LUDWIG & ASSOCIATES LTD.

Materials and Welding Consulting

LABORATORY ACCREDITATION BUREAU
ISO/IEC 17025 ACCREDITED
Certificate Number L2057

LABORATORY TEST REPORT

CUSTOMER: **Woodside Fabrications Ltd.**
6124 - 39th Avenue
Camrose, Alberta
T4V 3B1

Laboratory Test No.: C07-300.2
Date: March 7, 2007

Attention: Douglas French

PQR Number: WFL-2-1 **Process:** SAW
Material: SA 516 Gr. 60N to SA 516 Gr. 70N (Heat No.: 44410 - 34383)
Thickness: 6.32 mm (0.249 in.)
Thermal Condition: As Welded

NOTCH-TOUGHNESS TEST

TYPE OF TEST: Charpy V-Notch
TEST TEMPERATURE: -48°C (-55°F)
ORIENTATION: Transverse
SPECIMEN SIZE: 10 x 5 mm

Specimen Number	Notch Location	Impact Values Joules	(ft.lbs)
V2.1	Weld Metal	30.1	(22.2)
V2.2	within 1/16 in.	35.1	(25.9)
V2.3	of root	33.9	(25.0)
V3.1	Gr. 60N - HAZ	32.5	(24.0)
V3.2	Gr. 60N - HAZ	30.1	(22.2)
V3.3	Gr. 60N - HAZ	14.2	(10.5)
W3.1	Gr. 70N - HAZ	28.5	(21.0)
W3.2	Gr. 70N - HAZ	9.5	(7.0)
W3.3	Gr. 70N - HAZ	25.8	(19.0)

We certify the test results in this report and that the specimen(s) were prepared and tested in accordance with the requirements of ASME Section VIII, Div. 1, UG-84 – 2004 *edition and latest addenda. The information regarding material identification (i.e. size, thickness, heat number, etc.) has been provided by the customer whose name appears on this report.* ***Samples associated with this report will be discarded in 45 days.***

Laboratory Test Conducted By: _____
Charles Ugarenko / Steve Rieberger, C.E.T.

4027 - 14 Street, S.E., CALGARY, ALBERTA T2G 3K6 PHONE: (403) 262-7072 FAX: (403) 266-3169
7925 Davies Road, EDMONTON, ALBERTA T6E 4N1 PHONE: (780) 468-3030 FAX: (780) 468-3032

LUDWIG & ASSOCIATES LTD.

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LABORATORY ACCREDITATION BUREAU
ISO/IEC 17025 ACCREDITED
Certificate Number L2057

LABORATORY TEST REPORT

CUSTOMER: **Woodside Fabrications Ltd.**
6124 - 39th Avenue
Camrose, Alberta
T4V 3B1

Laboratory Test No.: C07-300.2
Date: March 5, 2007

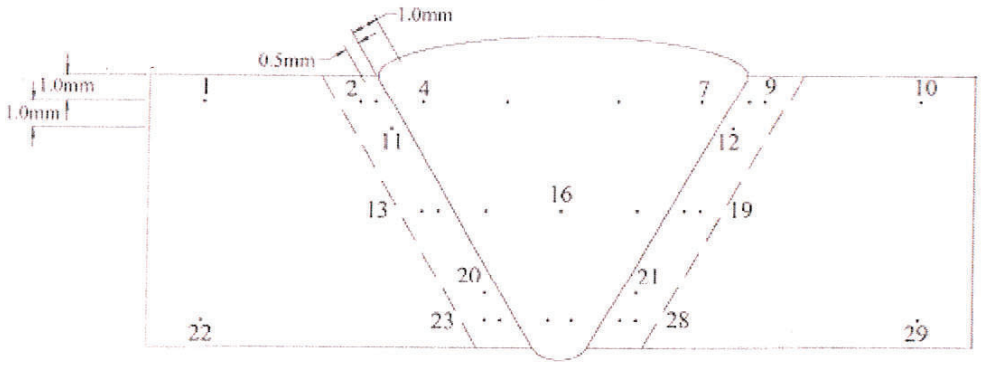
Attention: Douglas French

PQR Number:	WFL-2-1	**Process:**	SAW
Material:	SA 516 Gr. 60N to SA 516 Gr. 70N (Heat No.: 44410 - 34383)		
Thickness:	6.32 mm (0.249 in.)		
Thermal Condition:	As Welded		

HARDNESS TEST

TYPE OF TEST: Vickers LOAD: 10 kg

INSTRUMENT TYPE: Mitutoyo AVK-C1



SA 516 Gr. 70N SA 516 Gr. 60N

1)	166 HV	7)	172 HV	13)	214 HV	19)	210 HV	25)	194 HV
2)	192 HV	8)	194 HV	14)	220 HV	20)	222 HV	26)	198 HV
3)	197 HV	9)	178 HV	15)	188 HV	21)	223 HV	27)	212 HV
4)	175 HV	10)	173 HV	16)	192 HV	22)	169 HV	28)	194 HV
5)	162 HV	11)	194 HV	17)	186 HV	23)	188 HV	29)	166 HV
6)	170 HV	12)	203 HV	18)	215 HV	24)	209 HV		

We certify the test results in this report and that the specimen(s) were prepared and tested in accordance with the requirements of ASTM E92 - 82 (Reapproved 2003)$^{\epsilon 2}$. *The information regarding material identification (i.e. size, thickness, heat number, etc.) has been provided by the customer whose name appears on this report.* ***Samples associated with this report will be discarded in 45 days.***

Laboratory Test Conducted By: _____
Andrew Vessey / Steve Rieberger, C.E.T.

4027 - 14 Street, S.E., CALGARY, ALBERTA T2G 3K6 PHONE: (403) 262-7072 FAX: (403) 266-3169
7925 Davies Road, EDMONTON, ALBERTA T6E 4N1 PHONE: (780) 468-3030 FAX: (780) 468-3032

QM-System: Certification as per ISO 9001

Erläuterungen siehe Rückseite/Explications voir au verso/See reverse for explanations (www.dillinger.de/certificate)

DILLINGER HÜTTE

A02 INSPECTION CERTIFICATE 3.1 AS PER EN 10204:2004
INSPECTION CERTIFICATE 3.1 AS PER ISO 10474:2013
MATERIAL TEST REPORT (MTR)

A10 Advice of dispatch No./ Date of dispatch: 558728-23.02.16

A08/ Manufacturer's order/ A03 Certificate No.: 411465-004 Sheet 1/...

A05 Established Inspecting body: DH

A06 Purchaser: EDMONTON STEEL, EDMON A07.1 No. ED10682-J1010ER

Final receiver: EDMONTON STEEL, EDMON A07.2 No.

B01 Product: HEAVY PLATES

B02/ Steel design. SA516-60 SA20-S5

B03 Any suppl. requirements ASME-IIA:2013
DIL-HUE-1:R33-2014-04-04

20255

B01-B99 Description of the product

B14 Item No.	B08 Number of pieces	B09 Thickness	B10 Width INCH	B11 Length	B12 Theoretical mass KG	B04 Product delivery condition	B07.2 Heat No.	B07.1 Rolled plate No./ Test No.	A09 Purchaser article number
01	1	0,3750 x	96,50000 x	480,00000	2234	N	429693	29242-01	EPL-248
01	1	0,3750 x	96,50000 x	480,00000	2234	N	429693	29242-02	SA 516 Gr. 60/70
01	1	0,3750 x	96,50000 x	480,00000	2234	N	429693	29242-03	0.375 in. w.t. plate
01	1	0,3750 x	96,50000 x	480,00000	2234	N	429693	29243-01	HT # 429693 29249-03
01	1	0,3750 x	96,50000 x	480,00000	2234	N	429693	29243-02	Internal PO: E20306
01	1	0,3750 x	96,50000 x	480,00000	2234	N	429693	29243-03	External PO: 210377
01	1	0,3750 x	96,50000 x	480,00000	2234	N	429693	29245-01	Date Received: 29-Jan-19
01	1	0,3750 x	96,50000 x	480,00000	2234	N	429693	29245-02	Recieved by: Jessie Springett
01	1	0,3750 x	96,50000 x	480,00000	2234	N	429693	29245-03	
01	1	0,3750 x	96,50000 x	480,00000	2234	N	429693	29249-01	
01	1	0,3750 x	96,50000 x	480,00000	2234	N	429693	29249-02	
**	12				26808		429693	29249-03	
02	1	0,3750 x	120,50000 x	480,00000	2790	N	429693	29255-01	
02	1	0,3750 x	120,50000 x	480,00000	2790	N	429693	29255-02	
02	1	0,3750 x	120,50000 x	480,00000	2790	N	429693	29255-03	
02	1	0,3750 x	120,50000 x	480,00000	2790	N	429693	29256-01	
02	1	0,3750 x	120,50000 x	480,00000	2790	N	429693	29256-02	
02	1	0,3750 x	120,50000 x	480,00000	2790	N	429693	29256-03	
02	1	0,3750 x	120,50000 x	480,00000	2790	N	429693	29263-01	
02	1	0,3750 x	120,50000 x	480,00000	2790	N	429693	29263-02	
02	1	0,3750 x	120,50000 x	480,00000	2790	N	429693	29263-03	
02	1	0,3750 x	120,50000 x	480,00000	2790	N	429693	29264-01	

A04 DH Manufacturer's mark

Z01/Z02/Z03 We hereby certify, that the above mentioned materials have been delivered in accordance with the terms of order.

B. BALDAUF
Test House Manager

AHB Inspector's stamp

AG der Dillinger Hüttenwerke
Postfach 1580, D-66748 Dillingen/Saar
Inspection department

A01

Date 23.02.16 PP 1

QM-System: Certification as per ISO 9001

DILLINGER HÜTTE

Erläuterungen siehe Rückseite/Explications voir au verso/See reverse for explanations (www.dillinger.de/certificate)

A02 INSPECTION CERTIFICATE 3.1 AS PER EN 10204:2004
INSPECTION CERTIFICATE 3.1 AS PER ISO 10474:2013
MATERIAL TEST REPORT (MTR)

A10 Advice of dispatch No./ Date of dispatch: 558728-23.02.16

A08/ Manufacturer's order/ A03 Certificate No.: 411465-004 Sheet: 11/...

A05 Established Inspecting body: DH

A06 Purchaser: EDMONTON STEEL, EDMON A07.1 No. ED10682-J1010ER

Final receiver: EDMONTON STEEL, EDMON A07.2 No.

B01 Product: HEAVY PLATES

B02/ Steel design. SA516-60 SA20-S5

B03 Any suppl. requirements ASME-IIA:2013
DIL-HUE-1:R33-2014-04-04

C70-C99 Chemical composition % - Heat analysis

B07.2 Heat	C70	C	SI	MN	P	S	N	CU	MO	NI	CR	V	NB	SN	TI
429474	Y	0,182	0,377	1,17	0,010	0,0009	0,0075	0,028	0,010	0,032	0,033	0,000	0,000	0,001	0,003
429477	Y	0,180	0,375	1,17	0,009	0,0011	0,0070	0,015	0,004	0,025	0,035	0,000	0,000	0,001	0,002
429479	Y	0,173	0,368	1,17	0,010	0,0008	0,0072	0,023	0,012	0,028	0,047	0,001	0,000	0,001	0,003
429480	Y	0,171	0,378	1,19	0,010	0,0006	0,0060	0,019	0,011	0,033	0,041	0,000	0,000	0,001	0,002
429483	Y	0,176	0,381	1,18	0,008	0,0008	0,0082	0,025	0,008	0,026	0,033	0,000	0,000	0,001	0,002
429485	Y	0,183	0,378	1,18	0,009	0,0007	0,0075	0,038	0,006	0,028	0,042	0,000	0,000	0,002	0,003
429601	Y	0,191	0,378	1,19	0,006	0,0008	0,0063	0,014	0,012	0,030	0,029	0,001	0,001	0,001	0,002
429693	Y	0,161	0,384	1,19	0,010	0,0010	0,0068	0,025	0,011	0,024	0,028	0,001	0,001	0,001	0,003
429696	Y	0,154	0,373	1,16	0,009	0,0008	0,0075	0,020	0,006	0,019	0,028	0,001	0,003	0,001	0,002

B07.2 Heat	C70	B	CA	AL-T
429474	Y	0,0003	0,0021	0,032
429477	Y	0,0003	0,0017	0,034
429479	Y	0,0003	0,0013	0,034
429480	Y	0,0002	0,0014	0,033
429483	Y	0,0001	0,0014	0,030
429485	Y	0,0003	0,0013	0,034
429601	Y	0,0002	0,0020	0,038
429693	Y	0,0002	0,0015	0,032
429696	Y	0,0001	0,0016	0,033

A04 D H Manufacturer's mark

Z01/Z02/Z03 We hereby certify, that the above mentioned materials have been delivered in accordance with the terms of order.

B. BALDAUF
Test House Manager

AHB Inspector's stamp

Date 23.02.16

A01 AG der Dillinger Hüttenwerke
Postfach 1580, D-66748 Dillingen/Saar
Inspection department

PP 1

QM-System: Certification as per ISO 9001

DILLINGER HÜTTE

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A02 INSPECTION CERTIFICATE 3.1 AS PER EN 10204:2004
INSPECTION CERTIFICATE 3.1 AS PER ISO 10474:2013
MATERIAL TEST REPORT (MTR)

A10 Advice of dispatch No./ Date of dispatch: 558728-23.02.16

A08/ Manufacturer's order/ A03 Certificate No.: 411465-004 Sheet 1/...

A05 Established Inspecting body: DH

A06 Purchaser: EDMONTON STEEL,EDMON A07.1 No. ED10682-J1010ER

Final receiver: EDMONTON STEEL,EDMON A07.2 No.

B01 Product: HEAVY PLATES

B02/ Steel design. SA516-70 SA20-S5

B03 Any suppl. requirements ASME-IIA:2013
DIL-HUE-1:R33-2014-04-04

20234

B01-B99 Description of the product

B14 Item No.	B08 Number of pieces	B09 Thickness		B10 Width INCH		B11 Length	B12 Theoretical mass KG	B04 Product delivery condition	B07.2 Heat No.	B07.1 Rolled plate No./ Test No.	A09 Purchaser article number
01	1	0,3750	x	96,50000	x	480,00000	2234	N	429693	29242-01	
01	1	0,3750	x	96,50000	x	480,00000	2234	N	429693	29242-02	
01	1	0,3750	x	96,50000	x	480,00000	2234	N	429693	29242-03	
01	1	0,3750	x	96,50000	x	480,00000	2234	N	429693	29243-01	
01	1	0,3750	x	96,50000	x	480,00000	2234	N	429693	29243-02	
01	1	0,3750	x	96,50000	x	480,00000	2234	N	429693	29243-03	
01	1	0,3750	x	96,50000	x	480,00000	2234	N	429693	29245-01	
01	1	0,3750	x	96,50000	x	480,00000	2234	N	429693	29245-02	
01	1	0,3750	x	96,50000	x	480,00000	2234	N	429693	29245-03	
01	1	0,3750	x	96,50000	x	480,00000	2234	N	429693	29249-01	
01	1	0,3750	x	96,50000	x	480,00000	2234	N	429693	29249-02	
01	1	0,3750	x	96,50000	x	480,00000	2234	N	429693	29249-03	
**	12						26808				
02	1	0,3750	x	120,50000	x	480,00000	2790	N	429693	29255-01	
02	1	0,3750	x	120,50000	x	480,00000	2790	N	429693	29255-02	
02	1	0,3750	x	120,50000	x	480,00000	2790	N	429693	29255-03	
02	1	0,3750	x	120,50000	x	480,00000	2790	N	429693	29256-01	
02	1	0,3750	x	120,50000	x	480,00000	2790	N	429693	29256-02	
02	1	0,3750	x	120,50000	x	480,00000	2790	N	429693	29256-03	
02	1	0,3750	x	120,50000	x	480,00000	2790	N	429693	29263-01	
02	1	0,3750	x	120,50000	x	480,00000	2790	N	429693	29263-02	
02	1	0,3750	x	120,50000	x	480,00000	2790	N	429693	29263-03	
02	1	0,3750	x	120,50000	x	480,00000	2790	N	429693	29264-01	

EPL-248
SA 516 Gr. 60/70
0.375 in. w.t. plate
HT # 429693 29249-03
Internal PO: E20306
External PO: 210377
Date Received: 29-Jan-19
Recieved by: Jessie Springett

A04 DH Manufacturer's mark

Z01/Z02/Z03 We hereby certify, that the above mentioned materials have been delivered in accordance with the terms of order.

B. BALDAUF
Test House Manager

AHB Inspector's stamp

Date 23.02.16

A01 AG der Dillinger Hüttenwerke
Postfach 1580, D-66748 Dillingen/Saar
Inspection department

PP 1

QM-System: Certification as per ISO 9001

DILLINGER HÜTTE

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A02 INSPECTION CERTIFICATE 3.1 AS PER EN 10204:2004
INSPECTION CERTIFICATE 3.1 AS PER ISO 10474:2013
MATERIAL TEST REPORT (MTR)

A10 Advice of dispatch No./ Date of dispatch: 558728-23.02.16

A08/ Manufacturer's order/ A03 Certificate No.: 411465-004

Sheet: 11/...

A05 Established Inspecting body: DH

A06 Purchaser: EDMONTON STEEL, EDMON — A07.1 No. ED10682-J1010ER

Final receiver: EDMONTON STEEL, EDMON — A07.2 No.

B01 Product: HEAVY PLATES

B02/ Steel design. SA516-70 SA20-S5

B03 Any suppl. requirements ASME-IIA:2013
DIL-HUE-1:R33-2014-04-04

C70-C99 Chemical composition % - Heat analysis

B07.2 Heat	C70	C	SI	MN	P	S	N	CU	MO	NI	CR	V	NB	SN	TI
429474	Y	0,182	0,377	1,17	0,010	0,0009	0,0075	0,028	0,010	0,032	0,033	0,000	0,000	0,001	0,003
429477	Y	0,180	0,375	1,17	0,009	0,0011	0,0070	0,015	0,004	0,025	0,035	0,000	0,000	0,001	0,002
429479	Y	0,173	0,368	1,17	0,010	0,0008	0,0072	0,023	0,012	0,028	0,047	0,001	0,000	0,001	0,003
429480	Y	0,171	0,378	1,19	0,010	0,0006	0,0060	0,019	0,011	0,033	0,041	0,000	0,000	0,001	0,002
429483	Y	0,176	0,381	1,18	0,008	0,0008	0,0082	0,025	0,008	0,026	0,033	0,000	0,000	0,001	0,002
429485	Y	0,183	0,378	1,18	0,009	0,0007	0,0075	0,038	0,006	0,028	0,042	0,000	0,000	0,002	0,003
429601	Y	0,191	0,378	1,19	0,006	0,0008	0,0063	0,014	0,012	0,030	0,029	0,001	0,001	0,001	0,002
429693	Y	0,161	0,384	1,19	0,010	0,0010	0,0068	0,025	0,011	0,024	0,028	0,001	0,001	0,001	0,003
429696	Y	0,154	0,373	1,16	0,009	0,0008	0,0075	0,020	0,006	0,019	0,028	0,001	0,003	0,001	0,002

B07.2 Heat	C70	B	CA	AL-T
429474	Y	0,0003	0,0021	0,032
429477	Y	0,0003	0,0017	0,034
429479	Y	0,0003	0,0013	0,034
429480	Y	0,0002	0,0014	0,033
429483	Y	0,0001	0,0014	0,030
429485	Y	0,0003	0,0013	0,034
429601	Y	0,0002	0,0020	0,038
429693	Y	0,0002	0,0015	0,032
429696	Y	0,0001	0,0016	0,033

A04 D H Manufacturer's mark

Z01/Z02/Z03 We hereby certify, that the above mentioned materials have been delivered in accordance with the terms of order.

B. BALDAUF
Test House Manager

AHB Inspector's stamp

Date 23.02.16

A01 AG der Dillinger Hüttenwerke
Postfach 1580, D-66748 Dillingen/Saar
Inspection department

PP 1

QM-System: Certification as per ISO 9001

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A02 INSPECTION CERTIFICATE 3.1 AS PER EN 10204:2004
INSPECTION CERTIFICATE 3.1 AS PER ISO 10474:2013
MATERIAL TEST REPORT (MTR)

A10 Advice of dispatch No./ Date of dispatch: 626272-10.02.18

A08/ Manufacturer's order/ A03 Certificate No.: 431792-001

Sheet: 12/...

A05 Established Inspecting body: DH

A06 Purchaser: EDMONTON STEEL, EDMON — A07.1 No. ED10722-J1010ER

Final receiver: EDMONTON STEEL, EDMON — A07.2 No.

B01 Product: HEAVY PLATES

B02/ Steel design. SA516-70 SA20-S5

B03 Any suppl. requirements ASME-IIA:2015
DIL-HUE-1:R34-2016-08-19

C70-C99 Chemical composition % - Product analysis

B07.2 Heat	B07.1 Test No.	C01	C	SI	MN	P	S	N	CU	MO	NI	CR	V	NB	SN	TI
454461	64437	K1	0,167	0,366	1,16	0,011	0,0007	0,0076	0,025	0,006	0,050	0,029	0,001	0,002	0,001	0,002
454836	27699	K1	0,170	0,368	1,16	0,010	0,0007	0,0061	0,033	0,007	0,027	0,038	0,000	0,001	0,001	0,003
454836	27706	K1	0,177	0,369	1,16	0,010	0,0006	0,0059	0,033	0,007	0,027	0,038	0,001	0,001	0,001	0,003
454837	27740	K1	0,166	0,369	1,16	0,009	0,0005	0,0060	0,026	0,005	0,023	0,028	0,001	0,001	0,001	0,002
454837	27783	K1	0,179	0,373	1,17	0,008	0,0005	0,0060	0,024	0,004	0,022	0,024	0,001	0,001	0,001	0,001
454840	27789	K1	0,167	0,369	1,17	0,009	0,0004	0,0060	0,023	0,004	0,022	0,023	0,001	0,001	0,000	0,002
454840	27796	K1	0,164	0,371	1,17	0,009	0,0005	0,0064	0,023	0,004	0,022	0,023	0,001	0,001	0,000	0,002
454840	27809	K1	0,165	0,365	1,15	0,009	0,0005	0,0054	0,023	0,010	0,024	0,038	0,001	0,001	0,000	0,002
454843	27952	K1	0,145	0,358	1,14	0,009	0,0004	0,0053	0,023	0,014	0,025	0,045	0,001	0,000	0,000	0,002

B07.2 Heat	B07.1 Test No.	C01	B	CA	AL-T
454461	64437	K1	0,0001	0,0013	0,034
454836	27699	K1	0,0001	0,0018	0,031
454836	27706	K1	0,0001	0,0019	0,032
454837	27740	K1	0,0000	0,0015	0,030
454837	27783	K1	0,0000	0,0014	0,029
454840	27789	K1	0,0001	0,0011	0,031
454840	27796	K1	0,0000	0,0011	0,031
454840	27809	K1	0,0000	0,0012	0,035
454843	27952	K1	0,0000	0,0011	0,038

A04 D H Manufacturer's mark

Z01/Z02/Z03 We hereby certify, that the above mentioned materials have been delivered in accordance with the terms of order.

B. BALDAUF
Test House Manager

AHB Inspector's stamp

Date 12.02.18

AG der Dillinger Hüttenwerke
Postfach 1580, D-66748 Dillingen/Saar
Inspection department

A01

QM-System: Certification as per ISO 9001

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DILLINGER

A02 INSPECTION CERTIFICATE 3.1 AS PER EN 10204:2004
INSPECTION CERTIFICATE 3.1 AS PER ISO 10474:2013
MATERIAL TEST REPORT (MTR)

A10 Advice of dispatch No./ Date of dispatch: 626272-10.02.18

A08/ A03 Manufacturer's order/ Certificate No.: 431792-001 Sheet: 12/...

A05 Established Inspecting body: DH

A06 Purchaser: EDMONTON STEEL,EDMON A07.1 No. ED10722-J1010ER

Final receiver: EDMONTON STEEL,EDMON A07.2 No.

B01 Product: HEAVY PLATES

B02/ Steel design. SA516-60 SA20-S5

B03 Any suppl. requirements ASME-IIA:2015
DIL-HUE-1:R34-2016-08-19

C70-C99 Chemical composition % - Product analysis

B07.2 Heat	B07.1 Test No.	C01	C	SI	MN	P	S	N	CU	MO	NI	CR	V	NB	SN	TI
454461	64437	K1	0,167	0,366	1,16	0,011	0,0007	0,0076	0,025	0,006	0,050	0,029	0,001	0,002	0,001	0,002
454836	27699	K1	0,170	0,368	1,16	0,010	0,0007	0,0061	0,033	0,007	0,027	0,038	0,000	0,001	0,001	0,003
454836	27706	K1	0,177	0,369	1,16	0,010	0,0006	0,0059	0,033	0,007	0,027	0,038	0,001	0,001	0,001	0,003
454837	27740	K1	0,166	0,369	1,16	0,009	0,0005	0,0060	0,026	0,005	0,023	0,028	0,001	0,001	0,001	0,002
454837	27783	K1	0,179	0,373	1,17	0,008	0,0005	0,0060	0,024	0,004	0,022	0,024	0,001	0,001	0,001	0,001
454840	27789	K1	0,167	0,369	1,17	0,009	0,0004	0,0060	0,023	0,004	0,022	0,023	0,001	0,001	0,000	0,002
454840	27796	K1	0,164	0,371	1,17	0,009	0,0005	0,0064	0,023	0,004	0,022	0,023	0,001	0,001	0,000	0,002
454840	27809	K1	0,165	0,365	1,15	0,009	0,0005	0,0054	0,023	0,010	0,024	0,038	0,001	0,001	0,000	0,002
454843	27952	K1	0,145	0,358	1,14	0,009	0,0004	0,0053	0,023	0,014	0,025	0,045	0,001	0,000	0,000	0,002

B07.2 Heat	B07.1 Test No.	C01	B	CA	AL-T
454461	64437	K1	0,0001	0,0013	0,034
454836	27699	K1	0,0001	0,0018	0,031
454836	27706	K1	0,0001	0,0019	0,032
454837	27740	K1	0,0000	0,0015	0,030
454837	27783	K1	0,0000	0,0014	0,029
454840	27789	K1	0,0001	0,0011	0,031
454840	27796	K1	0,0000	0,0011	0,031
454840	27809	K1	0,0000	0,0012	0,035
454843	27952	K1	0,0000	0,0011	0,038

A04 D H Manufacturer's mark

Z01/Z02/Z03 We hereby certify, that the above mentioned materials have been delivered in accordance with the terms of order.

B. BALDAUF
Test House Manager

AHB Inspector's stamp

Date 12.02.18

A01 AG der Dillinger Hüttenwerke
Postfach 1580, D-66748 Dillingen/Saar
Inspection department

QM-System: Certification as per ISO 9001

DILLINGER

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A02 INSPECTION CERTIFICATE 3.1 AS PER EN 10204:2004
INSPECTION CERTIFICATE 3.1 AS PER ISO 10474:2013
MATERIAL TEST REPORT (MTR)

A10 Advice of dispatch No./ Date of dispatch: 645948-05.08.18

A08/ Manufacturer's order/ A03 Certificate No.: 436752-003

Sheet: 4/...

A05 Established Inspecting body: DH

A06 Purchaser: EDMONTON STEEL, EDMON — A07.1 No. ED10734-J1010ER

Final receiver: EDMONTON STEEL, EDMON — A07.2 No.

B01 Product: HEAVY PLATES

B02/ Steel design. SA516-60 SA20-S5

B03 Any suppl. requirements ASME-IIA:2017
DIL-HUE-1:R35-2018-02-12

C94 Heat analysis Carbon equivalent / Alloying restrictions

B07.2 Heat													
459852	FO-02=	0,37	FO-51=	0,000	FO-55=	0,08	FO-78=	0,03	FO-91=	7,1
460565	FO-02=	0,39	FO-51=	0,000	FO-55=	0,22	FO-78=	0,06	FO-91=	6,9
460566	FO-02=	0,38	FO-51=	0,001	FO-55=	0,13	FO-78=	0,04	FO-91=	6,8
460567	FO-02=	0,40	FO-51=	0,001	FO-55=	0,21	FO-78=	0,09	FO-91=	6,8

C95 Ladle treatment

ITEM NO.: 01-05
HEAT OF THE INDICATED ITEM: VACUUM DEGASSED / SULPHIDE SHAPE CONTROL

C95 Further information about ladle treatment

ITEM NO.: 01-05
CALCIUM TREATED

C70-C99 Chemical composition % - Product analysis

B07.2 Heat	B07.1 Test No.	C01	C	SI	MN	P	S	N	CU	MO	NI	CR	V	NB	SN	TI
459852	56930	K1	0,172	0,365	1,19	0,008	0,0008	0,0059	0,018	0,005	0,026	0,025	0,000	0,000	0,000	0,001
460565	34603	K1	0,169	0,366	1,15	0,004	0,0003	0,0058	0,019	0,040	0,153	0,019	0,000	0,000	0,000	0,001
460565	34606	K1	0,171	0,366	1,16	0,004	0,0004	0,0061	0,018	0,040	0,155	0,018	0,000	0,000	0,000	0,001
460565	34835	K1	0,173	0,365	1,16	0,003	0,0004	0,0061	0,018	0,041	0,159	0,018	0,000	0,000	0,000	0,001
460566	34468	K1	0,177	0,385	1,19	0,009	0,0002	0,0072	0,034	0,010	0,050	0,031	0,001	0,000	0,001	0,004
460567	35011	K1	0,173	0,381	1,18	0,008	0,0002	0,0063	0,054	0,022	0,049	0,066	0,001	0,000	0,003	0,002

A04 Manufacturer's mark: DH

Z01/Z02/Z03 We hereby certify, that the above mentioned materials have been delivered in accordance with the terms of order.

B. BALDAUF
Test House Manager

AHB
Inspector's stamp

Date 06.08.18

A01 AG der Dillinger Hüttenwerke
Postfach 1580, D-66748 Dillingen/Saar
Inspection department

PP 1

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A02 INSPECTION CERTIFICATE 3.1 AS PER EN 10204:2004
INSPECTION CERTIFICATE 3.1 AS PER ISO 10474:2013
MATERIAL TEST REPORT (MTR)

A10 Advice of dispatch No./ Date of dispatch: 645948-05.08.18

A08/ Manufacturer's order/ A03 Certificate No.: 436752-003

Sheet: 5/...

A05 Established Inspecting body: DH

A06 Purchaser: EDMONTON STEEL,EDMON — A07.1 No. ED10734-J1010ER

Final receiver: EDMONTON STEEL,EDMON — A07.2 No.

B01 Product: HEAVY PLATES

B02/ Steel design. SA516-60 SA20-S5

B03 Any suppl. requirements ASME-IIA:2017
DIL-HUE-1:R35-2018-02-12

C70-C99 Chemical composition % - Product analysis

B07.2 Heat	B07.1 Test No.	C01	B	CA	AL-T
459852	56930	K1	0,0001	0,0011	0,030
460565	34603	K1	0,0000	0,0010	0,036
460565	34606	K1	0,0000	0,0011	0,035
460565	34835	K1	0,0000	0,0011	0,034
460566	34468	K1	0,0002	0,0012	0,058
460567	35011	K1	0,0000	0,0016	0,041

C94 Product analysis Carbon equivalent / Alloying restrictions

B07.2 Heat	B07.1 Test No.	C01						
459852	56930	K1	FO-02=	0,38	FO-51=	0,000	FO-55=	0,07
460565	34603	K1	FO-02=	0,38	FO-51=	0,000	FO-55=	0,23
460565	34606	K1	FO-02=	0,39	FO-51=	0,000	FO-55=	0,23
460565	34835	K1	FO-02=	0,39	FO-51=	0,000	FO-55=	0,24
460566	34468	K1	FO-02=	0,39	FO-51=	0,001	FO-55=	0,13
460567	35011	K1	FO-02=	0,39	FO-51=	0,001	FO-55=	0,19

C94 Carbon equivalent formula / Alloying restrictions

FO-02 = C+(MN/6)+(CR+MO+V)/5+(NI+CU)/15
FO-51 = V +NB
FO-55 = CU+MO+NI+CR
FO-78 = CR+MO
FO-91 = MN/C

A04 D H Manufacturer's mark

Z01/Z02/Z03 We hereby certify, that the above mentioned materials have been delivered in accordance with the terms of order.

B. BALDAUF
Test House Manager

AHB Inspector's stamp

AG der Dillinger Hüttenwerke
Postfach 1580, D-66748 Dillingen/Saar
Inspection department

A01

Date 06.08.18 PP 1

QM-System: Certification as per ISO 9001

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DILLINGER

A02 INSPECTION CERTIFICATE 3.1 AS PER EN 10204:2004
INSPECTION CERTIFICATE 3.1 AS PER ISO 10474:2013
MATERIAL TEST REPORT (MTR)

A10 Advice of dispatch No./ Date of dispatch: 645948-05.08.18

A08/ Manufacturer's order/ A03 Certificate No.: 436752-003

Sheet: 4/...

A05 Established Inspecting body: DH

A06 Purchaser: EDMONTON STEEL, EDMON — A07.1 No. ED10734-J1010ER

Final receiver: EDMONTON STEEL, EDMON — A07.2 No.

B01 Product: HEAVY PLATES

B02/ Steel design. SA516-70 SA20-S5

B03 Any suppl. requirements ASME-IIA:2017
DIL-HUE-1:R35-2018-02-12

C94 Heat analysis Carbon equivalent / Alloying restrictions

B07.2 Heat										
459852	FO-02=	0,37	FO-51=	0,000	FO-55=	0,08	FO-78=	0,03	FO-91=	7,1
460565	FO-02=	0,39	FO-51=	0,000	FO-55=	0,22	FO-78=	0,06	FO-91=	6,9
460566	FO-02=	0,38	FO-51=	0,001	FO-55=	0,13	FO-78=	0,04	FO-91=	6,8
460567	FO-02=	0,40	FO-51=	0,001	FO-55=	0,21	FO-78=	0,09	FO-91=	6,8

C95 Ladle treatment

ITEM NO.: 01-05
HEAT OF THE INDICATED ITEM: VACUUM DEGASSED / SULPHIDE SHAPE CONTROL

C95 Further information about ladle treatment

ITEM NO.: 01-05
CALCIUM TREATED

C70-C99 Chemical composition % - Product analysis

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459852	56930	K1	0,172	0,365	1,19	0,008	0,0008	0,0059	0,018	0,005	0,026	0,025	0,000	0,000	0,000	0,001
460565	34603	K1	0,169	0,366	1,15	0,004	0,0003	0,0058	0,019	0,040	0,153	0,019	0,000	0,000	0,000	0,001
460565	34606	K1	0,171	0,366	1,16	0,004	0,0004	0,0061	0,018	0,040	0,155	0,018	0,000	0,000	0,000	0,001
460565	34835	K1	0,173	0,365	1,16	0,003	0,0004	0,0061	0,018	0,041	0,159	0,018	0,000	0,000	0,000	0,001
460566	34468	K1	0,177	0,385	1,19	0,009	0,0002	0,0072	0,034	0,010	0,050	0,031	0,001	0,000	0,001	0,004
460567	35011	K1	0,173	0,381	1,18	0,008	0,0002	0,0063	0,054	0,022	0,049	0,066	0,001	0,000	0,003	0,002

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B. BALDAUF
Test House Manager

AHB Inspector's stamp

Date 06.08.18

A01 AG der Dillinger Hüttenwerke
Postfach 1580, D-66748 Dillingen/Saar
Inspection department

QM-System: Certification as per ISO 9001

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DILLINGER

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INSPECTION CERTIFICATE 3.1 AS PER ISO 10474:2013
MATERIAL TEST REPORT (MTR)

A10 Advice of dispatch No./ Date of dispatch: 645948-05.08.18

A08/ Manufacturer's order/ A03 Certificate No.: 436752-003

Sheet: 5/...

A05 Established Inspecting body: DH

A06 Purchaser: EDMONTON STEEL, EDMON — A07.1 No. ED10734-J1010ER

Final receiver: EDMONTON STEEL, EDMON — A07.2 No.

B01 Product: HEAVY PLATES

B02/ Steel design. SA516-70 SA20-S5

B03 Any suppl. requirements ASME-IIA:2017
DIL-HUE-1:R35-2018-02-12

C70-C99 Chemical composition % - Product analysis

B07.2 Heat	B07.1 Test No.	C01	B	CA	AL-T
459852	56930	K1	0,0001	0,0011	0,030
460565	34603	K1	0,0000	0,0010	0,036
460565	34606	K1	0,0000	0,0011	0,035
460565	34835	K1	0,0000	0,0011	0,034
460566	34468	K1	0,0002	0,0012	0,058
460567	35011	K1	0,0000	0,0016	0,041

C94 Product analysis Carbon equivalent / Alloying restrictions

B07.2 Heat	B07.1 Test No.	C01						
459852	56930	K1	FO-02=	0,38	FO-51=	0,000	FO-55=	0,07
460565	34603	K1	FO-02=	0,38	FO-51=	0,000	FO-55=	0,23
460565	34606	K1	FO-02=	0,39	FO-51=	0,000	FO-55=	0,23
460565	34835	K1	FO-02=	0,39	FO-51=	0,000	FO-55=	0,24
460566	34468	K1	FO-02=	0,39	FO-51=	0,001	FO-55=	0,13
460567	35011	K1	FO-02=	0,39	FO-51=	0,001	FO-55=	0,19

C94 Carbon equivalent formula / Alloying restrictions

FO-02 = C+(MN/6)+(CR+MO+V)/5+(NI+CU)/15
FO-51 = V +NB
FO-55 = CU+MO+NI+CR
FO-78 = CR+MO
FO-91 = MN/C

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B. BALDAUF
Test House Manager

AHB Inspector's stamp

Date 06.08.18

A01 AG der Dillinger Hüttenwerke
Postfach 1580, D-66748 Dillingen/Saar
Inspection department

PP 1

WELDING PROCEDURE SPECIFICATION NO.: STS-4 (Rev. 0)

WELDING PROCEDURE QUALIFICATION RECORD NO.(S): STS-4-1 (Rev. 0), STS-4-2 (Rev. 0), WFL-4-1 (Rev.1)

QUALIFIED IN ACCORDANCE WITH ASME SECTION IX FOR

Base Metal (Typical): P1 Groups 1 & 2 to P1 Groups 1 & 2 (SA 333 Gr. 6, SA 350 Gr. LF2, SA 420 Gr. WPL6, SA 516 Gr. 70 etc.)

Process(es): SMAW **Weld Types:** GROOVE & FILLET

Position: ALL POSITIONS **Diameter:** ALL DIAMETERS

Filler Metal: E6010, E7018-1

BASE METAL CONDITIONS & GROOVE THICKNESS RANGE QUALIFIED:

NOTCH TOUGHNESS APPLICATIONS TO -50 °F AS WELDED

BASE METAL THICKNESS RANGE 0.116 to 1.750 in. inclusive

COMBINED DEPOSITED WELD METAL THICKNESS

ASME IX 1.750 in. maximum

API 650, 620, 12D, 12F 1.750 in. maximum

PROVINCIAL REGISTRATION

This WPS was prepared to the requirements of ASME Section IX 2017 and includes some of the additional requirements of the construction codes listed. The application of this WPS is outside the work scope of SGS Canada Inc.

Prepared By: Sara Van Roestel

Signed: Sara Van Roestel

Date: April 8, 2019

Reviewed By: Keelan Wolfe, C.E.T.

Signed: Keelan Wolfe

Date: April 8, 2019

(File E19-00104)

QW-482 WELDING PROCEDURE SPECIFICATION (WPS)

Organization Name: Storage Tank Solutions Inc.
Welding Procedure Specification No.: STS-4 (Rev. 0) Date: April 8, 2019
Revision(s): Rev. 0: Essential - Addition of PQR No.'s STS-4-1 (Rev.0) and STS-4-2 (Rev.0). Updated to current code requirements. WPS No. formerly WFL-4 (Rev.1).
Supporting PQR No.(s): STS-4-1 (Rev. 0), STS-4-2 (Rev. 0), WFL-4-1 (Rev.1)
Welding Process(es): Shielded Metal Arc Welding (SMAW)

JOINTS (QW-402)

Joint Design: All ASME groove & fillet, reference construction drawing for joint details. Where joint details are not specified, refer to figures 1 to 15 attached
Root Opening: As per attached typical groove designs, see figures 1 to 15 attached
Backing: With or without Retainers: With or without

BASE METALS (QW-403)

P-Number: P1 Groups 1 & 2 To P-Number: P1 Groups 1 & 2
Thickness Range: Groove: 0.116 to 1.750 in. inclusive
Fillet: 0.116 to 8.00 in. inclusive
Pipe Diameter Ranges: Groove: All diameters
Fillet: All diameters
Deposited Weld Metal (Per Pass): E6010: 0.188 in. maximum
E7018-1: 0.188 in. maximum

FILLER METALS (QW-404)

	SMAW	SMAW
Specification No. (SFA)	SFA 5.1	SFA 5.1
AWS No. (Class)	E6010	E7018-1
F-No.	F3	F4
A-No.	A1	A1
Diameter	3/32 to 3/16 in. inclusive	3/32 to 1/4 in. inclusive
Deposited Weld Metal Thickness Range:		
Groove	0.188 in. max. (1)	1.750 in. max. (1)
Fillet	All fillet sizes (2)	All fillet sizes

(1) Combined deposited weld metal thickness shall not exceed 1.750 in.
(2) E6010 is restricted to a single pass for fillet weld applications requiring an MDMT less than -20 °F.

POSITION (QW-405)

Position of Groove: All positions Position of Fillet: All positions
Weld Progression: E6010: Vertical down E7018-1: Vertical down

PREHEAT (QW-406)

Preheat Temperature (Minimum): See attached preheat sheet prior to welding.
Interpass Temperature (Maximum): 500 °F
Preheat Maintenance: See attached preheat sheet prior to welding. Preheat maintenance is not required if welding is interrupted or after the completion of welding unless required by the code of construction.

WPS NO. STS-4 (Rev. 0)

POSTWELD HEAT TREATMENT (QW-407)

With or Without: Without

Temperature Range: N/A Time Range: N/A

ELECTRICAL CHARACTERISTICS (QW-409)

Current: Direct Polarity: Reverse, electrode positive

Amps: See Table 1 Volts: See Table 1

Maximum Heat Input

Base Metal Thickness Range	E6010 Electrode	E7018-1 Electrode
0.125 - 0.624 in.	29,302 J/in.	36,800 J/in.
0.625 in. and greater	30,191 J/in.	36,800 J/in.

TECHNIQUE (QW-410)

Manual or Automatic: Manual

String or Weave: E6010: String E7018-1: String or weave

Initial & Interpass Cleaning: Brushing, chipping or grinding as required

Method of Back Gouging: Air carbon arc, back-grind as required

Multiple or Single Pass Per Side: Multiple

Peening: Not permitted

Use of Thermal Process: N/A

Travel Speed: See Table 1

TABLE 1 - WELDING PARAMETERS

Process	Filler Metal	Diameter in.	Current Type & Polarity	Amperage Range	Voltage Range	Travel Speed i.p.m.
SMAW	E6010	3/32	DCRP	50 - 100	18 - 32	1.8 - 18
SMAW	E6010	1/8	DCRP	60 - 140	19 - 32	2.3 - 20
SMAW	E6010	5/32	DCRP	115 - 250	21 - 32	4.8 - 20
SMAW	E6010	3/16	DCRP	120 - 300	21 - 32	5.1 - 20
SMAW	E7018-1	3/32	DCRP	60 - 110	18 - 26	1.8 - 20
SMAW	E7018-1	1/8	DCRP	90 - 170	19 - 28	2.8 - 20
SMAW	E7018-1	5/32	DCRP	110 - 220	20 - 30	3.6 - 22
SMAW	E7018-1	3/16	DCRP	160 - 320	20 - 30	5.3 - 25
SMAW	E7018-1	7/32	DCRP	240 - 340	20 - 32	7.9 - 25
SMAW	E7018-1	1/4	DCRP	275 - 360	21 - 32	9.5 - 25

Note: Welding parameters shall be adjusted to ensure that the maximum heat input value specified in QW-409 above is not exceeded.
Heat Input (joules per inch) = (Amperage X Voltage X 60) / Travel Speed (i.p.m.)

WPS NO. STS-4 (Rev. 0)

TYPICAL JOINT DESIGNS

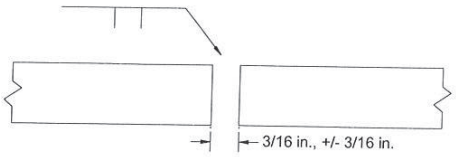


Figure 1
Single Square Butt

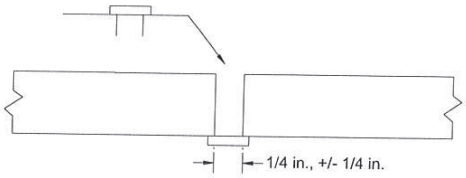


Figure 2
Single Square Butt with Backing Strip

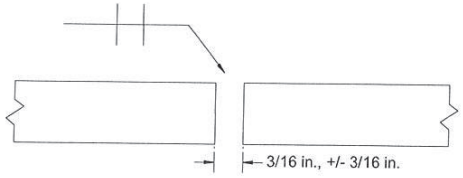


Figure 3
Double Square Butt

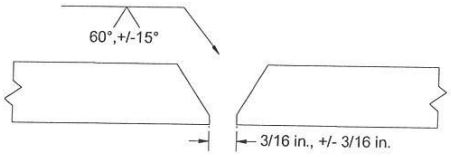


Figure 4
Single Vee Butt

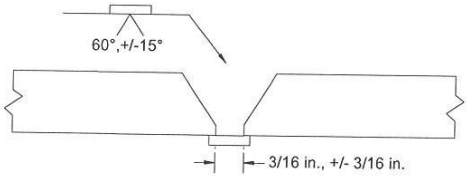


Figure 5
Single Vee Butt with Backing Strip

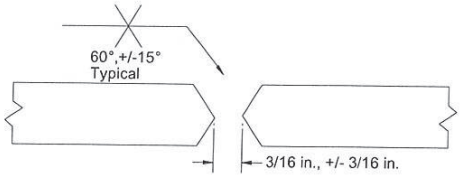


Figure 6
Double Vee Butt

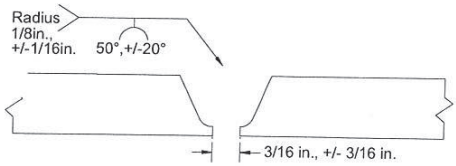


Figure 7
Single U Butt

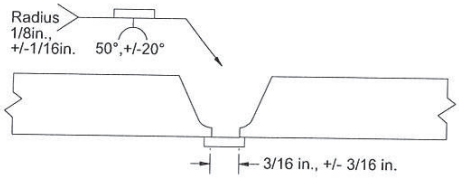


Figure 8
Single U Butt with Backing Strip

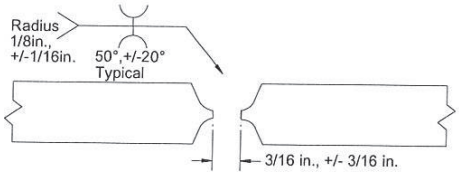


Figure 9
Double U Butt

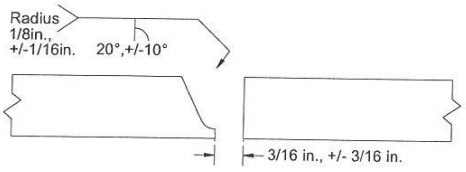


Figure 10
Single J Butt

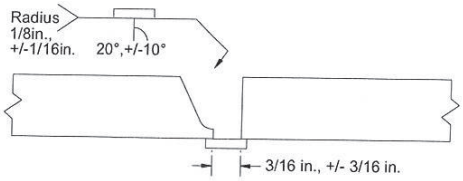


Figure 11
Single J Butt with Backing Strip

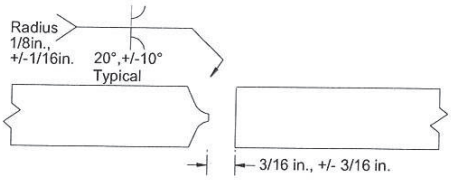


Figure 12
Double J Butt

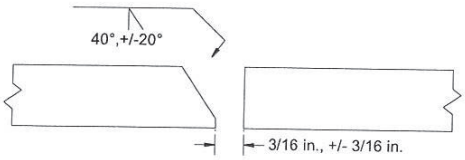


Figure 13
Single Bevel Butt

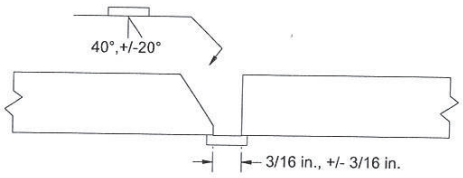


Figure 14
Single Bevel Butt with Backing Strip

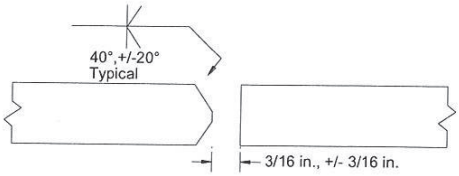


Figure 15
Double Bevel Butt

Additional joint designs and internal misalignment on circumferential welds shall be within the dimensional limits stated on the approved construction drawing and/or the engineering design.

PREHEAT

P-No. 1

LARGE, WELDED, LOW-PRESSURE STORAGE TANKS IN ACCORDANCE WITH API 620 Twelfth Edition

THICKNESS OF THE THICKER PLATE	MINIMUM PREHEAT TEMPERATURE	
	P1 Group 1	P1 Group 2
0 to 1.25 in.	32 °F	50 °F
Greater than 1.25 in to 1.50 in.	200 °F	200 °F
Greater than 1.50 in.	200 °F	200 °F

- No welding of any kind shall be performed when the surfaces to be welded are wet with rain snow or ice; when rain or snow is falling on such surfaces; or during periods of high winds unless the welder and the work are properly shielded.
- Preheat shall be applied when the metal temperature is below the temperature required by Table 6-2 (summarized above). In that case the base metal shall be heated to at least the temperature indicated within 3 in. of the place where welding is to be started and maintained 3 in. ahead of the arc. Material P-Number and Group Number shall be as designated in ASME IX or in API 630 6.7.2 for materials not listed in ASME IX.

WELDED TANKS FOR OIL STORAGE IN ACCORDANCE WITH API 650 Twelfth Edition

THICKNESS OF THE THICKER PLATE	MINIMUM PREHEAT TEMPERATURE	
	Material Group I, II, III, and IIIA	Material Group IV, IVA, V & VI
0 to 1.25 in.	32 °F	50 °F
Greater than 1.25 in to 1.50 in.	200 °F	200 °F
Greater than 1.50 in.	200 °F	200 °F

- No welding of any kind shall be performed when the surfaces to be welded are wet with rain snow or ice; when rain or snow is falling on such surfaces; or during periods of high winds unless the welder and the work are properly shielded.
- Preheat shall be applied when metal temperature is below the temperature required by table 7-1 (summarized above) for the base metals being joined, and metal shall be heated to at least the temperature indicated within 3 in. of the place where welding is to be started and maintained 3 in. ahead of the arc. Material Groups shall be as designated in Table 4.4

WELDED STORAGE TANKS IN ACCORDANCE WITH API 12D Eleventh Edition and API 12F Twelfth Edition

THICKNESS OF THE THICKER PLATE	MINIMUM PREHEAT TEMPERATURE
0 to 1.25 in.	50 °F
Greater than 1.25 in to 1.50 in.	200 °F
Greater than 1.50 in.	200 °F

- No welding of any kind shall be performed when the surfaces to be welded are wet with rain snow or ice; when rain or snow is falling on such surfaces; or during periods of high winds unless the welder and the work are properly shielded.
- Preheat shall be applied when the metal temperature is below the temperature required by the table above. In that case the base metal shall be heated to at least the temperature indicated within 3 in. of the place where welding is to be started and maintained 3 in. ahead of the arc.

QW-483 PROCEDURE QUALIFICATION RECORD (PQR)

Organization Name: Storage Tank Solutions Inc.
Procedure Qualification Record No.: STS-4-1 (Rev. 0) Date: February 21, 2019
Welding Process(es): Shielded Metal Arc Welding (SMAW)

JOINTS (QW-402)

Joint Design: Butt joint, single vee groove, see next page
Root Opening: See next page
Backing: Without Retainers: Without

BASE METALS (QW-403)

Material Specification No.: SA 333 to SA 350 Type or Grade: Gr. 6 to Gr. LF2
Heat Treat Condition (1): SA 333 Gr. 6: Quenched/Tempered SA 350 Gr. LF2: Normalized
P-No.: P1 Group 1 To P-No.: P1 Group 2 Thickness: 0.232 in.
Heat Number: 44391 to A50A8 Carbon Equivalent (2): 0.21 to 0.40
Diameter: 6.625 in. O.D.
Other: Schedule 40 pipe machined to 0.232 in. wall thickness
Deposited Weld Metal (Per Pass): Did not exceed 0.094 in. for E6010, and 0.125 in. for E7018-1

(1) Condition of base metal prior to welding.
(2) Per CSA Z662 Carbon Equivalent formula. See chemical composition of heat / ladle analysis on attached material test reports.

FILLER METALS (QW-404)

	SMAW	SMAW
Specification No. (SFA)	SFA 5.1	SFA 5.1
AWS No. (Class)	E6010 (3)	E7018-1 (4)
F-No.	F3	F4
A-No.	A1	A1
Diameter	See attached sketch	
Deposited Weld Metal Thickness	0.094 in.	0.138 in.

(3) The Lincoln Electric Company: Fleetweld 5P+
(4) ESAB: OK 55.00

POSITION (QW-405)

Position of Groove: 5G
Weld Progression: E6010: Vertical down E7018-1: Vertical down

PREHEAT (QW-406)

Preheat Temperature: 50 °F Interpass Temp. (Max.): 400 °F
Preheat Maintenance: Weld was allowed to cool to ambient temperature in still air after welding was completed.

POSTWELD HEAT TREATMENT (QW-407)

With or Without: Without
Temperature: N/A Time: N/A

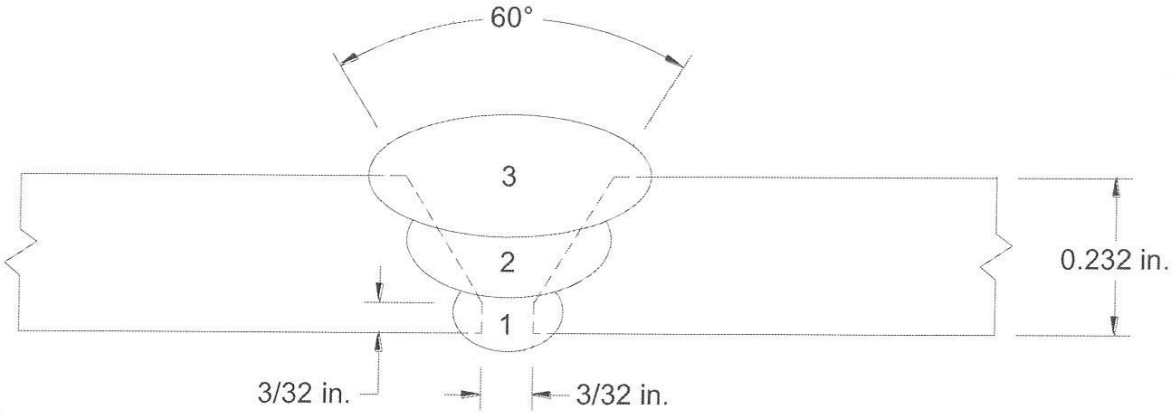
PQR NO. STS-4-1 (Rev. 0)

ELECTRICAL CHARACTERISTICS (QW-409)

Current	Direct	Polarity	Reverse, electrode positive
Amps	See below	Volts	See below
Heat Input	E6010: 29,302 J/in. maximum		E7018-1: 36,800 J/in. maximum

TECHNIQUE (QW-410)

Manual or Automatic	Manual	
String or Weave	E6010: String	E7018-1: Weave
Initial & Interpass Cleaning	Brushing, chipping and grinding as required	
Method of Back Gouging	Not conducted	
Multiple or Single Pass Per Side	E6010: Single	E7018-1: Multiple
Peening	Not conducted	
Use of Thermal Process	N/A	
Travel Speed	See below	



Pass	Process	Filler Metal	Diameter in.	Current Type & Polarity	Amperage Range	Voltage Range	Travel Speed i.p.m.
1	SMAW	E6010	1/8	DCEP	74 - 94	24 - 26	4.3
2	SMAW	E7018-1	3/32	DCEP	88 - 92	23 - 25	5.7
3	SMAW	E7018-1	3/32	DCEP	90 - 94	23 - 25	3.6

PQR NO. STS-4-1 (Rev. 0)

CHARPY V-NOTCH IMPACT TEST

Type of Test Charpy V-Notch Orientation Transverse

Governing Specification	Notch Location	Specimen Size in.	Test Temperature ° F	Specimen Number	Impact Values ft•lbf
ASME B31.3 - 2016	Weld metal within 1/16 in. of root	0.394 x 0.197	-50	J2.1	28
				J2.2	19
				J2.3	35
ASME B31.3 - 2016	Gr. 6 - HAZ	0.394 x 0.197	-50	J3.1	50
				J3.2	9
				J3.3	39
ASME B31.3 - 2016	Gr. LF2 - HAZ	0.394 x 0.197	-50	J4.1	21
				J4.2	85
				J4.3	98

OTHER TESTS

Vickers Hardness - see attached Laboratory Test Report No.: E19-104.10

Welder's Name Aaron Smedsrud Certificate File No. W-28887
Welder's Name Christopher Jaques Certificate File No. N/A
Tests Conducted By SGS Canada Inc.
Laboratory Test No. E19-104.10

We certify the statements in this record are correct and that the test welds were prepared, welded and tested in accordance with the requirements of Section IX of the ASME Code.

Organization Storage Tank Solutions Inc.

Date January 21, 2021 Print Sebastien Ouellet

Signed S. Ouellet

QW-483 PROCEDURE QUALIFICATION RECORD (PQR)

Organization Name: Storage Tank Solutions Inc.
Procedure Qualification Record No.: STS-4-2 (Rev.0) Date: February 21, 2019
Welding Process(es): Shielded Metal Arc Welding (SMAW)

JOINTS (QW-402)

Joint Design: Butt joint, single vee groove, see next page
Root Opening: See next page
Backing: Without Retainers: Without

BASE METALS (QW-403)

Material Specification No.: SA 516 Type or Grade: Gr. 60/70
Heat Treat Condition (1): SA 516 Gr. 60/70: Normalized
P-No.: P1 Groups 1/2 To P-No.: P1 Groups 1/2 Thickness: 0.875 in.
Heat Number: 449291 55060-03 Carbon Equivalent (2): 0.37
Diameter: N/A Other: Plate product form
Deposited Weld Metal (Per Pass): Did not exceed 0.094 in. for E6010, and 0.125 in. for E7018-1

(1) Condition of base metal prior to welding.
(2) Per CSA Z662 Carbon Equivalent formula. See chemical composition of heat analysis on attached material test report

FILLER METALS (QW-404)

	SMAW	SMAW
Specification No. (SFA)	SFA 5.1	SFA 5.1
AWS No. (Class)	E6010 (3)	E7018-1 (4)
F-No.	F3	F4
A-No.	A1	A1
Diameter	See attached sketch	
Deposited Weld Metal Thickness	0.094 in.	0.781 in.

(3) The Lincoln Electric Company: Fleetweld 5P+
(4) ESAB: OK 55.00

POSITION (QW-405)

Position of Groove: 3G
Weld Progression: E6010: Vertical down E7018-1: Vertical down

PREHEAT (QW-406)

Preheat Temperature: 50 °F Interpass Temp. (Max.): 500 °F
Preheat Maintenance: Weld was allowed to cool to ambient temperature in still air after welding was completed.

POSTWELD HEAT TREATMENT (QW-407)

With or Without: Without
Temperature: N/A Time: N/A

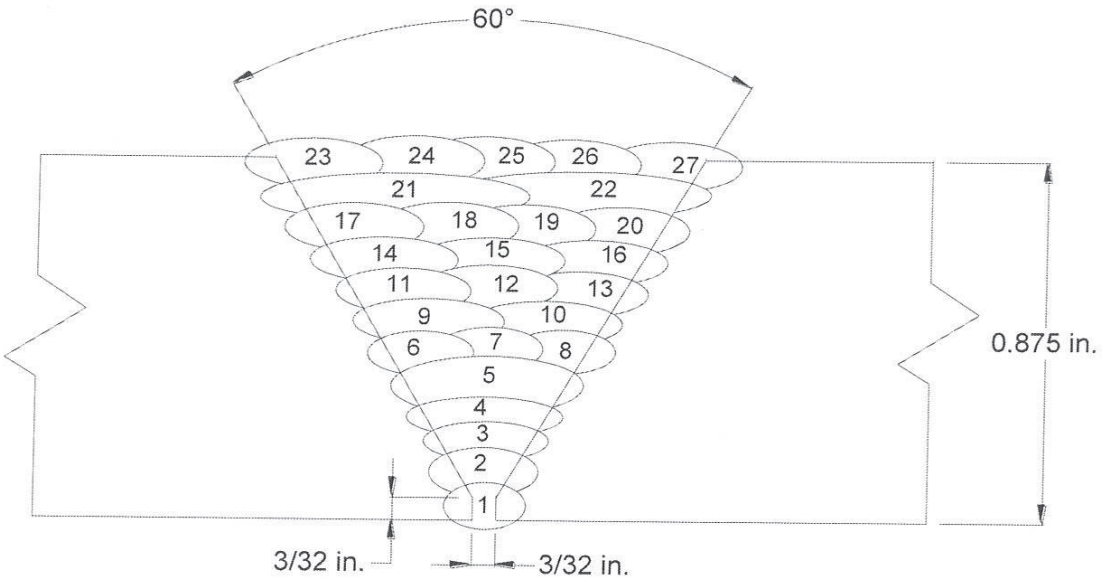
PQR NO. STS-4-2 (Rev.0)

ELECTRICAL CHARACTERISTICS (QW-409)

Current	Direct	Polarity	Reverse, electrode positive
Amps	See next page	Volts	See next page
Heat Input	E6010: 30,191 J/in. maximum		E7018-1: 31,543 J/in. maximum

TECHNIQUE (QW-410)

Manual or Automatic	Manual	
String or Weave	E6010: String	E7018-1: Weave
Initial & Interpass Cleaning	Brushing, chipping and grinding as required	
Method of Back Gouging	Not conducted	
Multiple or Single Pass Per Side	E6010: Single	E7018-1: Multiple
Peening	Not conducted	
Use of Thermal Process	N/A	
Travel Speed	See next page	



PQR NO. STS-4-2 (Rev.0)

Pass	Process	Filler Metal	Diameter in.	Current Type & Polarity	Amperage Range	Voltage Range	Travel Speed i.p.m.
1	SMAW	E6010	1/8	DCEP	80 - 84	26 - 28	4.4
2	SMAW	E7018-1	3/32	DCEP	82 - 86	21 - 23	6.7
3	SMAW	E7018-1	3/32	DCEP	84 - 88	21 - 23	6.4
4	SMAW	E7018-1	1/8	DCEP	158 - 162	22 - 24	7.3
5	SMAW	E7018-1	1/8	DCEP	158 - 162	22 - 24	7.0
6	SMAW	E7018-1	1/8	DCEP	158 - 162	22 - 24	9.5
7	SMAW	E7018-1	1/8	DCEP	158 - 162	22 - 24	8.8
8	SMAW	E7018-1	1/8	DCEP	158 - 168	22 - 24	13.3
9	SMAW	E7018-1	1/8	DCEP	158 - 168	22 - 24	16.0
10	SMAW	E7018-1	1/8	DCEP	158 - 168	22 - 24	15.7
11	SMAW	E7018-1	1/8	DCEP	158 - 162	21 - 23	13.3
12	SMAW	E7018-1	1/8	DCEP	158 - 162	21 - 23	14.1
13	SMAW	E7018-1	1/8	DCEP	158 - 162	21 - 23	13.3
14	SMAW	E7018-1	1/8	DCEP	158 - 162	21 - 23	9.2
15	SMAW	E7018-1	1/8	DCEP	158 - 162	21 - 23	12.6
16	SMAW	E7018-1	1/8	DCEP	158 - 162	21 - 23	14.4
17	SMAW	E7018-1	1/8	DCEP	158 - 162	21 - 23	12.6
18	SMAW	E7018-1	1/8	DCEP	158 - 162	21 - 23	11.8
19	SMAW	E7018-1	1/8	DCEP	158 - 162	21 - 23	11.1
20	SMAW	E7018-1	1/8	DCEP	158 - 162	21 - 23	13.6
21	SMAW	E7018-1	1/8	DCEP	158 - 162	21 - 23	12.9
22	SMAW	E7018-1	1/8	DCEP	158 - 162	21 - 23	10.0
23	SMAW	E7018-1	1/8	DCEP	158 - 162	21 - 23	13.1
24	SMAW	E7018-1	1/8	DCEP	158 - 162	21 - 23	12.9
25	SMAW	E7018-1	1/8	DCEP	158 - 162	21 - 23	11.3
26	SMAW	E7018-1	1/8	DCEP	158 - 162	21 - 23	12.6
27	SMAW	E7018-1	1/8	DCEP	158 - 162	21 - 23	14.1

PQR NO. STS-4-2 (Rev.0)

TENSILE TEST (QW-150)

Sample No.	Width in.	Thickness in.	Area sq. in.	Ultimate Load lbf	Ultimate Stress psi	Fracture Type & Location
T1	0.752	0.850	0.639	50,600	79,200	Partial Cup & Cone Parent Metal
T2	0.752	0.870	0.654	51,780	79,200	Partial Cup & Cone Parent Metal

GUIDED BEND TEST (QW-160)

Type & Figure No.	Result	Type & Figure No.	Result
QW-462.2, TSB - S1	Pass	QW-462.2, TSB - S3	Pass
QW-462.2, TSB - S2	Pass	QW-462.2, TSB - S4	Pass

CHARPY V-NOTCH IMPACT TEST

Type of Test Charpy V-Notch Orientation Transverse

Governing Specification	Notch Location	Specimen Size in.	Test Temperature ° F	Specimen Number	Impact Values ft•lbf
ASME B31.3 - 2016	Weld metal within 1/16 in. of root	0.394 x 0.394	-50	K2.1	56
				K2.2	55
				K2.3	18
ASME B31.3 - 2016	HAZ	0.394 x 0.394	-50	K3.1	149
				K3.2	81
				K3.3	61

OTHER TESTS

Vickers Hardness - see attached Laboratory Test Report No.: E19-104.10

Welder's Name Aaron Smedsrud Certificate File No. W-28887
Welder's Name Christopher Jaques Certificate File No. N/A
Tests Conducted By SGS Canada Inc.
Laboratory Test No. E19-104.10

We certify the statements in this record are correct and that the test welds were prepared, welded and tested in accordance with the requirements of Section IX of the ASME Code.

Organization Storage Tank Solutions Inc.

Date January 21, 2021 Print Sebastien Ouellet

Signed S Ouellet

QW-483 PROCEDURE QUALIFICATION RECORD (PQR)

Company Name Storage Tank Solutions Inc.
Procedure Qualification Record No. WFL-4-1 (Rev.1) Date May 2, 2007
Revision(s) Rev.1 - Essential. Addition of deposited weld metal per pass, update to manufacturer's certifying statement, and corporate name change, formerly Woodside Fabricators Ltd. September 7, 2018.
Welding Process(es) SMAW Type(s) Manual

JOINTS (QW-402)

Type Butt joint, single vee groove, see next page

BASE METALS (QW-403)

Material Spec. SA 516 to SA 516 Type or Grade Gr. 60 to Gr.70
P-No. P1 Grp.1 To P-No. P1 Grp.2 Thickness 6.32 mm (0.249 in.)
Diameter N/A Other Plate Product Form m/c to 0.249 in.
Deposited Weld Metal (Per Pass) Did not exceed 0.50 in.

FILLER METALS (QW-404)

Specification No. (SFA)	SFA 5.1	SFA 5.1
AWS No. (Class)	E6010	E7018-1
Filler Metal F-No.	F3	F4
Filler Metal A-No.	A1	A1
Size of Electrode	See attached sketch	
Deposited Weld Metal Thickness	2.39 mm (0.094 in.)	3.94 mm (0.155 in.)

POSITION (QW-405)

Position of Groove 3G
Weld Progression Vertical down

PREHEAT (QW-406)

Preheat Temperature 10°C (50°F) Interpass Temp. (Max.) 232°C (450°F)

POSTWELD HEAT TREATMENT (QW-407)

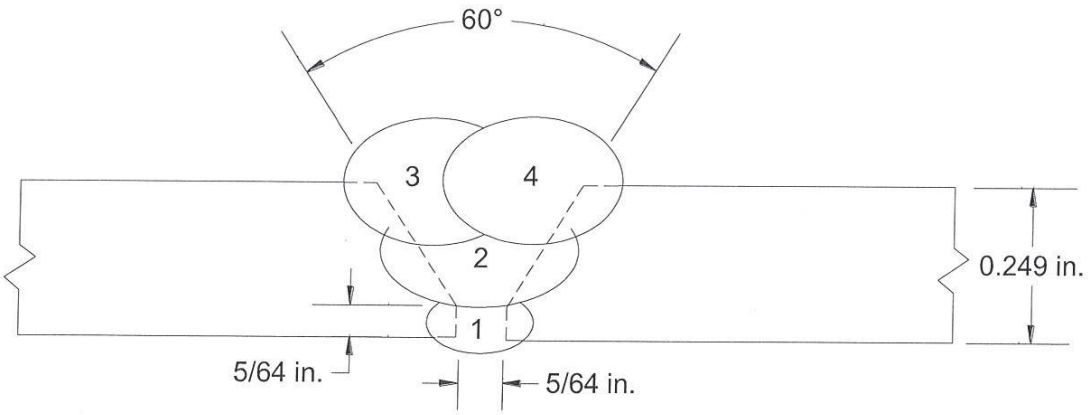
Temperature N/A Time N/A

ELECTRICAL CHARACTERISTICS (QW-409)

Current Direct Polarity Reverse, electrode positive
Amps See next page Volts See next page
Heat Input F3: 20,330 J/in. maximum F4: 20,070 J/in. maximum

TECHNIQUE (QW-410)

String or Weave Root: String Remainder: Weave
Travel Speed See next page
Multiple or Single Pass Per Side F3: Single F4: Multiple



Pass	Process	Filler Metal	Diameter mm (in.)	Current & Polarity	Amperage Range	Voltage Range	Travel Speed mm/min (i.p.m.)
1	SMAW	E6010	3.2 (1/8)	DCRP	85 - 87	24 - 25	158 (6.2)
2	SMAW	E7018-1	3.2 (1/8)	DCRP	140 - 145	21 - 22	233 (9.2)
3	SMAW	E7018-1	3.2 (1/8)	DCRP	140 - 145	21 - 22	282 (11.1)
4	SMAW	E7018-1	3.2 (1/8)	DCRP	140 - 145	21 - 22	275 (10.8)

PQR NO. WFL-4-1 (Rev.1)

TENSILE TEST (QW-150)

Specimen No.	Width mm (in.)	Thickness mm (in.)	Area Sq. mm (Sq. in.)	Ultimate Load N (lbs.)	Ultimate Stress MPa (psi)	Character & Fracture Location
T1	19.0	4.74	49.5	46 874	524	Partial Cup & Cone
	(0.748)	(0.185)	(0.139)	(10,500)	(76,000)	Parent Metal (SA 516 Gr.70)
T2	19.0	4.88	92.7	47 904	517	Partial Cup & Cone
	(0.748)	(0.192)	(0.144)	(10,800)	(74,900)	Weld Metal

GUIDED BEND TEST (QW-160)

Type & Figure No.	Result	Type & Figure No.	Result
QW-462.3a, TRB - R1	Pass	QW-462.3a, TFB - F1	Pass
QW-462.3a, TRB - R2	Pass	QW-462.3a, TFB - F2	Pass

CHARPY IMPACT TOUGHNESS

Type of Test Charpy V Notch Orientation Transverse
Test Temperature -48° C (-55° F) Specimen Size 10 X 5 mm

Specimen No.	Notch Location	Impact Values J (ft. lbs)
W2.1	Weld Metal	10.8 (8.0)
W2.2	Weld Metal	25.2 (18.6)
W2.3	Weld Metal	30.1 (22.2)
W3.1	P1 Grp.1 - HAZ	15.7 (11.6)
W3.2	P1 Grp.1 - HAZ	77.6 (57.2)
W3.3	P1 Grp.1 - HAZ	93.8 (69.2)
W4.1	P1 Grp.2 - HAZ	55.6 (41.0)
W4.2	P1 Grp.2 - HAZ	64.0 (47.2)
W4.3	P1 Grp.2 - HAZ	38.0 (28.0)

OTHER TESTS

Vickers Hardness - see attached laboratory test report

Welders Name Kyle Maser Certificate File No. N/A
Tests Conducted By Ludwig & Associates Ltd.
Laboratory Test No. E07-393.12

We hereby recertify that the statements in this record have been revised in accordance with Paragraph QW-200.2 and that the test welds were prepared, welded and tested in accordance with the requirements of Section IX of the ASME Code.

Manufacturer Storage Tank Solutions Inc.

Date January 21, 2021 Signed

CHARPY V-NOTCH IMPACT TEST

Customer: **Storage Tank Solutions Inc.**
9 Well Head Street
Devon, Alberta
T9G 1Z6

Laboratory Test No.: E19-104.10
Date: March 15, 2019

Attention: Sebastien Ouellet

PQR No.:	STS-4-1 (Rev.0)	**Material Heat No.:**	44391 to A50A8
Material:	SA 333 Gr. 6 to SA 350 Gr. LF2		
Material Size:	168 mm (6.625 in.) O.D. x 5.89 mm (0.232 in.) w.t.		
Thermal Condition:	As Welded		

Specimen Size:	*10 x 5 mm (0.394 x 0.197 in.)*	*Machine:*	*Satec SI-1K3, S/N: 1503*
Orientation:	*Transverse*	*Capacity:*	*407 J (300 ft·lbf)*
Test Temperature:	*-46 °C (-50 °F)*	*Verified Range:*	*3.4-325J (2.5-240 ft·lbf)*
Governing Spec.:	*ASME B31.3-2016*	*Calibration Date:*	*March 19, 2018*

Specimen Number	Notch Location	Impact Values Joules	(ft·lbf)
J2.1	Weld Metal within 1.5mm (1/16") of root	38	(28)
J2.2		26	(19)
J2.3		47	(35)
J3.1	SA 333 Gr. 6 - HAZ	68	(50)
J3.2		12	(9)
J3.3		53	(39)
J4.1	SA 350 Gr. LF2 - HAZ	28	(21)
J4.2		115	(85)
J4.3		133	(98)

Note: Metric values calculated by direct conversion.

Test Conducted By: Tong Zhao (Edmonton)

Certified By: _____
Eric Dacyk, C.E.T.

ANAB ACCREDITED ISO/IEC 17025 TESTING LABORATORY Certification # L2057.01-1

SGS Canada Inc. | 4027 - 14 Street S.E. Calgary, AB T2G 3K6 t +1 (403) 262-7072 f +1 (403) 266-3169
7925 Davies Road Edmonton, AB T6E 4N1 t +1 (780) 468-3030 f +1 (780) 468-3032 www.sgs.com

HARDNESS TEST

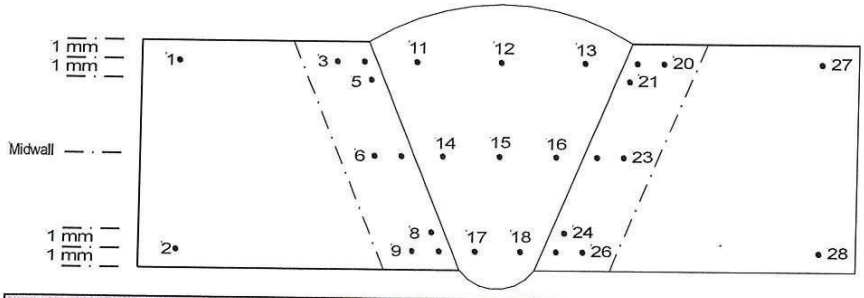
Customer: **Storage Tank Solutions Inc.**
9 Well Head Street
Devon, Alberta
T9G 1Z6

Laboratory Test No.: E19-104.10
Date: March 15, 2019

Attention: Sebastien Ouellet

PQR No.: STS-4-1 (Rev.0)
Material: SA 333 Gr. 6 to SA 350 Gr. LF2
Material Size: 168 mm (6.625 in.) O.D. x 5.89 mm (0.232 in.) w.t.
Thermal Condition: As Welded
Material Heat No.: 44391 to A50A8

Type of Test: *Vickers 10 kg (HV10)*
Governing Spec.: *ASTM E92 - 17 & ANSI/NACE MR0175/ISO 15156:2015*
Instrument: *LECO S/N: 1594*
Calibration Date: *July 27, 2018*



SA 350 Gr. LF2				Weld Metal		SA 333 Gr. 6			
Parent Metal		HAZ				HAZ		Parent Metal	
1	148	3	185	11	194	19	189	27	175
2	156	4	196	12	193	20	157	28	170
		5	190	13	186	21	194		
		6	169	14	182	22	194		
		7	180	15	186	23	185		
		8	182	16	185	24	161		
		9	171	17	163	25	160		
		10	181	18	162	26	170		

Test Conducted By: Tong Zhao (Edmonton)

Certified By: _____
Eric Dacyk, C.E.T.

ANAB ACCREDITED
ISO/IEC 17025
TESTING LABORATORY
Certification # L2057.01-1

SGS Canada Inc. | 4027 - 14 Street S.E. Calgary, AB T2G 3K6 t +1 (403) 262-7072 f +1 (403) 266-3169
7925 Davies Road Edmonton, AB T6E 4N1 t +1 (780) 468-3030 f +1 (780) 468-3032 www.sgs.com

TENSILE / BEND TEST

Customer: **Storage Tank Solutions Inc.**
9 Well Head Street
Devon, Alberta
T9G 1Z6

Laboratory Test No.: E19-104.11
Date: March 18, 2019

Attention: Sebastien Ouellet

PQR No.:	STS-4-2 (Rev.0)	**Material Heat No.:**	454840 27789-02
Material:	SA 516 Gr. 60/70		
Material Thickness:	22.2 mm (0.875 in.)		
Thermal Condition:	As Welded		

Governing Spec.: ASME Section IX - 2017 *Instrument: Tinius Olsen S/N: 133660*

SAMPLE NO.(QW-150)	T1		T2	
WIDTH mm (in.)	19.1	(0.752)	19.1	(0.752)
THICKNESS mm (in.)	21.6	(0.850)	22.1	(0.870)
AREA sq. mm (sq. in.)	413	(0.639)	422	(0.654)
ULTIMATE LOAD N (lbf)	225 179	(50,600)	230 525	(51,800)
ULTIMATE STRESS MPa (psi)	546	(79,200)	546	(79,200)
FRACTURE TYPE	Partial Cup & Cone		Partial Cup & Cone	
FRACTURE LOCATION	Parent Metal		Parent Metal	

Note: Imperial values calculated by direct conversion.

SAMPLE TYPE(QW-462.2)	Side Bend	Side Bend	Side Bend	Side Bend
SAMPLE NO.	S1	S2	S3	S4
RESULTS	Pass	Pass	Pass	Pass

Test Conducted By: Ibrahim Mohamoud (Edmonton)

Certified By: _____
Eric Dacyk, C.E.T.

ANAB ACCREDITED ISO/IEC 17025 TESTING LABORATORY Certification # L2057.01-1

SGS Canada Inc. | 4027 - 14 Street S.E. Calgary, AB T2G 3K6 t +1 (403) 262-7072 f +1 (403) 266-3169
7925 Davies Road Edmonton, AB T6E 4N1 t +1 (780) 468-3030 f +1 (780) 468-3032 www.sgs.com

CHARPY V-NOTCH IMPACT TEST

Customer: **Storage Tank Solutions Inc.**
9 Well Head Street
Devon, Alberta
T9G 1Z6

Laboratory Test No.: E19-104.11
Date: March 21, 2019

Attention: Sebastien Ouellet

PQR No.:	STS-4-2 (Rev.0)	**Material Heat No.:**	454840 27789-02
Material:	SA 516 Gr. 60/70		
Material Thickness:	22.2 mm (0.875 in.)		
Thermal Condition:	As Welded		

Specimen Size:	*10 x 10 mm (0.394 x 0.394 in.)*	*Machine:*	*Satec SI-1K3, S/N: 1503*
Orientation:	*Transverse*	*Capacity:*	*407 J (300 ft·lbf)*
Test Temperature:	*-46 °C (-50 °F)*	*Verified Range:*	*3.4-325J (2.5-240 ft·lbf)*
Governing Spec.:	*ASME B31.3-2016*	*Calibration Date:*	*March 19, 2018*

Specimen Number	Notch Location	Impact Values Joules	(ft·lbf)
K2.1	Weld Metal within 1.5mm (1/16") of root	76	(56)
K2.2		75	(55)
K2.3		24	(18)
K3.1	HAZ within 1/4 to 1/2t of weld surface	202	(149)
K3.2		110	(81)
K3.3		83	(61)

Note: Metric values calculated by direct conversion.

Test Conducted By: Tong Zhao (Edmonton)

Certified By: _____
Eric Dacyk, C.E.T.

ANAB ACCREDITED ISO/IEC 17025 TESTING LABORATORY Certification # L2057.01-1

SGS Canada Inc. | 4027 - 14 Street S.E. Calgary, AB T2G 3K6 t +1 (403) 262-7072 f +1 (403) 266-3169
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HARDNESS TEST

Customer: **Storage Tank Solutions Inc.**
9 Well Head Street
Devon, Alberta
T9G 1Z6

Laboratory Test No.: E19-104.11
Date: March 12, 2019

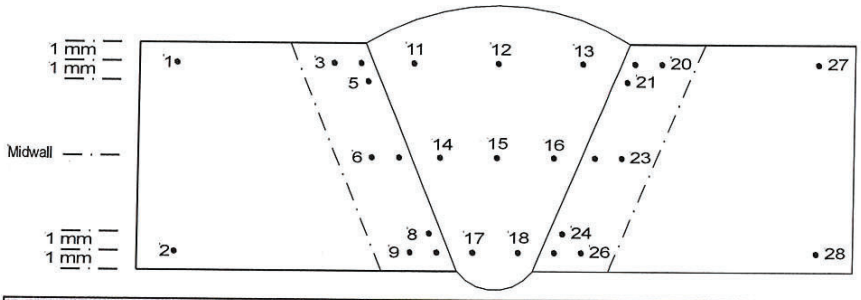
Attention: Sebastien Ouellet

PQR No.: STS-4-2 (Rev.0)
Material: SA 516 Gr. 60/70
Material Thickness: 22.2 mm (0.875 in.)
Thermal Condition: As Welded

Material Heat No.: 454840 27789-02

Type of Test: *Vickers 10 kg (HV10)*
Governing Spec.: *ASTM E92 - 17*

Instrument: *LECO S/N: 1594*
Calibration Date: *July 27, 2018*



Parent Metal		HAZ		Weld Metal		HAZ		Parent Metal	
1	152	*3*	308	*11*	206	*19*	277	*27*	152
2	148	*4*	317	*12*	181	*20*	255	*28*	143
		5	263	*13*	203	*21*	245		
		6	182	*14*	192	*22*	208		
		7	198	*15*	186	*23*	194		
		8	185	*16*	193	*24*	192		
		9	190	*17*	173	*25*	180		
		10	191	*18*	173	*26*	194		

Test Conducted By: Ibrahim Mohamoud (Edmonton)

Certified By: _____
Eric Dacyk, C.E.T.

ANAB ACCREDITED
ISO/IEC 17025
TESTING LABORATORY
Certification # L2057.01-1

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LUDWIG & ASSOCIATES LTD.

Materials and Welding Consulting

LABORATORY TEST REPORT

CUSTOMER: **Woodside Fabricators Ltd.**
6124 - 39th Ave
Camrose, Alberta
T4V 3B1

Laboratory Test No.: E07-393.12
Date: May 7, 2007

Attention: Doug French

PQR No.:	WFL-4-1
Material:	SA 516 Gr. 60 to SA 516 Gr. 70
Thickness:	6.32 mm (0.249 in.)
Thermal Condition:	As Welded

TENSILE TEST QW-150

SAMPLE NUMBER	T1	QW-462.1(a)	T2	QW-462.1(a)
WIDTH mm (in.)	19.0	(0.748)	19.0	(0.748)
THICKNESS mm (in.)	4.71	(0.185)	4.88	(0.192)
AREA sq. mm (sq. in.)	49.5	(0.139)	92.7	(0.144)
ULTIMATE LOAD N (lbs)	46 874	(10,500)	47 904	(10,800)
UTS MPa (psi)	524	(76,000)	517	(74,900)
FRACTURE TYPE	Partial Cup & Cone		Partial Cup & Cone	
FRACTURE LOCATION	Parent Metal (SA 516 Gr. 70)		Weld Metal	

GUIDED-BEND TEST QW-160

SAMPLE WIDTH: 38.1 mm (1.50 in.) SAMPLE THICKNESS: 6.32 mm (0.249 in.)
PLUNGER SIZE: 22.2 mm (0.875 in.) YOKE SIZE: 41.1 mm (1.62 in.)

QW-462.3(a)	Face Bend	Face Bend	Root Bend	Root Bend
SAMPLE NUMBER(S)	F1	F2	R1	R2
RESULTS	Pass	Pass	Pass	Pass

We certify the test results in this report and that the specimen(s) were prepared and tested in accordance with the requirements of ASME Section IX, 2004 edition and latest addenda. *Material information has been provided by the Customer whose name appears on this report.*

Samples associated with this report will be discarded in 30 days.

Laboratory Test Conducted By: _____ For
Natashua Collier, C.E.T.

4027 - 14 Street, S.E., CALGARY, ALBERTA T2G 3K6 PHONE: (403) 262-7072 FAX: (403) 266-3169
7925 Davies Road, EDMONTON, ALBERTA T6E 4N1 PHONE: (780) 468-3030 FAX: (780) 468-3032

LUDWIG & ASSOCIATES LTD.

Materials and Welding Consulting

LABORATORY TEST REPORT

CUSTOMER: **Woodside Fabricators Ltd.**
6124 - 39th Ave
Camrose, Alberta
T4V 3B1

Laboratory Test No.: E07-393.12
Date: May 7, 2007

Attention: Doug French

PQR No.:	WFL-4-1
Material:	SA 516 Gr. 60 to SA 516 Gr. 70
Thickness:	6.32 mm (0.249 in.)
Thermal Condition:	As Welded

NOTCH-TOUGHNESS TEST

TYPE OF TEST: Charpy V-Notch
TEST TEMPERATURE: -48°C (-55°F)

ORIENTATION: Transverse
SPECIMEN SIZE: 10 x 5 mm

Specimen Number	Notch Location	Impact Values Joules	(ft.lbs)
W2.1	Weld Metal within 1/16" of root	10.8	(8.0)
W2.2	Weld Metal within 1/16" of root	25.2	(18.6)
W2.3	Weld Metal within 1/16" of root	30.1	(22.2)
W3.1	Gr. 60 - HAZ	15.7	(11.6)
W3.2	Gr. 60 - HAZ	77.6	(57.2)
W3.3	Gr. 60 - HAZ	93.8	(69.2)
W4.1	Gr. 70 - HAZ	55.6	(41.0)
W4.2	Gr. 70 - HAZ	64.0	(47.2)
W4.3	Gr. 70 - HAZ	38.0	(28.0)

We certify the test results in this report and that the specimen(s) were prepared and tested in accordance with the requirements of ASME Section VIII, Div. I, UG-84 - 2004 *edition and latest addenda. Material information has been provided by the Customer whose name appears on this report.*

Samples associated with this report will be discarded in 30 days.

Laboratory Test Conducted By: _____ FOR
Natashua Collier, C.E.T.

4027 - 14 Street, S.E., CALGARY, ALBERTA T2G 3K6 PHONE: (403) 262-7072 FAX: (403) 266-3169
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LUDWIG & ASSOCIATES LTD.

Materials and Welding Consulting

LABORATORY TEST REPORT

CUSTOMER: **Woodside Fabricators Ltd.**
6124 - 39th Ave
Camrose, Alberta
T4V 3B1

Laboratory Test No.: E07-393.12
Date: May 7, 2007

Attention: Doug French

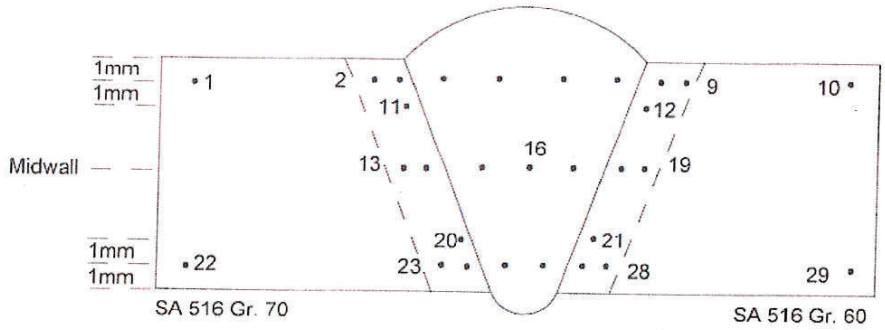
PQR No.:	WFL-4-1
Material:	SA 516 Gr. 60 to SA 516 Gr. 70
Thickness:	6.32 mm (0.249 in.)
Thermal Condition:	As Welded

HARDNESS TEST

TYPE OF TEST: Vickers

LOAD: 10 kg

INSTRUMENT TYPE: Leco V-100-C1



1)	153 HV	7)	181 HV	13)	173 HV	19)	162 HV	25)	171 HV
2)	193 HV	8)	206 HV	14)	188 HV	20)	192 HV	26)	178 HV
3)	210 HV	9)	207 HV	15)	167 HV	21)	185 HV	27)	186 HV
4)	174 HV	10)	161 HV	16)	166 HV	22)	158 HV	28)	167 HV
5)	169 HV	11)	187 HV	17)	168 HV	23)	173 HV	29)	157 HV
6)	164 HV	12)	190 HV	18)	172 HV	24)	185 HV		

We certify the test results in this report and that the specimen(s) were prepared and tested in accordance with the requirements of ASTM E92-82 (Reapproved 2003). *Material information has been provided by the Customer whose name appears on this report.*

Samples associated with this report will be discarded in 30 days

Laboratory Test Conducted By: _____

Natashua Collier, C.E.T.

4027 - 14 Street, S.E., CALGARY, ALBERTA T2G 3K6 PHONE: (403) 262-7072 FAX: (403) 266-3169
7925 Davies Road, EDMONTON, ALBERTA T6E 4N1 PHONE: (780) 468-3030 FAX: (780) 468-3032

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INSPECTION CERTIFICATE

(BS EN 10204 3.1: 2004 - ISO 10474 3.1: 2013)

Number / Número: 853076

Date / Día: July 21, 2017

Siderca S.A.I.C
Dr Jorge A. Simini 250
(B2804MHA) Campana
Buenos Aires, Argentina
(54) 3489 433103 tel
(54) 3489 433465 fax

Customer / Cliente: VAN LEEUWEN PIPE & TUBE (CANADA) INC.

Customer's Order Item / Orden Cliente - Item: 45001803-00008

Customer's Reference / Ref. del Cliente: N/A

Manufacturer's Works Order N° / Confirmación de Venta: 51938/08

Manufacturing Process / Proceso de Manufactura: SEAMLESS HOT ROLLED

Product Type / Tipo de Producto: CARBON STEEL FOR LOW TEMPERATURE SERVICE

Surface / Superficie: INT BARE /EXT VARNISHED

Standard or Specification / Normas o Especificaciones: ASTM/ASME A/SA333-10+CSA Z245.1-14 CATII-SS+PSF00374+NACE MR0175/103+IPRO LP-006

Steel Grade / Grado de acero: 1/6/359 CAT II SS

Ends / Extremos: BEVELLED AT 30 DEG. ASTM

Dimensions / Dimensiones: 6 5/8 X 0.280 INCH; 168.30 X 7.11 MM

Schedule / Cédula: 040

Length / Longitud: 11.0/11.8 m

Quantity / Cantidad: 83 Pcs/pz; 3157.94 FT; 962.54 MTS; 59747 LB; 27101 KG

Nominal Weight / Peso Nominal: 18.97 LB/FT; 28.26 KG/M

TENSILE TEST / ENSAYO DE TENSIÓN

Heat N° Colada N°	Sample N° Muestra N°	Zone Zona	Lot N° Lote N°	Pipe N° Tubo N°	Specimen condition Condición de la probeta: Ls	Sc	Type Tipo	Ori	Specimen dimensions Dimensiones de la probeta: Size Tamaño	Area Sección	Test temp Temp. ensayo	Y.S. Eul 0.50 % Min: 52 Max: --	U.T.S. Req. Min: 66 Max: 91	Y.S./U.T.S Eul 0.50 % Req. Max. 0.93	Elongation / Alargamiento: Lo	Min.	Obt.
									In	In2	°F	ksi	ksi		mm	%	%
44391	2836324	E1	71971	20	B	AM	Ss	L	0.999 x 0.278	0.279	RT	57.7	71.1	0.80	50,8	28.0	36.6
44391	2836325	E2	71971	40	B	AM	Ss	L	0.995 x 0.279	0.279	RT	58.1	72.0	0.81	50,8	28.0	36.7
44391	2836326	E1	71971	60	B	AM	Ss	L	0.999 x 0.283	0.284	RT	60.0	73.1	0.82	50,8	28.0	39.1
44391	2836327	E2	71972	80	B	AM	Ss	L	0.999 x 0.279	0.280	RT	62.2	75.9	0.82	50,8	28.0	40.9
44391	2836329	E2	71973	1	B	AM	Ss	L	1. x 0.276	0.278	RT	59.3	73.3	0.81	50,8	28.0	36.1
44391	2836335	E1	71974	20	B	AM	Ss	L	0.994 x 0.277	0.277	RT	56.7	70.5	0.80	50,8	28.0	38.5
44391	2836339	E2	71974	40	B	AM	Ss	L	0.994 x 0.279	0.278	RT	60.3	73.5	0.82	50,8	28.0	38.5
44391	2836343	E1	71974	60	B	AM	Ss	L	0.999 x 0.279	0.280	RT	60.9	73.3	0.83	50,8	28.0	39.0
44391	2836344	E2	71975	80	B	AM	Ss	L	0.999 x 0.283	0.284	RT	59.2	73.4	0.81	50,8	28.0	38.9
44391	2837409	E1	71971	17	B	AM	Ss	L	0.995 x 0.274	0.274	RT	64.2	76.8	0.84	50,8	28.0	31.6
44391	2837410	E1	71975	85	B	AM	Ss	L	0.993 x 0.265	0.264	RT	58.2	73.6	0.79	50,8	28.0	28.8
44391	2842966	E1	71972	92	B	AM	Ss	L	0.994 x 0.278	0.277	RT	58.1	72.2	0.81	50,8	28.0	36.9
44391	2842967	E1	71973	14	B	AM	Ss	L	0.997 x 0.282	0.282	RT	59.2	73.4	0.81	50,8	28.0	38.6

JF September 18,2017
SA 333 Gr.6 / CSA Z245.1 Gr 3
Sch 40
6.625 OD x 0.280 w.t.
Heat # 44391 E6-20
PO# 186973

AM: As manufactured / Según proceso de fabricación
B: Body / Cuerpo
E1 / E2: Ends of Sampling / Extremos de Muestra
L: Longitudinal / Longitudinal
Lo: Initial length / Longitud inicial
Ls: Location of sample / Ubicación de la muestra
Max: Maximum / Máximo
Min: Minimum / Mínimo
Obt: Obtained / Obtenido
Ori: Orientation / Orientación
Req. Max: Required maximum / Máximo requerido
Req: Required / Requerido
RT: Room temperature / Temperatura ambiente
Sc: Specimen condition / Condición de la probeta
Ss: Strip specimen / Muestra rectangular
U.T.S.: Ultimate tensile strength / Resistencia
Y.S: Yield strength / Fluencia

Tenaris

INSPECTION CERTIFICATE

(BS EN 10204 3.1: 2004 - ISO 10474 3.1: 2013)

Number / Número: 853076

Date / Día: July 21, 2017

Siderca S.A.I.C
Dr Jorge A. Simini 250
(B2804MHA) Campana
Buenos Aires, Argentina
(54) 3489 433100 tel
(54) 3489 433405 fax

Customer / Cliente: VAN LEEUWEN PIPE & TUBE (CANADA) INC.	Customer's Order Item / Orden Cliente - Item: 45001803-00008	Customer's Reference / Ref. del Cliente: N/A	Manufacturer's Works Order N° / Confirmación de Venta: 51938/08
Manufacturing Process / Proceso de Manufactura: SEAMLESS HOT ROLLED	Product Type / Tipo de Producto: CARBON STEEL FOR LOW TEMPERATURE SERVICE		Surface / Superficie: INT BARE /EXT VARNISHED
Standard or Specification / Normas o Especificaciones: ASTM/ASME A/SA333-10+CSA Z245.1-14 CATII-SS+PSP00374+NACE MR0175/103+IPRO LP-006		Steel Grade / Grado de acero: 1/6/359 CAT II SS	Ends / Extremos: BEVELLED AT 30 DEG. ASTM
Dimensions / Dimensiones: 6 5/8 X 0.280 INCH 168.30 X 7.11 MM	Schedule / Cédula: 040	Length / Longitud: 11.0/11.8 m	Quantity / Cantidad: 83 Pcs/pz 3157.94 FT 59747 LB 962.54 MTS 27101 KG	Nominal Weight / Peso Nominal: 18.97 LB/FT 28.26 KG/M

CHEMICAL COMPOSITION / COMPOSICIÓN QUÍMICA

					Composition % / Composición %																											
					X 100							X 100										X 10000								X 100	
					C	Mn	Si	Cr	Mo	Al sol	Cu	P	Ni	V	Al	Sn	As	Nb	Ti	Pb	Sb	Co	S	Zr	Bi	Ca	B	N	Mg	W	Ce.1	Ce.2
				H Max	25	135	50	30	12	--	40	25	400	80	--	--	--	20	110	--	--	--	100	--	--	--	10	--	--	--	42	40
				Min	--	40	10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
				P Max	25	135	50	30	12	--	40	25	400	80	--	--	--	20	110	--	--	--	100	--	--	--	10	--	--	--	42	40
				Min	--	40	10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Heat N° Colada N°	Sample N° Muestra N°	Lot N° Lote N°	Pipe N° Tubo N°																													
44391				H	8	105	23	9	4	2	16	12	70	4	15	11	4	14	3	1	2	7	9	10	20	12	1	43	7	20	30	21
44391	2836335	71971	40	P	9	105	23	9	4	1	17	12	74	3	16	10	4	14	3	1	3	7	10	20	22	16	2	50	4	20	31	23
44391	2836324	71971	20	P	9	105	23	9	4	2	16	13	72	4	18	10	4	16	3	1	3	7	11	20	22	16	2	48	5	20	31	23
44391	2836326	71971	60	P	10	105	23	9	4	1	17	12	73	3	15	10	4	14	2	1	3	7	7	20	22	12	2	45	4	20	32	25
44391	2837409	71971	17	P	9	106	24	9	4	2	16	13	69	3	16	10	4	15	3	1	3	7	10	20	22	11	2	41	4	20	31	23
44391	2836329	71973	1	P	8	105	23	9	4	1	17	12	70	3	15	10	4	14	3	1	3	7	10	20	22	12	2	45	4	20	30	21
44391	2836327	71972	80	P	8	105	22	9	4	1	17	12	73	3	15	10	3	14	2	1	3	7	10	20	22	12	2	44	3	20	30	21
44391	2836343	71974	60	P	8	105	23	9	4	1	17	11	69	4	16	10	3	14	3	1	3	7	8	20	22	11	2	50	5	20	30	21
44391	2836344	71975	80	P	8	105	22	9	4	2	17	12	66	5	16	10	3	14	3	1	2	7	9	20	22	12	2	44	4	20	30	21
44391	2837410	71975	85	P	9	105	23	9	4	1	16	12	70	5	17	10	4	15	3	1	3	7	9	20	22	12	2	41	3	20	31	23
44391	2836339	71974	40	P	10	105	23	9	4	1	17	12	74	4	15	10	4	14	3	1	3	7	10	20	22	12	2	44	4	20	32	25
44391	2836335	71974	20	P	10	105	23	9	4	1	17	12	75	3	15	10	4	16	3	1	3	7	9	20	22	14	2	45	4	20	32	25

Ce.1: C+(MN/6)+(CR+MO+V)/5+(NI+CU)/15

Ce.2: C+(MN/6)+(SI/24)+(CU/15)+(NI/20)+(CR+MO+V+NB)/5+(5*B))

H: Heat / Colada

Max: Maximum / Máximo

Min: Minimum / Mínimo

P: Product / Producto

CLIENTE / Customer / Client
VAN LEEUWEN PIPE AND TUBE -CAN
2875-64TH AVENUE
EDMONTON - ALBERTA T6P 1R1
CANADA
CAN

CERTIFICADO DE INSPECCION

Inspection Certificate - Certificat de Réception

UNE EN 10204:06 / 3.1
ISO 10474:15 / 3.1

FECHA: Date: 24/05/2018

N.º No. 195241

HOJA: Page: 4

SGI 1922164 SGI 6000236 SGI 6009987

ULMA FORJA, S.COOP.
Management Systems certified by LRQAE
Certified acc. PED 97/23/EC+AD2000-WD
PED 14/68/UE
by TÜV Rheinland
N.º 01 202 E/O 02 7443

Bº Zubillaga, 3 - Apdo. 14
20560 OÑATI (Gipuzkoa) SPAIN
Tel.: 34 - 943 780552
Fax: 34 - 943 781806
E-mail: ulma@ulmapiping.com

PRODUCTO / Article - Produit: FLANGES

SU PEDIDO N.º / Your Order No. / Votre Cde. N.º: 45001896

DE / of - de: 10/01/2018

NORMAS APLICABLES / Requirements - Normes Applicables: ASME B16.5-17

MATERIAL CORRESPONDIENTE / Material Correspondent - Qualité: ASME SA350LF2CL1-2-17, ASTM A350LF2CL1-2-17
ASME SA105M-17, ASTM A105M-14

MODO DE FUSION (*) / Steel Making - Elaboration de l'acier: 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)

E - Elec. Y - Oxígeno básico

MARCA DEL FABRICANTE / Mark of factory / Marque du fabricant

Packing 139834

DEPARTAMENTO / Section / Département: QUALITY ASSURANCE

PARTIDA / Item / Poste	CANTIDAD / Quantity / Quantité	DESCRIPCION / Description / Description	LOTE	OBSERVACIONES / Remarks / Observations (*)	COLADA N.º / Heat No / N.º Coulée	RESISTENCIA / T.Strength / Resist Rupt N/mm2	LIMITE ELAST. / Y.Strength 0.2 % N/mm2	ALARGAM. / Elongation / Allongement Lo=50mm/4d %	ESTRICCION / Red. Area / Striction %	RESILIENCIA / Impact test / Résilience Joules			CHARPY V 10x10mm MEDIA / Average / Moyenne	°C	DUREZA / Hardness / Dureté HBW	
48 24738	20	WN 4 1500LB XXS RTJ A350LF2	18M18E	NE	A18A8	521	307	32.10	67.40	56	58	61	58	-50	148	151
54 24626	6	WN 4 600LB XXS RF A350LF2	12A18F	NE	A41A8	513	305	29.70	57.90	68	68	66	67	-50	148	151
54 24626	19	WN 4 600LB XXS RF A350LF2	29O17	NE	B73A7	524	317	28.10	61.40	46	51	42	46	-50	150	156
56 22171	67	WN 6 150LB STD/40 RF A350LF2	15Y806	NE	A50A8	517	309	29.80	50.60	63	68	73	68	-50	150	151
56 22171	3	WN 6 150LB STD/40 RF A350LF2	29A804	NE	A50A8	519	311	31.20	59.80	65	54	59	59	-50	149	150
45 24672	5	BLIND 8 600LB RF A350LF2	17A817	NE	A58A8	507	295	28.20	59.40	54	61	56	58	-50	147	149

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

COLADA N.º / Heat No / N.º Coulée	C %	Si %	Mn %	P %	S %	Cr %	Ni %	Mo %	Nb %	V %	Cu %	Al %	Ti %	B %	CEq %
B73A7	0,190	0,230	0,980	0,009	0,003	0,090	0,080	0,010	0,004	0,006	0,190	0,035	0,002	0,0004	0,39
A50A8	0,190	0,250	1,060	0,006	0,004	0,050	0,070	0,010	0,003	0,004	0,180	0,031	0,001	0,0002	0,40
A18A8	0,190	0,190	1,080	0,007	0,005	0,070	0,070	0,012	0,002	0,000	0,220	0,025	0,002	0,0005	0,41
A41A8	0,180	0,210	1,060	0,011	0,005	0,060	0,060	0,013	0,003	0,010	0,180	0,043	0,001	0,0002	0,39
A58A8	0,190	0,180	1,060	0,009	0,001	0,100	0,090	0,021	0,004	0,003	0,180	0,040	0,001	0,0005	0,41

(*) OBSERVACIONES / Remarks / Observations: N_NORMALIZED AT 900 C AND ALLOWED TO COOL IN STILL AIR.

- Las dimensiones y la condición superficial se hallaron satisfactorias
- Dimension and surface condition were found acceptable
- Les dimensions et étais 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
ULMA FORJA S. COOP.
Dpto. de Garantía de calidad
Quality Assurance Dept.

SA 350 LF2
6.625" O.D. x 0.280 w.t.
W/N 150 RF 6 STD
HT# A50A8
Internal PO# E20170
External PO# 203177

Recieved By: Jessie Springett
12/09/18

CLIENTE / Customer - Client

VAN LEEUWEN PIPE AND TUBE -CAN
2875-64TH AVENUE
EDMONTON - ALBERTA T6P 1R1
CANADA
CAN

CERTIFICADO DE INSPECCION

Inspection Certificate - Certificat de Réception

UNE EN 10204:06 / 3.1
ISO 10474:15 / 3.1

FECHA: Date: 15/12/2017 05/02/2018

N.º No. 192002 Rev.01

HOJA: Page: 6

SGI 1922164 SGI 6000236 SGI 6009987

ULMA FORJA, S.COOP.
Management Systems certified by LRQAE
Certified acc. PED 97/23/EC+AD2000-W0
PED 14/68/UE
by TÜV Rheinland
N.º 01 202 E/0 02 7443

Bº Zubillaga, 3 - Apdo. 14
20560 OÑATI (Gipuzkoa) SPAIN
Tel.: 34 - 943 780562
Fax: 34 - 943 781808
E-mail: ulma@ulmapiping.com

PRODUCTO / Article - Produit: FLANGES

SU PEDIDO N.º / Your Order No. / Votre Cde. N.º: 45001856

DE / of. - de: 03/11/2017

NORMAS APLICABLES / Requirements - Normes Applicables: ASME B16.5-17

MATERIAL CORRESPONDIENTE / Material Correspondent - Qualité: ASME SA350LF2CL1-2-17, ASTM A350LF2CL1-2-17
ASME SA105M-17, ASTM A105M-14
NACE MR0175/ISO15156-02/03-15 & NACE MR0103/ISO17495-15
Clause 7.2.1.4, Annex A.2 and SSC Region 3.
CSA-Z245.12-13 GR248 CAT II-SS (WN & BLIND FLANGES ONLY)

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

MARCA DEL FABRICANTE / Mark of factory / Marque du fabricant

Packing 136413

DEPARTAMENTO / Section / Département: QUALITY ASSURANCE

PARTIDA Item Poste	CANTIDAD Quantity Quantité	DESCRIPCION Description Description	LOTE	OBSERVACIONES Remarks Observations (*)	COLADA N.º Heat No N.º Coulée	RESISTENCIA T.Strength Resist Rupt N/mm2	LIMITE ELAST. Y.Strength 0.2 % N/mm2	ALARGAM. Elongation Allongement Lo=50mm/4d %	ESTRICCION Red. Area Striction %	RESILIENCIA Impact test Résilience Joules			CHARPY V 10x10mm ISO9016 - EN10045 MEDIA Average Moyenne	°C	DUREZA Hardness Dureté HBW	
47 37010	7	WN 3 2500LB XXS RTJ A350LF2	07N17	NE	B73A7	505	298	35,60	72,50	41	48	46	45	-50	144	150
47 37010	3	WN 3 2500LB XXS RTJ A350LF2	27O17	NE	B73A7	526	319	27,30	60,10	54	53	38	48	-50	151	157
51 22170	13	WN 4 150LB XS/80 RF A350LF2	05Y17	NE	43AV7	519	312	25,40	55,60	47	55	51	51	-50	155	159
51 22170	2	WN 4 150LB XS/80 RF A350LF2	27S17	NE	A14A7	495	302	33,40	66,70	59	54	52	55	-50	154	156
56 22202	70	WN 4 600LB XS/80 RF A350LF2	21O17	NE	B47A7	501	301	30,20	62,00	47	51	40	46	-50	140	146
59 22171	2	WN 6 150LB STD/40 RF A350LF2	19N17	NE	A63A7	505	298	31,00	64,10	57	56	49	54	-50	158	163
59 22171	18	WN 6 150LB STD/40 RF A350LF2	17N17	NE	B63A7	506	290	33,60	65,90	40	43	46	43	-50	140	149
60 22172	5	WN 6 150LB XS/80 RF A350LF2	10O17	NE	A48A7	522	315	28,50	59,90	46	55	53	52	-50	153	157
63 24627	2	WN 6 600LB XXS RF A350LF2	27S17	NE	A64A7	505	298	35,00	70,00	49	47	44	47	-50	154	157
66 22174	4	WN 8 150LB XS/80 RF A350LF2	24N17	NE	B55A7	486	289	36,00	70,90	39	45	47	43	-50	138	145

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

COLADA N.º Heat No N.º Coulée	C %	Si %	Mn %	P %	S %	Cr %	Ni %	Mo %	Nb %	V %	Cu %	Al %	Ti %	CEq %
43AV7	0,192	0,240	1,020	0,015	0,005	0,096	0,094	0,022	0,001	0,000	0,253	0,035	0,003	0,41
A14A7	0,180	0,190	1,020	0,008	0,004	0,060	0,060	0,009	0,005	0,005	0,120	0,041	0,002	0,38
A48A7	0,190	0,160	1,020	0,009	0,004	0,050	0,070	0,010	0,007	0,007	0,140	0,036	0,001	0,39
A63A7	0,193	0,230	1,030	0,015	0,002	0,100	0,098	0,029	0,001	0,000	0,239	0,041	0,003	0,41
A64A7	0,180	0,240	1,030	0,015	0,006	0,085	0,091	0,024	0,001	0,000	0,205	0,042	0,002	0,39
B47A7	0,200	0,210	1,030	0,012	0,001	0,060	0,050	0,010	0,005	0,006	0,170	0,034	0,002	0,40
B55A7	0,180	0,180	0,990	0,012	0,004	0,060	0,060	0,009	0,003	0,005	0,190	0,030	0,001	0,38
B63A7	0,180	0,230	1,010	0,010	0,003	0,060	0,070	0,010	0,005	0,003	0,180	0,028	0,001	0,38
B73A7	0,190	0,230	0,980	0,009	0,003	0,090	0,080	0,010	0,004	0,006	0,190	0,035	0,002	0,39

(*) OBSERVACIONES: / Remarks / Observations: N_NORMALIZED AT 900 C AND ALLOWED TO COOL IN STILL AIR.

- 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 normes aplicables.
- Manufacturing requirements are satisfied.
- Les normes applicables sont respectées.

EL INSPECTOR
Works Inspector - L'inspecteur

ULMA FORJA S. COOP.
Dpto. de Garantía de calidad
Quality Assurance Dept.

QM-System: Certification as per ISO 9001

Erläuterungen siehe Rückseite/Explications voir au verso/See reverse for explanations (www.dillinger.de/certificate)

DILLINGER

A02 INSPECTION CERTIFICATE 3.1 AS PER EN 10204:2004
INSPECTION CERTIFICATE 3.1 AS PER ISO 10474:2013
MATERIAL TEST REPORT (MTR)

A10 Advice of dispatch No./ Date of dispatch: 611114-07.09.17

A08/ Manufacturer's order/ A03 Certificate No.: 427758-001

Sheet: 1/...

A05 Established Inspecting body: DH

A06 Purchaser: EDMONTON STEEL, EDMON — A07.1 No. ED10715-J1010ER

Final receiver: EDMONTON STEEL, EDMON — A07.2 No.

B01 Product: HEAVY PLATES.

B02/ Steel design. SA516-70 SA20-S5

B03 Any suppl. requirements: ASME-IIA:2015
DIL-HUE-1:R34-2016-08-19

21070

B01-B99 Description of the product

B14 Item No.	B08 Number of pieces	B09 Thickness	B10 Width INCH	B11 Length	B12 Theoretical mass KG	B04 Product delivery condition	B07.2 Heat No.	B07.1 Rolled plate No./ Test No.	A09 Purchaser article number
01	1	0,5000 x	96,50000 x	480,00000	2979	N	449291	55053-01	ITEM001
01	1	0,5000 x	96,50000 x	480,00000	2979	N	449291	55053-02	ITEM001
01	1	0,5000 x	96,50000 x	480,00000	2979	N	449291	55053-03	ITEM001
01	1	0,5000 x	96,50000 x	480,00000	2979	N	449291	55054-01	ITEM001
01	1	0,5000 x	96,50000 x	480,00000	2979	N	449291	55054-02	ITEM001
01	1	0,5000 x	96,50000 x	480,00000	2979	N	449291	55054-03	ITEM001
01	1	0,5000 x	96,50000 x	480,00000	2979	N	449291	55056-01	ITEM001
01	1	0,5000 x	96,50000 x	480,00000	2979	N	449291	55056-02	ITEM001
01	1	0,5000 x	96,50000 x	480,00000	2979	N	449291	55056-03	ITEM001
01	1	0,5000 x	96,50000 x	480,00000	2979	N	449291	55060-01	ITEM001
01	1	0,5000 x	96,50000 x	480,00000	2979	N	449291	55060-02	ITEM001
**	12				35748		449291	55060-03	ITEM001
***	12				35748				

EPL-243
SA 516 Gr. 60/70
0.50"
HT# 449291 55060 03
PO# 203847
Internal PO# E20207
Recieved: 26/09/2018
Recieved by: Jessie Springett

B04 Product delivery condition

ITEM NO.: 01
N: HT: 1670 GR.F +36 -27 GR.F
SOAKING TIME TO ATTAIN THE TARGET TEMPERATURE OVER THE WHOLE SECTION: 1-1,75 MIN/MM (25-45 MIN/INCH)
COOLING IN STILL AIR

A04 D H Manufacturer's mark

Z01/Z02/Z03 We hereby certify, that the above mentioned materials have been delivered in accordance with the terms of order.

B. BALDAUF
Test House Manager

AHB Inspector's stamp

Date 08.09.17

AG der Dillinger Hüttenwerke
Postfach 1580, D-66748 Dillingen/Saar
Inspection department

A01

PP 1

QM-System: Certification as per ISO 9001

Erläuterungen siehe Rückseite/Explications voir au verso/See reverse for explanations (www.dillinger.de/certificate)

DILLINGER

A02 INSPECTION CERTIFICATE 3.1 AS PER EN 10204:2004
INSPECTION CERTIFICATE 3.1 AS PER ISO 10474:2013
MATERIAL TEST REPORT (MTR)

A10 Advice of dispatch No./ Date of dispatch: 611114-07.09.17

A08/ Manufacturer's order/ A03 Certificate No.: 427758-001

Sheet: 2/...

A05 Established Inspecting body: DH

A06 Purchaser: EDMONTON STEEL, EDMON — A07.1 No. ED10715-J1010ER

Final receiver: EDMONTON STEEL, EDMON — A07.2 No.

B01 Product: HEAVY PLATES

B02/ Steel design. SA516-70 SA20-S5

B03 Any suppl. requirements ASME-IIA:2015
DIL-HUE-1:R34-2016-08-19

B06 Marking of the product

ITEM NO.: 01
STEEL DESIGNATION SA516 70 MTLTV SA516 60 MTLTV
HEAT NO. / TRADEMARK / ROLLED PLATE NO.-TEST NO. / INSPECTOR'S STAMP

B07-B99 Further information about the product

ITEM NO.: 01
THICKNESS REDUCTION RATIO >= 3,0 IS FULFILLED - CF. A/SA20(M) PAR. 5.3

C10-C29 Tensile test

B14 Item No.	B07.2 Heat No.	B07.1 Rol.plate/ Test No.	B05 Reference (heat) treatment	C01	C02/ C01	C03 Temp. GR.F	C10	C11 KSI RP02	C12 RM	C13	A % L0=8IN	C14-C15
01	449291	55053		K1	Q	RT		49,9	73,8		26	
01	449291	55054		K1	Q	RT		50,0	73,8		24	
01	449291	55056		K1	Q	RT		50,2	73,4		27	
01	449291	55060		K1	Q	RT		50,2	74,0		27	

C30-C39 Hardness test

B14 Item. No.	B07.2 Heat No.	B07.1 Rol.plate/ Test No.	B05 Reference (heat) treatment	C01	C02/C01	C03 Temp. GR.F	C30 Method of test	C35	C31 Individual values			C32 Mean value
01	449291	55053		K1	O	RT	HBW 10/3000	HB	139	138	139	139
01	449291	55054		K1	O	RT	HBW 10/3000	HB	139	138	137	138
01	449291	55056		K1	O	RT	HBW 10/3000	HB	139	139	139	139
01	449291	55060		K1	O	RT	HBW 10/3000	HB	139	139	139	139

A04 D H Manufacturer's mark

Z01/Z02/Z03 We hereby certify, that the above mentioned materials have been delivered in accordance with the terms of order.

B. BALDAUF
Test House Manager

AHB Inspector's stamp

Date 08.09.17

A01 AG der Dillinger Hüttenwerke
Postfach 1580, D-66748 Dillingen/Saar
Inspection department

PP 1

QM-System: Certification as per ISO 9001

Erläuterungen siehe Rückseite/Explications voir au verso/See reverse for explanations (www.dillinger.de/certificate)

DILLINGER

A02 INSPECTION CERTIFICATE 3.1 AS PER EN 10204:2004
INSPECTION CERTIFICATE 3.1 AS PER ISO 10474:2013
MATERIAL TEST REPORT (MTR)

A10 Advice of dispatch No./ Date of dispatch: 611114-07.09.17

A08/ Manufacturer's order/ A03 Certificate No.: 427758-001

Sheet: 3/...

A05 Established Inspecting body: DH

A06 Purchaser: EDMONTON STEEL, EDMON — A07.1 No. ED10715-J1010ER

Final receiver: EDMONTON STEEL, EDMON — A07.2 No.

B01 Product: HEAVY PLATES

B02/ Steel design. SA516-70 SA20-S5

B03 Any suppl. requirements: ASME-IIA:2015
DIL-HUE-1:R34-2016-08-19

C40-C49 Impact test

B14 Item No.	B07.2 Heat No.	B07.1 Rol.plate/ Test No.	B05 Reference (heat) treatment	C01	C02/ C01	C03 Temp. GR.F	C41 Width of test piece	C40 Type of test piece	C44 Testing method	C46 Energy	C45	C42 Individual values AV=FT.LBF			C43 Mean value
01	449291	55053		K1	LV	-51		CHP-V			AV 8	212	193	147	184
01	449291	55054		K1	LV	-51		CHP-V			AV 8	131	189	195	172
01	449291	55056		K1	LV	-51		CHP-V			AV 8	228	134	203	188
01	449291	55060		K1	LV	-51		CHP-V			AV 8	206	198	223	209

C70-C99 Chemical composition % - Heat analysis

B07.2 Heat	C70	C	SI	MN	P	S	N	CU	MO	NI	CR	V	NB	SN	TI
449291	Y	0,161	0,358	1,160	0,010	0,0013	0,0066	0,026	0,005	0,027	0,033	0,000	0,000	0,0009	0,002

B07.2 Heat	C70	B	CA	AL-T
449291	Y	0,0001	0,0021	0,029

C94 Heat analysis Carbon equivalent / Alloying restrictions

B07.2 Heat 449291

FO-02= 0,37 FO-51= 0,000 FO-55= 0,09 FO-78= 0,04 FO-91= 7,2

C95 Ladle treatment

ITEM NO.: 01
HEAT OF THE INDICATED ITEM: VACUUM DEGASSED / SULPHIDE SHAPE CONTROL

C95 Further information about ladle treatment

ITEM NO.: 01
CALCIUM TREATED

A04 D H Manufacturer's mark

Z01/Z02/Z03 We hereby certify, that the above mentioned materials have been delivered in accordance with the terms of order.

B. BALDAUF
Test House Manager

AHB Inspector's stamp

A01 AG der Dillinger Hüttenwerke
Postfach 1580, D-66748 Dillingen/Saar
Inspection department

Date 08.09.17 PP 1

QM-System: Certification as per ISO 9001

DILLINGER

Erläuterungen siehe Rückseite/Explications voir au verso/See reverse for explanations (www.dillinger.de/certificate)

A02 INSPECTION CERTIFICATE 3.1 AS PER EN 10204:2004
INSPECTION CERTIFICATE 3.1 AS PER ISO 10474:2013
MATERIAL TEST REPORT (MTR)

A10 Advice of dispatch No./ Date of dispatch: 611114-07.09.17

A08/ A03 Manufacturer's order/ Certificate No.: 427758-001 Sheet: 4

A05 Established Inspecting body: DH

A06 Purchaser: EDMONTON STEEL, EDMON A07.1 No. ED10715-J1010ER

Final receiver: EDMONTON STEEL, EDMON A07.2 No.

B01 Product: HEAVY PLATES

B02/ Steel design. SA516-70 SA20-S5

B03 Any suppl. requirements ASME-IIA:2015
DIL-HUE-1:R34-2016-08-19

C70-C99 Chemical composition % - Product analysis

B07.2 Heat	B07.1 Test No.	C01	C	SI	MN	P	S	N	CU	MO	NI	CR	V	NB	SN	TI
449291	55053	K1	0,160	0,354	1,16	0,010	0,0010	0,0057	0,025	0,003	0,027	0,031	0,000	0,000	0,000	0,001

B07.2 Heat	B07.1 Test No.	C01	B	CA	AL-T
449291	55053	K1	0,0000	0,0020	0,029

C94 Product analysis Carbon equivalent / Alloying restrictions

B07.2 Heat	B07.1 Test No.	C01						
449291	55053	K1	FO-02=	0,36	FO-51=	0,000	FO-55=	0,09

C94 Carbon equivalent formula / Alloying restrictions

FO-02 = C+(MN/6)+(CR+MO+V)/5+(NI+CU)/15
FO-51 = V +NB
FO-55 = CU+MO+NI+CR
FO-78 = CR+MO
FO-91 = MN/C

D01 Marking and identification, surface appearance, shape and dimensional properties

ITEM NO.: 01
EXAMINATION OF MARKING, SURFACE, SHAPE AND DIMENSIONS: THE RESULTS MEET THE REQUIREMENTS.
SURFACE AS PER ASME-SA20
THICKNESS AS PER ASME-SA20
LENGTH AND WIDTH AS PER ASME-SA20

MTR APPROVED EDMONTON EXCHANGER

A04 DH Manufacturer's mark

Z01/Z02/Z03 We hereby certify, that the above mentioned materials have been delivered in accordance with the terms of order.

B. BALDAUF
Test House Manager

AHB Inspector's stamp

AG der Dillinger Hüttenwerke
Postfach 1580, D-66748 Dillingen/Saar
Inspection department

A01

Date 08.09.17 PP 1

QM-System: Certification as per ISO 9001

Erläuterungen siehe Rückseite/Explications voir au verso/See reverse for explanations (www.dillinger.de/certificate)

DILLINGER

A02 INSPECTION CERTIFICATE 3.1 AS PER EN 10204:2004
INSPECTION CERTIFICATE 3.1 AS PER ISO 10474:2013
MATERIAL TEST REPORT (MTR)

A10 Advice of dispatch No./ Date of dispatch: 611114-07.09.17

A08/ Manufacturer's order/ A03 Certificate No.: 427758-001

Sheet: 1/...

A05 Established Inspecting body: DH

A06 Purchaser: EDMONTON STEEL, EDMON — A07.1 No. ED10715-J1010ER

Final receiver: EDMONTON STEEL, EDMON — A07.2 No.

B01 Product: HEAVY PLATES

B02/ Steel design. SA516-60 SA20-S5

B03 Any suppl. requirements: ASME-IIA:2015
DIL-HUE-1:R34-2016-08-19

21071

B01-B99 Description of the product

B14 Item No.	B08 Number of pieces	B09 Thickness	B10 Width INCH	B11 Length	B12 Theoretical mass KG	B04 Product delivery condition	B07.2 Heat No.	B07.1 Rolled plate No./ Test No.	A09 Purchaser article number
01	1	0,5000 x	96,50000 x	480,00000	2979	N	449291	55053-01	ITEM001
01	1	0,5000 x	96,50000 x	480,00000	2979	N	449291	55053-02	ITEM001
01	1	0,5000 x	96,50000 x	480,00000	2979	N	449291	55053-03	ITEM001
01	1	0,5000 x	96,50000 x	480,00000	2979	N	449291	55054-01	ITEM001
01	1	0,5000 x	96,50000 x	480,00000	2979	N	449291	55054-02	ITEM001
01	1	0,5000 x	96,50000 x	480,00000	2979	N	449291	55054-03	ITEM001
01	1	0,5000 x	96,50000 x	480,00000	2979	N	449291	55056-01	ITEM001
01	1	0,5000 x	96,50000 x	480,00000	2979	N	449291	55056-02	ITEM001
01	1	0,5000 x	96,50000 x	480,00000	2979	N	449291	55056-03	ITEM001
01	1	0,5000 x	96,50000 x	480,00000	2979	N	449291	55060-01	ITEM001
01	1	0,5000 x	96,50000 x	480,00000	2979	N	449291	55060-02	ITEM001
01	1	0,5000 x	96,50000 x	480,00000	2979	N	449291	55060-03	ITEM001
**	12				35748				
***	12				35748				

B04 Product delivery condition

ITEM NO.: 01
N: HT: 1670 GR.F +36 -27 GR.F
SOAKING TIME TO ATTAIN THE TARGET TEMPERATURE OVER THE WHOLE SECTION: 1-1,75 MIN/MM (25-45 MIN/INCH)
COOLING IN STILL AIR

A04 D H Manufacturer's mark

Z01/Z02/Z03 We hereby certify, that the above mentioned materials have been delivered in accordance with the terms of order.

B. BALDAUF
Test House Manager

AHB Inspector's stamp

Date 08.09.17

AG der Dillinger Hüttenwerke
Postfach 1580, D-66748 Dillingen/Saar
Inspection department

A01

PP 1

QM-System: Certification as per ISO 9001

Erläuterungen siehe Rückseite/Explications voir au verso/See reverse for explanations (www.dillinger.de/certificate)

DILLINGER

A02 INSPECTION CERTIFICATE 3.1 AS PER EN 10204:2004
INSPECTION CERTIFICATE 3.1 AS PER ISO 10474:2013
MATERIAL TEST REPORT (MTR)

A10 Advice of dispatch No./ Date of dispatch: 611114-07.09.17

A08/ Manufacturer's order/ A03 Certificate No.: 427758-001

Sheet: 2/...

A05 Established Inspecting body: DH

A06 Purchaser: EDMONTON STEEL, EDMON — A07.1 No. ED10715-J1010ER

Final receiver: EDMONTON STEEL, EDMON — A07.2 No.

B01 Product: HEAVY PLATES

B02/ Steel design. SA516-60 SA20-S5

B03 Any suppl. requirements ASME-IIA:2015
DIL-HUE-1:R34-2016-08-19

B06 Marking of the product

ITEM NO.: 01
STEEL DESIGNATION SA516 70 MTLTV SA516 60 MTLTV
HEAT NO. / TRADEMARK / ROLLED PLATE NO.-TEST NO. / INSPECTOR'S STAMP

B07-B99 Further information about the product

ITEM NO.: 01
THICKNESS REDUCTION RATIO >= 3,0 IS FULFILLED - CF. A/SA20(M) PAR. 5.3

C10-C29 Tensile test

B14 Item No.	B07.2 Heat No.	B07.1 Rol.plate/ Test No.	B05 Reference (heat) treatment	C01	C02/ C01	C03 Temp. GR.F	C10	C11 KSI RP02	C12 RM	C13	A % L0=8IN	C14-C15
01	449291	55053		K1	Q	RT		49,9	73,8		26	
01	449291	55054		K1	Q	RT		50,0	73,8		24	
01	449291	55056		K1	Q	RT		50,2	73,4		27	
01	449291	55060		K1	Q	RT		50,2	74,0		27	

C30-C39 Hardness test

B14 Item. No.	B07.2 Heat No.	B07.1 Rol.plate/ Test No.	B05 Reference (heat) treatment	C01	C02/C01	C03 Temp. GR.F	C30 Method of test	C35	C31 Individual values			C32 Mean value
01	449291	55053		K1	O	RT	HBW 10/3000	HB	139	138	139	139
01	449291	55054		K1	O	RT	HBW 10/3000	HB	139	138	137	138
01	449291	55056		K1	O	RT	HBW 10/3000	HB	139	139	139	139
01	449291	55060		K1	O	RT	HBW 10/3000	HB	139	139	139	139

A04 D H Manufacturer's mark

Z01/Z02/Z03 We hereby certify, that the above mentioned materials have been delivered in accordance with the terms of order.

B. BALDAUF
Test House Manager

AHB Inspector's stamp

Date 08.09.17

AG der Dillinger Hüttenwerke
Postfach 1580, D-66748 Dillingen/Saar
Inspection department

A01

PP 1

QM-System: Certification as per ISO 9001

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A02 INSPECTION CERTIFICATE 3.1 AS PER EN 10204:2004
INSPECTION CERTIFICATE 3.1 AS PER ISO 10474:2013
MATERIAL TEST REPORT (MTR)

A10 Advice of dispatch No./ Date of dispatch: 611114-07.09.17

A08/ Manufacturer's order/ A03 Certificate No.: 427758-001

Sheet: 3/...

A05 Established Inspecting body: DH

A06 Purchaser: EDMONTON STEEL,EDMON — A07.1 No. ED10715-J1010ER

Final receiver: EDMONTON STEEL,EDMON — A07.2 No.

B01 Product: HEAVY PLATES

B02/ Steel design. SA516-60 SA20-S5

B03 Any suppl. requirements ASME-IIA:2015
DIL-HUE-1:R34-2016-08-19

C40-C49 Impact test

B14 Item No.	B07.2 Heat No.	B07.1 Rol.plate/ Test No.	B05 Reference (heat) treatment	C01	C02/ C01	C03 Temp. GR.F	C41 Width of test piece	C40 Type of test piece	C44 Testing method	C46 Energy	C45	C42 Individual values AV=FT.LBF			C43 Mean value
01	449291	55053		K1	LV	-51		CHP-V			AV 8	212	193	147	184
01	449291	55054		K1	LV	-51		CHP-V			AV 8	131	189	195	172
01	449291	55056		K1	LV	-51		CHP-V			AV 8	228	134	203	188
01	449291	55060		K1	LV	-51		CHP-V			AV 8	206	198	223	209

C70-C99 Chemical composition % - Heat analysis

B07.2 Heat	C70	C	SI	MN	P	S	N	CU	MO	NI	CR	V	NB	SN	TI
449291	Y	0,161	0,358	1,160	0,010	0,0013	0,0066	0,026	0,005	0,027	0,033	0,000	0,000	0,0009	0,002

B07.2 Heat	C70	B	CA	AL-T
449291	Y	0,0001	0,0021	0,029

C94 Heat analysis Carbon equivalent / Alloying restrictions

B07.2 Heat										
449291	FO-02=	0,37	FO-51=	0,000	FO-55=	0,09	FO-78=	0,04	FO-91=	7,2

C95 Ladle treatment

ITEM NO.: 01
HEAT OF THE INDICATED ITEM: VACUUM DEGASSED / SULPHIDE SHAPE CONTROL

C95 Further information about ladle treatment

ITEM NO.: 01
CALCIUM TREATED

A04 D H Manufacturer's mark

Z01/Z02/Z03 We hereby certify, that the above mentioned materials have been delivered in accordance with the terms of order.

B. BALDAUF
Test House Manager

AHB Inspector's stamp

AG der Dillinger Hüttenwerke
Postfach 1580, D-66748 Dillingen/Saar
Inspection department

A01

Date 08.09.17

PP 1

QM-System: Certification as per ISO 9001

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DILLINGER

A02 INSPECTION CERTIFICATE 3.1 AS PER EN 10204:2004
INSPECTION CERTIFICATE 3.1 AS PER ISO 10474:2013
MATERIAL TEST REPORT (MTR)

A10 Advice of dispatch No./ Date of dispatch: 611114-07.09.17

A08/ Manufacturer's order/ A03 Certificate No.: 427758-001

Sheet: 4

A05 Established Inspecting body: DH

A06 Purchaser: EDMONTON STEEL,EDMON — A07.1 No. ED10715-J1010ER

Final receiver: EDMONTON STEEL,EDMON — A07.2 No.

B01 Product: HEAVY PLATES

B02/ Steel design. SA516-60 SA20-S5

B03 Any suppl. requirements ASME-IIA:2015
DIL-HUE-1:R34-2016-08-19

C70-C99 Chemical composition % - Product analysis

B07.2 Heat	B07.1 Test No.	C01	C	SI	MN	P	S	N	CU	MO	NI	CR	V	NB	SN	TI
449291	55053	K1	0,160	0,354	1,16	0,010	0,0010	0,0057	0,025	0,003	0,027	0,031	0,000	0,000	0,000	0,001

B07.2 Heat	B07.1 Test No.	C01	B	CA	AL-T
449291	55053	K1	0,0000	0,0020	0,029

C94 Product analysis Carbon equivalent / Alloying restrictions

B07.2 Heat	B07.1 Test No.	C01						
449291	55053	K1	FO-02=	0,36	FO-51=	0,000	FO-55=	0,09

C94 Carbon equivalent formula / Alloying restrictions

FO-02 = C+(MN/6)+(CR+MO+V)/5+(NI+CU)/15
FO-51 = V +NB
FO-55 = CU+MO+NI+CR
FO-78 = CR+MO
FO-91 = MN/C

D01 Marking and identification, surface appearance, shape and dimensional properties

ITEM NO.: 01
EXAMINATION OF MARKING, SURFACE, SHAPE AND DIMENSIONS: THE RESULTS MEET THE REQUIREMENTS.

SURFACE	AS PER ASME-SA20
THICKNESS	AS PER ASME-SA20
LENGTH AND WIDTH	AS PER ASME-SA20

MTR APPROVED EDMONTON EXCHANGER

A04 DH Manufacturer's mark

Z01/Z02/Z03 We hereby certify, that the above mentioned materials have been delivered in accordance with the terms of order.

B. BALDAUF
Test House Manager

AHB Inspector's stamp

AG der Dillinger Hüttenwerke
Postfach 1580, D-66748 Dillingen/Saar
Inspection department

A01

Date 08.09.17 PP 1

QM-System: Certification as per ISO 9001

Erläuterungen siehe Rückseite/Explications voir au verso/See reverse for explanations (www.dillinger.de/certificate)

DILLINGER

A02 INSPECTION CERTIFICATE 3.1 AS PER EN 10204:2004
INSPECTION CERTIFICATE 3.1 AS PER ISO 10474:2013
MATERIAL TEST REPORT (MTR)

A10 Advice of dispatch No./ Date of dispatch: 626272-10.02.18

A08/ Manufacturer's order/ A03 Certificate No.: 431792-001

Sheet: 12/...

A05 Established Inspecting body: DH

A06 Purchaser: EDMONTON STEEL, EDMON — A07.1 No. ED10722-J1010ER

Final receiver: EDMONTON STEEL, EDMON — A07.2 No.

B01 Product: HEAVY PLATES

B02/ Steel design. SA516-70 SA20-S5

B03 Any suppl. requirements ASME-IIA:2015
DIL-HUE-1:R34-2016-08-19

C70-C99 Chemical composition % - Product analysis

B07.2 Heat	B07.1 Test No.	C01	C	SI	MN	P	S	N	CU	MO	NI	CR	V	NB	SN	TI
454461	64437	K1	0,167	0,366	1,16	0,011	0,0007	0,0076	0,025	0,006	0,050	0,029	0,001	0,002	0,001	0,002
454836	27699	K1	0,170	0,368	1,16	0,010	0,0007	0,0061	0,033	0,007	0,027	0,038	0,000	0,001	0,001	0,003
454836	27706	K1	0,177	0,369	1,16	0,010	0,0006	0,0059	0,033	0,007	0,027	0,038	0,001	0,001	0,001	0,003
454837	27740	K1	0,166	0,369	1,16	0,009	0,0005	0,0060	0,026	0,005	0,023	0,028	0,001	0,001	0,001	0,002
454837	27783	K1	0,179	0,373	1,17	0,008	0,0005	0,0060	0,024	0,004	0,022	0,024	0,001	0,001	0,001	0,001
454840	27789	K1	0,167	0,369	1,17	0,009	0,0004	0,0060	0,023	0,004	0,022	0,023	0,001	0,001	0,000	0,002
454840	27796	K1	0,164	0,371	1,17	0,009	0,0005	0,0064	0,023	0,004	0,022	0,023	0,001	0,001	0,000	0,002
454840	27809	K1	0,165	0,365	1,15	0,009	0,0005	0,0054	0,023	0,010	0,024	0,038	0,001	0,001	0,000	0,002
454843	27952	K1	0,145	0,358	1,14	0,009	0,0004	0,0053	0,023	0,014	0,025	0,045	0,001	0,000	0,000	0,002

B07.2 Heat	B07.1 Test No.	C01	B	CA	AL-T
454461	64437	K1	0,0001	0,0013	0,034
454836	27699	K1	0,0001	0,0018	0,031
454836	27706	K1	0,0001	0,0019	0,032
454837	27740	K1	0,0000	0,0015	0,030
454837	27783	K1	0,0000	0,0014	0,029
454840	27789	K1	0,0001	0,0011	0,031
454840	27796	K1	0,0000	0,0011	0,031
454840	27809	K1	0,0000	0,0012	0,035
454843	27952	K1	0,0000	0,0011	0,038

A04 D H Manufacturer's mark

Z01/Z02/Z03 We hereby certify, that the above mentioned materials have been delivered in accordance with the terms of order.

B. BALDAUF
Test House Manager

AHB Inspector's stamp

Date 12.02.18

AG der Dillinger Hüttenwerke
Postfach 1580, D-66748 Dillingen/Saar
Inspection department

A01

PP 1

QM-System: Certification as per ISO 9001

DILLINGER

Erläuterungen siehe Rückseite/Explications voir au verso/See reverse for explanations (www.dillinger.de/certificate)

A02 INSPECTION CERTIFICATE 3.1 AS PER EN 10204:2004
INSPECTION CERTIFICATE 3.1 AS PER ISO 10474:2013
MATERIAL TEST REPORT (MTR)

A10 Advice of dispatch No./ Date of dispatch: 626272-10.02.18

A08/ A03 Manufacturer's order/ Certificate No.: 431792-001

Sheet: 12/...

A05 Established Inspecting body: DH

A06 Purchaser: EDMONTON STEEL,EDMON — A07.1 No. ED10722-J1010ER

Final receiver: EDMONTON STEEL,EDMON — A07.2 No.

B01 Product: HEAVY PLATES

B02/ Steel design. SA516-60 SA20-S5

B03 Any suppl. requirements ASME-IIA:2015
DIL-HUE-1:R34-2016-08-19

C70-C99 Chemical composition % - Product analysis

B07.2 Heat	B07.1 Test No.	C01	C	SI	MN	P	S	N	CU	MO	NI	CR	V	NB	SN	TI
454461	64437	K1	0,167	0,366	1,16	0,011	0,0007	0,0076	0,025	0,006	0,050	0,029	0,001	0,002	0,001	0,002
454836	27699	K1	0,170	0,368	1,16	0,010	0,0007	0,0061	0,033	0,007	0,027	0,038	0,000	0,001	0,001	0,003
454836	27706	K1	0,177	0,369	1,16	0,010	0,0006	0,0059	0,033	0,007	0,027	0,038	0,001	0,001	0,001	0,003
454837	27740	K1	0,166	0,369	1,16	0,009	0,0005	0,0060	0,026	0,005	0,023	0,028	0,001	0,001	0,001	0,002
454837	27783	K1	0,179	0,373	1,17	0,008	0,0005	0,0060	0,024	0,004	0,022	0,024	0,001	0,001	0,001	0,001
454840	27789	K1	0,167	0,369	1,17	0,009	0,0004	0,0060	0,023	0,004	0,022	0,023	0,001	0,001	0,000	0,002
454840	27796	K1	0,164	0,371	1,17	0,009	0,0005	0,0064	0,023	0,004	0,022	0,023	0,001	0,001	0,000	0,002
454840	27809	K1	0,165	0,365	1,15	0,009	0,0005	0,0054	0,023	0,010	0,024	0,038	0,001	0,001	0,000	0,002
454843	27952	K1	0,145	0,358	1,14	0,009	0,0004	0,0053	0,023	0,014	0,025	0,045	0,001	0,000	0,000	0,002

B07.2 Heat	B07.1 Test No.	C01	B	CA	AL-T
454461	64437	K1	0,0001	0,0013	0,034
454836	27699	K1	0,0001	0,0018	0,031
454836	27706	K1	0,0001	0,0019	0,032
454837	27740	K1	0,0000	0,0015	0,030
454837	27783	K1	0,0000	0,0014	0,029
454840	27789	K1	0,0001	0,0011	0,031
454840	27796	K1	0,0000	0,0011	0,031
454840	27809	K1	0,0000	0,0012	0,035
454843	27952	K1	0,0000	0,0011	0,038

A04 DH Manufacturer's mark

Z01/Z02/Z03 We hereby certify, that the above mentioned materials have been delivered in accordance with the terms of order.

B. BALDAUF
Test House Manager

AHB Inspector's stamp

AG der Dillinger Hüttenwerke
Postfach 1580, D-66748 Dillingen/Saar
Inspection department

A01

Date 12.02.18 PP 1

WELDING PROCEDURE SPECIFICATION NO.: STS-7 (Rev.0)

WELDING PROCEDURE QUALIFICATION RECORD NO.(S): STS-7-1 (Rev.0), STS-7-3 (Rev.0), STS-7-4 (Rev.0), STS-7-5 (Rev.0)

QUALIFIED IN ACCORDANCE WITH ASME SECTION IX FOR

Restricted Applications: SAW WELDING SIMULTANEOUSLY WITH TWO WELDING HEADS, ONE ON EACH SIDE OF THE JOINT

Base Metal (Typical): P1 Groups 1 & 2 to P1 Groups 1 & 2 (SA 333 Gr. 6, SA 350 Gr. LF2, SA 420 Gr. WPL6, SA 516 Gr. 70 etc.)

Process(es): SAW **Weld Types:** GROOVE & FILLET

Position: FLAT & HORIZONTAL **Diameter:** ALL DIAMETERS

Filler Metal: F7A6-EM12K

BASE METAL CONDITIONS & GROOVE THICKNESS RANGE QUALIFIED:

NOTCH TOUGHNESS APPLICATIONS TO -50 °F AS WELDED

BASE METAL THICKNESS RANGE 0.125 to 1.750 in. inclusive

COMBINED DEPOSITED WELD METAL THICKNESS

ASME IX 1.750 in. maximum

API 650, 620, 12D, 12F 1.750 in. maximum

PROVINCIAL REGISTRATION

This WPS was prepared to the requirements of ASME Section IX 2017 and includes some of the additional requirements of the construction codes listed. The application of this WPS is outside the work scope of SGS Canada Inc.

Prepared By: Sara Van Roestel

Signed: [signature]

Date: July 8, 2019

Reviewed By: Keelan Wolfe, C.E.T.

Signed: [signature]

Date: July 8, 2019

(File E19-285)

QW-482 WELDING PROCEDURE SPECIFICATION (WPS)

Organization Name: Storage Tank Solutions Inc.
Welding Procedure Specification No.: STS-7 (Rev.0) Date: July 8, 2019
Supporting PQR No.(s): STS-7-1 (Rev.0), STS-7-3 (Rev.0), STS-7-4 (Rev.0), STS-7-5 (Rev.0)
Welding Process(es): Submerged Arc Welding (SAW)

JOINTS (QW-402)

Joint Design: All ASME groove & fillet, reference construction drawing for joint details. Where joint details are not specified, refer to figures 1 to 15 attached
Root Opening: As per attached typical groove designs, see figures 1 to 15 attached
Backing: With Retainers: With or without

BASE METALS (QW-403)

P-Number: P1 Groups 1 & 2 To P-Number: P1 Groups 1 & 2
Thickness Range: Groove: 0.125 to 1.750 in. inclusive (1)
Fillet: 0.125 to 8.00 in. inclusive
Pipe Diameter Ranges: Groove: All diameters
Fillet: All diameters
Deposited Weld Metal (Per Pass): 0.250 in. maximum
(1) Reference thickness limitations for tests on welds in fabrication or assembly in ASME B31.3 Table 323.3.1 - Impact Testing Requirements for metals.

FILLER METALS (QW-404)

	SAW
Specification No. (SFA)	SFA 5.17
Flux / Wire Classification	F7A6-EM12K
F-No.	F6
A-No.	A1
Diameter	5/64 to 3/16 in. inclusive
Supplemental Filler Metal	Without
Flux Type	Neutral
Flux Designation	Lincolnweld 882 (2)
Alloy Elements	Without
Alloy Flux	Without
Recrushed Slag	Without
Deposited Weld Metal Thickness Range:	
Groove	1.750 in. max. (3)
Fillet	All fillet sizes

(2) Other flux trade names may be used provided they meet an F7A6 classification
(3) Deposited weld metal thickness shall not exceed 1.750 in.

POSITION (QW-405)

Position of Groove: Flat & Horizontal Position of Fillet: Flat & Horizontal
Weld Progression: N/A

PREHEAT (QW-406)

Preheat Temperature (Minimum) See attached preheat sheet prior to welding.
Interpass Temperature (Maximum) 500 °F
Preheat Maintenance See attached preheat sheet prior to welding. Preheat maintenance is not required if welding is interrupted or after the completion of welding unless required by the code of construction.

POSTWELD HEAT TREATMENT (QW-407)

With or Without Without
Temperature Range N/A Time Range N/A

ELECTRICAL CHARACTERISTICS (QW-409)

Current Direct Polarity Reverse, electrode positive
Amps See Table 1 Volts See Table 1
Maximum Heat Input

Base Metal Thickness Range	SAW Leading head	SAW Trailing Head
0.125 to 0.499 in.	45,300 J/in.	33,887 J/in.
0.500 to 0.624 in.	53,530 J/in.	50,557 J/in.
0.625 in. and greater	65,032 J/in.	46,742 J/in.

TECHNIQUE (QW-410)

Manual or Automatic Machine
Single or Multiple Electrodes Leading and Trailing Heads - Single
Electrode Spacing N/A
String or Weave String
Initial & Interpass Cleaning Brushing, chipping or grinding as required
Method of Back Gouging Air carbon arc, back-grind as required
Oscillation N/A
Contact Tube to Work Distance 0.500 in. - 1.75 in.
Multiple or Single Pass Per Side Multiple
Electrode Spacing N/A
Peening Not permitted
Use of Thermal Process N/A
Travel Speed See Table 1

TABLE 1 - WELDING PARAMETERS

LEADING HEAD							
Process	Filler Metal	Diameter in.	Current Type& Polarity	Amperage Range	Voltage Range	Travel Speed i.p.m.	Wire Feed Speed i.p.m.
SAW	F7A6-EM12K	5/64	DCRP	200 - 500	25 - 32	4.7 - 30	60 - 245
SAW	F7A6-EM12K	3/32	DCRP	250 - 600	25 - 33	5.8 - 32	60 - 245
SAW	F7A6-EM12K	1/8	DCRP	250 - 700	26 - 33	6.0 - 35	45 - 180
SAW	F7A6-EM12K	5/32	DCRP	370 - 800	26 - 34	8.9 - 40	45 - 180
SAW	F7A6-EM12K	3/16	DCRP	500 - 1000	28 - 36	13.0 - 50	30 – 100
TRAILING HEAD							
Process	Filler Metal	Diameter in.	Current Type& Polarity	Amperage Range	Voltage Range	Travel Speed i.p.m.	Wire Feed Speed i.p.m.
SAW	F7A6-EM12K	5/64	DCRP	200 - 500	25 - 32	6.5 - 30	60 - 245
SAW	F7A6-EM12K	3/32	DCRP	250 - 600	25 - 33	8.1 - 32	60 - 245
SAW	F7A6-EM12K	1/8	DCRP	250 - 700	26 - 33	8.4 - 35	45 - 180
SAW	F7A6-EM12K	5/32	DCRP	370 - 800	26 - 34	12.4 - 40	45 - 180
SAW	F7A6-EM12K	3/16	DCRP	500 - 1000	28 - 36	18.0 - 50	30 – 100

Note: Welding parameters shall be adjusted to insure that the maximum heat input value specified in QW-409 above is not exceeded.

Heat Input (joules per inch) = (Amperage X Voltage X 60) / Travel Speed (i.p.m.)

TYPICAL JOINT DESIGNS

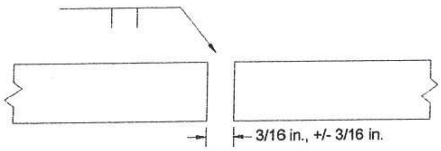


Figure 1
Single Square Butt

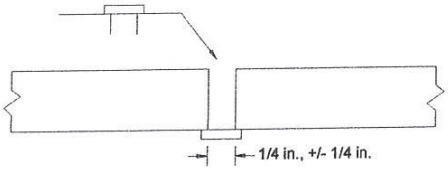


Figure 2
Single Square Butt with Backing Strip

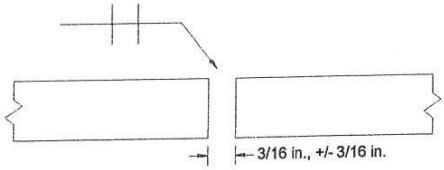


Figure 3
Double Square Butt

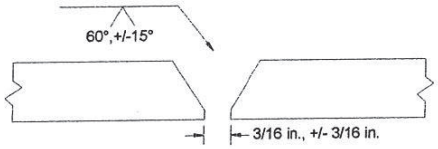


Figure 4
Single Vee Butt

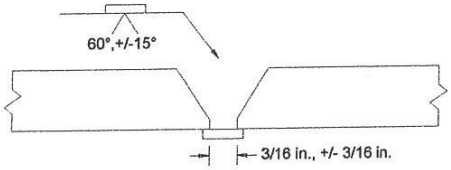


Figure 5
Single Vee Butt with Backing Strip

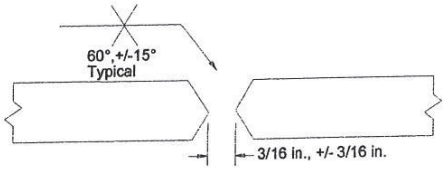


Figure 6
Double Vee Butt

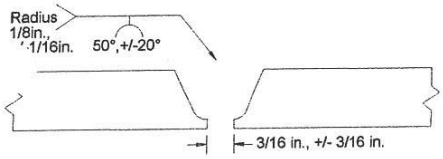


Figure 7
Single U Butt

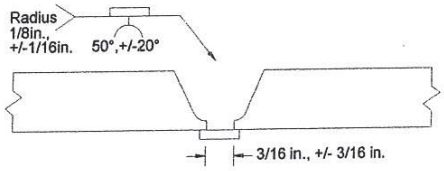


Figure 8
Single U Butt with Backing Strip

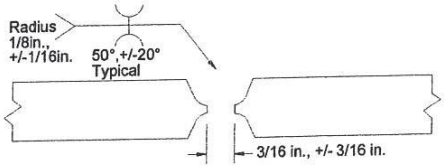


Figure 9
Double U Butt

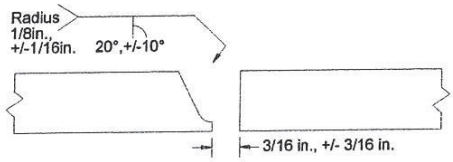


Figure 10
Single J Butt

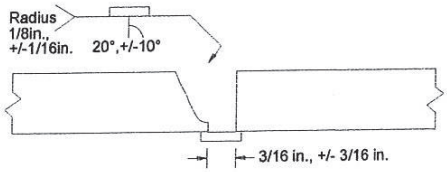


Figure 11
Single J Butt with Backing Strip

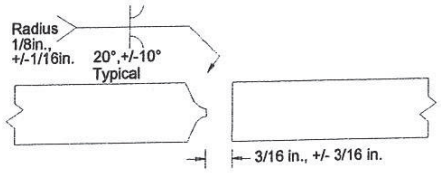


Figure 12
Double J Butt

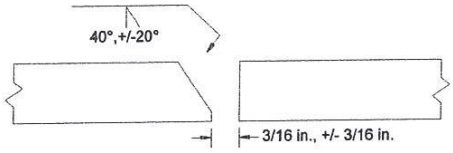


Figure 13
Single Bevel Butt

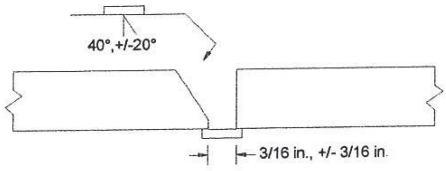


Figure 14
Single Bevel Butt with Backing Strip

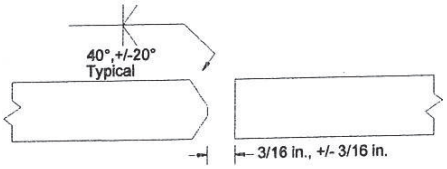


Figure 15
Double Bevel Butt

Additional joint designs and internal misalignment on circumferential welds shall be within the dimensional limits stated on the approved construction drawing and/or the engineering design.

PREHEAT
P-No. 1

LARGE, WELDED, LOW-PRESSURE STORAGE TANKS IN ACCORDANCE WITH API 620 Twelfth Edition, Addendum 1

THICKNESS OF THICKER PLATE	MINIMUM PREHEAT TEMPERATURE	
	P1 Group 1	P1 Group 2
Less than or equal to 1.25 in.	32 °F	50 °F
Greater than 1.25 in to 1.50 in.	50 °F	100 °F
Greater than 1.50 in.	200 °F	200 °F

- No welding of any kind shall be performed when the surfaces to be welded are wet with rain snow or ice; when rain or snow is falling on such surfaces; or during periods of high winds unless the welder and the work are properly shielded.
- Preheat shall be applied when the metal temperature is below the temperature required by Table 6-2 (summarized above). In that case the base metal shall be heated to at least the temperature indicated within 3.0 in. of the place where welding is to be started and maintained 3.0 in. ahead of the arc. Material P-Number and Group Number shall be as designated in ASME IX or in API 630 6.7.2 for materials not listed in ASME IX.

WELDED TANKS FOR OIL STORAGE IN ACCORDANCE WITH API 650 Twelfth Edition, Addendum 2

THICKNESS OF THICKER PLATE	MINIMUM PREHEAT TEMPERATURE	
	Material Group I, II, III, and IIIA	Material Group IV, IVA, V & VI
Less than or equal to 1.25 in.	32 °F	50 °F
Greater than 1.25 in to 1.50 in.	50 °F	100 °F
Greater than 1.50 in.	200 °F	200 °F

- No welding of any kind shall be performed when the surfaces to be welded are wet with rain, snow or ice; when rain or snow is falling on such surfaces; or during periods of high winds unless the welder and the work are properly shielded.
- Preheat shall be applied when metal temperature is below the temperature required by table 7-1 (summarized above) for the base metals being joined, and metal shall be heated to at least the temperature indicated within 3.0 in. of the place where welding is to be started and maintained 3.0 in. ahead of the arc. Material Groups shall be as designated in Table 4.4

QW-483 PROCEDURE QUALIFICATION RECORD (PQR)

Organization Name: Storage Tank Solutions Inc.
Procedure Qualification Record No.: STS-7-1 (Rev.0) Date: February 22, 2019
Welding Process(es): Submerged Arc Welding (SAW)

JOINTS (QW-402)

Joint Design: Butt joint, square groove, see page 2
Root Opening: See page 2
Backing: Without Retainers: Without

BASE METALS (QW-403)

Material Specification No.: SA 516 Type or Grade: Gr. 60/70
Heat Treat Condition (1): SA 516 Gr. 60/70: Normalized
P-No.: P1 Groups 1/2 To P-No.: P1 Groups 1/2 Thickness: 0.250 in.
Heat Number: 429693 29267-03 Carbon Equivalent (2): 0.37
Diameter: N/A Other: Plate product form m/c to 0.250 in.
Deposited Weld Metal (Per Pass): Did not exceed 0.125 in.

(1) Condition of base metal prior to welding.
(2) Per CSA Z662 Carbon Equivalent formula. See chemical composition of heat analysis on attached material test report

FILLER METALS (QW-404)

	SAW
Specification No. (SFA)	SFA 5.17
Flux / Wire Classification	F7A6-EM12K (3)
F-No.	F6
A-No.	A1 (4)
Diameter	See attached sketch
Supplemental Filler Metal	Without
Flux Type	Neutral
Flux Designation	F7A6
Flux Trade Name	Lincolnweld 882
Alloy Elements	Without
Alloy Flux	Without
Recrushed Slag	Without
Deposited Weld Metal Thickness	0.250 in.

(3) The Lincoln Electric Company: Lincolnweld 882M Flux / L-61 Electrode Lot No. 15135168
(4) F7A6-EM12K A-No. established from chemical analysis of SAW weld cap deposit. See attached Laboratory Test Report No.: E19-104.3

POSITION (QW-405)

Position of Groove: 2G Weld Progression: N/A

PREHEAT (QW-406)

Preheat Temperature: 50 °F Interpass Temp. (Max.): N/A
Preheat Maintenance: Weld was allowed to cool to ambient temperature in still air after welding was completed.

POSTWELD HEAT TREATMENT (QW-407)

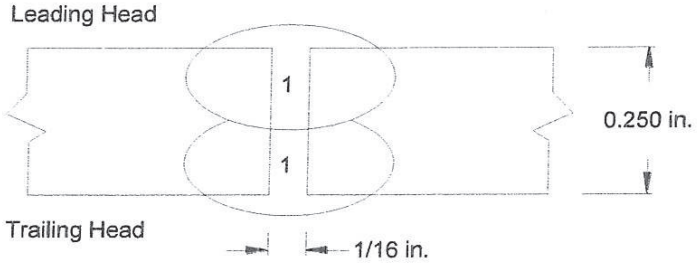
With or Without Without
Temperature N/A Time N/A

ELECTRICAL CHARACTERISTICS (QW-409)

Current Direct Polarity Reverse, electrode positive
Amps See below Volts See below

TECHNIQUE (QW-410)

Manual or Automatic	Machine
Single or Multiple Electrodes	Single - Leading and Trailing Head
Electrode Spacing	2.0 in.
Multiple or Single Heads	Multiple – One on each side of the joint
Multiple or Single Pass Per Side	Multiple
String or Weave	String
Contact Tube to Work Distance	0.750 in. - 1.00 in.
Travel Speed	See below
Initial & Interpass Cleaning	Brushing, chipping and grinding as required
Method of Back Gouging	Not conducted
Peening	Not conducted
Oscillation	N/A
Use of Thermal Process	N/A



Pass	Process	Filler Metal	Diameter in.	Current Type & Polarity	Amperage Range	Voltage Range	Travel Speed i.p.m.
Leading Head							
1	SAW	F7A6-EM12K	3/32	DCRP	370 - 390	29 - 31	24.0
Trailing Head							
1	SAW	F7A6-EM12K	3/32	DCRP	300 - 310	27 - 29	21.4

PQR NO. STS-7-1 (Rev.0)

TENSILE TEST (QW-150)

Sample No.	Width in.	Thickness in.	Area sq. in.	Ultimate Load lbf	Ultimate Stress psi	Fracture Type & Location
T1	0.752	0.226	0.170	12,900	76,200	Partial Cup & Cone Parent Metal
T2	0.748	0.223	0.167	12,700	75,900	Partial Cup & Cone Parent Metal

GUIDED BEND TEST (QW-160)

Type & Figure No.	Result	Type & Figure No.	Result
QW-462.3a, TRB - R1	Pass	QW-462.3a, TFB - F1	Pass
QW-462.3a, TRB - R2	Pass	QW-462.3a, TFB - F2	Pass

OTHER TESTS

Vickers Hardness - see attached Laboratory Test Report No.: E19-104.1
Chemical Analysis (SAW Cap) - see attached Laboratory Test Report No.: E19-104.3

Welder's Name Matthew MacKenzie & Christopher Jaques
Certificate File No. N/A
Tests Conducted By SGS Canada Inc.
Laboratory Test No. E19-104.1

We certify the statements in this record are correct and that the test welds were prepared, welded and tested in accordance with the requirements of Section IX of the ASME Code.

Organization Storage Tank Solutions Inc.

Date _____ Print _____

Signed _____

QW-483 PROCEDURE QUALIFICATION RECORD (PQR)

Organization Name: Storage Tank Solutions Inc.
Procedure Qualification Record No.: STS-7-3 (Rev.0) Date: February 22, 2019
Welding Process(es): Submerged Arc Welding (SAW)

JOINTS (QW-402)

Joint Design: Butt joint, double bevel groove, see page 2
Root Opening: See page 2
Backing: Without Retainers: Without

BASE METALS (QW-403)

Material Specification No.: SA 516 Type or Grade: Gr. 60/70
Heat Treat Condition (1): SA 516 Gr. 60/70: Normalized
P-No.: P1 Groups 1/2 To P-No.: P1 Groups 1/2 Thickness: 0.875 in.
Heat Number: 454840 27789-02 Carbon Equivalent (2): 0.37
Diameter: N/A Other: Plate product form
Deposited Weld Metal (Per Pass): Did not exceed 0.188 in.

(1) Condition of base metal prior to welding.
(2) Per CSA Z662 Carbon Equivalent formula. See chemical composition of heat analysis on attached material test report

FILLER METALS (QW-404)

	SAW
Specification No. (SFA)	SFA 5.17
Flux / Wire Classification	F7A6-EM12K (3)
F-No.	F6
A-No.	A1 (4)
Diameter	See attached sketch
Supplemental Filler Metal	Without
Flux Type	Neutral
Flux Designation	F7A6
Flux Trade Name	Lincolnweld 882
Alloy Elements	Without
Alloy Flux	Without
Recrushed Slag	Without
Deposited Weld Metal Thickness	0.875 in.

(3) The Lincoln Electric Company: Lincolnweld 882M Flux / L-61 Electrode Lot No. 15135168
(4) F7A6-EM12K A-No. established from chemical analysis of SAW weld cap deposit. See attached Laboratory Test Report No.: E19-104.3

POSITION (QW-405)

Position of Groove: 2G Weld Progression: N/A

PREHEAT (QW-406)

Preheat Temperature: 50 °F Interpass Temp. (Max.): 500 °F
Preheat Maintenance: Weld was allowed to cool to ambient temperature in still air after welding was completed.

POSTWELD HEAT TREATMENT (QW-407)

With or Without: Without

Temperature: N/A Time: N/A

ELECTRICAL CHARACTERISTICS (QW-409)

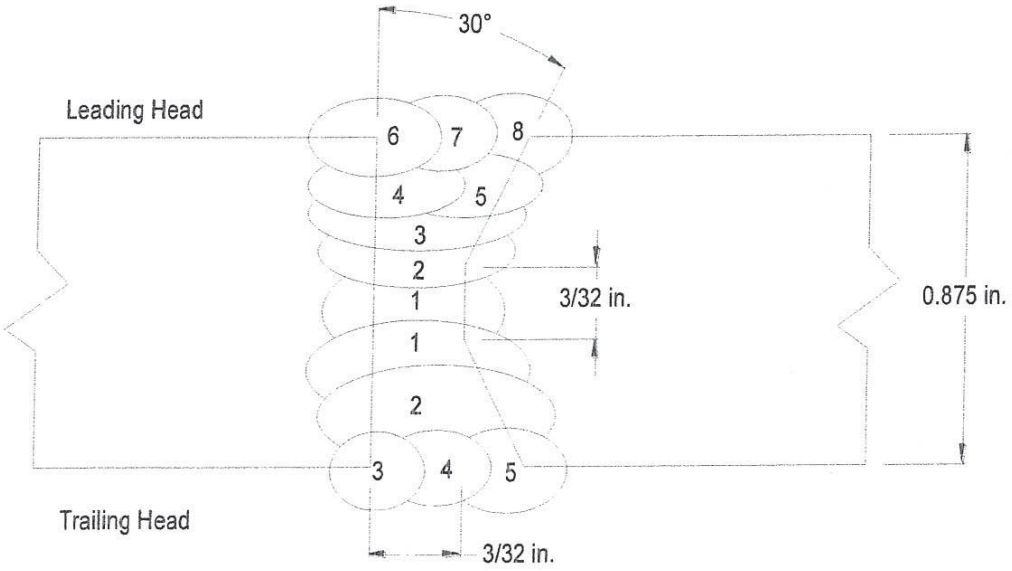
Current: Direct Polarity: Reverse, electrode positive

Amps: See next page Volts: See next page

Heat Input: Leading head: 65,032 J/in. maximum Trailing Head: 46,742 J/in. maximum

TECHNIQUE (QW-410)

Manual or Automatic	Machine
Single or Multiple Electrodes	Single - Leading and Trailing Head
Electrode Spacing	2.0 in.
Multiple or Single Heads	Multiple – One on each side of the joint
Multiple or Single Pass Per Side	Multiple
String or Weave	String
Contact Tube to Work Distance	0.750 in. - 1.00 in.
Travel Speed	See below
Initial & Interpass Cleaning	Brushing, chipping and grinding as required
Method of Back Gouging	Not conducted
Peening	Not conducted
Oscillation	N/A
Use of Thermal Process	N/A



Pass	Process	Filler Metal	Diameter in.	Current Type & Polarity	Amperage Range	Voltage Range	Travel Speed i.p.m.
Leading Head							
1	SAW	F7A6-EM12K	3/32	DCRP	370 - 390	30 - 32	17.6
2	SAW	F7A6-EM12K	3/32	DCRP	380 - 400	30 - 32	14.7
3	SAW	F7A6-EM12K	3/32	DCRP	410 - 430	31 - 33	14.1
4	SAW	F7A6-EM12K	3/32	DCRP	405 - 415	30 - 32	14.1
5	SAW	F7A6-EM12K	3/32	DCRP	440 - 450	31 - 33	14.1
6	SAW	F7A6-EM12K	3/32	DCRP	410 - 430	31 - 33	12.4
7	SAW	F7A6-EM12K	3/32	DCRP	400 - 420	31 - 33	15.3
8	SAW	F7A6-EM12K	3/32	DCRP	410 - 430	31 - 33	14.1
Trailing Head							
1	SAW	F7A6-EM12K	3/32	DCRP	350 - 370	27 - 29	17.6
2	SAW	F7A6-EM12K	3/32	DCRP	330 - 340	27 - 29	14.7
3	SAW	F7A6-EM12K	3/32	DCRP	340 - 350	27 - 29	12.4
4	SAW	F7A6-EM12K	3/32	DCRP	310 - 330	27 - 29	15.3
5	SAW	F7A6-EM12K	3/32	DCRP	270 - 280	27 - 29	14.7

PQR NO. STS-7-3 (Rev.0)

TENSILE TEST (QW-150)

Sample No.	Width in.	Thickness in.	Area sq. in.	Ultimate Load lbf	Ultimate Stress psi	Fracture Type & Location
T1	0.748	0.819	0.613	46,600	76,200	Partial Cup & Cone Weld Metal
T2	0.748	0.819	0.613	47,000	76,700	Partial Cup & Cone Weld Metal

GUIDED BEND TEST (QW-160)

Type & Figure No.	Result	Type & Figure No.	Result
QW-462.2, TSB - S1	Pass	QW-462.2, TSB - S3	Pass
QW-462.2, TSB - S2	Pass	QW-462.2, TSB - S4	Pass

CHARPY V-NOTCH IMPACT TEST

Type of Test Charpy V-Notch Orientation Transverse

Governing Specification	Notch Location	Specimen Size in.	Test Temperature ° F	Specimen Number	Impact Values ft•lbf
ASME VIII Div.1 - 2017 & ASME B31.3 - 2016	Weld metal within 1/16 in. from wed surface	0.394 x 0.394	-50	C2.1	102
				C2.2	17
				C2.3	75
ASME VIII Div.1 - 2017 & ASME B31.3 - 2016	HAZ within 1/4 to 1/2T of cap side	0.394 x 0.394	-50	C3.1	192
				C3.2	231
				C3.3	61
ASME VIII Div.1 - 2017 & ASME B31.3 - 2016	HAZ within 1/4 to 1/2T of opposite cap side	0.394 x 0.394	-50	C4.1	75
				C4.2	135
				C4.3	170

OTHER TESTS

Vickers Hardness - see attached Laboratory Test Report No.: E19-104.3
Chemical Analysis (SAW Cap) - see attached Laboratory Test Report No.: E19-104.3

Welder's Name Matthew MacKenzie & Christopher Jaques
Certificate File No. N/A
Tests Conducted By SGS Canada Inc.
Laboratory Test No. E19-104.3

We certify the statements in this record are correct and that the test welds were prepared, welded and tested in accordance with the requirements of Section IX of the ASME Code.

Organization Storage Tank Solutions Inc.

Date _____ Print _____

Signed _____

QW-483 PROCEDURE QUALIFICATION RECORD (PQR)

Organization Name: Storage Tank Solutions Inc.
Procedure Qualification Record No.: STS-7-4 (Rev.0) Date: June 11, 2019
Welding Process(es): Submerged Arc Welding (SAW)

JOINTS (QW-402)

Joint Design: Butt joint, square groove, see page 2
Root Opening: See page 2
Backing: Without Retainers: Without

BASE METALS (QW-403)

Material Specification No.: SA 516 Type or Grade: Gr. 60/70
Heat Treat Condition (1): SA 516 Gr. 60/70: Normalized
P-No.: P1 Groups 1/2 To P-No.: P1 Groups 1/2 Thickness: 0.250 in.
Heat Number: 429693 29267-03 Carbon Equivalent (2): 0.37
Diameter: N/A Other: Plate product form m/c to 0.250 in.
Deposited Weld Metal (Per Pass): Did not exceed 0.188 in.

(1) Condition of base metal prior to welding.
(2) Per CSA Z662 Carbon Equivalent formula. See chemical composition of heat analysis on attached material test report

FILLER METALS (QW-404)

	SAW
Specification No. (SFA)	SFA 5.17
Flux / Wire Classification	F7A6-EM12K (3)
F-No.	F6
A-No.	A1 (4)
Diameter	See attached sketch
Supplemental Filler Metal	Without
Flux Type	Neutral
Flux Designation	F7A6
Flux Trade Name	Lincolnweld 882
Alloy Elements	Without
Alloy Flux	Without
Recrushed Slag	Without
Deposited Weld Metal Thickness	0.250 in.

(3) The Lincoln Electric Company: Lincolnweld 882M Flux / L-61 Electrode Lot No. 15135168
(4) F7A6-EM12K A-No. established from chemical analysis of SAW weld cap deposit. See attached Laboratory Test Report No.: E19-104.3

POSITION (QW-405)

Position of Groove: 2G Weld Progression: N/A

PREHEAT (QW-406)

Preheat Temperature: 50 °F Interpass Temp. (Max.): 400 °F
Preheat Maintenance: Weld was allowed to cool to ambient temperature in still air after welding was completed.

PQR NO. STS-7-4 (Rev.0)

POSTWELD HEAT TREATMENT (QW-407)

With or Without Without

Temperature N/A Time N/A

ELECTRICAL CHARACTERISTICS (QW-409)

Current Direct Polarity Reverse, electrode positive

Amps See below Volts See below

Heat Input Leading head: 45,300 J/in. maximum Trailing Head: 33,887 J/in. maximum

TECHNIQUE (QW-410)

Manual or Automatic Machine

Single or Multiple Electrodes Single - Leading and Trailing Head

Electrode Spacing 3.50 in.

Multiple or Single Heads Multiple – One on each side of the joint

Multiple or Single Pass Per Side Multiple

String or Weave String

Contact Tube to Work Distance 0.750 in. - 1.00 in.

Travel Speed See below

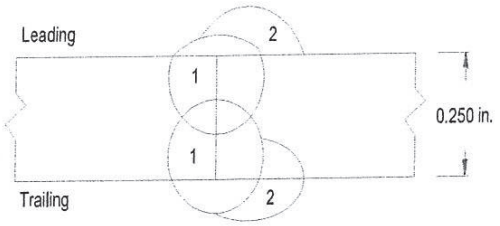
Initial & Interpass Cleaning Brushing, chipping and grinding as required

Method of Back Gouging Not conducted

Peening Not conducted

Oscillation N/A

Use of Thermal Process N/A



Pass	Process	Filler Metal	Diameter in.	Current Type & Polarity	Amperage Range	Voltage Range	Travel Speed i.p.m.
Leading Head							
1	SAW	F7A6-EM12K	3/32	DCRP	365 - 390	29 - 31	15.0
2	SAW	F7A6-EM12K	3/32	DCRP	370 - 400	27 - 30	16.4
Trailing Head							
1	SAW	F7A6-EM12K	3/32	DCRP	295 - 310	27 - 29	15.0
2	SAW	F7A6-EM12K	3/32	DCRP	310 - 340	27 - 30	16.4

Note: Monitored parameters provided by Storage Tank Solutions Inc.

PQR NO. STS-7-4 (Rev.0)

CHARPY V-NOTCH IMPACT TEST

Type of Test Charpy V-Notch Orientation Transverse

Governing Specification	Notch Location	Specimen Size in.	Test Temperature ° F	Specimen Number	Impact Values ft•lbf
ASME VIII Div.1 - 2017 & ASME B31.3 - 2016	Weld metal within 1/16 in. of root	0.394 x 0.197	-60	A2.1	35
				A2.2	25
				A2.3	20
ASME VIII Div.1 - 2017 & ASME B31.3 - 2016	HAZ @ Middle 1/2t	0.394 x 0.197	-60	A3.1	8
				A3.2	56
				A3.3	7

OTHER TESTS

Vickers Hardness - see attached Laboratory Test Report No.: E19-285.2
Chemical Analysis (SAW Cap) - see attached Laboratory Test Report No.: E19-104.3

Welder's Name Matthew MacKenzie & Christopher Jaques
Certificate File No. N/A
Tests Conducted By SGS Canada Inc.
Laboratory Test No. E19-285.2

We certify the statements in this record are correct and that the test welds were prepared, welded and tested in accordance with the requirements of Section IX of the ASME Code.

Organization Storage Tank Solutions Inc.

Date _____ Print _____

Signed _____

QW-483 PROCEDURE QUALIFICATION RECORD (PQR)

Organization Name: Storage Tank Solutions Inc.
Procedure Qualification Record No.: STS-7-5 (Rev.0) Date: June 11, 2019
Welding Process(es): Submerged Arc Welding (SAW)

JOINTS (QW-402)

Joint Design: Butt joint, single bevel groove, see page 2
Root Opening: See page 2
Backing: Without Retainers: Without

BASE METALS (QW-403)

Material Specification No.: SA 516 Type or Grade: Gr. 60/70
Heat Treat Condition (1): SA 516 Gr. 60/70: Normalized
P-No.: P1 Groups 1/2 To P-No.: P1 Groups 1/2 Thickness: 0.500 in.
Heat Number: 459852 56930-01 Carbon Equivalent (2): 0.38
Diameter: N/A Other: Plate product form
Deposited Weld Metal (Per Pass): Did not exceed 0.188 in.

(1) Condition of base metal prior to welding.
(2) Per CSA Z662 Carbon Equivalent formula. See chemical composition of heat analysis on attached material test report

FILLER METALS (QW-404)

	SAW
Specification No. (SFA)	SFA 5.17
Flux / Wire Classification	F7A6-EM12K (3)
F-No.	F6
A-No.	A1 (4)
Diameter	See attached sketch
Supplemental Filler Metal	Without
Flux Type	Neutral
Flux Designation	F7A6
Flux Trade Name	Lincolnweld 882
Alloy Elements	Without
Alloy Flux	Without
Recrushed Slag	Without
Deposited Weld Metal Thickness	0.500 in.

(3) The Lincoln Electric Company: Lincolnweld 882M Flux / L-61 Electrode Lot No. 15135168
(4) F7A6-EM12K A-No. established from chemical analysis of SAW weld cap deposit. See attached Laboratory Test Report No.: E19-104.3

POSITION (QW-405)

Position of Groove: 2G Weld Progression: N/A

PREHEAT (QW-406)

Preheat Temperature: 50 °F Interpass Temp. (Max.): 500 °F
Preheat Maintenance: Weld was allowed to cool to ambient temperature in still air after welding was completed.

PQR NO. STS-7-5 (Rev.0)

POSTWELD HEAT TREATMENT (QW-407)

With or Without Without

Temperature N/A Time N/A

ELECTRICAL CHARACTERISTICS (QW-409)

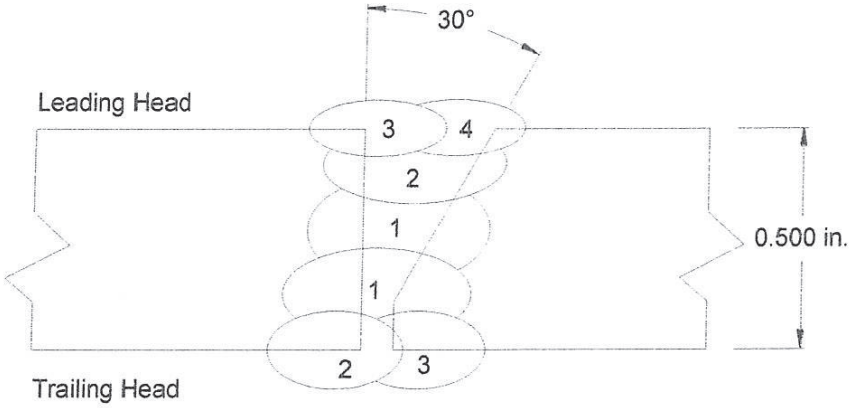
Current Direct Polarity Reverse, electrode positive

Amps See below Volts See below

Heat Input Leading head: 53,530 J/in. maximum Trailing Head: 50,557 J/in. maximum

TECHNIQUE (QW-410)

Manual or Automatic	Machine
Single or Multiple Electrodes	Single - Leading and Trailing Head
Electrode Spacing	2.50 in.
Multiple or Single Heads	Multiple -- One on each side of the joint
Multiple or Single Pass Per Side	Multiple
String or Weave	String
Contact Tube to Work Distance	0.750 in. - 1.00 in.
Travel Speed	See below
Initial & Interpass Cleaning	Brushing, chipping and grinding as required
Method of Back Gouging	Not conducted
Peening	Not conducted
Oscillation	N/A
Use of Thermal Process	N/A



Pass	Process	Filler Metal	Diameter in.	Current Type & Polarity	Amperage Range	Voltage Range	Travel Speed i.p.m.
Leading Head							
1	SAW	F7A6-EM12K	3/32	DCRP	350 - 370	27 - 30	11.5
2	SAW	F7A6-EM12K	3/32	DCRP	360 - 380	27 - 30	12.0
3	SAW	F7A6-EM12K	3/32	DCRP	380 - 400	27 - 30	14.2
4	SAW	F7A6-EM12K	3/32	DCRP	390 - 410	27 - 30	14.2
Trailing Head							
1	SAW	F7A6-EM12K	3/32	DCRP	330 - 350	27 - 30	11.5
2	SAW	F7A6-EM12K	3/32	DCRP	340 - 360	27 - 30	12.0
3	SAW	F7A6-EM12K	3/32	DCRP	350 - 370	27 - 30	14.2

Note: Monitored parameters provided by Storage Tank Solutions Inc.

PQR NO. STS-7-5 (Rev.0)

CHARPY V-NOTCH IMPACT TEST

Type of Test Charpy V-Notch Orientation Transverse

Governing Specification	Notch Location	Specimen Size in.	Test Temperature ° F	Specimen Number	Impact Values ft•lbf
ASME VIII Div.1 - 2017 & ASME B31.3 - 2016	Weld metal within 1/16 in. of root	0.394 x 0.394	-50	B2.1	84
				B2.2	51
				B2.3	74
ASME VIII Div.1 - 2017 & ASME B31.3 - 2016	HAZ @ Middle 1/2t	0.394 x 0.394	-50	B3.1	136
				B3.2	131
				B3.3	119

OTHER TESTS

Vickers Hardness - see attached Laboratory Test Report No.: E19-285.2
Chemical Analysis (SAW Cap) - see attached Laboratory Test Report No.: E19-104.3

Welder's Name Matthew MacKenzie & Christopher Jaques
Certificate File No. N/A
Tests Conducted By SGS Canada Inc.
Laboratory Test No. E19-285.2

We certify the statements in this record are correct and that the test welds were prepared, welded and tested in accordance with the requirements of Section IX of the ASME Code.

Organization Storage Tank Solutions Inc.

Date _____ Print _____

Signed _____

TENSILE / BEND TEST

Customer: **Storage Tank Solutions Inc.**
9 Well Head Street
Devon, Alberta
T9G 1Z6

Laboratory Test No.: E19-104.1
Date: March 8, 2019

Attention: Sebastien Ouellet

PQR No.:	STS-7-1 (Rev. 0)	**Material Heat No.:**	429693 29249-03
Material:	SA 516 Gr. 60/70	**Weld Type:**	Double Sided
Material Thickness:	6.35 mm (0.250 in.)		
Welding Process:	SAW		
Weld Thickness:	6.35 mm (0.250 in.)		
Thermal Condition:	As Welded		

Governing Spec.: ASME Section IX - 2017

Instrument: Satec S/N: 1308

SAMPLE NO.(QW-150)	T1		T2	
WIDTH mm (in.)	19.1	(0.752)	19.0	(0.748)
THICKNESS mm (in.)	5.73	(0.226)	5.66	(0.223)
AREA sq. mm (sq. in.)	109	(0.170)	108	(0.167)
ULTIMATE LOAD N (lbf)	57 518	(12,900)	56 272	(12,700)
ULTIMATE STRESS MPa (psi)	526	(76,200)	523	(75,900)
FRACTURE TYPE	Partial Cup & Cone		Partial Cup & Cone	
FRACTURE LOCATION	Parent Metal		Parent Metal	

Note: Imperial values calculated by direct conversion.

SAMPLE TYPE(QW-462.3a)	Face Bend	Face Bend	Root Bend	Root Bend
SAMPLE NO.	F1	F2	R1	R2
RESULTS	Pass	Pass	Pass	Pass

Test Conducted By: Ibrahim Mohamoud (Edmonton)

Certified By: _____
Eric Dacyk, C.E.T.

ANAB ACCREDITED
TESTING LABORATORY
Certification # L2057.01-1

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7925 Davies Road Edmonton, AB T6E 4N1 t +1 (780) 468-3030 f +1 (780) 468-3032 www.sgs.com

HARDNESS TEST

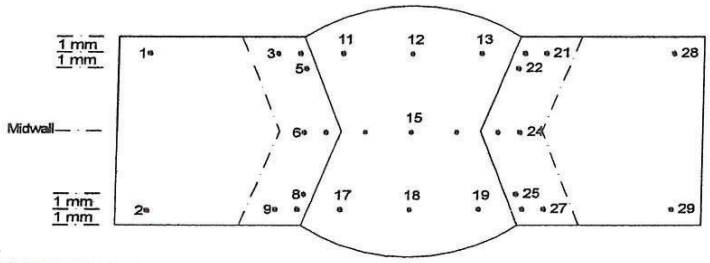
Customer: **Storage Tank Solutions Inc.**
9 Well Head Street
Devon, Alberta
T9G 1Z6

Laboratory Test No.: E19-104.1
Date: March 8, 2019

Attention: Sebastien Ouellet

PQR No.:	STS-7-1 (Rev. 0)	**Material Heat No.:**	429693 29249-03
Material:	SA 516 Gr. 60/70	**Weld Type:**	Double Sided
Material Thickness:	6.35 mm (0.250 in.)		
Welding Process:	SAW		
Weld Thickness:	6.35 mm (0.250 in.)		
Thermal Condition:	As Welded		

Type of Test:	*Vickers 10 kg (HV10)*	*Instrument:*	*Buehler 5112*
Governing Spec.:	*ASTM E92 - 17 & ANSI/NACE MR0175/ISO 15156:2015*	*Calibration Date:*	*July 27, 2018*



Parent Metal		HAZ		Weld Metal		HAZ		Parent Metal	
1	154	*3*	170	*11*	175	*20*	167	*28*	158
2	160	*4*	197	*12*	180	*21*	166	*29*	160
		5	199	*13*	173	*22*	186		
		6	186	*14*	175	*23*	214		
		7	195	*15*	192	*24*	207		
		8	188	*16*	193	*25*	191		
		9	167	*17*	175	*26*	179		
		10	182	*18*	176	*27*	168		
				19	185				

Test Conducted By: Tong Zhao (Edmonton)

Certified By: _____
Eric Dacyk, C.E.T.

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SGS

TENSILE / BEND TEST

Customer: **Storage Tank Solutions Inc.**
9 Well Head Street
Devon, Alberta
T9G 1Z6

Laboratory Test No.: E19-104.3
Date: March 15, 2019

Attention: Sebastien Ouellet

PQR No.:	STS-7-3 (Rev. 0)	**Material Heat No.:**	454840 27789-02
Material:	SA 516 Gr. 60/70	**Weld Type:**	Double Sided
Material Thickness:	22.2 mm (0.875 in.)		
Weld Process:	SAW		
Weld Thickness:	22.2 mm (0.875 in.)		
Thermal Condition:	As Welded		

Governing Spec.: ASME Section IX - 2017

Instrument: Tinius Olsen S/N: 133660

SAMPLE NO.(QW-150)	T1		T2	
WIDTH mm (in.)	19.0	(0.748)	19.0	(0.748)
THICKNESS mm (in.)	20.8	(0.819)	20.8	(0.819)
AREA sq. mm (sq. in.)	395	(0.613)	395	(0.613)
ULTIMATE LOAD N (lbf)	207 501	(46,600)	209 027	(47,000)
ULTIMATE STRESS MPa (psi)	525	(76,200)	529	(76,700)
FRACTURE TYPE	Partial Cup & Cone		Partial Cup & Cone	
FRACTURE LOCATION	Weld Metal		Weld Metal	

Note: Imperial values calculated by direct conversion.

SAMPLE TYPE(QW-462.2)	Side Bend	Side Bend	Side Bend	Side Bend
SAMPLE NO.	S1	S2	S3	S4
RESULTS	Pass	Pass	Pass	Pass

Test Conducted By: Mohamed Botan (Edmonton)

Certified By: _____
Eric Dacyk, C.E.T.

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TESTING LABORATORY
Certification # L2037.01-1

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CHARPY V-NOTCH IMPACT TEST

Customer: **Storage Tank Solutions Inc.**
9 Well Head Street
Devon, Alberta
T9G 1Z6

Laboratory Test No.: E19-104.3
Date: March 15, 2019

Attention: Sebastien Ouellet

PQR No.:	STS-7-3 (Rev. 0)	**Material Heat No.:**	454840 27789-02
Material:	SA 516 Gr. 60/70	**Weld Type:**	Double Sided
Material Thickness:	22.2 mm (0.875 in.)		
Weld Process:	SAW		
Weld Thickness:	22.2 mm (0.875 in.)		
Thermal Condition:	As Welded		

Specimen Size:	*10 x 10 mm (0.394 x 0.394 in.)*	*Machine:*	*Satec SI-1K3, S/N: 1503*
Orientation:	*Transverse*	*Capacity:*	*407 J (300 ft·lbf)*
Test Temperature:	*-46 °C (-50 °F)*	*Verified Range:*	*3.4-325 J (2.5-240 ft·lbf)*
Governing Spec.:	*ASME Section VIII, Div. I, UG-84 - 2017 & ASME B31.3-2016*	*Calibration Date:*	*March 19, 2018*

Specimen Number	Notch Location	Impact Values Joules	(ft·lbf)
C2.1	Weld Metal within 1.5mm (1/16") from weld surface	138	(102)
C2.2		23	(17)
C2.3		102	(75)
C3.1	HAZ within 1/4 to 1/2T of cap side	260	(192)
C3.2		313	(231)
C3.3		83	(61)
C4.1	HAZ within 1/4 to 1/2T of opposite cap side	102	(75)
C4.2		183	(135)
C4.3		230	(170)

Note: Metric values calculated by direct conversion.

Test Conducted By: Tong Zhao (Edmonton)

Certified By: _____
Eric Dacyk, C.E.T.

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Certification # L2057.01-1

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HARDNESS TEST

Customer: **Storage Tank Solutions Inc.**
9 Well Head Street
Devon, Alberta
T9G 1Z6

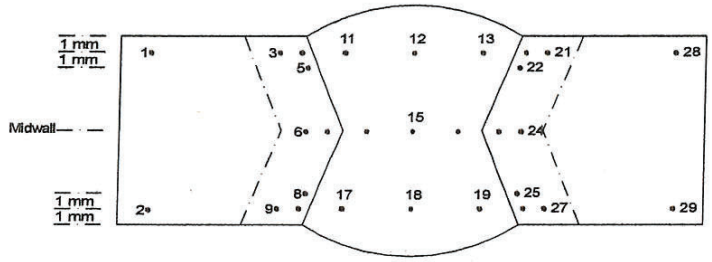
Laboratory Test No.: E19-104.3
Date: March 15, 2019

Attention: Sebastien Ouellet

PQR No.:	STS-7-3 (Rev. 0)	**Material Heat No.:**	454840 27789-02
Material:	SA 516 Gr. 60/70	**Weld Type:**	Double Sided
Material Thickness:	22.2 mm (0.875 in.)		
Weld Process:	SAW		
Weld Thickness:	22.2 mm (0.875 in.)		
Thermal Condition:	As Welded		

Type of Test: *Vickers 10 kg (HV10)*
Governing Spec.: *ASTM E92 - 17 & ANSI/NACE MR0175/ISO 15156:2015*

Instrument: *Buehler 5112*
Calibration Date: *July 27, 2018*



Parent Metal		HAZ		Weld Metal		HAZ		Parent Metal	
1	166	*3*	162	*11*	156	*20*	186	*28*	157
2	157	*4*	181	*12*	152	*21*	156	*29*	160
		5	188	*13*	169	*22*	205		
		6	155	*14*	161	*23*	178		
		7	159	*15*	163	*24*	158		
		8	185	*16*	156	*25*	208		
		9	174	*17*	165	*26*	201		
		10	184	*18*	147	*27*	155		
				19	164				

Test Conducted By: Ibrahim Mohamoud (Edmonton)

Certified By: _____
Eric Dacyk, C.E.T.

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ISO/IEC 17025
TESTING LABORATORY
Certification # L2057.01-1

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CHEMICAL ANALYSIS

Customer: **Storage Tank Solutions Inc.**
9 Well Head Street
Devon, Alberta
T9G 1Z6

Laboratory Test No.: E19-104.3
Date: March 13, 2019

Attention: Sebastien Ouellet

PQR No.:	STS-7-3 (Rev. 0)	**Material Heat No.:**	454840 27789-02
Material:	SA 516 Gr. 60/70	**Weld Type:**	Double Sided
Material Thickness:	22.2 mm (0.875 in.)		
Weld Process:	SAW		
Weld Thickness:	22.2 mm (0.875 in.)		
Thermal Condition:	As Welded		

Instrument: *Shimadzu PDA-7000 Optical Emission Spectrometer*
Calibration Date: *September 26, 2018*
Governing Spec.: *ASTM E415-17*

	% by Weight
Carbon	0.07
Manganese	1.19
Sulphur	0.007
Phosphorus	0.011
Silicon	0.44
Chromium	0.03
Nickel	0.02
Molybdenum	0.01
Copper	0.10
Niobium	<0.01
Vanadium	0.01
Aluminum	0.02
Titanium	<0.01
Boron	<0.0004

Test Conducted By: Kamaldeep Brar (Calgary)

Certified By: _____
Eric Dacyk, C.E.T.

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CHARPY V-NOTCH IMPACT TEST

Customer: **Storage Tank Solutions Inc.**
9 Well Head Street
Devon, Alberta
T9G 1Z6

Laboratory Test No.: E19-00285.1
Date: June 26, 2019

Attention: Sebastien Ouellet

PQR No.:	STS-7-4 (Rev. 0)	**Material Heat No.:**	429693 29267-03
Material:	SA 516 Gr. 60/70	**Weld Type:**	Double Sided
Material Thickness:	6.35 mm (0.250 in.)		
Welding Process:	SAW		
Weld Thickness:	6.35 mm (0.250 in.)		
Thermal Condition:	As Welded		

Specimen Size:	*10 x 5 mm (0.394 x 0.197 in.)*	*Machine:*	*Satec SI-1K3, S/N: 1503*
Orientation:	*Transverse*	*Capacity:*	*407 J (300 ft·lbf)*
Test Temperature:	*-51 °C (-60 °F)*	*Verified Range:*	*3.4-325 J (2.5-240 ft·lbf)*
Governing Spec.:	*ASME B31.3 – 2016 & ASME VIII, Div.1, UG-84 - 2017*	*Calibration Date:*	*March 19, 2019*

Specimen Number	Notch Location	Impact Values Joules	(ft·lbf)
A2.1	Weld Metal within 1.5mm (1/16") of root	47	(35)
A2.2		34	(25)
A2.3		27	(20)
A3.1	HAZ @ Middle 1/2t	11	(8)
A3.2		76	(56)
A3.3		9	(7)

Note: Metric values calculated by direct conversion.

Test Conducted By: Mohamed Botan (Edmonton)

Certified By: _____
Eric Dacyk, C.E.T.

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HARDNESS TEST

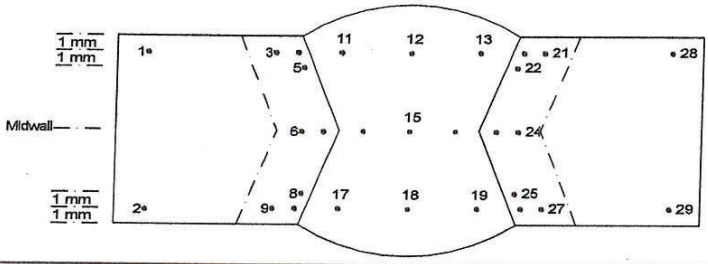
Customer: **Storage Tank Solutions Inc.**
9 Well Head Street
Devon, Alberta
T9G 1Z6

Laboratory Test No.: E19-00285.1
Date: June 27, 2019

Attention: Sebastien Ouellet

PQR No.:	STS-7-4 (Rev. 0)	**Material Heat No.:**	429693 29267-03
Material:	SA 516 Gr. 60/70	**Weld Type:**	Double Sided
Material Thickness:	6.35 mm (0.250 in.)		
Welding Process:	SAW		
Weld Thickness:	6.35 mm (0.250 in.)		
Thermal Condition:	As Welded		

Type of Test: *Vickers 10 kg (HV10)* *Instrument:* *Buehler 5112*
Governing Spec.: *ASTM E92 - 17 & ANSI/NACE MR0175/ISO 15156:2015* *Calibration Date:* *July 27, 2018*



Parent Metal		HAZ		Weld Metal		HAZ		Parent Metal	
1	160	*3*	167	*11*	173	*20*	176	*28*	154
2	163	*4*	182	*12*	163	*21*	160	*29*	154
		5	185	*13*	167	*22*	170		
		6	167	*14*	174	*23*	179		
		7	176	*15*	163	*24*	170		
		8	178	*16*	166	*25*	202		
		9	169	*17*	180	*26*	196		
		10	188	*18*	175	*27*	161		
				19	180				

Test Conducted By: Ibrahim Mohamoud (Edmonton)

Certified By: _____
Eric Dacyk, C.E.T.

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CHARPY V-NOTCH IMPACT TEST

Customer: **Storage Tank Solutions Inc.**
9 Well Head Street
Devon, Alberta
T9G 1Z6

Laboratory Test No.: E19-00285.2
Date: June 26, 2019

Attention: Sebastien Ouellet

PQR No.:	STS-7-5 (Rev. 0)	**Material Heat No.:**	459852 56930-01
Material:	SA 516 Gr. 60/70	**Weld Type:**	Double Sided
Material Thickness:	12.7 mm (0.500 in.)		
Welding Process:	SAW		
Weld Thickness:	12.7 mm (0.500 in.)		
Thermal Condition:	As Welded		

Specimen Size:	*10 x 10 mm (0.394 x 0.394 in.)*	*Machine:*	*Satec SI-1K3, S/N: 1503*
Orientation:	*Transverse*	*Capacity:*	*407 J (300 ft·lbf)*
Test Temperature:	*-46 °C (-50 °F)*	*Verified Range:*	*3.4-325 J (2.5-240 ft·lbf)*
Governing Spec.:	*ASME B31.3 – 2016 & ASME Section VIII, Div. I, UG-84 - 2017*	*Calibration Date:*	*March 19, 2019*

Specimen Number	Notch Location	Impact Values Joules	(ft·lbf)
B2.1	Weld Metal within 1.5mm (1/16") of root	114	(84)
B2.2		69	(51)
B2.3		100	(74)
B3.1	HAZ @ Middle 1/2t	184	(136)
B3.2		178	(131)
B3.3		161	(119)

Note: Metric values calculated by direct conversion.

Test Conducted By: Mohamed Botan (Edmonton)

Certified By: _____
Eric Dacyk, C.E.T.

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HARDNESS TEST

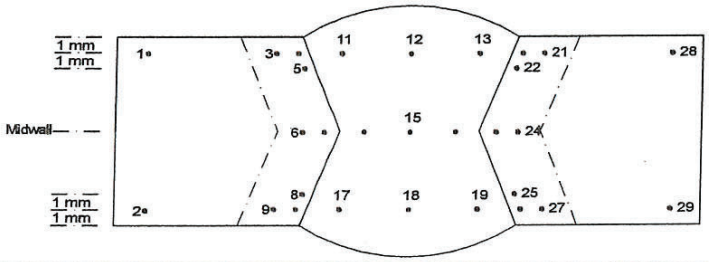
Customer: **Storage Tank Solutions Inc.**
9 Well Head Street
Devon, Alberta
T9G 1Z6

Laboratory Test No.: E19-00285.2
Date: June 27, 2019

Attention: Sebastien Ouellet

PQR No.:	STS-7-5 (Rev. 0)	**Material Heat No.:**	459852 56930-01
Material:	SA 516 Gr. 60/70	**Weld Type:**	Double Sided
Material Thickness:	12.7 mm (0.500 in.)		
Welding Process:	SAW		
Weld Thickness:	12.7 mm (0.500 in.)		
Thermal Condition:	As Welded		

Type of Test: *Vickers 10 kg (HV10)* — *Instrument:* *Buehler 5112*
Governing Spec.: *ASTM E92 - 17 & ANSI/NACE MR0175/ISO 15156:2015* — *Calibration Date:* *July 27, 2018*



Parent Metal		HAZ		Weld Metal		HAZ		Parent Metal	
1	162	*3*	179	*11*	198	*20*	213	*28*	153
2	159	*4*	209	*12*	176	*21*	182	*29*	152
		5	224	*13*	196	*22*	218		
		6	170	*14*	189	*23*	173		
		7	171	*15*	188	*24*	178		
		8	224	*16*	179	*25*	234		
		9	173	*17*	188	*26*	237		
		10	208	*18*	190	*27*	192		
				19	179				

Test Conducted By: Ibrahim Mohamoud (Edmonton)

Certified By: _____
Eric Dacyk, C.E.T.

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SECTION 6.0

Weld Consumables

22801 St. Clair Avenue
Cleveland, Ohio 44117-1199 U.S.A.
(216) 481-8100

THE LINCOLN ELECTRIC COMPANY

PRODUCT CERTIFICATE

LINCOLNWELD 882 FLUX

The product named above and supplied on the referenced order number is of the same manufacturing process, and material requirements as the material which was used for the tests and calculations, the results of which are shown below. This certificate complies to the requirements of EN 10204, Type 2.2.

- Basicity Index

  B.I.* = 1.6

  *Calculated using Boniszewski formula shown below

  $$B.I. = \frac{0.5\,(FeO + MnO) + CaO + MgO + Na_2O + K_2O + CaF_2}{SiO_2 + 0.5\,(TiO_2 + ZrO_2 + Al_2O_3)}$$

- Flux Sizing Distribution*

+20 MESH	34%	Maximum
-20 +100 MESH	64%	Minimum
-100 MESH	2%	Maximum

  *U.S. sieve number per ASTM E11-04

- Flux Composition (Based on Elemental Values Determined by X-Ray Fluorescence)

Na_2O	2%	SiO_2	16%	MnO	1%
MgO	22%	CaO	1%	FeO	1%
Al_2O_3	24%	ZrO_2	7%	CaF_2	24%

- Density (g/cm^3): 1.2

- Flux Classification: EN 760 – S A AS 1

Phillip J. Woodring, Certification Supervisor, February 19 2008
Date

Cert No. F882

The Lincoln Electric Company
22801 St. Clair Avenue
Cleveland, Ohio 44117-1199

CERTIFICATE OF CONFORMANCE

LINCOLN ELECTRIC
THE WELDING EXPERTS®

Product:	**Lincolnweld® L-61®**
Classification:	**EM12K**
	EM12K
Specification:	**AWS A5.17:2019, ASME SFA-5.17**
	AWS A5.23:2011, ASME SFA-5.23
Date	**October 28, 2020**

This is to certify that the product named above is of the same classification(s) and design as the material used for the tests reported herein. The material was tested according to the specification(s) indicated and met all requirements. It was manufactured and supplied according to a Quality System Program that meets the requirements of ISO9001 among others as documented on The Lincoln Electric web page (*http://www.lincolnelectric.com/en-us/company/Pages/certifications.aspx*).

Electrode composition (weight %)	**EM12K Requirements**	**Electrode Results**
C	0.05 - 0.15	0.12
Mn	0.80 - 1.25	0.97
Si	0.10 - 0.35	0.23
S	0.030 max.	0.007
P	0.030 max.	0.005
Cu (Total)	0.35 max.	0.09

1. This document meets the requirements of AWS A5.01M/A5.01 Schedule F. When a specific lot number is referenced it also meets the requirements of EN10204, type 2.2. It does not meet the requirements of type 3.1.
2. The size(s) of electrode tested is determined by the requirements for this classification. All other sizes manufactured will also meet these requirements.

October 28, 2020

Daniel Gaul, Certification Supervisor — Date

Jonathan S. Ogborn

October 28, 2020

Jon Ogborn, Manager, Consumable Compliance — Date

Cert. No. 40061

The Lincoln Electric Company
22801 St. Clair Avenue
Cleveland, Ohio 44117-1199

CERTIFICATE OF CONFORMANCE

(APPLIES ONLY TO U.S. PRODUCTS)

LINCOLN ELECTRIC
THE WELDING EXPERTS®

Product:	**Lincolnweld® L-61®**
Classification:	**EM12K**
	EM12K
Specification:	**AWS A5.17:1997, ASME SFA-5.17**
	AWS A5.23:2011, ASME SFA-5.23
Date	**December 18, 2015**

Q1 Lot Number: 16025054

This is to certify that the product named above and supplied on the referenced order number is of the same classification, manufacturing process, and material requirements as the material which was used for the test that was concluded on the date shown, the results of which are shown below. All tests required by the specifications shown for classification were performed at that time and the material tested met all requirements. It was manufactured and supplied according to the Quality System Program of the Lincoln Electric Company, Cleveland, Ohio, U.S.A., which meets the requirements of ISO9001, NCA3800, AWS A5.01, and other specification and Military requirements, as applicable. The Quality System Program has been approved by ASME, ABS, and VdTUV.

Electrode composition (weight %)	**EM12K Requirements**	**Electrode Results**
C	0.05 - 0.15	0.11
Mn	0.80 - 1.25	0.98
Si	0.10 - 0.35	0.19
S	0.030 max.	0.011
P	0.030 max.	0.005
Total Cu	0.35 max.	0.09

1. This certificate complies with the requirements of EN 10204, Type 2.2.
2. The electrode size required to be tested for this classification is 5/32 inch. All other sizes manufactured will also meet these requirements.
3. Results below the detection limits of the instrument or lower than the precision required by the specification are reported as zero.

Toronto Cunningham — December 18, 2015
Toronto Cunningham, Certification Supervisor — Date

Marie Quintana — December 31, 2015
Marie Quintana, Director, Consumable Compliance — Date

Cert. No. 40061

The Lincoln Electric Company
22801 St. Clair Avenue
Cleveland, Ohio 44117-1199

CERTIFICATE OF CONFORMANCE

LINCOLN ELECTRIC
THE WELDING EXPERTS®

Q1 Lot Number:
15989595

Product: **Fleetweld® 5P+™**
Classification: **E6010**
Specification: **AWS A5.1:2012, ASME SFA-5.1**
Date **October 01, 2018**

This is to certify that the product named above is of the same classification(s) and design as the material used for the tests reported herein. The material was tested according to the specification(s) indicated and met all requirements. It was manufactured and supplied according to a Quality System Program that meets the requirements of ISO9001 among others as documented on The Lincoln Electric web page (*http://www.lincolnelectric.com/en-us/company/Pages/certifications.aspx*).

Operating Settings	**E6010 Requirements**	**RESULTS**	
Required Size for Classification	Not Specified	5/32" (4.0 mm)	3/16" (4.8 mm)
Current Type/Polarity	DC+	DC+	DC+
Nominal Voltage, V		27	27
Nominal Current, A		140	170
Average Heat Input, kJ/mm (kJ/in)		2.1 (53)	2.5 (63)
Travel Speed, cm/min (in/min)		11 (4.37)	11 (4.41)
Pass/Layers		16/8	16/8
Preheat Temperature, °C (°F)	(225 min.)	105 (225)	105 (225)
Interpass Temperature, °C (°F)	(225 - 350)	150 (300)	150 (300)
Postweld Heat Treatment	As-welded	As-welded	As-welded
Mechanical Properties of Weld Metal			
Tensile Strength, MPa (ksi)	(60 min.)	550 (80)	540 (79)
Yield Strength, 0.2% Offset, MPa (ksi)	(48 min.)	440 (63)	440 (63)
Elongation %	22 min.	23	23
Average Impact Energy Joules @ -29 °C (ft-lbs @ -20 °F)	(20 min.)	91 (67) 87,90,97 (64,66,72)	75 (56) 73,74,79 (54,55,58)
Average Hardness, HRB	Info. Only	86	85
Chemical Composition of Weld Metal (weight %)			
C	0.20 max.	0.15	0.14
Mn	1.20 max.	0.60	0.60
Si	1.00 max.	0.22	0.19
S	Not Specified	0.008	0.007
P	Not Specified	0.010	0.012
Cr	0.20 max.	0.03	0.03
Ni	0.30 max.	0.02	0.03
Mo	0.30 max.	0.01	0.01
V	0.08 max.	0.00	0.01
Mn+Ni+Cr+Mo+V	Not Specified	0.67	0.67

1. This document meets the requirements of AWS A5.01M/A5.01 Schedule G. When a specific lot number is referenced it also meets the requirements of EN10204, type 2.2. It does not meet the requirements of type 3.1.
2. The electrode sizes required to be tested for this classification are 5/32 inch and 3/16 inch. All other sizes manufactured will also meet these requirements.
3. Fillet Weld Test (positions as required): Met requirements.
4. Radiographic Inspection: Grade 2 - Met requirements.
5. The strength and elongation properties reported here were obtained from tensile specimens artificially aged at 105°C (220°F) for 48 hours.
6. Strength values in SI units are reported to the nearest 10 MPa converted from actual data. Preheat and interpass temperature values in SI units are reported to the nearest 5 degrees.

Toronto Cunningham — October 01, 2018
Toronto Cunningham, Certification Supervisor — Date

Jonathan S. Ogborn — October 01, 2018
Jon Ogborn, Manager, Consumable Compliance — Date

Cert. No. 30055

The Lincoln Electric Company
22801 St. Clair Avenue
Cleveland, Ohio 44117-1199

CERTIFICATE OF CONFORMANCE

Q1 Lot Number: 15192360

LINCOLN ELECTRIC
THE WELDING EXPERTS®

Product: **Fleetweld® 5P+**
Classification: **E6010**
Specification: **AWS A5.1:2012, ASME SFA-5.1**
Date **June 30, 2016**

This is to certify that the product named above is of the same classification(s) and design as the material used for the tests reported herein. The material was tested according to the specification(s) indicated and met all requirements. It was manufactured and supplied according to a Quality System Program that meets the requirements of ISO9001 among others as documented on The Lincoln Electric web page (*http://www.lincolnelectric.com/en-us/company/Pages/certifications.aspx*).

Operating Settings	**E6010 Requirements**	**RESULTS**	
Electrode Size		5/32 inch	3/16 inch
Current Type/Polarity	DC+	DC+	DC+
Nominal Voltage, V		25	26
Nominal Current, A		140	170
Average Heat Input, kJ/mm (kJ/in)		2.1 (53)	2.5 (63)
Pass/Layers		18/9	16/8
Preheat Temperature, °C (°F)	(225 min.)	105 (225)	105 (225)
Interpass Temperature, °C (°F)	(225 - 350)	150 (300)	150 (300)
Postweld Heat Treatment	As-welded	As-welded	As-welded
Mechanical properties of weld deposits			
Tensile Strength, MPa (ksi)	(60 min.)	550 (79)	490 (71)
Yield Strength, 0.2% Offset, MPa (ksi)	(48 min.)	440 (64)	390 (57)
Elongation %	22 min.	28	29
Average Impact Energy Joules @ -29 °C (ft-lbs @ -20 °F)	(20 min.)	89 (66) 84,91,93 (62,67,68)	93 (69) 84,96,100 (62,71,73)
Average Hardness, HRB	Info. Only	88	82
Chemical composition of weld deposits (weight %)			
C	0.20 max.	0.13	0.13
Mn	1.20 max.	0.66	0.52
Si	1.00 max.	0.25	0.15
S	Not Specified	0.007	0.005
P	Not Specified	0.009	0.009
Cr	0.20 max.	0.03	0.03
Ni	0.30 max.	0.04	0.04
Mo	0.30 max.	0.01	0.01
V	0.08 max.	0.01	0.00
Mn+Ni+Cr+Mo+V	Not Specified	0.74	0.60

1. This document meets the requirements of EN10204, type 2.2, when a specific lot or order number is referenced. It does not meet the requirements of type 3.1.
2. The electrode sizes required to be tested for this classification are 5/32 inch and 3/16 inch. All other sizes manufactured will also meet these requirements.
3. Fillet Weld Test (positions as required): Met requirements.
4. Radiographic Inspection: Grade 2 - Met requirements.
5. The strength and elongation properties reported here were obtained from tensile specimens artificially aged at 105°C (220°F) for 48 hours.
6. Strength values in SI units are reported to the nearest 10 MPa converted from actual data. Preheat and interpass temperature values in SI units are reported to the nearest 5 degrees.

Toronto Cunningham — June 30, 2016
Toronto Cunningham, Certification Supervisor — Date

Marie Quintana — June 30, 2016
Marie Quintana, Director, Consumable Compliance — Date

Cert. No. 30055

SECTION 7.0

Foudation

Exhibit 30, Rev 1

FOUNDATION REPORT

TANK TAG NUMBER: TANK 8 **WORK ORDER NUMBER:**

CUSTOMER: AEM **PROJECT:** BAKER LAKE

ITP LINE NUMBER: Tank 8 **DATE:** 2021-08-06

1.0 TANK PAD ACCEPTANCE GUIDELINES

1.1 In acceptance of the Tank Foundation, we acknowledges that the following requirements have been met:

a) The foundation circumference meets the requirements of API 650 Para 7.5.

b) The foundation has been staked to clearly identify the major tank axis (North, South, East, West) and the tank center point

c) There is adequate access to the tank erection area to commence erection activities.

1.2 Our acceptance of the tank foundation is limited only to the above requirements. Acceptance does not constitute certification of the foundation design and/or construction including but not limited to the following:

a) Certification of the foundation design including that of the leak detection and cathodic protection system.

b) Certification that the foundation has the load bearing capacities required.

c) Dimensional accuracy other than that explicitly stated above.

d) That the coordinate axis complies with the clients plot plan.

e) That soil embedded items have been properly placed according to approved drawings. This will be confirmed during the installation of components associated with the embedded items.

f) Certification that the foundation has been properly constructed or is structurally acceptable.

g) Certifications that the leak detection and/or cathodic protection systems have been properly installed.

OBSERVATIONS:

Acceptable at time of Inspection.

ACCEPTED BY: Matthew MacKenzie **DATE:** 2021-08-6

(NAME & SIGNATURE)

STS QC REPRESENTATIVE

ACCEPTED BY: [signature] **DATE:** Sept 4th 21

(NAME & SIGNATURE)

CLIENT INSPECTOR

SECTION 8.0

Floor

STS STORAGE TANK SOLUTIONS **AS BUILT STAMP**

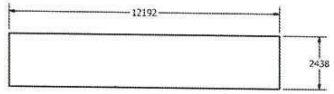
☐ CHANGE ☒ NO CHANGE

NAME: Lindsay C Bolton
SIGNATURE:
DATE: August 31, 2021

PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	UNIT WT (KG)	TOT WT (KG)
F1	17	PL 7.94 X 2438 X 12192	ASME SA 516 GRADE 70 KILLED FINE GRAIN, NORMALIZED	1,853	31,493
F2	2	PL 7.94 X 2438 x 10769	ASME SA 516 GRADE 70 KILLED FINE GRAIN, NORMALIZED	1,634	3,268
F3	4	PL 7.94 X 2438 x 12192	ASME SA 516 GRADE 70 KILLED FINE GRAIN, NORMALIZED	1,771	7,085
F4	4	PL 7.94 X 2438 x 10693	ASME SA 516 GRADE 70 KILLED FINE GRAIN, NORMALIZED	1,408	5,630
F5	4	PL 7.94 X 2129 X 5279	ASME SA 516 GRADE 70 KILLED FINE GRAIN, NORMALIZED	669	2,675
F6	4	PL 7.94 X 2438 X 2469	ASME SA 516 GRADE 70 KILLED FINE GRAIN, NORMALIZED	354	1,416
F7	2	PL 7.94 X 2438 x 7315	ASME SA 516 GRADE 70 KILLED FINE GRAIN, NORMALIZED	1,111	2,223
F8	4	PL 7.94 X 2438 x 4837	ASME SA 516 GRADE 70 KILLED FINE GRAIN, NORMALIZED	356	1,425
F9	2	PL 7.94 X 1115 x 12043	ASME SA 516 GRADE 70 KILLED FINE GRAIN, NORMALIZED	445	890
F10	4	PL 7.94 X 2379 X 3112	ASME SA 516 GRADE 70 KILLED FINE GRAIN, NORMALIZED	423	1,690

TOT WT: 57,794



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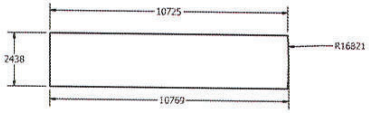

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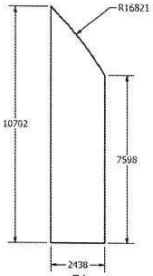
SCALE 1 / 100

F3
QTY: 4
SCALE 1 / 100



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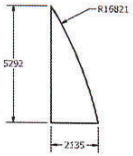

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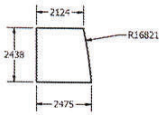

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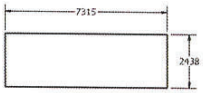

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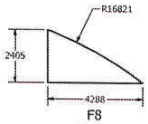

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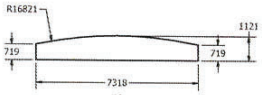

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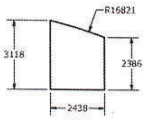

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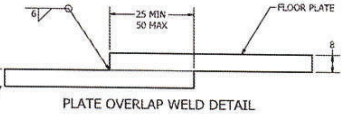
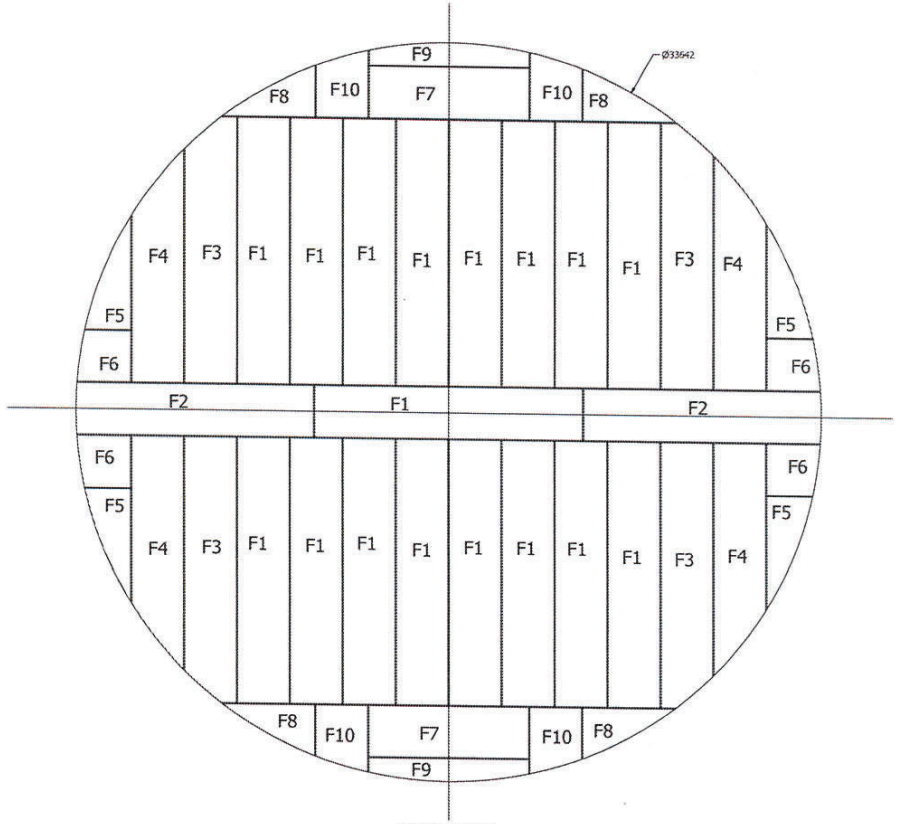


PLATE OVERLAP WELD DETAIL



FLOOR LAYOUT
SCALE 1 / 100

REVISION HISTORY		
REV	DESCRIPTION	DATE
A	ISSUED FOR REVIEW	2/18/2019
1	ISSUED FOR CONSTRUCTION	6/8/2021

DRAWN: MARC LOSIER 2/18/2021
CHECKED
QA
MFG
APPROVED

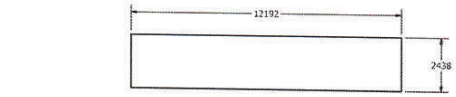
TITLE: FLOOR LAYOUT

BAKER LAKE WHALE TAIL PROJECT FLOOR AND ROOF LAYOUT FOR 10,000CUM TANK #8 6170TNK43

SIZE: A1 | DWG NO: 341-M1 | REV: 1
SCALE: 1 | SHEET 1 OF 2

15-Jun-2021
Permit Number: P471

PARTS LIST					
ITEM	QTY	DESCRIPTION	MATERIAL	UNIT WT (KG)	TOT WT (KG)
F1	17	PL 7.94 X 2438 X 12192	ASME SA 516 GRADE 70 KILLED FINE GRAIN, NORMALIZED	1,853	31,493
F2	2	PL 7.94 X 2438 x 10769	ASME SA 516 GRADE 70 KILLED FINE GRAIN, NORMALIZED	1,634	3,268
F3	4	PL 7.94 X 2438 x 12192	ASME SA 516 GRADE 70 KILLED FINE GRAIN, NORMALIZED	1,771	7,085
F4	4	PL 7.94 X 2438 x 10693	ASME SA 516 GRADE 70 KILLED FINE GRAIN, NORMALIZED	1,408	5,630
F5	4	PL 7.94 X 2159 X 5279	ASME SA 516 GRADE 70 KILLED FINE GRAIN, NORMALIZED	669	2,675
F6	4	PL 7.94 X 2438 X 2469	ASME SA 516 GRADE 70 KILLED FINE GRAIN, NORMALIZED	354	1,416
F7	2	PL 7.94 X 2438 x 7315	ASME SA 516 GRADE 70 KILLED FINE GRAIN, NORMALIZED	1,111	2,223
F8	4	PL 7.94 X 2438 x 4837	ASME SA 516 GRADE 70 KILLED FINE GRAIN, NORMALIZED	356	1,425
F9	2	PL 7.94 X 1115 x 12043	ASME SA 516 GRADE 70 KILLED FINE GRAIN, NORMALIZED	445	890
F10	4	PL 7.94 X 2379 X 3112	ASME SA 516 GRADE 70 KILLED FINE GRAIN, NORMALIZED	423	1,690
				TOT WT:	57,794



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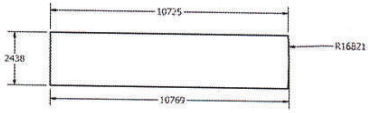

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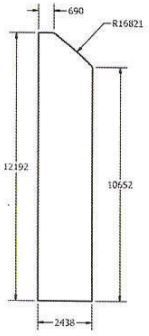

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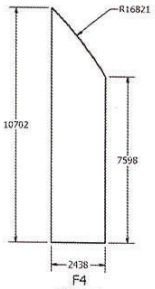
SCALE 1 / 100



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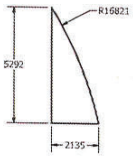
SCALE 1 / 100



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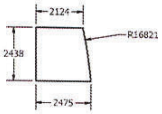

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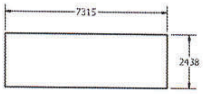

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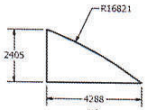
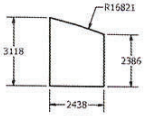
SCALE 1/100



F8
QTY:4
SCALE 1/100

F9
QTY:2
SCALE 1/100



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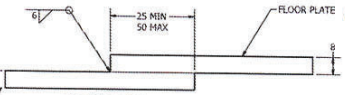
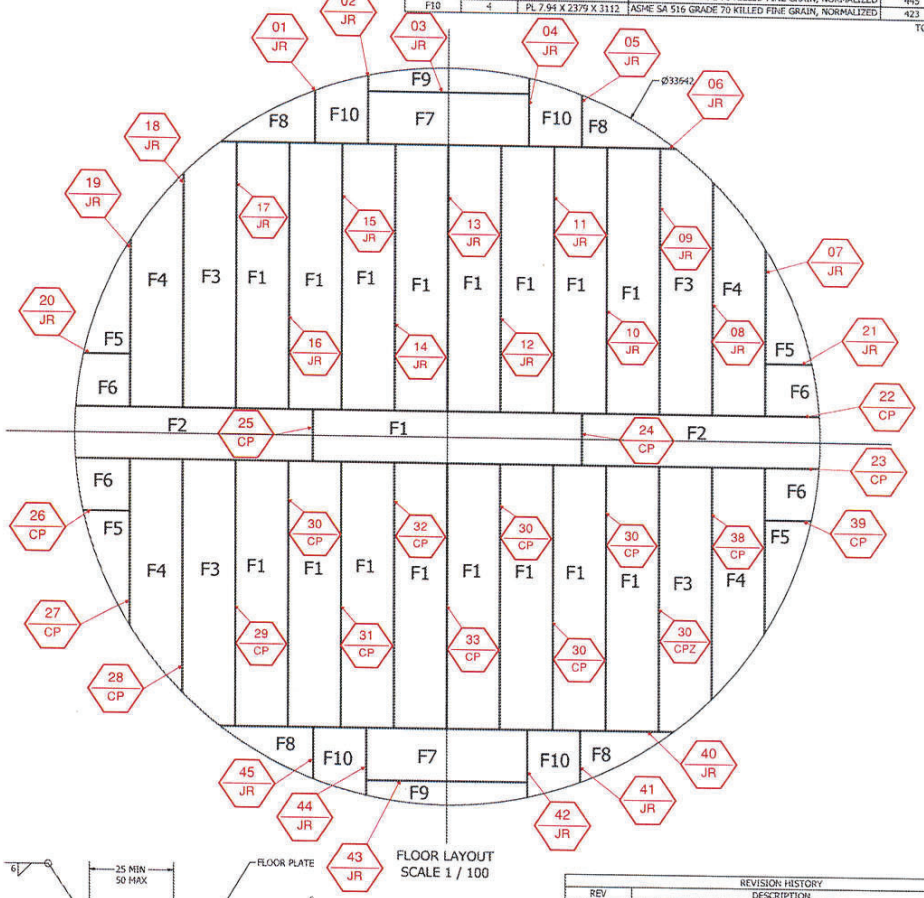


PLATE OVERLAP WELD DETAIL



FLOOR LAYOUT
SCALE 1 / 100

REVISION HISTORY		
REV	DESCRIPTION	DATE
A	ISSUED FOR REVIEW	2/18/2019
1	ISSUED FOR CONSTRUCTION	6/8/2021

DRAWN: MARC LOSIER 2/18/2021
CHECKED
QA
MFG
APPROVED

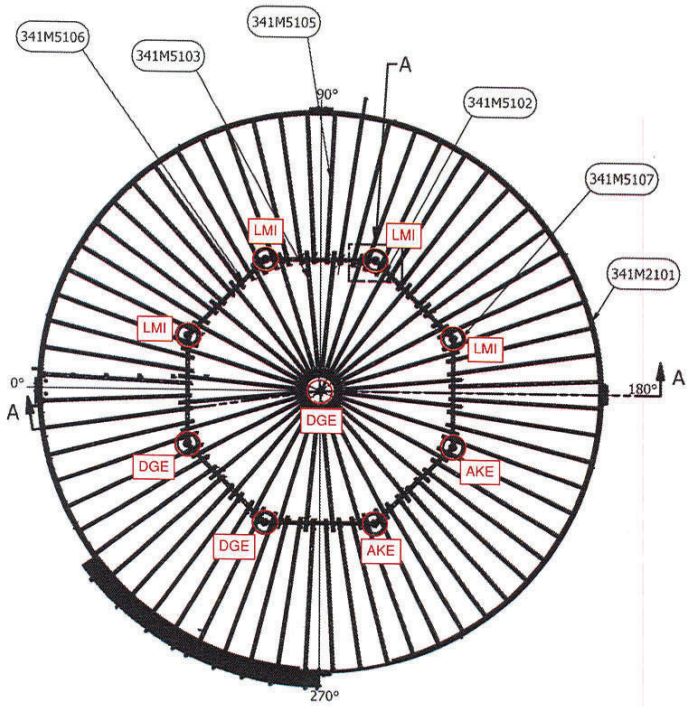
TITLE: FLOOR LAYOUT

BAKER LAKE WHALE TAIL PROJECT FLOOR AND ROOF LAYOUT FOR 10,000CUM TANK #8 6170TNK43

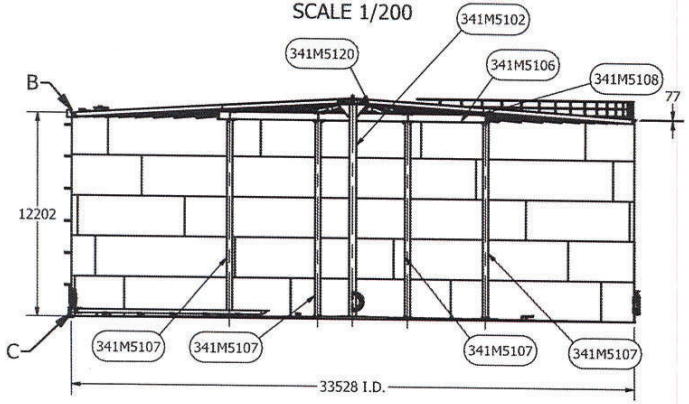
SIZE: A1 | DWG NO: 341-M1 | REV: 1 | SCALE: 1:1 | SHEET 1 OF 2

15-Jun-2021
Permit Number: P471

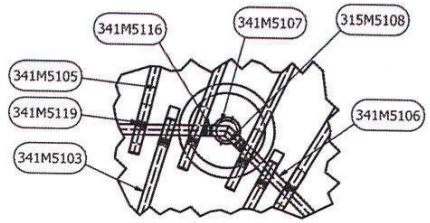
PARTS LIST				
ITEM	QTY	DESCRIPTION	MATERIAL	MASS
341M2101	10	RIM ANGLE 76X76X10 [3"X3"X3/8"] SEE DRG 315-M2	G40.21-300W	125 kg
341M5102	1	CENTRE COLUMN, SEE SHT 5		2741 kg
341M5103	32	INNER RAFTER W250X33 [W10"X22] SEE SHT 2	G40.21-350W	248 kg
341M5104	64	SHELL CLIP, PLATE 6 THK 152 X 189, SEE DETAIL	G40.21-300W	1 kg
341M5105	64	OUTER RAFTER W250X33 [W10"X22] SEE SHT 2	G40.21-350W	295 kg
341M5106	8	INTERMEDIATE GIRDER ASSEMBLY SEE SHT 4		570 kg
341M5107	8	INTERMEDIATE COLUMN ASSEMBLY SEE SHT 6		1285 kg
341M5108	8	GIRDER CONNECTION PLATE 13 [1/2"] THK 279 X 688 SEE DETAIL	G40.21-300W	10 kg
341M5116	128	BOLT, HEAVY HEX, 5/8" X 2.5" LG	A325	0 kg
341M5117	512	NUT, HEAVY HEX, 5/8" UNC	A325	0 kg
341M5118	1024	WASHER, PLAIN, TYPE A, 5/8"	A325	0 kg
341M5119	320	BOLT, HEAVY HEX, 5/8" X 2." LG	A325	0 kg
341M5120	64	BOLT, HEAVY HEX, 5/8" X 3" LG	A325	0 kg



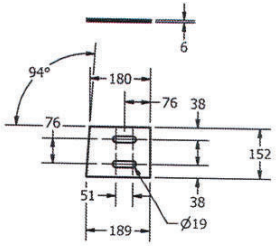
PLAN
SCALE 1/200



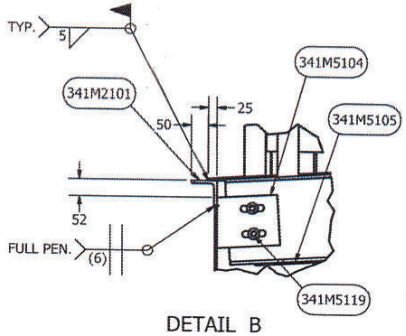
SECTION A-A
SCALE 1/200



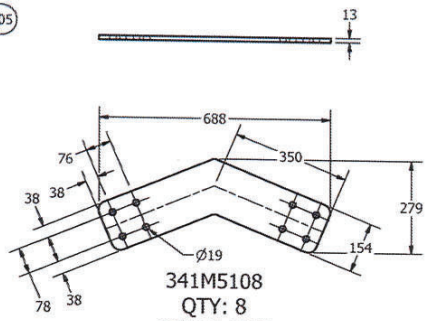
DETAIL A
SCALE 1/50



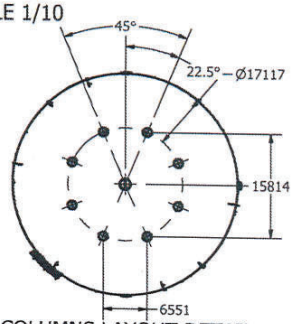
341M5104
SHELL CLIP
QTY: 64
SCALE 1/10



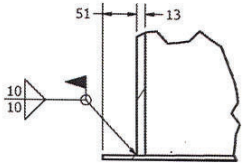
DETAIL B
SCALE 1/10



341M5108
QTY: 8
SCALE 1/10



COLUMNS LAYOUT DETAIL
SCALE 1/500



DETAIL C
SCALE 1/5

REVISION HISTORY		
REV	DESCRIPTION	DATE
A	ISSUED FOR REVIEW	3/9/2021
1	ISSUED FOR CONSTRUCTION	6/8/2021

DRAWN: MARC LOSIER	3/8/2021	ROOF STRUCTURE LAYOUT
CHECKED: KYLE BROWN	3/7/2019	
QA		
MFG		TITLE: BAKER LAKE WHALE TAIL PROJECT - 10M LITERS - TANK #8: 6170TNK43 - ROOF STRUCTURE
APPROVED		
		SIZE: A2 / DWG NO: 341-M5 / REV: 1
		SCALE: 1/200 / SHEET 1 OF 6

PROFESSIONAL ENGINEER
KYLE BROWN
LICENSEE
NT/NU
15-Jun-2021
Permit Number: P471

VISUAL TEST REPORT

Customer: AGNICO EAGLE

Location: BAKER LAKE

Code Requiring Test: API 650 (section 8.5.2) Reason for Test: New Construction

A weld shall be acceptable by visual examination if the inspection shows the following.

a) There are no crater cracks, other surface cracks or arc strikes in or adjacent to the welded joints.
b) Maximum permissible undercut is 0.4 mm (1/64 in.) in depth for vertical butt joints, vertically oriented permanent attachments, attachment welds for nozzles, manholes, flush-type openings, and the inside shell-to-bottom welds. For horizontal butt joints, horizontally oriented permanent attachments, and annular-ring butt joints, the maximum permissible undercut is 0.8 mm (1/32 in.) in depth.
c) The frequency of surface porosity in the weld does not exceed one cluster (one or more pores) in any 100 mm (4 in.) of length, and the diameter of each cluster does not exceed 2.5 mm (3/32 in.).
d) The reinforcement of the welds on all thicknesses:

Plate Thickness mm (in.)	Maximum Reinforcement Thickness mm (in.)	
	Vertical Joints	Horizontal Joints
≤ 13 (1/2)	2.5 (3/32)	3 (1/8)
> 13 (1/2) to 25 (1)	3 (1/8)	5 (3/16)
> 25 (1)	5 (3/16)	6 (1/4)

Surface Condition (As Welded)

Test Solution: N/A Test Date(s): 2021-08-18

Tested by: Matthew MacKenzie Ambient Conditions: 10 Degrees Celcius

Items Tested:

FLOOR WELDS.

Results:

ALL WELDING ACCEPTABLE AT TIME OF INSPECTION.

STS Representative Signature: Matthew MacKenzie Date: 2021-08-18

Client Representative Signature: [signature] Date: 4th Sept 21

Exhibit 14, Rev 1

VACUUM BOX TEST REPORT – FLOOR PLATE WELDS

Customer: AGNICO EAGLE

Location: BAKER LAKE

Equipment Tag No.: TANK 8

Equipment Description:

Code Requiring Test: API 650 Reason for Test: New Construction

(A vacuum box/soap solution test for floor plate weld seams is required for new construction or major alterations, no visible leaks should be observed)

Test Solution: Water / Snoop Ambient Conditions: 10 Degrees Celcius

Test Date(s): 2021-08-30 Surface Condition: Clean

Tested by: Matthew MacKenzie Surface Test Temperature: 10 Degrees Celcius

Pressure Gauge:

Items Tested:

Floor plates

Results:

No leak detected

Acceptable at time of Inspection.

STS Representative Signature: Matthew MacKenzie Date: 2021-08-30

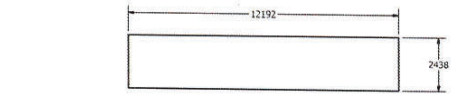
Client Representative Signature: Date: 4 Sept 21

SECTION 9.0

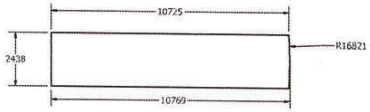
Shell to Floor Seams

Inside Floor Corner Joint - Floor to Shell Weld

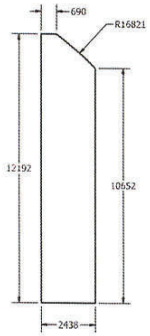
PARTS LIST					
ITEM	QTY	DESCRIPTION	MATERIAL	UNIT WT (KG)	TOT WT (KG)
F1	17	PL 7.94 X 2438 X 12192	ASME SA 516 GRADE 70 KILLED FINE GRAIN, NORMALIZED	1,853	31,493
F2	2	PL 7.94 X 2438 x 10769	ASME SA 516 GRADE 70 KILLED FINE GRAIN, NORMALIZED	1,634	3,268
F3	4	PL 7.94 X 2438 x 12192	ASME SA 516 GRADE 70 KILLED FINE GRAIN, NORMALIZED	1,771	7,085
F4	4	PL 7.94 X 2438 x 10693	ASME SA 516 GRADE 70 KILLED FINE GRAIN, NORMALIZED	1,408	5,630
F5	4	PL 7.94 X 2129 x 5279	ASME SA 516 GRADE 70 KILLED FINE GRAIN, NORMALIZED	669	2,675
F6	4	PL 7.94 X 2438 X 2469	ASME SA 516 GRADE 70 KILLED FINE GRAIN, NORMALIZED	354	1,416
F7	2	PL 7.94 X 2438 x 7315	ASME SA 516 GRADE 70 KILLED FINE GRAIN, NORMALIZED	1,111	2,223
F8	4	PL 7.94 X 2438 x 4837	ASME SA 516 GRADE 70 KILLED FINE GRAIN, NORMALIZED	356	1,425
	2	PL 7.94 X 1115 x 12043	ASME SA 516 GRADE 70 KILLED FINE GRAIN, NORMALIZED	445	890
	4	2379 X 3112	ASME SA 516 GRADE 70 KILLED FINE GRAIN, NORMALIZED	423	1,690
				TOT WT:	57,794



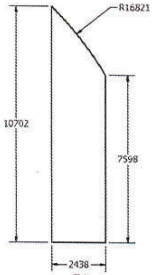
F1
QTY:17
SCALE 1 / 100



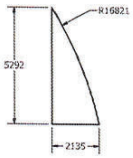
F2
QTY:2
SCALE 1 / 100



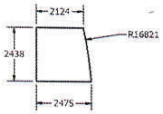
F3
QTY: 4
SCALE 1 / 100



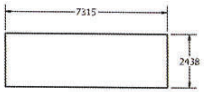
F4
QTY: 4
SCALE 1 / 100



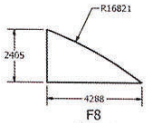
F5
QTY: 4
SCALE 1/100



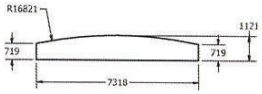
F6
QTY: 4
SCALE 1/100



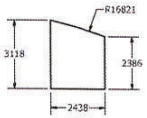
F7
QTY:2
SCALE 1/100



F8
QTY:4
SCALE 1/100



F9
QTY:2
SCALE 1/100



F10
QTY: 4
SCALE 1/100

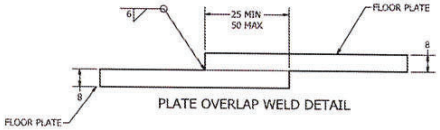
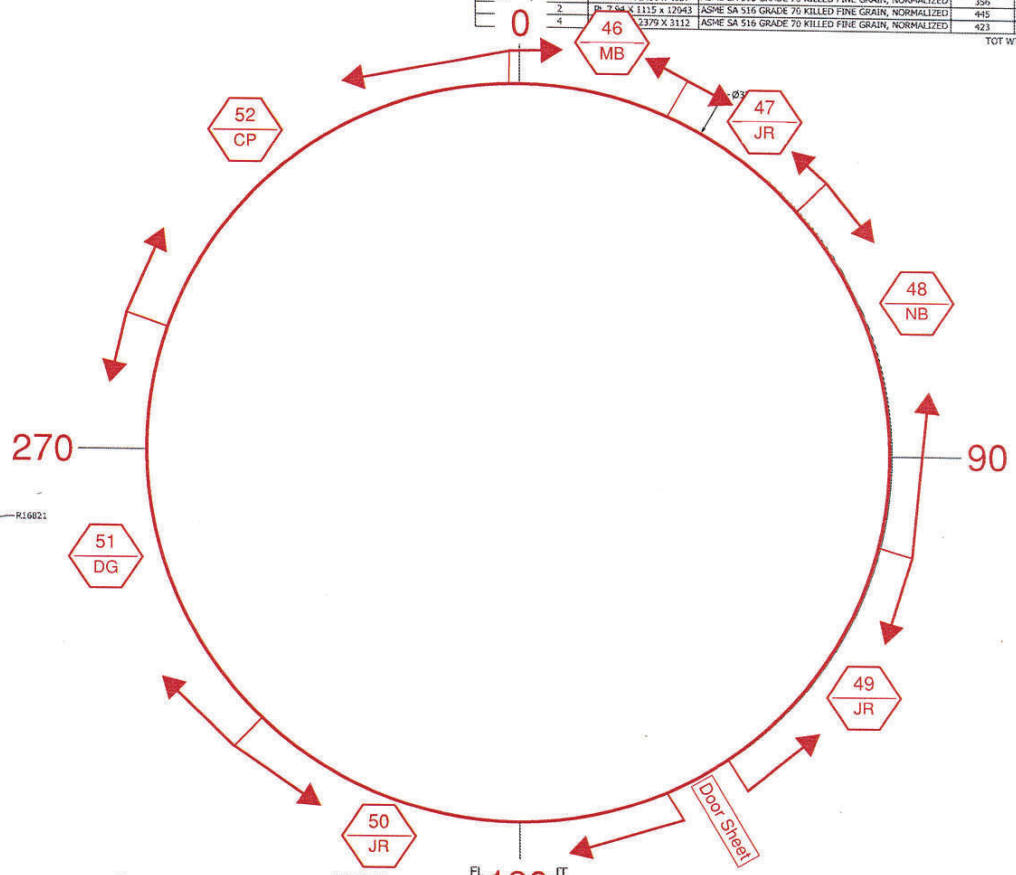


PLATE OVERLAP WELD DETAIL



REVISION HISTORY		
REV	DESCRIPTION	DATE
A	ISSUED FOR REVIEW	2/18/2019
1	ISSUED FOR CONSTRUCTION	6/8/2021

DRAWN: MARC LOSIER 2/18/2021
CHECKED
QA
MFG
APPROVED

TITLE: FLOOR LAYOUT

BAKER LAKE WHALE TAIL PROJECT FLOOR AND ROOF LAYOUT FOR 10,000CUM TANK #8 6170TNK43

SIZE: A1 | DWG NO: 341-M1 | REV: 1
SCALE: 1 | SHEET 1 OF 2

15-Jun-2021
Permit Number: P471

VISUAL TEST REPORT

Customer: AGNICO EAGLE

Location: BAKER LAKE

Code Requiring Test: API 650 (section 8.5.2) Reason for Test: New Construction

A weld shall be acceptable by visual examination if the inspection shows the following.

a) There are no crater cracks, other surface cracks or arc strikes in or adjacent to the welded joints.
b) Maximum permissible undercut is 0.4 mm (1/64 in.) in depth for vertical butt joints, vertically oriented permanent attachments, attachment welds for nozzles, manholes, flush-type openings, and the inside shell-to-bottom welds. For horizontal butt joints, horizontally oriented permanent attachments, and annular-ring butt joints, the maximum permissible undercut is 0.8 mm (1/32 in.) in depth.
c) The frequency of surface porosity in the weld does not exceed one cluster (one or more pores) in any 100 mm (4 in.) of length, and the diameter of each cluster does not exceed 2.5 mm (3/32 in.).
d) The reinforcement of the welds on all thicknesses:

Plate Thickness mm (in.)	Maximum Reinforcement Thickness mm (in.)	
	Vertical Joints	Horizontal Joints
≤ 13 (1/2)	2.5 (3/32)	3 (1/8)
> 13 (1/2) to 25 (1)	3 (1/8)	5 (3/16)
> 25 (1)	5 (3/16)	6 (1/4)

Surface Condition (As Welded)

Test Solution: N/A Test Date(s): 2021-08-23

Tested by: Matthew MacKenzie Ambient Conditions: 10 Degrees Celcius

Items Tested:

Shell to bottom seam weld.

Results:

No leaks detected at the time of inspection; acceptable to code.

VISUAL INSPECTION ACCEPTABLE AT TIME OF INSPECTION

STS Representative Signature: [signature] Date: 2021-08-23

Client Representative Signature: Mario Marcil Date: 08-29-21

QUALITY CONTROL MANUAL

VISUAL TEST REPORT

Customer: AGNICO EAGLE

Location: BAKER LAKE

Code Requiring Test: API 650 (section 8.5.2) Reason for Test: New Construction

A weld shall be acceptable by visual examination if the inspection shows the following.

a) There are no crater cracks, other surface cracks or arc strikes in or adjacent to the welded joints.
b) Maximum permissible undercut is 0.4 mm (1/64 in.) in depth for vertical butt joints, vertically oriented permanent attachments, attachment welds for nozzles, manholes, flush-type openings, and the inside shell-to-bottom welds. For horizontal butt joints, horizontally oriented permanent attachments, and annular-ring butt joints, the maximum permissible undercut is 0.8 mm (1/32 in.) in depth.
c) The frequency of surface porosity in the weld does not exceed one cluster (one or more pores) in any 100 mm (4 in.) of length, and the diameter of each cluster does not exceed 2.5 mm (3/32 in.).
d) The reinforcement of the welds on all thicknesses:

Plate Thickness mm (in.)	Maximum Reinforcement Thickness mm (in.)	
	Vertical Joints	Horizontal Joints
≤ 13 (1/2)	2.5 (3/32)	3 (1/8)
> 13 (1/2) to 25 (1)	3 (1/8)	5 (3/16)
> 25 (1)	5 (3/16)	6 (1/4)

Surface Condition (As Welded)

Test Solution: N/A Test Date(s): 2021-08-31

Tested by: Matthew MacKenzie Ambient Conditions: 10 Degrees Celcius

Items Tested:

SHELL TO FLOOR FINAL PASS.

Results:

ALL WELDING ACCEPTABLE AT TIME OF INSPECTION.

STS Representative Signature: Matthew MacKenzie Date: 2021-08-31

Client Representative Signature: [signature] Date: Sept 8th 2021

Exhibit 24, Rev 1

DIESEL TEST REPORT (SHELL TO BOTTOM WELD)

Customer: AGNICO EAGLE

Location: BAKER LAKE

Equipment Tag No.: TK 8

Equipment Type: Above Ground Storage Tank

Equipment Description: Diesel Storage Tank

Code Requiring Test: API 650 (section 7.2.4) Reason for Test: New Construction

(The initial weld pass inside the shell shall have all slag and non-metals removed from the surface of the weld and then examined for its entire circumference both visually and applying a high Flash-point penetrating oil such as light diesel to the gap between the shell and the bottom, letting stand for at least four hours, and examining the weld for evidence of wicking.)

Surface Condition (As Welded)

Test Solution: Diesel Test Date(s): 2021-08-23

Tested by: Matthew MacKenzie Ambient Conditions: 10 Degrees Celcius

Items Tested:

Shell to bottom seam weld, excluding door sheet area.

Results:

No leaks detected at the time of inspection; acceptable to code.

STS Representative Signature: _____ Date: 2021-08-23

Client Representative Signature: Mario Marcil Date: 08-29-21

Exhibit 25, Rev 1

DIESEL TEST REPORT (SHELL)

Customer: AGNICO EAGLE

Location: BAKER LAKE

Equipment Tag No.: TK 8

Equipment Type: Above Ground Storage Tank

Equipment Description: Diesel Storage Tank

Code Requiring Test: API 650 (section 7.3.5) Reason for Test: New Construction

(The shell shall be tested by painting all of the joints on the inside with a highly penetrating oil and carefully examining the outside of the joints for leakage.)

Surface Condition (As Welded)

Test Solution: Diesel Test Date(s): 2021-09-05

Tested by: Matthew MacKenzie Ambient Conditions: 10 Degrees Celcius

Items Tested:

Shell to bottom seam weld at door sheet area.

Results:

No leaks detected at the time of inspection; acceptable to code.

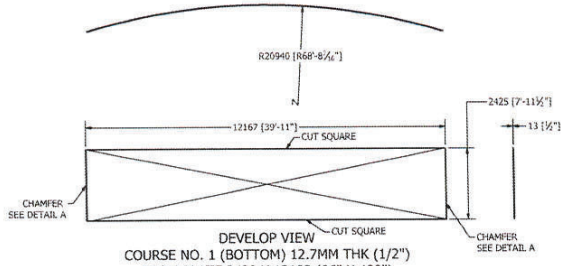
STS Representative Signature: Matthew MacKenzie Date: 2021-09-05

Client Representative Signature: Date: Sept 8TH 2021

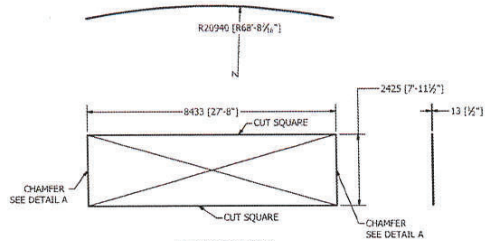
Exhibit 26, Rev 1

SECTION 10.0

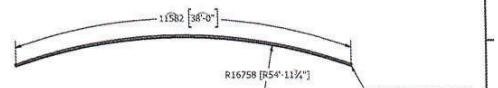
Shell



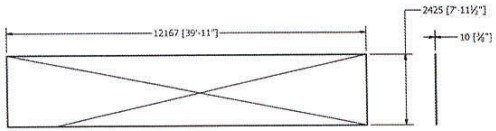
DEVELOP VIEW
COURSE NO. 1 (BOTTOM) 12.7MM THK (1/2")
FROM PLATE 2438 X 12192 (96" X 480")
QTY: 8
MARK C1



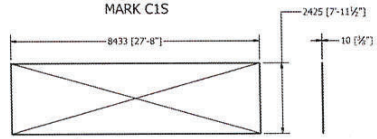
DEVELOP VIEW
COURSE NO. 1 (BOTTOM) 12.7MM THK (1/2")
FROM PLATE 2438 X 12192 (96" X 480")
QTY: 1
MARK C1S



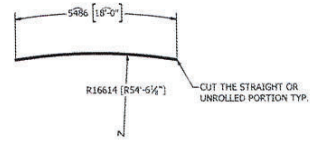
RIM ANGLE
L3"X3"X3/8"X 40'
ROLLED TOE OUT
QTY: 10
MARK 315M2101



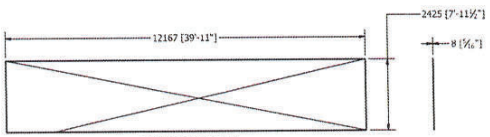
DEVELOP VIEW
COURSE NO. 2 - 9.5MM THK (3/8")
FROM PLATE 2438 X 12192 (96" X 480")
DO NOT ROLL
QTY: 8
MARK C2



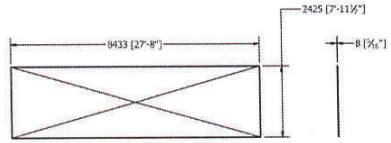
DEVELOP VIEW
COURSE NO. 2 - 9.5MM THK (3/8")
FROM PLATE 2438 X 12192 (96" X 480")
DO NOT ROLL
QTY: 1
MARK C2S



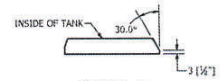
ROOF TOP ANGLE
L2"X2"X1/4"X 20'
ROLLED TOE OUT
QTY: 20
315M2102



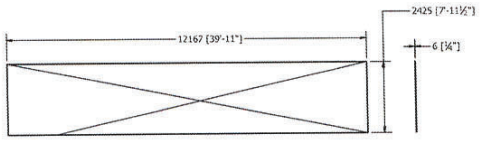
DEVELOP VIEW
COURSE NO. 3 & 4 - 7.9MM THK (5/16")
FROM PLATE 2438 X 12192 (96" X 480")
DO NOT ROLL
QTY: 16
MARK C3 & C4



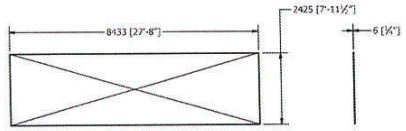
DEVELOP VIEW
COURSE NO. 3 & 4 - 7.9MM THK (5/16")
FROM PLATE 2438 X 12192 (96" X 480")
DO NOT ROLL
QTY: 2
MARK C3S & C4S



DETAIL A
COURSE NO. 1 VERT. PREP.
TYP. BOTH ENDS
SCALE 1 / 2



DEVELOP VIEW
COURSE NO. 5 - 6.4MM THK (1/4")
FROM PLATE 2438 X 12192 (96" X 480")
DO NOT ROLL
QTY: 8
MARK C5



DEVELOP VIEW
COURSE NO. 5 - 6.4MM THK (1/4")
FROM PLATE 2438 X 12192 (96" X 480")
DO NOT ROLL
QTY: 1
MARK C5S

STS STORAGE TANK SOLUTIONS **AS BUILT STAMP**

☐ CHANGE ☒ NO CHANGE

NAME: Lindsay C Bolton
SIGNATURE: LCB
DATE: September 6, 2021

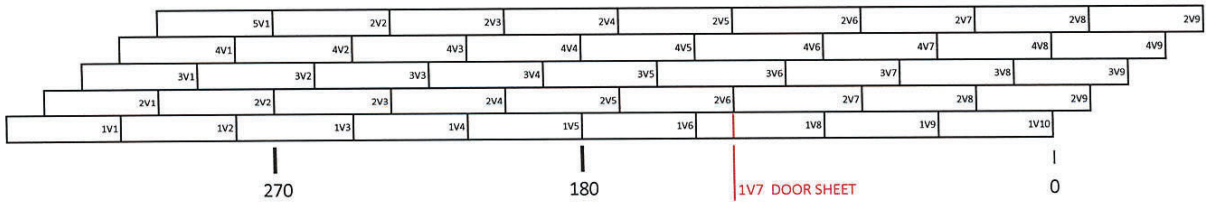
NOTES:
ONLY COURSE NO. 1 SHELL PLATES REQUIRE SHOP ROLLING
SHELL PLATES TO BE CHECKED CORNER TO CORNER FOR SQUARENESS
STEEL PLATES:ASME SA 516 GRADE 70 KILLED FINE GRAIN, NORMALIZED SUPPLIED BY ICL
STEEL SHAPES: CSA G40.21M 300W SUPPLIED BY TECHFORM

REGISTERED PROFESSIONAL ENGINEER
15-Jun-2021
Permit Number: P471

REVISION HISTORY		
REV	DESCRIPTION	DATE
A	ISSUED FOR REVIEW	2/5/2019
1	ISSUED FOR CONSTRUCTION	6/8/2021

DRAWN Marc Losier	2/18/2021	SHELL PLATES AND RIM ANGLE CUTTING AND ROLLING DETAILS
CHECKED		TITLE
QA		BAKER LAKE WHALE TAIL PROJECT - 10M LITERS - TANK #8: 6170TNK43
MFG		
APPROVED		
		SIZE A1 / DWG NO 341-M2 / REV 1
		SCALE / SHEET 1 OF 2

Tank #8 Baker Lake (AEM)



VERTS (Welder ID)

	IN	OUT
1V1	CPO	CPO
1V2	LMI	LMI
1V3	AKE	AKE
1V4	JNE	JNE
1V5	DGE	DGE
1V6	JNE	JNE
1V7	SFO	SFO
1V8	JNE	JNE
1V9	DGE	DGE
1V10	DGE	DGE

	IN	OUT
2V1	CJA	DGE
2V2	CJA	DGE
2V3	DGE	CPO
2V4	CPO	CPO
2V5	JNE	JNE
2V6	JNE	JNE
2V7	JNE	JNE
2V8	DGE	DGE
2V9	CPO	DGE

	IN	OUT
3V1	DGE	JNE
3V2	DGE	DGE
3V3	JNE	JNE
3V4	JRY	JRY
3V5	JRY	JRY
3V6	CPO	JRY
3V7	DGE	JRY
3V8	DGE	JRY
3V9	JNE	DGE

	IN	OUT
4V1	JNE	JNE
4V2	SFO	SFO
4V3	CPO	CPO
4V4	CPO	CPO
4V5	CPO	CPO
4V6	DGE	JRY
4V7	DGE	JRY
4V8	DGE	JNE
4V9	JNE	JNE

	IN	OUT
5V1	JNE	JNE
5V2	MBO	MBO
5V3	JRY	MBO
5V4	JRY	JRY
5V5	JRY	JRY
5V6	JRY	JRY
5V7	SFO	SFO
5V8	SFO	SFO
5V9	SFO	SFO

HORIZONTAL (Welder ID)

	IN	OUT
H1	JRY	CJA
DOOR SHEET	JNE/SFO	JNE/SFO

	IN	OUT
H2	JRY	CJA

	IN	OUT
H3	CPO	LMI

	IN	OUT
H4	JRY	LMI

PLATE IDENTIFICATION

	Heat Number
1V1	813P63640
1V2	813P63640
1V3	813P63640
1V4	813P63640
1V5	813P63640
1V6	0605092-03
1V7	0605092-03
1V8	0605092-03
1V9	823P63640
1V10	823P63640

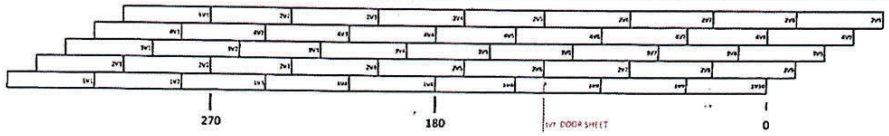
	Heat Number
2V1	813S61760
2V2	0605092-05
2V3	813S61760
2V4	812P33310
2V5	812P33310
2V6	812P33310
2V7	812P33310
2V8	813S61760
2V9	812P33310

	Heat Number
3V1	1600012-01
3V2	1600012-01
3V3	1600012-01
3V4	1600012-02
3V5	1600012-02
3V6	1600012-02
3V7	0604883-06
3V8	1600012-01
3V9	1600012-01

	Heat Number
4V1	811S00740
4V2	811S00740
4V3	811S00740
4V4	811S00740
4V5	811S00740
4V6	1600012-01
4V7	811S00740
4V8	811S00740
4V9	811S00740

	Heat Number
5V1	20002201
5V2	20002201
5V3	20002201
5V4	20002201
5V5	20002201
5V6	20002201
5V7	20002201
5V8	20002201
5V9	20002201

Tank #8 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	IT	IT	IT	
1V2	IT	IT	IT	
1V3	IT	IT	IT	
1V4	IT	IT	IT	
1V5	IT	IT	IT	
1V6	IT	IT	IT	
1V7	IT	IT	IT	
1V8	IT	IT	IT	
1V9	IT	IT	IT	
1V10	IT	IT	IT	

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

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

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

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

HORIZONTAL SEAMS MAPPING UT

H1V2	30"-36"	6" IT
H1V8	42"-48"	6" IT
Middle door sheet		6" IT

H2V3	24"-30"	6" IT
H2V9	36"-42"	6" IT

H3V1	60"-66"	6" IT
H3V7	42"-48"	6" IT

H4V5	24"-30"	6" IT
H4V9	36"-42"	6" IT

STS Representative Signature: [signature] Date: Sept 7/21

Client Representative Signature: [signature] Date: Sept 8th 2021

NDT Representative Signature: [signature] Date: Sept 06 /2021

NDT Representative CGSB No.: 17073