RT EXAMINATION OF FULL PENETRATION SQUARE BUTT WELDS, REFER TO RT STRETCH OUT DRAWING.
- 6) THE REVERSE SIDE OF DOUBLE WELDED SQUARE BUTT JOINTS SHALL BE THOROUGHLY CLEANED BY GRINDING BEFORE WELDING.

Dany
Lafra
mme

Signature:	
Authorized by:	
Date:	2018.05.24
Time:	10:20:13 AM

K BROWN CONTRACTING LTD.

SHELL PLATE DETAIL

AEM AMARUQ 1.5M LITER TANK

3/32" = 1'-0" MOSHER ENGINEERING 313-M3 1 OF 4 A
THIS DOCUMENT IS THE SOLE & EXCLUSIVE PROPERTY OF K BROWN CONTRACTING LTD.

WELDS ONLY INSPECTED ON THE OUTSIDE

0.

NOTES:
1) ROOF DIMENSIONS ARE HORIZONTAL DISTANCE FROM OUTSIDE SHELL.

ORIENTATION

B	31-MAY-18	ME	KB	ISSUED FOR APPROVAL	
A	19-MAY-18	ME	KB	ISSUED FOR APPROVAL	
REV	DWG	SHEET	BY	DESCRIPTION	
REVISIONS					

GENERAL ARRANGEMENT - ORIENTATION

AEM AMARUQ 1.5M LITER TANK

3/52* = 1'-0"	MOSHER ENGINEERING	313-M2	2 OF 2	B
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ICL Project #: 313

Location: Amaruk Mine, NU

Client Project #: 6115-C-260-001

Field Erected Fuel Storage Tank Handover Package

Manways

Contents

1. Weld Map, Visual Report
2. Leak Test Report – Shell Manway Repad Air Test
3. MPI Report

PO Box 654
Rankin Inlet, NU X0C 0G0
T 867.645.4030 F 867.645.4064

PRESSURE TEST CERTIFICATE

SITE: Amaruq,
Pad K 1.5 million
DATE: June 16 2019

WORK ORDER # _____
TITLE: _____

1. DESCRIPTION OF PIPE AND LOCATION:

DESCRIPTION OF PIPE AND LOCATION:
manHole to ref plate
ref plate to shell
manHole to shell inside

2. SKETCH INDICATING TEST POINT (S):

air - and soapy
water
30 PSI

max Holes
at $320^{\circ} - 140^{\circ}$

3. PIPE STANDARD / SPECIFICATION OF TEST SECTION:

PO Box 654
Rankin Inlet, NU X0C 0G0
T 867-645-4030 F 867-645-4064

4. TESTING MEDIA: *air pressure at 30 PSI with soapy water*

5. CALCULATED PRESSURE / ACTUAL PRESSURE AT LOWEST ELEVATION:

[illegible]

Include all pressure, temperature and pressure valve recording charts where applicable. Charts to be signed and approved by Engineer before acceptance. The location and course of any leaks or failures and description of repair action(s) taken to be included on additional sheets. All certificates to be submitted to Engineer for each Test Section.

CONTRACTOR REPRESENTATIVE

Sheldon Burry
(Print Name)

(Signature)

(Signature) _____
(Date) June 16 2019

ENGINEER

Mar. Andre Beaudet
(Print Name)

(Print Name)

(Signature)

(Signature)
16/6/19
(Date)



Man Hole
#1
45°

POINT CATE 1/4
FEB 014-012
MOSHER 918939

DG
Wt

DG
L

MG
W
150

DG
NS-C





EBE014
6781
0.2

50WT-4
MT-2

260WT CATS 1/4
FBE01-0-D02
MOSHER 9-10-93

Man. Hole
#2

1105-M1 A-B
IT-1

200 OUT

NS-F 330
NS-F 330

KS^o

Man. Hole

#2

2600W 0A75 1/4
E8E014-1002
105H47 949933



MAGNETIC PARTICLE EXAMINATION REPORT - Portable

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Part Description					
Part / Assy No.	Tank 313 Amaruq	Material	CS	Qty Inspected	See Below
DWG No.		Material Thickness		Heat No.	
Qty Accepted		Qty Rejected			
Type of Fabrication					
☐ Piping ☐ Vessel ☐ Tank ☒ Weld ☐ Casting ☐ Forging ☒ Plate ☒ Other Bolts ☒ Surface Acceptable for Inspection					
Inspection Parameters					
Magnetic Equipment:	AC YOKE	S/N:	7176	Calibration Date:	15/6/2019
Daily Yoke Verification	☐ Yes	Weight S/N:		Prod Spacing Amps:	☒ AC ☐ DC ☒ Continuous ☐ Residual
Yoke Leg Spacing:		Permanent Magnet Spacing:			
Testing Medium	Product: Magnaflux	Type:	☐ Fluorescent ☒ Dry Powder ☐ Colour Contrast	Colour: Yellow	Batch No.: 16F05K Expiry Date:
Testing Medium	Product:	Type:	☐ Fluorescent ☐ Dry Powder ☐ Colour Contrast	Colour:	Batch No.: Expiry Date:
Bath Concentration	☐ Fluorescent ☒ Non-Fluorescent	ml / 100ml		☐ Aerosol	Part Temperature: ☐ °F ☐ °C
Demagnetization	☐ Yes ☐ No	Number of Oersteds:			
Lighting Equipment					
Black Light Equipment used:		White Light Equipment used:	SPRCTROLINE		
Black Light Meter S/N:		Cal. Date:		Due Date:	
Black Light Sensor S/N:		Cal. Date:		Due Date:	
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Technician	Corey Randell	Reg. No.	9567	Client Final Acceptance	
Signature		Expiry Date	03/15/21	Authorized Inspector	
Certification	CGSB: ☒ Level 2 ☒ Level 3	SNT-TC-1A:	☐ Level 2 ☐ Level 3	CSA Supervisors Review	
Signature		Signature		Signature	
Date		Date		Date	

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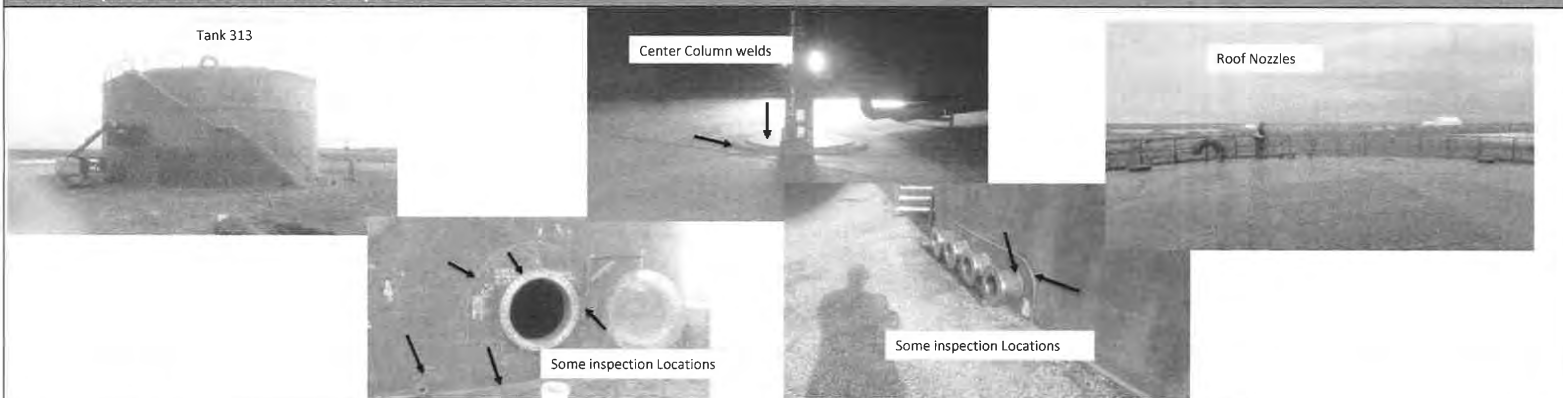
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See attached pictures for more details

See attached drawing for all shell inspection locations

Additional Optional Information - Sketches, Graphs etc.



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Signature		Expiry Date	03/15/21	Authorized Inspector		Signature		Date	
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TANK 313AMARUQ 2019

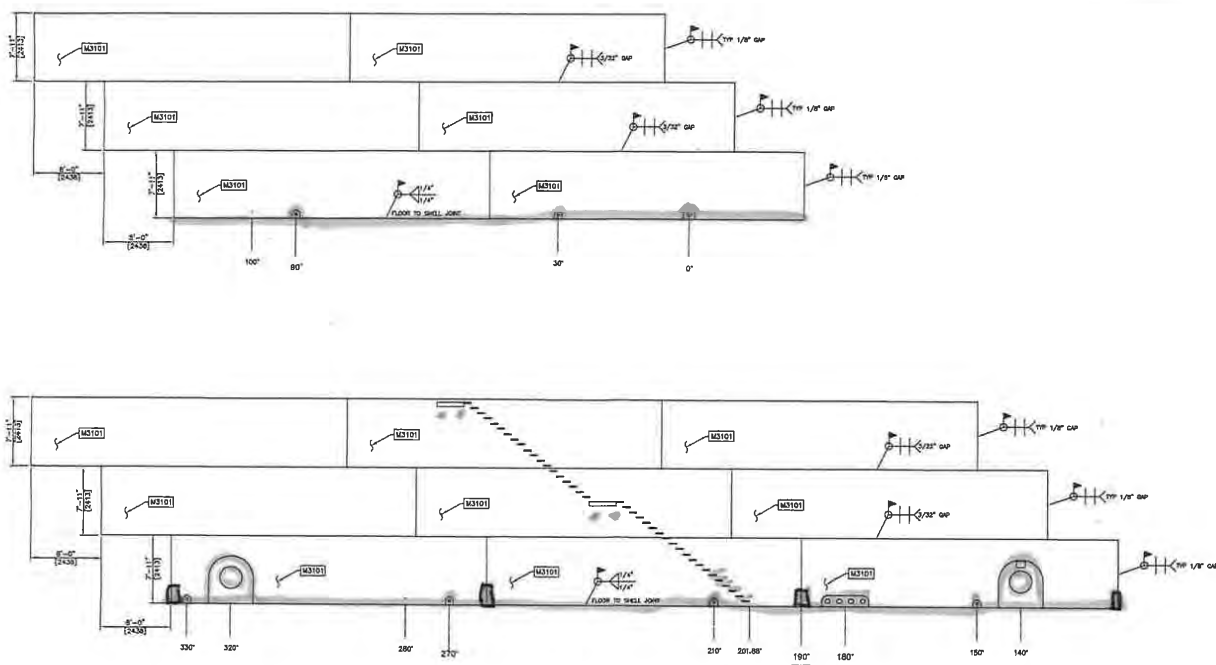
MT LOCATIONS

EACH NOZZLE WAS INSPECTED INSIDE AND OUT SIDE

BILL OF MATERIALS

MARK	QTY	DESCRIPTION	MATERIAL	WTH	WT
M3101	15	PLATE 5/16" THK x 7'-11" x 33'-10 53/64"	SA508-3200T	YES	3,482.5000

MATERIAL FOR ONE(1) SHOWN, ONE(1) REQUIRED.



SHELL LAYOUT DETAIL

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Dany
Lafra
mme

Signature:	
Authorized by:	
Date:	2018.05.24
Time:	10:20:13 AM

K BROWN CONTRACTING LTD.

SHELL PLATE DETAIL

ITEM NO. 1

ITEM NAME AEM AMARUQ 1.5M LITER TANK

DATE 3/32" = 1'-0" MOSHER ENGINEERING 313-M3 1 OF 4 A

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WELDS ONLY INSPECTED ON THE OUTSIDE

0°

[illegible]

NOTES:
1) ROOF DIMENSIONS ARE HORIZONTAL DISTANCE FROM OUTSIDE SHELL.

Dany Lafra mme	Signature Kamranul Hq Dany Lafra Ch. and Dany Lafra	K BROWN CONTRACTING LTD.										
	Date	B 15-MAY-16	M 16	K8	ISSUED FOR APPROVAL	GENERAL ARRANGEMENT - ORIENTATION						
	Date	A 19-MAY-16	M 16	K8	ISSUED FOR APPROVAL	AEM AMAPUR 1.5M LITER TANK						
	21-05-2010					2/32" = 1'-0"	MOSHER ENGINEERING	B 13-MAY-16	M 16	K8	2 OF 2	B
THIS DOCUMENT IS THE SOLE & EXCLUSIVE PROPERTY OF K BROWN CONTRACTING LTD.												
REVISIONS												

ICL Project #: 313

Location: Amaruk Mine, NU

Client Project #: 6115-C-260-001

Field Erected Fuel Storage Tank Handover Package

Item 19 – Bolts & Nuts

Contents

1. Hardware Schedule

Hardware Schedule				
QTY	Size	Grade	Description	Use
ROOF STRUCTURE				
68	5/8" x 2 1/2"	ASTM A325	Bolt, Hex Head, c/w Hex Nut & (2) Flat Washers	Rafter to Shell Connection
136	5/8"	ASTM A325	Washers, Flat	Rafter to Shell Connection
68	5/8"	ASTM A325	Nut, Hex Heavy	Rafter to Shell Connection
68	5/8" x 3 1/2"	ASTM A325	Bolt, Hex Head, c/w Hex Nut & (2) Flat Washers	Rafter to Column Connection
136	5/8"	ASTM A325	Washers, Flat	Rafter to Column Connection
68	5/8"	ASTM A325	Nut, Hex Heavy	Rafter to Column Connection
SHELL AND INTERNALS				
84	3/4" x 3 1/2"	A194 B7	Studs	Shell Manways
168	3/4"	A194 2H	Nut, Hex Heavy	Shell Manways
16	3/4" x 4 1/2"	A194 B7	Studs	N1 & N2 - Fuel Inlet - Internals
32	3/4"	A194 2H	Nut, Hex Heavy	N1 & N2 - Fuel Inlet - Internals
4	5/8" x 8 3/4" I.D.	A194 B7	U-Bolt	N1 & N2 - Fuel Inlet - Internal Pipe Support
16	5/8"	A194 2H	Nut, Hex Heavy	N1 & N2 - Fuel Inlet - Internal Pipe Support
16	3/4" x 4 1/2"	A194 B7	Studs	N3 & N4 - Fuel Outlet - Internals
32	3/4"	A194 2H	Nut, Hex Heavy	N3 & N4 - Fuel Outlet - Internals
24	5/8" x 4"	A194 B7	Studs	N5 - Water Drawoffs - Internals
48	5/8"	A194 2H	Nut, Hex Heavy	N5 - Water Drawoffs - Internals
8	3/4" x 4 1/2"	A194 B7	Studs	N6 - Drain - Internals
16	3/4"	A194 2H	Nut, Hex Heavy	N6 - Drain - Internals
ROOF				
40	5/8" x 9 1/2"	A194 B7	Studs	Roof Manways
120	5/8"	A194 2H	Nut, Hex Heavy	Roof Manways
12	7/8" x 5"	A194 B7	Studs	N10 - Vent
24	7/8"	A194 2H	Nut, Hex Heavy	N10 - Vent
8	3/4" x 4 1/2"	A194 B7	Studs	N11 - Gauge Hatch
16	3/4"	A194 2H	Nut, Hex Heavy	N11 - Gauge Hatch

ICL Project #: 313

Location: Amaruk Mine, NU

Client Project #: 6115-C-260-001

Field Erected Fuel Storage Tank Handover Package

Final

Contents

1. Scan of Name Plate
2. Data Sheet (Calibration of Tank)

API STANDARD 650

APPENDIX	B, K, T	YEAR COMPLETED	2019
EDITION	TWELFTH	ADDENDUM NO.	3
NOMINAL DIAMETER	17.4M	NOMINAL HEIGHT	7.2M
MAXIMUM CAPACITY	1500CUM	DESIGN LIQUID LEVEL	7.2M
DESIGN SPECIFIC GRAVITY	0.85	DESIGN METAL TEMP.	-40 DEG C
DESIGN PRESSURE	ATM	MAXIMUM OPERATING TEMP.	90 DEG C
MANUFACTURE'S SERIAL NO.	313-1	PARTIAL STRESS RELIEF	-
		PURCHASER'S TANK NO.	6170 TNK 42

FABRICATED BY	INUKSHUK CONSTRUCTION LIMITED
ERECTED BY	INUKSHUK CONSTRUCTION LIMITED

SHELL COURSE 1 TO 4	MATERIAL CSA G40.21M-260WT CAT5 NORMALIZED TCVN 13FT/LBS@-50DEG F TRANSVERSE CHARPY TCVN 15FT/LBS@-50DEG F LONGITUDINAL CHARPY
------------------------	---

	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	9M
CROWN BOTTOM	0.00	0.736	0.00	233.947	0.00	470.801	0.00	707.428	0.00	943.998	0.00	1,180.540	0.00	1,416.980	0.00	1,653.421	0.00	1,890.862	0.00
	0.01	1.862	0.01	236.317	0.01	473.168	0.01	709.793	0.01	946.364	0.01	1,182.904	0.01	1,419.345	0.01	1,655.785	0.01	1,892.226	0.01
	0.02	2.988	0.02	238.687	0.02	475.535	0.02	712.159	0.02	948.730	0.02	1,185.269	0.02	1,421.709	0.02	1,658.150	0.02	1,894.667	0.02
	0.03	4.837	0.03	241.057	0.03	477.902	0.03	714.525	0.03	951.096	0.03	1,187.633	0.03	1,424.074	0.03	1,660.514	0.03	1,897.134	0.03
	0.04	6.686	0.04	243.427	0.04	480.270	0.04	716.890	0.04	953.461	0.04	1,189.997	0.04	1,426.438	0.04	1,662.879	0.04	1,899.601	0.04
	0.05	9.012	0.05	245.797	0.05	482.637	0.05	719.256	0.05	955.827	0.05	1,192.362	0.05	1,428.802	0.05	1,665.243	0.05	1,902.068	0.05
	0.06	11.337	0.06	248.167	0.06	485.004	0.06	721.622	0.06	958.193	0.06	1,194.726	0.06	1,431.167	0.06	1,667.607	0.06	1,904.335	0.06
	0.07	13.705	0.07	250.537	0.07	487.371	0.07	723.988	0.07	960.558	0.07	1,197.091	0.07	1,433.531	0.07	1,669.972	0.07	1,906.822	0.07
	0.08	16.072	0.08	252.908	0.08	489.739	0.08	726.353	0.08	962.924	0.08	1,199.455	0.08	1,435.896	0.08	1,672.336	0.08	1,909.293	0.08
	0.09	18.440	0.09	255.278	0.09	492.106	0.09	728.719	0.09	965.290	0.09	1,201.819	0.09	1,438.260	0.09	1,674.701	0.09	1,911.745	0.09
0.10	20.808	0.10	257.648	0.10	494.473	0.10	731.085	0.10	967.656	0.10	1,204.184	0.10	1,440.624	0.10	1,677.065	0.10	1,914.196	0.10	
0.11	23.174	0.11	260.018	0.11	496.840	0.11	733.450	0.11	970.021	0.11	1,206.548	0.11	1,442.989	0.11	1,679.429	0.11	1,916.647	0.11	
0.12	25.540	0.12	262.388	0.12	499.208	0.12	735.816	0.12	972.387	0.12	1,208.913	0.12	1,445.353	0.12	1,681.794	0.12	1,919.098	0.12	
0.13	27.906	0.13	264.758	0.13	501.575	0.13	738.182	0.13	974.753	0.13	1,211.277	0.13	1,447.718	0.13	1,684.158	0.13	1,921.549	0.13	
0.14	30.272	0.14	267.128	0.14	503.942	0.14	740.548	0.14	977.118	0.14	1,213.641	0.14	1,450.082	0.14	1,686.523	0.14	1,924.001	0.14	
0.15	32.638	0.15	269.498	0.15	506.309	0.15	742.913	0.15	979.484	0.15	1,216.006	0.15	1,452.446	0.15	1,688.887	0.15	1,926.453	0.15	
0.16	35.004	0.16	271.868	0.16	508.677	0.16	745.279	0.16	981.850	0.16	1,218.370	0.16	1,454.811	0.16	1,691.252	0.16	1,928.905	0.16	
0.17	37.370	0.17	274.238	0.17	511.044	0.17	747.645	0.17	984.216	0.17	1,220.735	0.17	1,457.175	0.17	1,693.616	0.17	1,931.357	0.17	
0.18	39.736	0.18	276.609	0.18	513.411	0.18	750.010	0.18	986.581	0.18	1,223.099	0.18	1,459.540	0.18	1,695.980	0.18	1,933.809	0.18	
0.19	42.101	0.19	278.979	0.19	515.779	0.19	752.376	0.19	988.947	0.19	1,225.463	0.19	1,461.904	0.19	1,698.615	0.19	1,936.261	0.19	
0.20	44.466	0.20	281.349	0.20	518.146	0.20	754.742	0.20	991.313	0.20	1,227.828	0.20	1,464.268	0.20	1,701.249	0.20	1,938.713	0.20	
0.21	46.832	0.21	283.719	0.21	520.513	0.21	757.108	0.21	993.678	0.21	1,230.192	0.21	1,466.633	0.21	1,703.712	0.21	1,941.165	0.21	
0.22	49.197	0.22	286.089	0.22	522.880	0.22	759.473	0.22	996.044	0.22	1,232.557	0.22	1,468.997	0.22	1,706.180	0.22	1,943.617	0.22	
0.23	51.563	0.23	288.459	0.23	525.248	0.23	761.839	0.23	998.410	0.23	1,234.921	0.23	1,471.362	0.23	1,708.649	0.23	1,946.069	0.23	
0.24	53.928	0.24	290.829	0.24	527.615	0.24	764.205	0.24	1,000.775	0.24	1,237.285	0.24	1,473.726	0.24	1,711.111	0.24	1,948.521	0.24	
0.25	56.294	0.25	293.199	0.25	529.982	0.25	766.570	0.25	1,003.141	0.25	1,239.650	0.25	1,476.091	0.25	1,713.573	0.25	1,950.973	0.25	
0.26	58.659	0.26	295.569	0.26	532.349	0.26	768.936	0.26	1,005.507	0.26	1,242.014	0.26	1,478.455	0.26	1,716.035	0.26	1,953.425	0.26	
0.27	61.024	0.27	297.939	0.27	534.717	0.27	771.302	0.27	1,007.873	0.27	1,244.379	0.27	1,480.819	0.27	1,718.497	0.27	1,955.877	0.27	
0.28	63.389	0.28	300.310	0.28	537.084	0.28	773.667	0.28	1,010.238	0.28	1,246.743	0.28	1,483.184	0.28	1,720.959	0.28	1,958.329	0.28	
0.29	65.755	0.29	302.680	0.29	539.451	0.29	776.033	0.29	1,012.604	0.29	1,249.108	0.29	1,485.548	0.29	1,723.421	0.29	1,960.781	0.29	
0.30	68.120	0.30	305.050	0.30	541.818	0.30	778.399	0.30	1,014.970	0.30	1,251.472	0.30	1,487.913	0.30	1,725.883	0.30	1,963.233	0.30	
0.31	70.485	0.31	307.420	0.31	544.186	0.31	780.765	0.31	1,017.335	0.31	1,253.836	0.31	1,490.277	0.31	1,728.345	0.31	1,965.685	0.31	
0.32	72.850	0.32	309.790	0.32	546.553	0.32	783.130	0.32	1,019.701	0.32	1,256.201	0.32	1,492.641	0.32	1,730.807	0.32	1,968.137	0.32	
0.33	75.215	0.33	312.160	0.33	548.920	0.33	785.496	0.33	1,022.067	0.33	1,258.565	0.33	1,495.006	0.33	1,733.269	0.33	1,970.589	0.33	
0.34	77.583	0.34	314.530	0.34	551.287	0.34	787.862	0.34	1,024.433	0.34	1,260.930	0.34	1,497.370	0.34	1,735.731	0.34	1,973.041	0.34	
0.35	79.950	0.35	316.900	0.35	553.655	0.35	790.227	0.35	1,026.798	0.35	1,263.294	0.35	1,499.735	0.35	1,738.193	0.35	1,975.493	0.35	
0.36	82.317	0.36	319.270	0.36	556.022	0.36	792.593	0.36	1,029.164	0.36	1,265.658	0.36	1,502.099	0.36	1,740.655	0.36	1,977.945	0.36	
0.37	84.685	0.37	321.640	0.37	558.388	0.37	794.959	0.37	1,031.530	0.37	1,268.023	0.37	1,504.463	0.37	1,743.117	0.37	1,980.397	0.37	
0.38	87.052	0.38	324.011	0.38	560.754	0.38	797.325	0.38	1,033.895	0.38	1,270.387	0.38	1,506.828	0.38	1,745.579	0.38	1,982.849	0.38	
0.39	89.419	0.39	326.381	0.39	563.119	0.39	799.690	0.39	1,036.261	0.39	1,272.752	0.39	1,509.192	0.39	1,748.041	0.39	1,985.301	0.39	
0.40	91.786	0.40	328.751	0.40	565.485	0.40	802.056	0.40	1,038.627	0.40	1,275.116	0.40	1,511.557	0.40	1,750.503	0.40	1,987.753	0.40	
0.41	94.154	0.41	331.121	0.41	567.851	0.41	804.422	0.41	1,040.993	0.41	1,277.480	0.41	1,513.921	0.41	1,752.965	0.41	1,990.205	0.41	
0.42	96.521	0.42	333.491	0.42	570.217	0.42	806.787	0.42	1,043.358	0.42	1,279.845	0.42	1,516.285	0.42	1,755.427	0.42	1,992.657	0.42	
0.43	98.888	0.43	335.861	0.43	572.582	0.43	809.153	0.43	1,045.724	0.43	1,282.209	0.43	1,518.650	0.43	1,757.889	0.43	1,995.109	0.43	
0.44	101.255	0.44	338.231	0.44	574.948	0.44	811.519	0.44	1,048.090	0.44	1,284.574	0.44	1,521.014	0.44	1,760.351	0.44	1,997.561	0.44	
0.45	103.623	0.45	340.601	0.45	577.314	0.45	813.885	0.45	1,050.455	0.45	1,286.938	0.45	1,523.379	0.45	1,762.813	0.45	1,999.913	0.45	
0.46	105.990	0.46	342.968	0.46	579.679	0.46	816.250	0.4											