

EXCEEDING EXPECTATIONS SINCE 1969



IDEAL WELDERS
LTD

MUD BOOK

SRO No.: **9550046108**

Project Name: **CS4B**

Project Number: **U2905**

Station Name: **Hixon Lake**

Province: **British Columbia**

Contractor Name: **Ideal Welders Ltd**

10140

CN 06132

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6	Coating Package	<input type="checkbox"/>

Prepared by: _____

Reviewed by: _____



PRESSURE TEST FORM

ENB-CFCS-PROC-002F413



AFE No.	U2905	Province/State	BC
Project Name	TSRE	Station Name	CS4B - Hixon lake
Contractor/Vendor/PLM	Ideal Welders Ltd.	Location/Milepost	1010 Derwent Way.
Contract Ref. No.: e.g. (WO, PO, CWP)	10140	Date: YYYY/MM/DD	2020/03/20

Note 1: Identify testing information that is not applicable as N/A.

Identify Metric or Imperial units: kPa or psi L or gal. °C or °F m or ft

PRESSURE TEST INFORMATION

Test Date: YYYY/MM/DD	2020/3/20	Test No.	10140-U2905-012
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Drawing No.(s) and rev:

Spool	Control Number	Revision	Spool	Control Number	Revision
CS-4B-9549-01 MK1	06128	0	CS-4B-9550-01 MK1	06129	0
CS-4B-9551-01 MK1	06130	0	CS-4B-9552-01 MK1	06131	0
			CS-4B-9553-01 MK1	06132	0

Test Media

Test Media Type	Nitrogen <input type="checkbox"/>	Air <input type="checkbox"/>	Water <input checked="" type="checkbox"/>	Water with Additives <input type="checkbox"/>
Approximate Test Media Volume	2.3	CUBIC METERS	Type of Additive	N/A
Were permits for the use and disposal of water obtained?	Yes <input type="checkbox"/>		No Permits were required <input checked="" type="checkbox"/>	

PIPE SPECIFICATIONS

Manufacturer	Grade	NPS/OD	Wall Thickness	Length	Seam Type
TENARIS	A333 GR 6	12"	Sch 80	N/A	N/A

TEST EQUIPMENT DATA

Equipment Type	Make	Range	Serial No.
Precision Reference pressure tester	nVision	0-3000 PSI	571988
Continuous pressure recorder	nVision	0-3000 PSI	571988
Pressure Gauge	WGTC	0-5000 PSI	TE-90 S/N 0921172 TE-92 S/N 07181133
Liquid in Glass Thermometer	HBI	-35 TO 50C	TH-2 S/N 4F2571
Ambient Air Temp Recorder	LASARC	-35 TO 80C	CERT# C299061-00-01
Ground Temp Recorder	N/A	N/A	N/A
Test Medium Temp Recorder	nVision	-200 to 800c	571988

Reviewed

APR 16 2020



PRESSURE TEST FORM

ENB-CFCS-PROC-002F413



TEST EQUIPMENT ACCURACY VERIFICATION					
Test Equipment % of Test Pressure	Pressure Verification Before Test			Pressure Verification After Test	
	25%	50%	100%	100%	50%
Precision Reference pressure tester	528 PSI	1054 PSI	2052 PSI	2049 PSI	1056 PSI
Continuous pressure recorder	528 PSI	1054 PSI	2052 PSI	2049 PSI	1056 PSI
Pressure Gauge	530 PSI	1050 PSI	2050 PSI	2050 PSI	1050 PSI

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PRESSURE TEST FORM

ENB-CFCS-PROC-002F413



MAINLINE USE ONLY				
Pressure recorder and Precision Reference Tester Elevation		High Point Elevation		Critical Low Point Elevation
Location	N/A	N/A	N/A	N/A
Pressure	N/A	N/A	N/A	N/A
Location of Test Limits				
First 2 upstream and downstream welds	Upstream Weld ID	Coordinates (lat. and long.)	Downstream Weld ID	Coordinates (lat. and long.)
No. 1	N/A	N/A	N/A	N/A
No. 2	N/A	N/A	N/A	N/A

PRESSURE TESTING REQUIREMENTS

Note 1: Manually record temperatures to ensure equilibrium has been reached before pressurization according to FCS-014 or PCS-005
Note 2: Charts must be signed using ENB-CFCS-PROC-002F414 Pressure Test Chart ID Label

PRESSURE TESTING DESIGN REQUIREMENTS AND DURATION

Maximum Operating Pressure	936 PSI				
Can the entire piping system be visually inspected for leaks?	Yes <input checked="" type="checkbox"/>		No <input type="checkbox"/>		
Test Type	Design Min Pressure	Design Max Pressure	Time On	Time Off	Duration Required
Strength	2017 PSI	2160 PSI	N/A	N/A	60 Min.
Leak	2017 PSI	2160 PSI	N/A	N/A	Visual

ACTUAL TEST PRESSURES ACHIEVED AND DURATIONS

Test Type	Actual Min Pressure	Actual Max Pressure	Time On	Time Off	Actual Total Duration
Strength	2049 PSI	2052 PSI	9:02 AM	10:02 AM	60 Min.
Leak	2049 PSI	2049 PSI	10:02 AM	10:12 AM	10 Min.

PRESSURE TESTING DATA

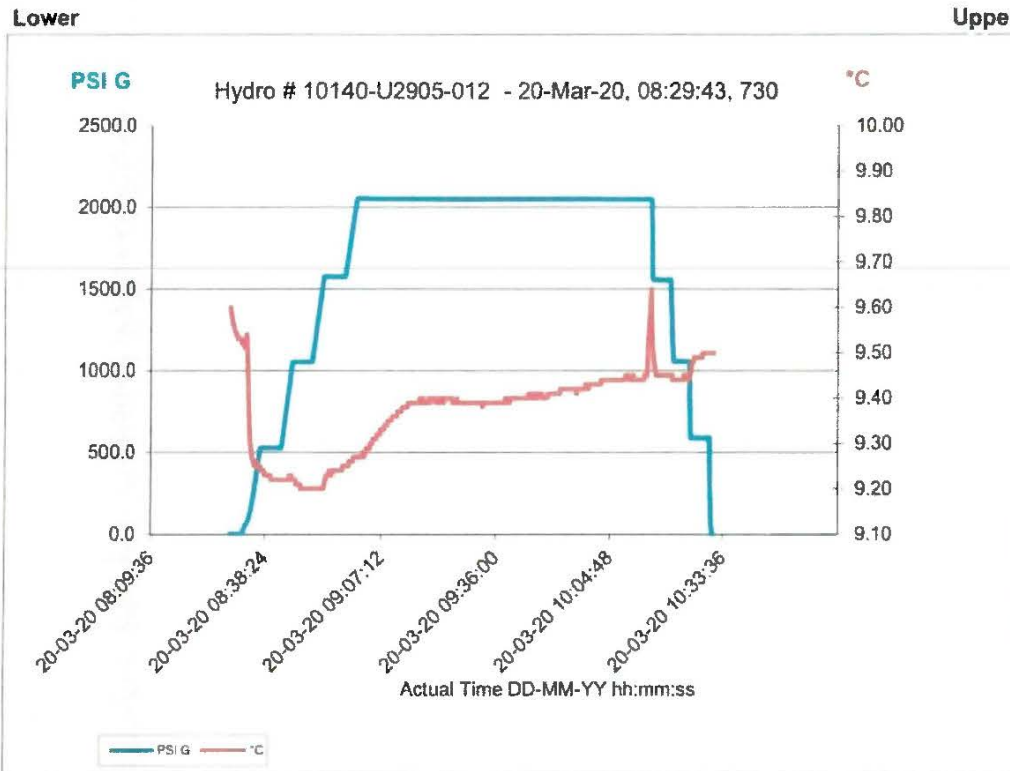
Test No. 10140-U2905-012

Time (approx. 15 min intervals)	Precision Reference Pressure	Temperature			Remarks (Weather, Volumes Added/Bled Off)
		Ambient Air Temp.	Test Medium Temp.	Ground Temp.	
AM	PSI	°C	°C	N/A	
8:32	1	8.5	9.53	N/A	0%
8:37	528	8.5	9.23	N/A	25% Start
8:42	528	8.5	9.22	N/A	25% End
8:45	1054	8.5	9.22	N/A	50% Start
8:50	1053	8	9.20	N/A	50% End
8:53	1575	8	9.22	N/A	75% Start
8:58	1574	8.5	.24	N/A	75% End
9:02	2052	8.5	9.27	N/A	100% Strength Test Start
9:12	2051	8.5	9.38	N/A	10 Min.
9:22	2050	8.5	9.39	N/A	20 Min.
9:32	2050	8.5	9.39	N/A	30 Min.

APR 16 2020
Christophe

Data Collection Report

	Chassis	Left Scale	Right Scale
Serial Number	571988	571428	569126
Datatype		Lower	Upper
Units		PSI G	°C



Hydro# 10140-U2905-012

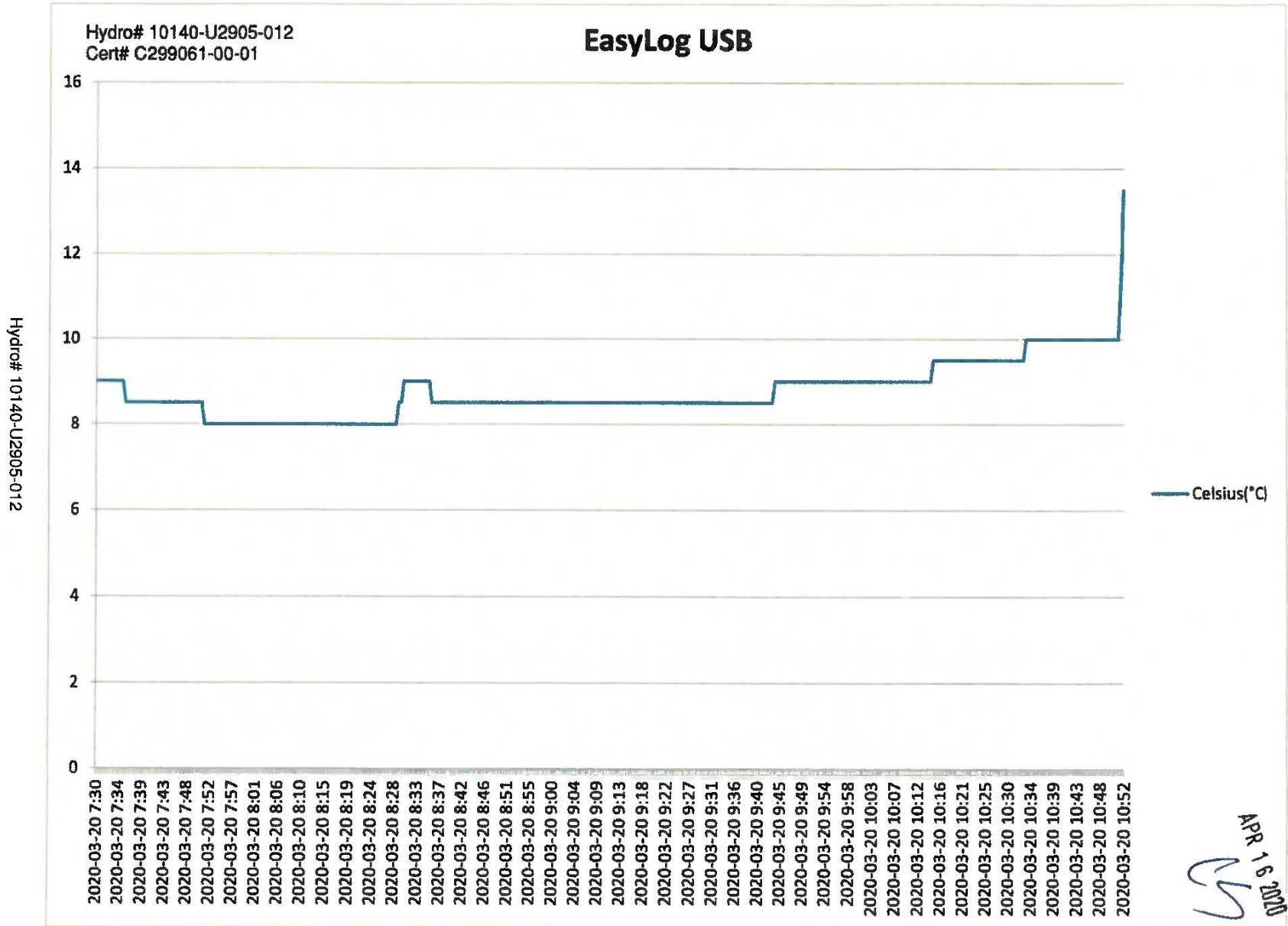
Hydro# 10140-U2905-012

Facility Construction



Pressure Test Chart Identification Label

AFE No.: U2905
 Project: CS4B- Hixon Lake
 Location: 1010 Derwent Way, Delta , BC
 Test Date yyyy/mm/dd: 2020/03/20
 Contractor/Job No.: 10140
 Contractor Test No.: 10140-U2905-012
 Pressure Element Range: 0 to 3000 PSI
 Pressure Element Pen Color: BLUE
 Temperature Element Range: -200 to +800 Celsius
 Temperature Element Pen Color: RED
The attached pressure recorder chart meets all pressure testing criteria design requirements.
CONTRACTOR REPRESENTATIVE
 Print: MIKE BAKER
 Sign: [Signature]
 Date yyyy/mm/dd: 2020/03/20
ENBRIDGE REPRESENTATIVE
 Print: GEOFF MOORE
 Sign: [Signature]
 Date yyyy/mm/dd: 2020/03/20



Hydro# 10140-U2905-012

Line No.	Flow	State	Pipe Spans	Line No.	Service	From Line	To Line	Design Code	Pressure Rating	Pipe Material	Pipe Sub	WALC	WALCE	PROFIT	Phase	Flow		Operating Pressure		Operating Temp		WET		Upset		Vacuum		Design		ROCK	C.A.	Pressure Test		Inspection	Insulation	Hand Tracing		Insulation		Plant Code	Internal Protection		P&ID		Notes	Pressure Protection		Line Size	Line Per Station	Status
																Wp	Lq	Press	Temp	Press	Temp	Press	Temp	Press	Temp	Press	Temp	Press	Temp			Press	Temp			Press	Temp	Press	Temp		Press	Temp	Press	Temp		Press	Temp			
10140-0001	Flow	State	Pipe Spans	Line No.	Service	From Line	To Line	Design Code	Pressure Rating	Pipe Material	Pipe Sub	WALC	WALCE	PROFIT	Phase	Wp	Lq	Press	Temp	Press	Temp	Press	Temp	Press	Temp	Press	Temp	Press	Temp	ROCK	C.A.	Press	Temp	Inspection	Insulation	Hand Tracing	Insulation	Plant Code	Internal Protection	P&ID	Notes	Pressure Protection	Line Size	Line Per Station	Status					

Hydro# 10140-U2905-012

APR 16 2020
CS



TORONTO 16975 Leslie Street Newmarket, ON L3Y 9A1 Tel: (905) 952-3750 Fax: (905) 952-3751	MONTRÉAL 20800 Boul. Industriel Ste-Anne-de-Bellevue, QC H9X 0A1 Tel: (514) 457-7280 Fax: (514) 457-4329	CALGARY #209, 4615 112 Ave SE Calgary, AB T2C 5J3 Tel: (403) 272-9332 Fax: (403) 248-5194	VANCOUVER 1282 Cliveden Av Delta, BC V3M 6G4 Tel: (604) 254-9622 Fax: (604) 254-3123
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www.itm.com - information@itm.com

Calibration Certificate

Customer: *Ideal Welders Limited*

Certificate: C299061-00-01

Unit Identification

Manufacturer: **Lascar**
 Model: **EL-USB-1**
 Description: **Temperature Data Logger**

Serial: **NA**
 Unit ID: **NA**

Calibration Date

Calibration Date: **30-Sep-2019**
 Due Date: **30-Sep-2020**

Calibration Conditions

Temperature: **22.41°C**
 Humidity: **47.38 %**
 Barometric Pressure: **N/A**

General Information

Remark: **N/A**

Standards Used

<u>Unit ID</u>	<u>Manufacturer</u>	<u>Model</u>	<u>Cal Date</u>	<u>Due Date</u>
INV145	Ametek	STS200A916	11-Dec-2018	11-Dec-2019
INV147	Ametek	DT1050	10-Dec-2018	10-Dec-2019

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The calibration was performed using measurement standards traceable to the National Measurement Institute Standards (NMIS) part of the National Research Council of Canada (NRC) or the National Institute of Standards and Technology (NIST), or to accepted international standards for measurement, or is derived by ratio type self-calibration techniques. Measurement uncertainties given in this report are based on a coverage factor of k=2 corresponding to a confidence level of approximately 95%.

Calibrated by: **B. Cardin**

Approved by:

Certificate: C299061-00-01
 Asset: ITM0029550

Calibration Certificate
 Hydro# 10140-U2905-012

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www.itm.com - information@itm.com

Test Results
 Procedure: Lascar EL-USB-1 /DT1050,STS200A916 Rev: 1
 Data Type: As Found Results: Pass

<u>Test Description</u>	<u>True Value</u>	<u>Reading</u>	<u>Lower Limit</u>	<u>Upper Limit</u>	<u>Test Status</u>	<u>Exp Uncert</u>
TEMPERATURE VERIFICATION						
0.328 °C		0.5 °C	-0.2 °C	0.8 °C	Pass	7.0e-002 °C
24.08 °C		23.6 °C	23.8 °C	24.6 °C	Pass	7.0e-002 °C
44.18 °C		44.0 °C	43.7 °C	44.7 °C	Pass	7.0e-002 °C

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Certificate: C299061-00-01
 Asset: ITM0029550

Hydro# 10140-U2905-012
 Calibration Certificate

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ALBERTA MEASUREMENT SERVICES LTD.

5327 - 91 STREET ~ EDMONTON, ALBERTA, T6E 2E6 ~ CANADA
 Phone (780) 468- 6387 ~ Fax (780) 462-9387

CALIBRATION CERTIFICATE

CUSTOMER: Ideal Welders Ltd
MODEL: nVision
CHASSIS SERIAL NUMBER: 571988
3K MODULE SERIAL NUMBER: 571428
CALIBRATION DATE: October 7, 2019

TEMPERATURE: 21.6°C
RELATIVE HUMIDITY: 33%
RTD MODULE SERIAL NUMBER: 569126
PROCEDURE: nVision RTD/3K
NEXT CAL DUE: October 7, 2020

MASTER INSTRUMENT READING	INSTRUMENT READING	ALLOWABLE TOLERANCE (°C)
-200.00°C	-200.00°C	0.05
0.00°C	0.01°C	0.09
200.00°C	200.03°C	0.13
400.00°C	400.01°C	0.17
600.00°C	599.98°C	0.21
800.00°C	799.95°C	0.25

MASTER DEADWEIGHT READING	INSTRUMENT READING	ALLOWABLE TOLERANCE (psi)
0 psi	0.0 psi	0.45
299.963 psi	299.9 psi	0.45
599.908 psi	599.9 psi	0.45
898.419 psi	898.4 psi	0.45
1198.581 psi	1198.6 psi	0.60
1498.735 psi	1498.7 psi	0.75
1798.918 psi	1799.0 psi	0.90
2099.070 psi	2099.1 psi	1.05
2399.213 psi	2399.2 psi	1.20
2699.330 psi	2699.5 psi	1.35
2999.482 psi	2999.6 psi	1.50

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MASTER INSTRUMENT READING	RTD PROBE READING	ALLOWABLE TOLERANCE (°C)
-0.084°C	-0.14°C	0.15

Userspan: RTD 1.00000, 3K 1.00011, RTD Probe Base resistance 99.980

REMARKS: The above instrument was found to be within the manufacturer's specifications: **3KPSI 0 TO 30% of Full Scale ±0.015% of Full Scale, 30% to 110% of Full Scale ±0.05% of Reading, RTD ±0.015% of reading +0.02Ω**

THE ABOVE EQUIPMENT HAS BEEN COMPARED TO AN AMETEK AMC910 S/N 2594163 TRACEABLE IN ACCORDANCE ANSI/NCSL Z540-1:1994, TRACEABLE TO THE INTERNATIONAL SYSTEM OF UNITS (SI), THROUGH NATIONAL METROLOGY INSTITUTES, RATIO METRIC TECHNIQUES OR NATURAL PHYSICAL CONSTANTS.

THE ABOVE EQUIPMENT HAS BEEN COMPARED TO A DH-BUDENBERG CPB5800/CPSS5800/CPM5800 DEADWEIGHT TESTER S/N 32503/257N/B2704 TRACEABLE TO UKAS ON CERTIFICATE 12814/15T32503/15WB2704.

Technician:
 Shane Snider



ITM Instruments Inc
www.itm.com
800-561-8187

1641 Venables Street
Vancouver, BC V5L 2H2
Phone: 604-254-9622 * Fax: 604-254-3123

Certificate of Calibration

Customer: Ideal Welders Ltd.

Work Order: 312748-00

Gauge Description: ENFM 4" 5000 PSI Pressure Gauge

Condition of gauge: USED

Gauge Serial No: 07181133

Date of Calibration: 2019-12-16

Due Date: 2020-12-16

Calibration Data

Applied Pressure	Gauge Reading	Deviation
PSI	PSI	
0	0	0
500	525	+25
1500	1550	+50
2500	2550	+50
3500	3550	+50
4500	4550	+50

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Gauge Accuracy: ASME Grade 1A, ±1% of span

Test Standards:

Vacuum Gauges:

Digitron Digital Manometer model 2082P, accuracy ±0.2% of reading / ±0.08 inches of Mercury Vacuum

Pressures to 60 PSI:

Ashcroft Digital Pressure Gauge, model 302089SD02L60#, accuracy ±0.05% or ±0.03 PSI

Pressures to 200 PSI:

Ashcroft Digital Pressure Gauge, model 302089SD02L200#, accuracy ±0.05% or ±0.1 PSI

Pressures to 600 PSI:

Ashcroft Digital Pressure Gauge, model 302089SD02L600#, accuracy ±0.05% or ±0.3 PSI

Pressures to 10,000 PSI:

Ashcroft dead weight tester model 1305D, serial number DWT-12587, accurate to within ±0.1%.

Traceable to NIST Test Numbers: 821/276493-08, 14737, 14846, 14847

Certified by:

Tony Donnelly Instrument Technician

TE-92

Hydro# 10140-U2905-012



ITM Instruments Inc
www.itm.com
800-561-8187

1641 Venables Street
Vancouver, BC V5L 2H2
Phone: 604-254-9622 * Fax: 604-254-3123

Certificate of Calibration

Customer: Ideal Welders Ltd.

Work Order: 312748-00

Gauge Description: WGTC 4", 5000 PSI Pressure Gauge

Condition of gauge: USED

Gauge Serial No: 0921172

Date of Calibration: 2019-12-16

Due Date: 2020-12-16

Calibration Data

Applied Pressure	Gauge Reading	Deviation
PSI	PSI	
0	0	0
500	500	0
1500	1500	0
2500	2500	0
3500	3500	0
4500	4500	0

APR 16 2020

Gauge Accuracy: ASME Grade 1A, $\pm 1\%$ of span

Test Standards:

Vacuum Gauges:

Digitron Digital Manometer model 2082P, accuracy $\pm 0.2\%$ of reading / ± 0.08 inches of Mercury Vacuum

Pressures to 60 PSI:

Ashcroft Digital Pressure Gauge, model 302089SD02L60#, accuracy $\pm 0.05\%$ or ± 0.03 PSI

Pressures to 200 PSI:

Ashcroft Digital Pressure Gauge, model 302089SD02L200#, accuracy $\pm 0.05\%$ or ± 0.1 PSI

Pressures to 600 PSI:

Ashcroft Digital Pressure Gauge, model 302089SD02L600#, accuracy $\pm 0.05\%$ or ± 0.3 PSI

Pressures to 10,000 PSI:

Ashcroft dead weight tester model 1305D, serial number DWT-12587, accurate to within $\pm 0.1\%$.

Traceable to NIST Test Numbers: 821/276493-08, 14737, 14846, 14847

Certified by:

Tony Donnelly Instrument Technician

TE-90

Hydro# 10140-U2905-012

Test Results
 Procedure: **Glass Thermometer: RTC-158B Rev: 1.0**
 Data Type: **As Found** Results: **Pass**

<u>Test Description</u>	<u>True Value</u>	<u>Reading</u>	<u>Lower Limit</u>	<u>Upper Limit</u>	<u>Test Status</u>	<u>Exp Uncert</u>
DEGREES CELCIUS						
-20.00 °C		-20.0 °C	-21.0 °C	-19.0 °C	Pass	1.9e-001 °C
0.00 °C		0.0 °C	-1.0 °C	1.0 °C	Pass	1.9e-001 °C
20.00 °C		20.0 °C	19.0 °C	21.0 °C	Pass	1.9e-001 °C
40.00 °C		40.0 °C	39.0 °C	41.0 °C	Pass	1.9e-001 °C

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Hydro# 10140-U2905-012

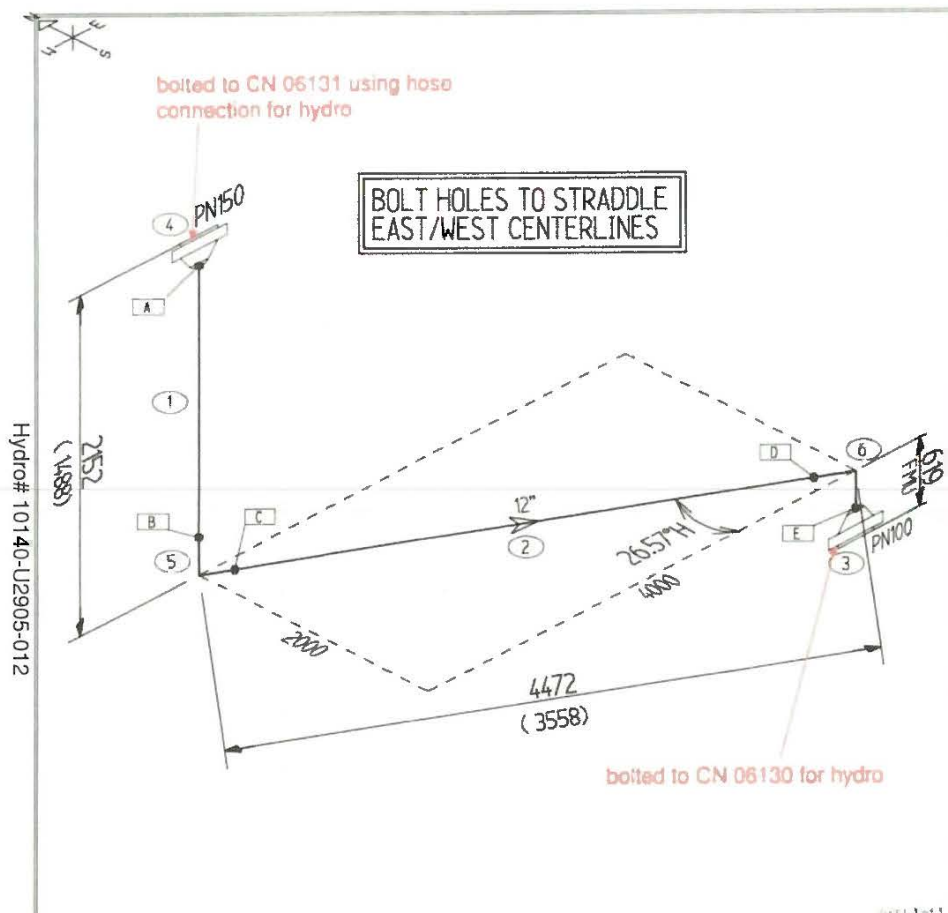
Certificate: C312741-00-01
 Asset: ITM0032185

Calibration Certificate

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ITEM	QTY	DESCRIPTION	UNIT
A333-Gr.6 SMLS Pipe			
1	1	12" Sch 80(17.48) BE x BE	1488
2	1	12" Sch 80(17.48) BE x BE	3558
			Total Length: 5046
Gr.290, CAT II (-45°C) Flanges			
3	1	12" PN-100 RF Weld Neck	Sch 80
4	1	12" PN-150 RF Weld Neck	Sch 80
Gr.290, CAT II (-45°C) Fittings			
5	1	12" 90 LR Elbow	Sch 80
6	1	12" 90 LR Elbow	Sch 80
LABOR			
5	12"	Sch 80 Bolt-Weld Low Temp Grp 5	
1	12"	Flange Prot. PN-150	
1	12"	Flange Prot. PN-100	
2504		Handling-M	

Rec./Ht.No.	WELD ID	WPS	RT	MPI	VIS
	A-12" BW				
	B-12" BW				
	C-12" BW				
	D-12" BW				
	E-12" BW				

Hydro# 10140-U2905-012

AS-BUILT

IDEAL WELDERS LTD.

THESE AS-BUILT DRAWINGS OR SCOPE OF WORK ACCURATELY REFLECTS CONSTRUCTION CONDITIONS

ISSUED BY: [Signature] BILL PAIDING

SIGNATURE: [Signature]

DATE ISSUED: 18 Mar 2020

HEAT #	ORIENTATION	ALIGNMENT	FINAL QA

INSPECTOR CHECKLIST

RT MPI PH BN HYDRO

LPI UT VIS AF PMT

10140

RTAUT: BM: 100 2: SW: 0 2: BHA: 0 2: HYDRO: 14403 kPag LPI: BM: 0 2: SW: 0 2: VISUAL: 100 2: AIR TEST: NONE MPI: BM: 100 2: SW: 100 2: FERRITE: 0 PH: 0 2: BLU: 0 2: PAINT: NONE 2: INS. CLASS:	FAB CODE: 2662B313 LNK. CLASS: F3 SUP. JOB # : M4-410g ft REF. IBC: CS-4B-9549/01	SERVICE: HBRIDGE MODULE: MLD MOD. C/DATE:	PO No: 9550046108 JOB No: 10140 CONTROL No: 06128
WELD PROCEDURES: 1: 1050N 2: 36N 3: 33N	DRAWN: MB DATE: 2019-11-18 CHK: AL APPR:	IDEAL WELDERS LTD. 400 Calder Street, Annapolis Island Delta, BC V8B 8B2 (25) 604-575-1200 (25) 604-575-1200 Website: www.idealwelders.com	

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APR 16 2020

Mapping for Spool CS-4B-9549-01 MK1






Client Enbridge Reference Drawing CS-4B-9549/01 Rev. 0 Module Number Load No.
 Project CS4B - U2905 - HIXON Line Class F3 System Number MAIN GAS
 PO No. 9550046108 Control 06128 Rev. 0 Line Designation MG-1324

Hydro Yes PWHT No Visual Direct Procedure # IWL-VT-001 Rev 3 Dimensional Yes 03-04-2020

BHN No Ferrite No PMI No All NDE Accepted as per Z862,B31.3

Weld Size	Type	Welder	WPS	RT	MT/LT	BHN	Ferrite	PMI No.	Visual	Failed	Repaired	Item No.	RN	Heat No.	PMI No.	BL/UT
A	12"	B/W Wire	MN	33N	✓ S-419				03-03-2020	<input type="checkbox"/>		1	P390	92256		
B	12"	B/W Wire	JE	33N	✓ S-419				03-03-2020	<input type="checkbox"/>		2	P352	92256		
C	12"	B/W Wire	JJ	33N	✓ S-377				02-28-2020	<input type="checkbox"/>		3	F2789	TL10030831		
D	12"	B/W Wire	JJ	33N	✓ S-377				02-28-2020	<input type="checkbox"/>		4	F2791	TL10030834		
E	12"	B/W Wire	JJ/FP	33N	✓ S-377				02-28-2020	<input type="checkbox"/>		5	F2778	992066		
												6	F2778	992066		

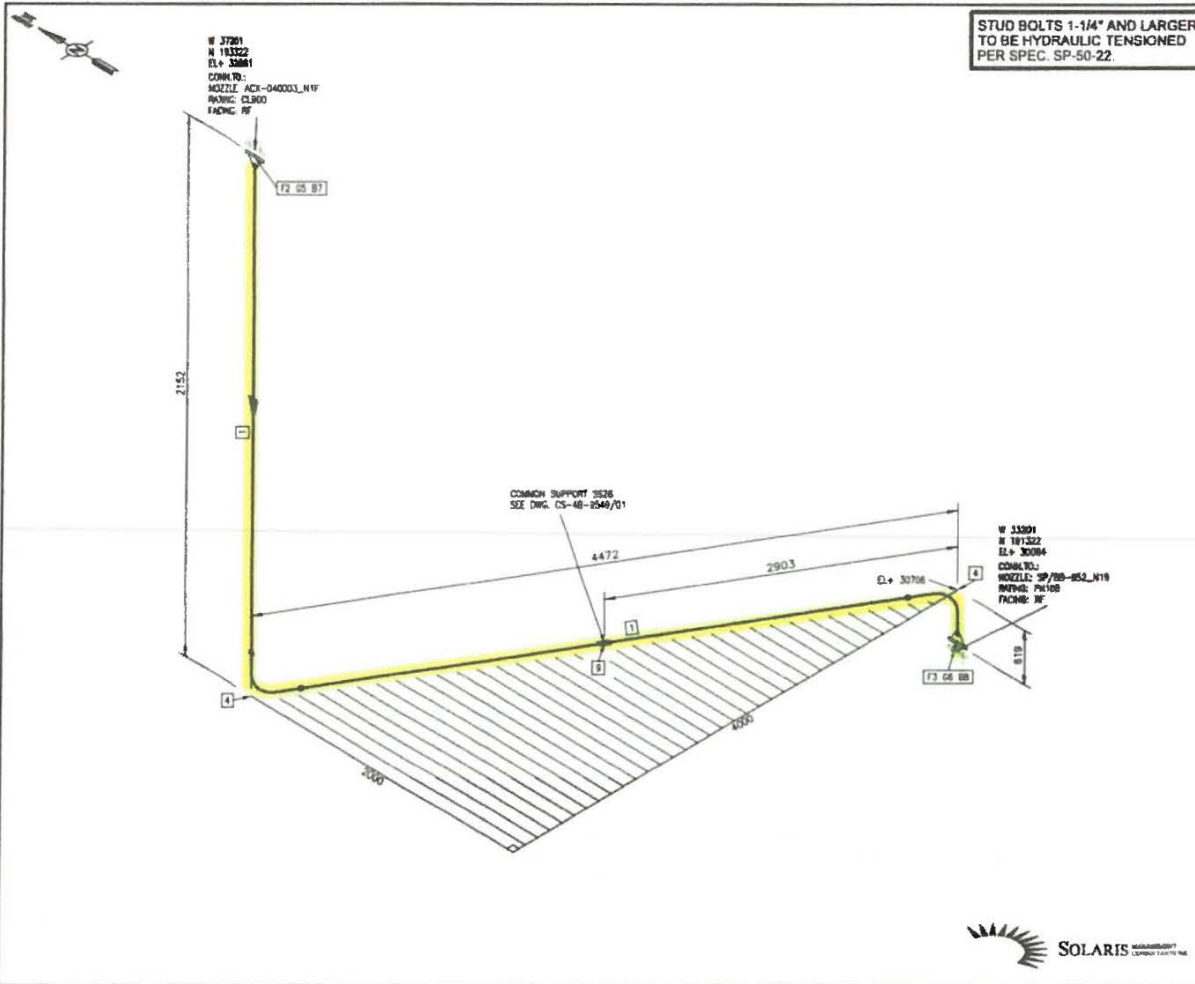
Hydro# 10140-U2905-012

All WELDS VISUALLY INSPECTED TO 831.3 AND ACCEPTED BY:  Mike Baker CWB Level III, Reg # 7196	DOCUMENTATION REVIEWED BY:  William Parsons CWB Level III, Reg # 8125 18 Mar 2020	DOCUMENTATION ACCEPTED BY:  Chris Spence Enbridge QA APR 16 2020
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March 18, 2020
 FO-IWL-QA-1211

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 10140 06128

Hydro# 10140-U2905-012



STUD BOLTS 1-1/4" AND LARGER TO BE HYDRAULIC TENSIONED PER SPEC. SP-50-22.

BILL OF MATERIAL

MARK	QTY	SIZE	DESCRIPTION
SHOP MATERIALS			
1	3046 mm	12"	PIPE, SMLS, SCH 80, BE, ASTM A333 GR. 6
2	1	12"	FLANGE, WFL, P#150, RF, SCH 80, CSA 2245.12 GR. 280 CWT 1 MISC
3	1	12"	FLANGE, WFL, P#150, RF, SCH 80, CSA 2245.12 GR. 280 CWT 1 MISC
4	2	12"	ELBOW, 90 DEG, LR, SCH 80, CSA 2245.11 GR. 280 CWT 1 MISC
FIELD MATERIALS			
5	1	12"	GASKET, 3.2mm THK, CL800, RF, SPIRAL WOUND, FLEXIBLE GRAPHITE FILLER C/W 304 SS WINDINGS & 304 SS INNER RING & CS CENTERING RING
6	1	12"	GASKET, 3.2mm THK, CL800, RF, SPIRAL WOUND, FLEXIBLE GRAPHITE FILLER C/W 304 SS WINDINGS & 304 SS INNER RING & CS CENTERING RING
7	20	1-1/2"x12-1/4"	STUD BOLT FULL THD 1/2 HEAVY HEX NUTS, ASTM A193 GR. B7/ASTM A194 GR. 2H
8	30	1-1/2"x11"	STUD BOLT FULL THD 1/2 HEAVY HEX NUTS, ASTM A193 GR. B7/ASTM A194 GR. 2H
9	1	12"	PIPE SUPPORT - PIPE STRAP - 5613

FINAL REDLINE MARK-UP

ALL DIMENSIONS UNLESS OTHERWISE SPECIFIED
 ALL DIMENSIONS TO FACE UNLESS OTHERWISE SPECIFIED
 DIMENSIONS TO CENTERLINE UNLESS OTHERWISE SPECIFIED
 DIMENSIONS TO SURFACE UNLESS OTHERWISE SPECIFIED
 DIMENSIONS TO CENTERLINE UNLESS OTHERWISE SPECIFIED

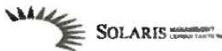
APPROVED BY: [Signature] DATE: 18 MAR 2020

SPECIFIC NOTES

GENERAL NOTES

1. ALL PIPE SUPPORTS TO BE SUPPLIED BY FABRICATOR.
2. MECHANICAL FABRICATOR TO VERIFY ALL DIMENSIONS PRIOR TO FABRICATION.

PRODUCT: MG	SPEC: F3	DESIGN CODE: 2882-15	INSPECTION CATEGORY: 100% NDE	PAINT CODE: A2
MODEL: CS-4B-1-02-PPE_LB	DES. PRESS.: 9830	DES. TEMP.: 54	INSULATION/HEAT TRACED: INSUL. THK.: mm	
REV: 0	REV: 0	DES. TEMP.: 54	NDE TYPE: -	INSUL. MAT.: -
MODULE ID: N/A	TEST: MIN HYDRO AT 13910 kPa(g)	TEST: AREA/DWP: EMP-05/G8	NDE PERCENTAGE: -	CONTRACTOR: N/A
	TEST: MAX HYDRO AT 14895 kPa(g)		MONIT: -45	STRESS CHECKED: °C GTR



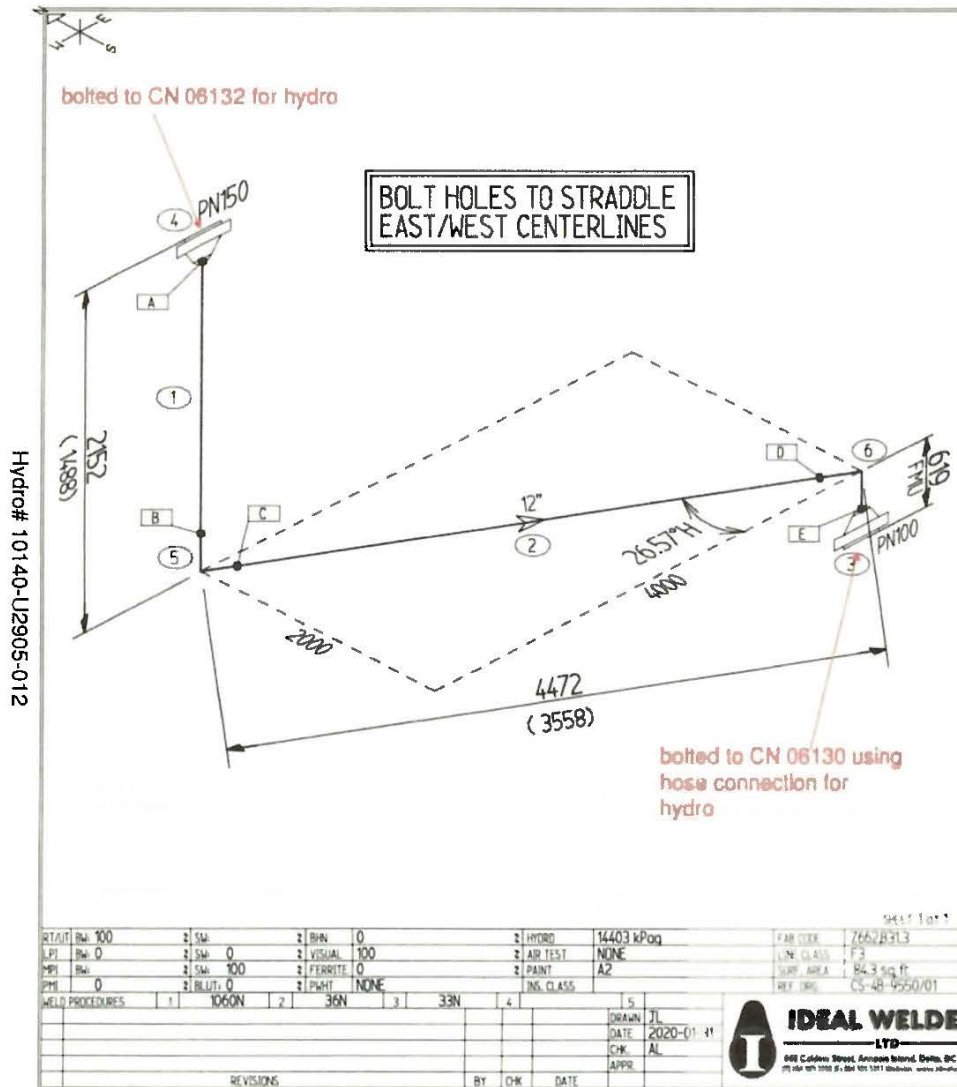
ISSUED FOR CONSTRUCTION

REV.	DATE	REVISION DESCRIPTION	DRW/DESIGN	DRAWING CHECK	DESIGN ENGINEER	DESIGN CHECK	PROJECT APPROVAL
0	2019/07/15	IFC U2905 (SOLARIS EB18-03356)	MOB	EDC	MTY	RAD	RMB

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PIPING ISOMETRIC			
MAIN GAS(MG)			
LINE NO. MG-12-F3-1325			
CS-4B HIXON COMPRESSOR STATION			
DRAWN/DESIGN: MOB	DESIGN ENGINEER: MTY	WEI PROJECT NUMBER: U2905	SCALE: NTS
DRAWING CHECK: EDC	DESIGN CHECK: RAD	DRAWING NUMBER: CS-4B-9550/01	DATE: 2019/07/15
PROJECT APPROVAL: RMB			

APR 16 2020
C9



ITEM	QTY	Description	Spec/Notes
A333-Gr.6 SMLS Pipe			
1	1	12" Sch 80(17.48) BE x BE	1488
2	1	12" Sch 80(17.48) BE x BE	3558
			Total Length 5046
Gr.290, CAT II (-45°C) Flanges			
3	1	12" PN-100 RF Weld Neck	Sch 80
4	1	12" PN-150 RF Weld Neck	Sch 80
Gr.290, CAT II (-45°C) Fittings			
5	1	12" 90 LR Elbow	Sch 80
6	1	12" 90 LR Elbow	Sch 80
LABOR			
5	12"	Sch 80 Butt-Weld Low Temp Grp 5	
1	12"	Flange Prot. PN-150	
1	12"	Flange Prot. PN-100	
2504		Handling-Wt	

Rec./Hit No.	WELDS	TYPE	WELDER ID	WPS	RT	MPI	VIS
	A	12" BW					
	B	12" BW					
	C	12" BW					
	D	12" BW					
	E	12" BW					

AS-BUILT

IDEAL WELDERS LTD

I HEREBY VERIFY THAT THE QUANTITY AND SCOPE OF WORK ACCURATELY REFLECTS THE ASSEMBLY CONDITIONS

VERIFIED BY: BILL PARSONS

DATE: 18 Mar 2020

HEAT # _____

ORIENTATION _____

ALIGNMENT _____

FINAL QA _____

INSPECTION CHECKLIST

RT MPI PW BN HYDRO

UT VIS DP PMI

10140

RT/UT: 100	SM: 2	BN: 0	HYDRO: 14403 kPa(g)	FAB CODE: 7662/R313	LINE SIZE: 12
LPI: 0	SM: 0	VISUAL: 100	AIR TEST: NONE	LINE CLASS: F3	SERVICE: _____
MPI: 0	SM: 100	FERRITE: 0	PAIN: A2	SURF AREA: 84.3 sq ft	MEDIA: NL
PHI: 0	BLUT: 0	PMHT: NONE	INS. CLASS: _____	REF. DRG: CS-4B-9550/01	MOD. CYCODE: _____
WELD PROCEDURES: 1 1060N 2 36N 3 33N 4 _____			REV. 0 LINE DESIGNATION: MG-1925		
DRAWN: JL DATE: 2020-01-31			CLIENT: ENBRIDGE		
CHK: AL			JOB No: 955004610B		
APPR: _____			PROJECT: U2905 COMPRESSOR STN CS48 HIXON		
REVISIONS: _____			MATERIAL TYPE: LOW TEMP.		
BY: _____			CS-4B-9550-01 MK1		
DATE: _____			DIA: 12.5		
_____			WGT: 2504 lb		
_____			CONTROL No: 06129		

APR 16 2020



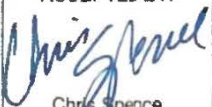
Mapping for Spool CS-4B-9550-01 MK1



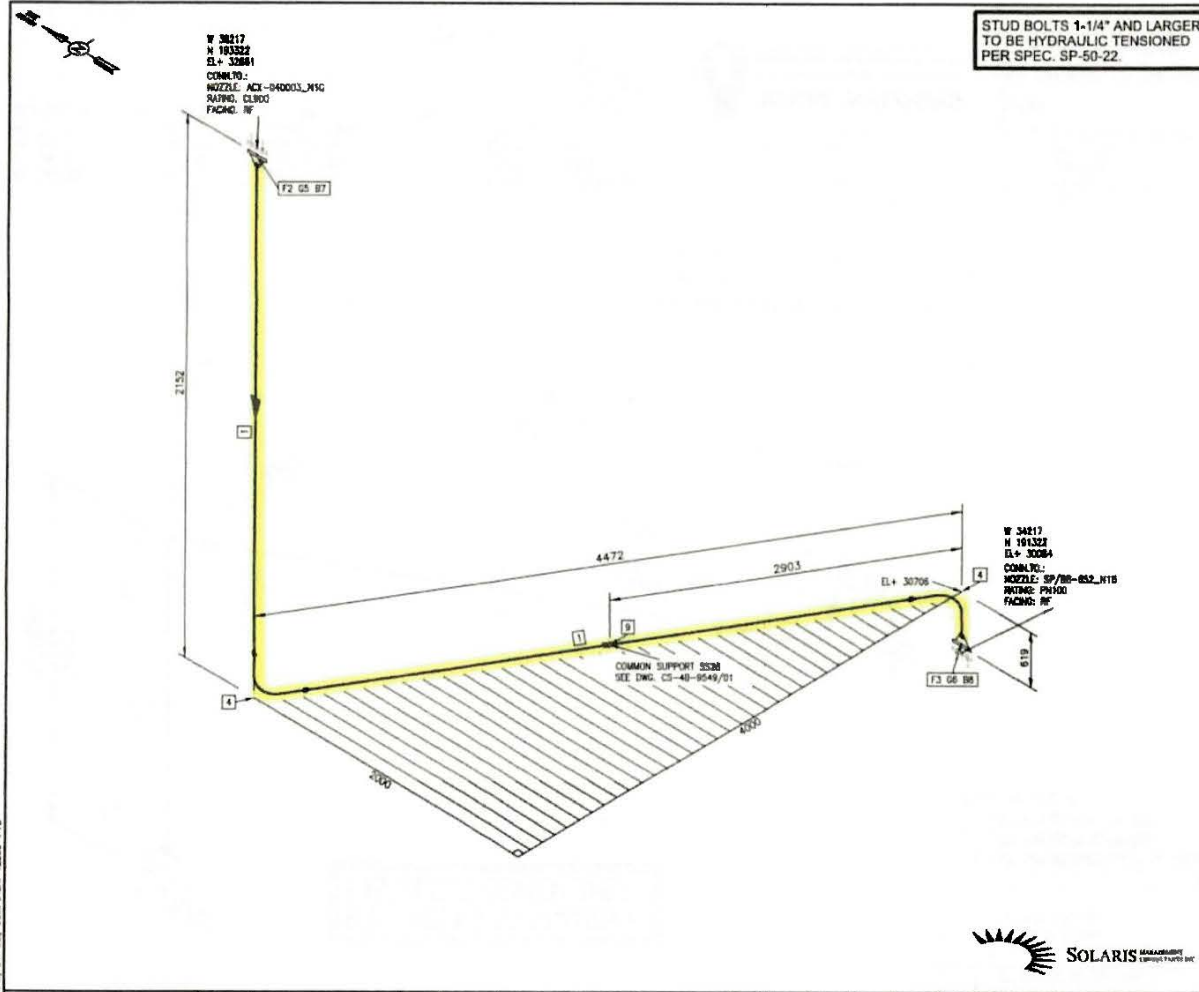
Client Enbridge	Reference Drawing CS-4B-9550/01	Rev. 0	Module Number	Load No.
Project CS4B - U2905 - HIXON	Line Class F3		System Number MAIN GAS	
PO No. 9550046108	Control 06129	Rev. 0	Line Designation MG-1325	
Hydro Yes	PWHT No	Visual Direct Procedure # IWL-VT-001 Rev 3	Dimensional Yes	03-04-2020
BHN No	Ferrite No	PMI No	All NDE Accepted as per Z662,B31.3	

Weld Size	Type	Welder	WPS	RT	MT/LT	BHN	Ferrite	PMI No.	Visual	Failed	Repairs	Item No.	RN	Heat No.	PMI No.	BL/UT
A	12"	B/W Wire	MN	33N	S-420				03-03-2020	<input type="checkbox"/>		1	P391	92257		
B	12"	B/W Wire	JE	33N	S-420				03-03-2020	<input type="checkbox"/>		2	P391	92257		
C	12"	B/W Wire	JJ	33N	S-378				02-28-2020	<input type="checkbox"/>		3	F2789	TL10030631		
D	12"	B/W Wire	FP	33N	S-378				02-28-2020	<input checked="" type="checkbox"/>	03-03-2020	4	F2791	TL10030634		
DR1	12"	B/W Wire	JE	33N	S-420				03-03-2020	<input type="checkbox"/>		5	F2778	992066		
E	12"	B/W Wire	FP	33N	S-378				02-28-2020	<input type="checkbox"/>		6	F2777	992065		

Hydro# 10140-U2905-012

ALL WELDS VISUALLY INSPECTED TO B31.3 AND ACCEPTED BY:  Mike Baker CWB Level III, Reg # 7196	DOCUMENTATION REVIEWED BY:  William Parsons CWB Level III, Reg # 8125 18 Mar 2020	DOCUMENTATION ACCEPTED BY:  Chris Spence Enbridge QA APR 16 2020
--	--	---

Hydro# 10140-U2905-012



STUD BOLTS 1-1/4" AND LARGER
 TO BE HYDRAULIC TENSIONED
 PER SPEC. SP-50-22.

BILL OF MATERIAL

QTY	SIZE	DESCRIPTION
SHOP MATERIALS		
1	5048 mm 12"	PIPE, SMLS, SCH 80, BK, ASTM A333 GR. 8
2	1	FLANGE, WFL, PN150, RF, SCH 80, CSA Z248.12 GR. 290 CAT 1 WASC
3	1	FLANGE, WFL, PN150, RF, SCH 80, CSA Z248.12 GR. 290 CAT 1 WASC
4	2	ELBOW, 90 DEG, LR, SCH 80, BK, CSA Z248.11 GR. 290 CAT 1 WASC
FIELD MATERIALS		
5	1	GASKET, 3.2mm THK, CLDR, RF, SPIRAL WOUND, FLEXIBLE GRAYWITE FILLER C/W 304 SS WINDINGS & 304 SS INNER RING & CS CORNERING RING
5	1	GASKET, 3.2mm THK, CLDR, RF, SPIRAL WOUND, FLEXIBLE GRAYWITE FILLER C/W 304 SS WINDINGS & 304 SS INNER RING & CS CORNERING RING
7	20	STUD BOLT FULL THD W/2 HEAVY HEX NUTS, ASTM A193 GR. B1/ASTM A194 GR. 2H
8	20	STUD BOLT FULL THD W/2 HEAVY HEX NUTS, ASTM A193 GR. B1/ASTM A194 GR. 2H
9	1	PIPE SUPPORT - PIPE STRAP - S013

FINAL REDLINE MARK UP		
<input type="checkbox"/>	REVISIONS	DATE
<input type="checkbox"/>	ISSUED FOR CONSTRUCTION	DATE
<input type="checkbox"/>	DESIGN CHECK	DATE
<input type="checkbox"/>	DESIGN ENGINEER	DATE
<input type="checkbox"/>	PROJECT APPROVAL	DATE
<input type="checkbox"/>	CONTRACTOR	DATE
<input type="checkbox"/>	MECHANICAL FABRICATOR	DATE
<input type="checkbox"/>	INSULATION	DATE
<input type="checkbox"/>	PAINT	DATE
<input type="checkbox"/>	WELDING	DATE
<input type="checkbox"/>	OTHER	DATE
DATE	BY	DATE
18 MAR 2020	WILLIAM PARSONS	

SPECIFIC NOTES

- GENERAL NOTES**
- ALL PIPE SUPPORTS TO BE SUPPLIED BY FABRICATOR.
 - MECHANICAL FABRICATOR TO VERIFY ALL DIMENSIONS PRIOR TO FABRICATION.

PRODUCT: MG	SPEC: F3	DESIGN CODE: 2662-15	INSP. CATEGORY: 100% NDE	PAINT CODE: A2
MODEL: CS-4B-X-02-PIPE.LB	DES. PRESS.: 99.30 MPaG	INSULATION/HEAT TRACED:	INSUL. THK.: mm	
PAD: CS-4B-8001/04	REV: 0	DES. TEMP.: 54 °C	NDE TYPE:	INSUL. MAT.:
MODULE ID: N/A	TEST: MIN HYDRO AT 1.3910 MPaG	NDE PERCENTAGE:	CONTRACTOR: N/A	
AREA/EWP: EWP-05/08	TEST: MAX HYDRO AT 1.4895 MPaG	MCMT: -45 °C	STRESS CHECKED: GTR	



ISSUED FOR CONSTRUCTION

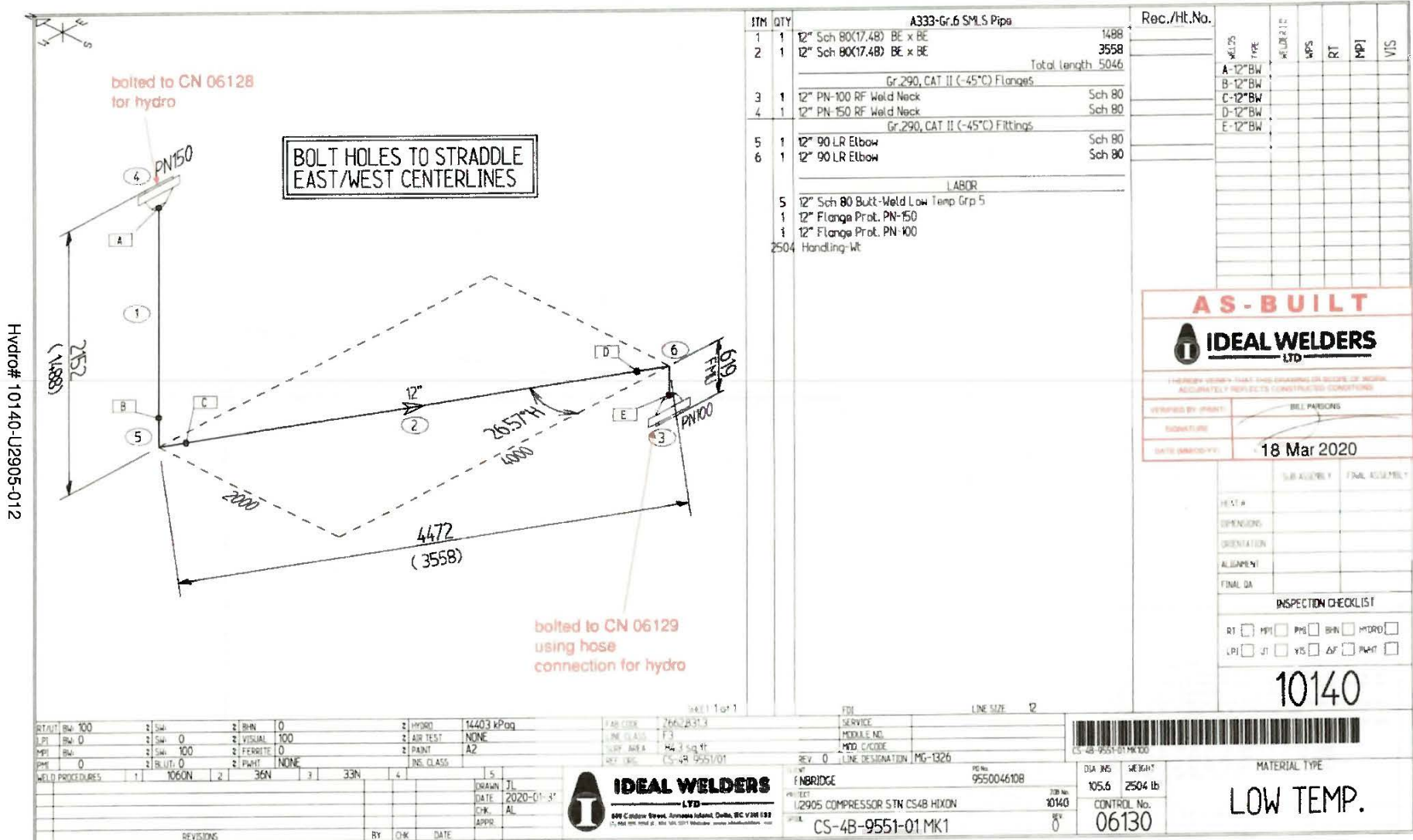
REV	DATE	REVISION DESCRIPTION	DRWN/DESIGN	DRAWN/CHECK	DESIGN/ENGINEER	DESIGN/CHECK	PROJECT APPROVAL
0	2019/07/15	IFC U2905 (SOLARIS E318-03356)	MMX	EDC	MTY	RAD	RMB

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PIPING ISOMETRIC MAIN GAS(MG) LINE NO. MG-12-F3-1326 CS-4B HXION COMPRESSOR STATION			
DRAWN/DESIGN: MMX	DESIGN ENGINEER: MTY	WEI PROJECT NUMBER: U2905	SCALE: NTS
DRAWING CHECK: EDC	DESIGN CHECK: RAD	DRAWING NUMBER: CS-4B-9551/01	DATE: 2019/07/15
PROJECT APPROVAL: RMB			REVISION:

APR 16 2020

Handwritten initials



Hydro# 10140-U2905-012

AS-BUILT

IDEAL WELDERS LTD

(THESE WELDERS HAVE THE DUTY AND SCOPE OF WORK ACCURATELY REFLECTS CONSTRUCTION CONDITIONS)

VERIFIED BY: [Signature] BILL PARSONS

SIGNATURE: [Signature]

DATE (MM/DD/YYYY): 18 Mar 2020

WELD TYPE	MPS	RT	MPI	VIS
A-12" BW				
B-12" BW				
C-12" BW				
D-12" BW				
E-12" BW				

INSPECTION CHECKLIST

RT MPI PMS BHN HYDRO

LPI UT VIS AS PAHT

10140

RT/UT: RW: 100	2 SW: 0	2 BHN: 0	2 HYDRO: 14403 kPag	PAR CODE: 26628313	SERVICE: []
LPI: RW: 0	2 SW: 0	2 VISUAL: 100	2 AIR TEST: NONE	LINE CLASS: F3	MEDIALE NO: []
MPI: RW: 0	2 SW: 100	2 FERRITE: 0	2 PAINT: A2	SUP AREA: H4 1 sq ft	MOD CODE: []
PMS: 0	2 BKUT: 0	2 PAHT: NONE	INS CLASS: []	REV: 0	LINE DESIGNATION: MG-1326
WELD PROCEDURES: 1 1060N 2 36N 3 33N 4					

IDEAL WELDERS LTD
 899 Columbia Street, Annapolis Junction, Odessa, BC V3B 1S3
 (250) 468-1000 or (800) 368-1000 Website: www.idealwelders.com

DATE: 2020-01-31
 CHECKED: AL
 APPR: []

CS-4B-9551-01 MK1

FE No: 9550046108
 DIA INS: 105.6
 WEIGHT: 2504 lb
 CONTROL No: 06130

MATERIAL TYPE: **LOW TEMP.**

APR 16 2020

Mapping for Spool CS-4B-9551-01 MK1






Client Enbridge **Reference Drawing** CS-4B-9551/01 **Rev.** 0 **Module Number** **Load No.**
Project CS4B - U2905 - HIXON **Line Class** F3 **System Number** MAIN GAS
PO No. 9550046108 **Control** 06130 **Rev.** 0 **Line Designation** MG-1326

Hydro Yes **PWHT** No **Visual** Direct Procedure # IWL-VT-001 Rev 3 **Dimensional** Yes 03-10-2020
BHN No **Ferrite** No **PMI** No **All NDE Accepted as per** Z862.B31.3

Weld Size	Type	Welder	WPS	RT	MT/LT	BHN	Ferrite	PMI No.	Visual	Failed	Repaired	Item No.	RN	Heat No.	PMI No.	BL/UT
A	12"	B/W Wire	MN	33N	S-504				03-06-2020	<input type="checkbox"/>		1	P391	92257		
B	12"	B/W Wire	JE	33N	S-504				03-06-2020	<input type="checkbox"/>		2	P390	92256		
C	12"	B/W Wire	FP	33N	S-421				03-03-2020	<input type="checkbox"/>		3	F2789	TL10030631		
D	12"	B/W Wire	FP	33N	S-421				03-03-2020	<input type="checkbox"/>		4	F2791	TL10030634		
E	12"	B/W Wire	FP	33N	S-421				03-03-2020	<input type="checkbox"/>		5	F2777	992065		
										<input type="checkbox"/>		6	F2778	992066		

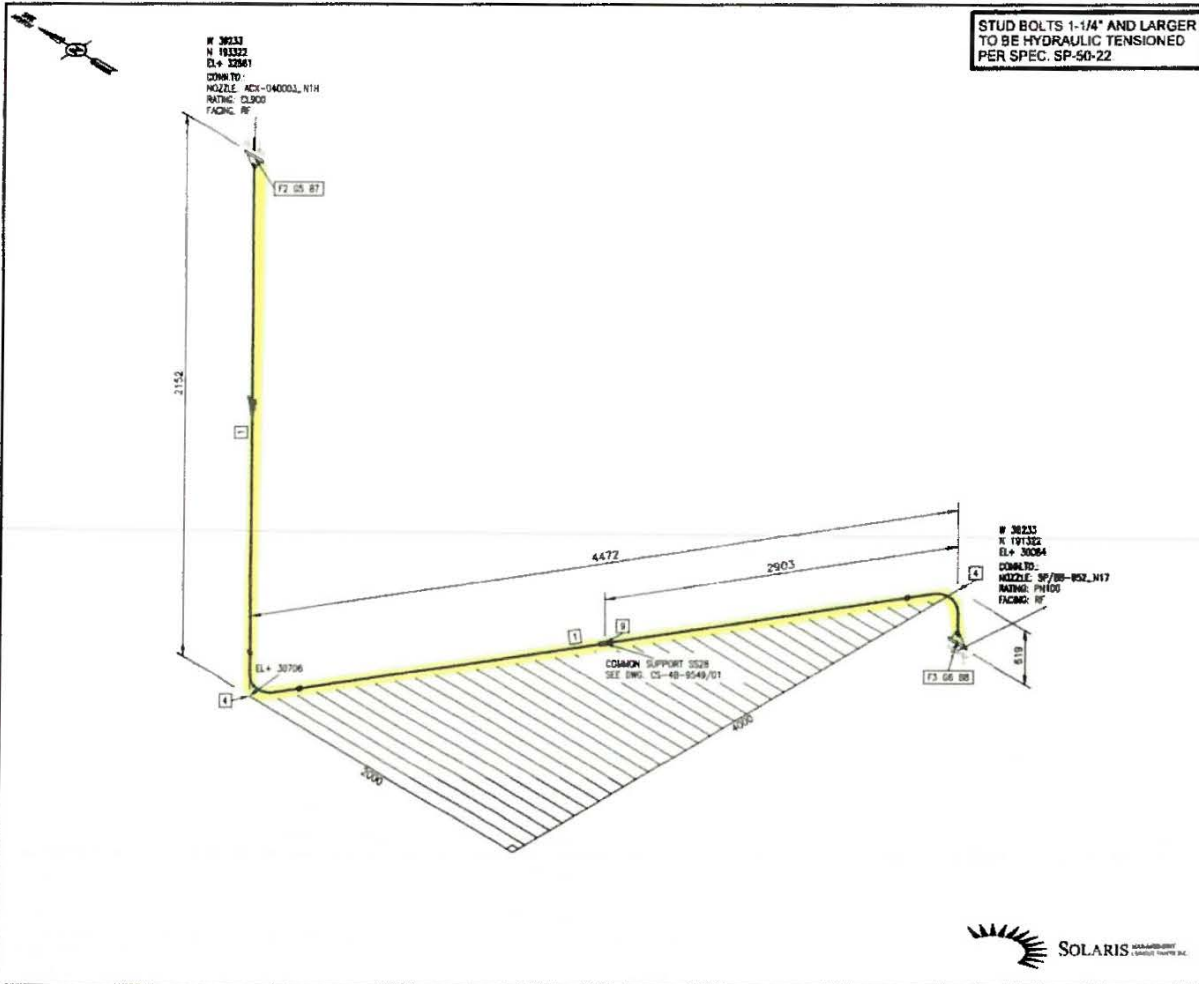
Hydro # 10140-U2905-012

All WELDS VISUALLY INSPECTED TO 831.3 AND ACCEPTED BY:  Mike Baker CWB Level III, Reg # 7196	DOCUMENTATION REVIEWED BY:  William Parsons CWB Level III, Reg # 8125 18 Mar 2020	DOCUMENTATION ACCEPTED BY:  Chris Spence Enbridge QA APR 16 2020
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March 18, 2020
 FO-IWL-Q4-1211

Page 1 of 1
 10140 06130

Hydro# 10140-U2905-012



STUD BOLTS 1-1/4" AND LARGER TO BE HYDRAULIC TENSIONED PER SPEC. SP-50-22

BILL OF MATERIAL

MARK	QTY	SIZE	DESCRIPTION
SHOP MATERIALS			
1	5048 mm	12"	PIPE, SMLS, SCH 80, SE, ASTM A333 GR. 6
2	1	12"	FLANGE, WN, PN150, RF, SCH 80, CSA Z245.12 GR. 280 CAT 1 WSC
3	1	12"	FLANGE, WN, PN150, RF, SCH 80, CSA Z245.12 GR. 280 CAT 1 WSC
4	2	12"	ELBOW, 90 DEG, LR, SCH 80, WN, CSA Z245.11 GR. 280 CAT 1 WSC
FIELD MATERIALS			
5	1	12"	CABINET, 3.2mm THK, CLSD, RF, SPIRAL WOUND, FLEXIBLE GRAPHITE FILLER C/W 304 SS WRINGON & 304 SS INNER RING & CS CENTERING RING
6	1	12"	CABINET, 3.2mm THK, CLSD, RF, SPIRAL WOUND, FLEXIBLE GRAPHITE FILLER C/W 304 SS WRINGON & 304 SS INNER RING & CS CENTERING RING
7	20	1-3/8"x12-1/4"	STUD BOLT FULL THD W/2 HEAVY HEX NUTS, ASTM A193 GR. B1/ASTM A194 GR. 2H
8	20	1-1/4"x11"	STUD BOLT FULL THD W/2 HEAVY HEX NUTS, ASTM A193 GR. B1/ASTM A194 GR. 2H
9	1	12"	PIPE SUPPORT - PIPE STRAP - S013

FINAL REDLINE MARK-UP

APPROVED FOR CONSTRUCTION
 APPROVED FOR CONSTRUCTION
 APPROVED FOR CONSTRUCTION
 APPROVED FOR CONSTRUCTION
 APPROVED FOR CONSTRUCTION
 APPROVED FOR CONSTRUCTION

REVIEWED BY: IDEAL WELDERS LTD
 APPROVED BY: WILLIAM PARSONS
 DATE: 18 MAR 2020

SPECIFIC NOTES

GENERAL NOTES

1. ALL PIPE SUPPORTS TO BE SUPPLIED BY FABRICATOR.
2. MECHANICAL FABRICATOR TO VERIFY ALL DIMENSIONS PRIOR TO FABRICATION.

PRODUCT: MG	SPEC: F3	DESIGN CODE: Z862-15	INSP. CATEGORY: 100% NDE	PAINT CODE: A2
MODEL: CS-4B-12-MG-11	DES. PRESS: 98.35	INSULATION/HEAT TRACED: N/A	INSUL. THK: 1.50	
REV: 0	DES. TEMP: 54 °C	NDE TYPE: -	INSUL. MAT: -	
MODULE ID: N/A	TEST: MIN HYDRO AT 13910 kPa	NDE PERCENTAGE: -	CONTRACTOR: N/A	
AREA/TEMP: EWP-03/08	TEST: MAX HYDRO AT 14865 kPa	HEMT: -45 °C	STRESS CHECKER: GTR	



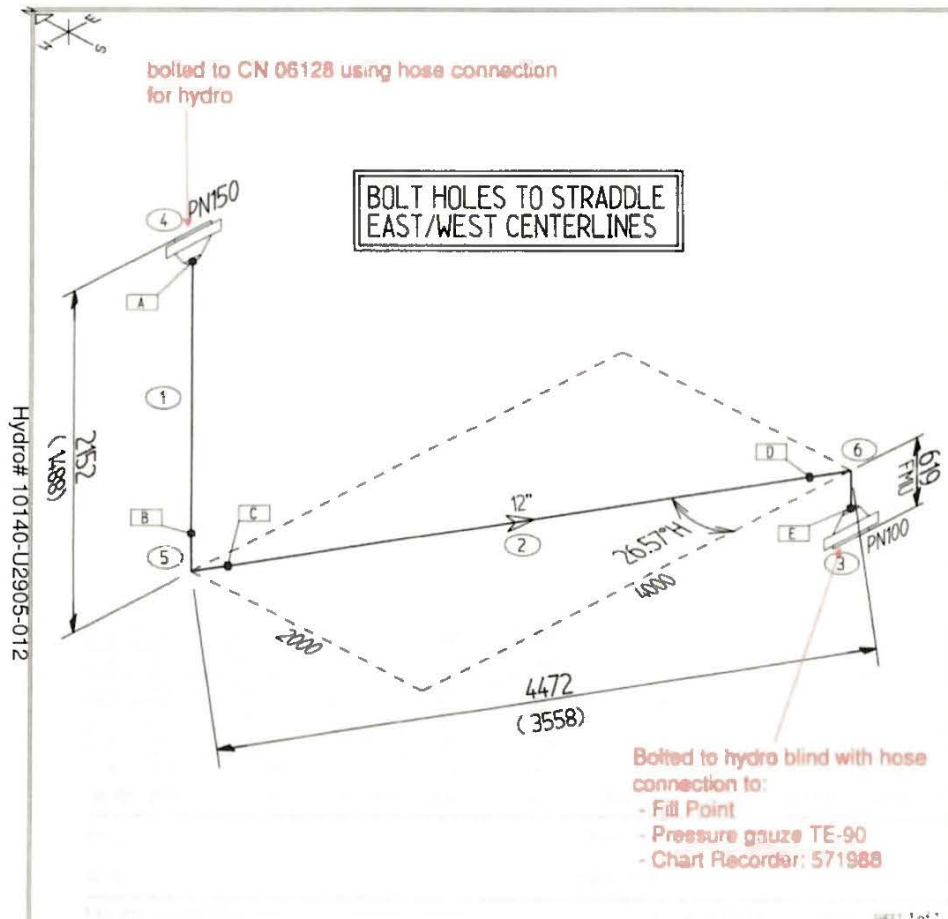
ISSUED FOR CONSTRUCTION

REV.	DATE	REVISION DESCRIPTION	DRAWN/DESIGN	DRAWING CHECK	DESIGN ENGINEER	DESIGN CHECK	PROJECT APPROVAL
G	2019/07/15	IPC U2905 (SOLARIS EB18-03358)	MOH	EDC	MTY	RAO	RMB

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PIPING ISOMETRIC			
MAIN GAS(MG)			
LINE NO. MG-12-F3-1327			
CS-4B MIXON COMPRESSOR STATION			
DRAWN/DESIGN	DESIGN ENGINEER	WD PROJECT NUMBER	SCALE
MOH	MTY	U2905	NTS
DRAWING CHECK	DESIGN CHECK	DATE	2018/07/15
EDC	RAO	DRAWING NUMBER	
PROJECT APPROVAL	RMB	CS-4B-9552/01	

APR 16 2020



ITEM	QTY	Description	Spec
A333-Gr.6 SMLS Pipe			
1	1	12" Sch 80(17.48) BE x BE	1488
2	1	12" Sch 80(17.48) BE x BE	3558
			Total Length: 5046
Gr.290, CAT II (-45°C) Flanges			
3	1	12" PN-100 RF Weld Neck	Sch 80
4	1	12" PN-150 RF Weld Neck	Sch 80
Gr.290, CAT II (-45°C) Fittings			
5	1	12" 90 LR Elbow	Sch 80
6	1	12" 90 LR Elbow	Sch 80
LABOR			
5	12"	Sch 80 Butt-Weld Low Temp Grp 5	
1	12"	Flange Prot. PN-150	
1	12"	Flange Prot. PN-100	
2504		Handling-ht	

Rec./Ht.No.	Weld Type	WPS	RT	MPI	VIS
	A-12" BW				
	B-12" BW				
	C-12" BW				
	D-12" BW				
	E-12" BW				

AS-BUILT

IDEAL WELDERS LTD

PLEASE VERIFY THAT THE DRAWING OR SCOPE OF WORK ACCURATELY REFLECTS COMPLETED CONDITIONS

VERIFIED BY: Bill Parsons

DATE: 18 Mar 2020

HEAT #	EXPENSURE	ORIENTATION	ALPHA #1	FINAL CA

INSPECTION CHECKLIST

RT MPI PW BN HYDR

LP UT VIS AT PM-T

10140

RT/UT BH: 100	2 SW: 0	2 BHN: 0	2 HYDR: 14403 kPa(g)	FAB CODE: 2662R31.3	SERVICE: ENBRIDGE	PO No: 9550046108	DIA IN: 105.6	WEIGHT: 2504 lb
LPI BH: 0	2 SW: 0	2 VISUAL: 100	2 AIR TEST: NONE	LINE CLASS: F3	MIDDLE NO:			
MPI BH: 0	2 SW: 100	2 FERRITE: 0	2 PAINT: AZ	SAFETY AREA: 84.3 sq ft	REQ. CODE:			
PHS: 0	2 BLUT: 0	2 PAINT: NONE	INS. CLASS:	REV. 0	LINE DESIGNATION: MG-1327			

WELD PROCEDURES: 1 | 106ON | 2 | 36N | 3 | 33N | 4

DRAWN: JL DATE: 2020-01-31

CHK: AL

IDEAL WELDERS LTD

600 Colborne Street, Ancaster, Ontario, M9C 1V9A4 CAN

PROJECT: U2905 COMPRESSOR STN CS4B MIXON

JOB No: 10140

CONTROL No: 06131

REV: 0

CS-4B-9552-01 MK1

APR 16 2020

CS






Mapping for Spool CS-4B-9552-01 MK1

Client Enbridge Reference Drawing CS-4B-9552/01 Rev. 0 Module Number Load No.
 Project CS4B - U2905 - HIXON Line Class F3 System Number MAIN GAS
 PO No. 9550046108 Control 06131 Rev. 0 Line Designation MG-1327

Hydro Yes PWHT No Visual Direct Procedure # IWL VT-001 Rev 3 Dimensional Yes 03-10-2020
 BHN No Ferrite No PMI No All NDE Accepted as per Z662,B31.3

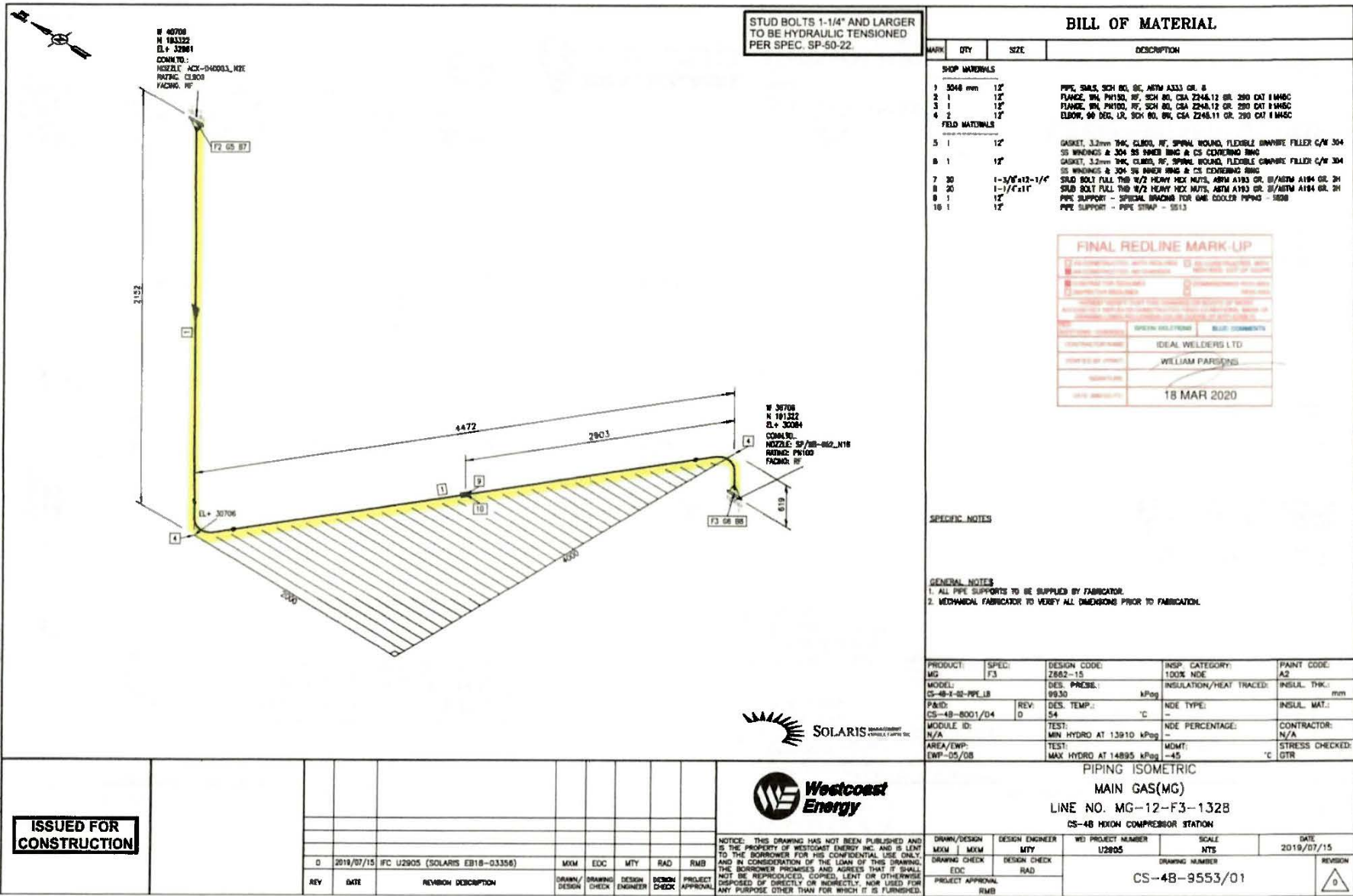
Weld Size	Type	Welder	WPS	RT	MT/LT	BHN	Ferrite	PMI No.	Visual	Failed	Repaired	Item No.	RN	Heat No.	PMI No.	BL/UT
A	12"	B/W Wire	MN	33N	S-446				03-04-2020	<input type="checkbox"/>		1	P357	96512		
B	12"	B/W Wire	JE	33N	S-446				03-04-2020	<input type="checkbox"/>		2	P390	92256		
C	12"	B/W Wire	JJ	33N	S-395				03-02-2020	<input checked="" type="checkbox"/>	03-04-2020	3	F2789	TL10030631		
CR1	12"	B/W Wire	JE	33N	S-446				03-04-2020	<input type="checkbox"/>		4	F2791	TL10030634		
D	12"	B/W Wire	JJ	33N	S-395				03-02-2020	<input type="checkbox"/>		5	F2778	992066		
E	12"	B/W Wire	FP	33N	S-395				03-02-2020	<input type="checkbox"/>		6	F2777	992065		

Hydro# 10140-U2905-012

All WELDS VISUALLY INSPECTED TO B31.3 AND ACCEPTED BY:  Mike Baker CWB Level III, Reg # 7196	DOCUMENTATION REVIEWED BY:  William Parsons CWB Level III, Reg # 8125 1 Mar 2020	DOCUMENTATION ACCEPTED BY:  Chris Spence Enbridge QA APR 16 2020
--	---	---

Drawing # 10140-119006-019

DATE EXTERNALIZED: 2019/07/15 12:12:02 PM BR: SLL COMPUTER: 12001-P10



STUD BOLTS 1-1/4" AND LARGER TO BE HYDRAULIC TENSIONED PER SPEC. SP-50-22.

BILL OF MATERIAL

MARK	QTY	SIZE	DESCRIPTION
SHOP MATERIALS			
1	5048 mm	12"	PIPE, 304S, SCH 80, 60, ASTM A333 GR. B
2	1	12"	FLANGE, WN, PN160, RF, SCH 80, CSA Z248.12 GR. 200 DAT 1 MNSC
3	1	12"	FLANGE, WN, PN160, RF, SCH 80, CSA Z248.12 GR. 200 DAT 1 MNSC
4	2	12"	ELBOW, 90 DEG, LR, SCH 80, 60, CSA Z248.11 GR. 200 DAT 1 MNSC
FIELD MATERIALS			
5	1	12"	GASKET, 3.2mm THK, CL800, RF, SPIRAL WOUND, FLEXIBLE GRAPHITE FILLER C/W 304 SS WINDINGS & 304 SS INNER RING & CS COVERING RING
6	1	12"	GASKET, 3.2mm THK, CL800, RF, SPIRAL WOUND, FLEXIBLE GRAPHITE FILLER C/W 304 SS WINDINGS & 304 SS INNER RING & CS COVERING RING
7	30	1-3/8"x12-1/2"	STUD BOLT FULL THD 1/2 HEAVY HEX NUTS, ASTM A193 GR. B/ASTM A194 GR. 2H
8	20	1-1/2"x11"	STUD BOLT FULL THD 1/2 HEAVY HEX NUTS, ASTM A193 GR. B/ASTM A194 GR. 2H
9	1	12"	PIPE SUPPORT - SPECIAL BRACING FOR GAS COOLER PIPING - 5008
10	1	12"	PIPE SUPPORT - PIPE STRAP - 5513

FINAL REDLINE MARK UP

1. All dimensions are in millimeters unless otherwise specified.
 2. All dimensions are to be as shown unless otherwise specified.
 3. All dimensions are to be as shown unless otherwise specified.

DATE	BY	DESCRIPTION
18 MAR 2020	WILLIAM PARSONS	ISSUED FOR CONSTRUCTION

SPECIFIC NOTES

GENERAL NOTES

- ALL PIPE SUPPORTS TO BE SUPPLIED BY FABRICATOR.
- Mechanical fabricator to verify all dimensions prior to fabrication.

PRODUCT: MG	SPEC: F3	DESIGN CODE: 2862-15	INSP. CATEGORY: 100% NDE	PAINT CODE: A2
MODEL: CS-4B-1-02-PPL-1B	DES. PRESS: 99.30 MPa	DES. TEMP: 54 °C	INSULATION/HEAT TRACED: INSUL. THK: mm	
PAID: CS-4B-8001/D4	REV: 0	DES. TEMP: 54 °C	NDE TYPE: -	INSUL. MAT.: -
MODULE ID: N/A	TEST: MIN HYDRO AT 13910 kPa	TEST: MAX HYDRO AT 14895 kPa	NDE PERCENTAGE: -	CONTRACTOR: N/A
AREA/EWP: EWP-05/08	TEST: -45 °C	TEST: -45 °C	STRESS CHECKED: GTR	



ISSUED FOR CONSTRUCTION

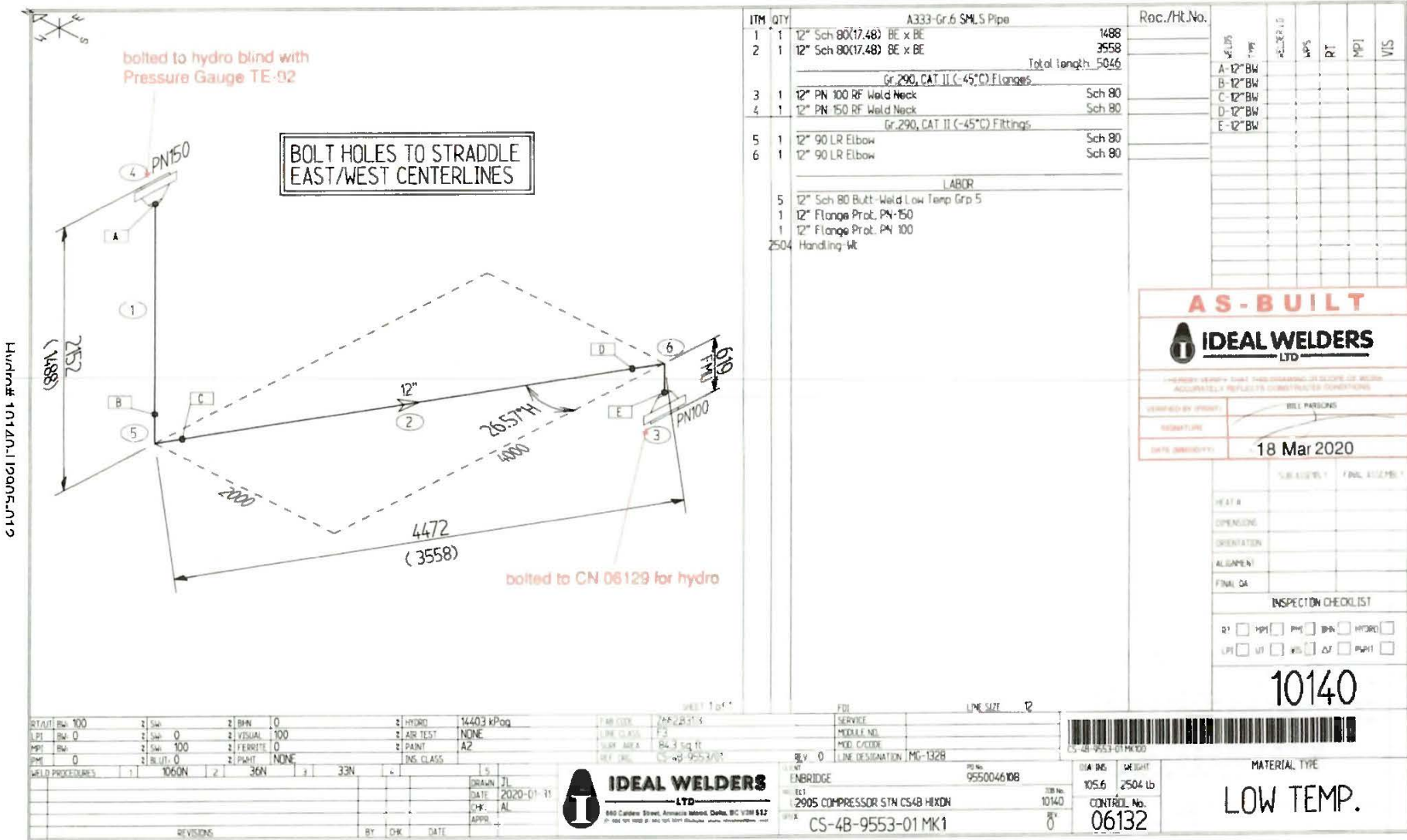
REV	DATE	REVISION DESCRIPTION	DRAWN/DESIGN	DRAWING CHECK	DESIGN ENGINEER	DESIGN CHECK	PROJECT APPROVAL
0	2019/07/15	IFC U2905 (SOLARIS EB18-03358)	MMM	EDC	MTY	RAD	RMB

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DESIGN ENGINEER	DESIGN CHECK	PROJECT APPROVAL	WD PROJECT NUMBER	SCALE	DATE
MMM	EDC	RMB	U2905	NTE	2019/07/15
			DRAWING NUMBER	REVISION	
			CS-4B-9553/01	0	

APR 16 2020

Handwritten signature



AS-BUILT

IDEAL WELDERS LTD

VERIFIED BY: [Signature] WILL PARRISH

DATE: 18 Mar 2020

INSPECTION CHECKLIST

R1 MP1 PM1 BN1 HYDR1

LPH UT W1 CJ PPH1

10140

RTA/ITM	RW 100	2 SH	2 BFN	0	HYDR	14403 kPag	FAB CODE	765-28313	SERVICE		
LEI	RW 0	2 SW	0	2 VISUAL	100	AIR TEST	NONE	LINE CLASS	F 2	MODULE NO.	
MPI	RW 100	2 SW	100	2 FERRITE	0	PAINT	AZ	SURF AREA	84.3 sq ft	MOD CODE	
SPM	0	2 BLUT	0	2 PMT	NONE	INS. CLASS		REF. DRG.	CS-4B-9553-01	LINE DESIGNATION	MG-132B
WELD PROCEDURES											
1 1060N 2 36N 3 33N											
DRAWN: JL DATE: 2020-01-31											
CHK: AL											
APPR: [Signature]											
REVISIONS											
BY: [Signature] DATE: [Signature]											



9550046108
 10140
 CONTROL No. 06132

MATERIAL TYPE
LOW TEMP.

APR 16 2020
 CS

Mapping for Spool CS-4B-9553-01 MK1



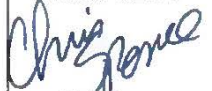


Client Enbridge Reference Drawing CS-4B-9553/01 Rev. 0 Module Number Load No.
 Project CS4B - U2905 - HIXON Line Class F3 System Number MAIN GAS
 PO No. 9550046108 Control 06132 Rev. 0 Line Designation MG-1328

Hydro Yes PWHT No Visual Direct Procedure # IWL-VT-001 Rev 3 Dimensional Yes 03-10-2020
 BHN No Ferrite No PMI No All NDE Accepted as per Z682.B31.3

Weld Size	Type	Welder	WPS	RT	MT/LT	BHN	Ferrite	PMI No.	Visual	Failed	Repaired	Item No.	RN	Heat No.	PMI No.	IL/UT
A 12"	B/W Wire	MN	33N	S-447					03-04-2020	<input type="checkbox"/>	<input type="checkbox"/>	1	P352	92256		
B 12"	B/W Wire	JE	33N	S-447					03-04-2020	<input type="checkbox"/>	<input type="checkbox"/>	2	P355	96512		
C 12"	B/W Wire	JJ	33N	S-396					03-02-2020	<input type="checkbox"/>	<input type="checkbox"/>	3	F2769	TL10030631		
D 12"	B/W Wire	FP	33N	S-396					03-02-2020	<input type="checkbox"/>	<input type="checkbox"/>	4	F2791	TL10030634		
E 12"	B/W Wire	FP	33N	S-396					03-02-2020	<input type="checkbox"/>	<input type="checkbox"/>	5	F2777	992065		
										<input type="checkbox"/>	<input type="checkbox"/>	6	F2778	992066		

Hydro# 10140-U2905-012

ALL WELDS VISUALLY INSPECTED TO B31.3 AND ACCEPTED BY:  Mike Baker CWB Level III, Reg # 7196	DOCUMENTATION REVIEWED BY:  William Parsons CWB Level III, Reg # 8125 18 Mar 2020	DOCUMENTATION ACCEPTED BY:  Chris Spence Enbridge QA APR 16 2020
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March 18, 2020
 FO-IWL-Q4-1211

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 10140 06132