



**Manufacturers Record Book**

**KELT EXPLORATION**

**FUELLED INC.**

**S180-L**

**100421 (A)**



## Project Quality Binder (100421A)

**Project Details: KELT EXPLORATION – FUELLED INC. S180-L**

Section	Document
<b>1</b>	<b>NEXT Fabricated Piping and Tubing</b>
1.0	Certificate of Authorization Permit (ABSA-AQP)
1.1	Pressure Piping Construction and Test Data Report (AB-83)
1.2	Colored Piping and Instrumentation Diagram
1.3	Pneumatic Pressure Test Reports
1.4	Calibration Certificates
1.5	Coating Report
<b>2</b>	<b>Vessels (NOTE: Original Build Docs 2005)</b>
2.1	Manufacturer's Data Reports (U1-A)
2.2	Nameplate
2.3	Traveler
2.4	Non-Destructive Testing (NDT)/ Examination Reports (NDE) Records
2.5	Inspection Summary 2021 (REA Eng. & Inspection)
2.6	UT Surveys 2021 (REA Eng. & Inspection)
2.7	AB-10
<b>3</b>	<b>Process Spooling (NOTE: original build Docs 3.11)</b>
3.1	Certificate of Authorization Permit (ABSA-AQP)
3.2	Pressure Piping Construction and Test Data Report (AB-83)
3.3	Spool Drawings – HT#s – Welder Map – NDE Map.
3.4	Weld Procedures
3.5	Welders Qualifications
3.6	Non-Destructive Testing (NDT)/ Examination Reports (NDE) Records
3.7	Hydro Test Certificates
3.8	Calibration Records for Pressure Gauges
3.9	Material Test Reports (MTR)
3.10	Plate Cooler Docs (GKM Fabrication Index will apply)
3.11	Existing Piping Docs (Original build)
<b>5</b>	<b>Components</b>
5.1	PSV Certificates
5.2	Certificate of Compliance (COC) – Valve





**(1)**

**FABRICATED PIPING AND**  
**TUBING**

**Certificate of Authorization Permit**

**Quality Management System**

Expiry Date: **December 14, 2022**

Reg. No.: **AQP-1282**

**NEXT COMPRESSION CORP.**

**5110 - 6 STREET N.E.  
CALGARY, ALBERTA**

having complied with the provisions of the SAFETY CODES ACT, is hereby authorized to perform the activities identified in the following table:

	<b>Construction</b>	<b>Repair</b>	<b>Alter</b>
<b>Pressure Vessels</b>			
ASME Section VIII-1 Pressure Vessels	Shop	Shop	Shop
<b>Pressure Piping</b>			
ASME B31.1 Power Piping	Shop/Field	Shop/Field	Shop/Field
ASME B31.3 Process Piping	Shop/Field	Shop/Field	Shop/Field
<b>Fittings</b>			
Category A,B,E,H	Shop	---	---



*As a condition of this permit, the holder is required to participate in interim audits by a safety codes officer to verify that the quality management system is being maintained in a manner acceptable to a safety codes officer.*

Dated at Edmonton, this 15th day of October, 2020

*W. P. ...*

Chief Inspector and Administrator

**Certificate No.: 14227**



# PRESSURE PIPING CONSTRUCTION AND TEST DATA REPORT

In accordance with the provisions of the PESR Section 31(1)

Shop Construction ; Field Construction   
 Final Data Report ; Partial Data Report  (from one ABSA- authorized Contractor to another ABSA- authorized Contractor).

Complete both sides of this Form

1. Constructed By: NEXT Compression Corp. Owner's Job No: 100421A  
(Name of ABSA authorized primary contractor or subcontractor)  
#5110 6 ST. NE CALGARY AB, CANADA T2K-4W5  
(Address)

Certificate of Authorization Permit No. AQP-1282(S) Expiry Date: Dec. 13/2022

2. Constructed For: KELT EXPLORATION  
(Name of primary contractor if different from above)  
311 6 AVE SW. SUITE 300, CALGARY AB T2P-3H2  
(Address)

Certificate of Authorization Permit No. AQP-N/A Expiry Date: N/A  
(Required when the primary contractor undertakes some/all of the quality functions, e.g., NDE, PWHT, Tie-in, fabrication, hydro test, final assembly etc.)

3. Owner: KELT EXPLORATION. 311 6 AVE SW. SUITE 300, CALGARY AB T2P-3H2  
(Name and address)  
LSD: TBD  
(Location of installation)

Certificate of Authorization Permit No. AQP-N/A Expiry Date: N/A  
(Required when the owner undertakes some/all of the quality functions, e.g., NDE, PWHT, Tie-in, fabrication, hydro test, final assembly etc.)

4. Piping Design Alberta Registration No.: PP-N/A  
(Required if aggregate piping volume is over 0.5m<sup>3</sup>)

5. Design Responsibility: Owner ; Contractor

6. WP No.: WP-3850.2 ; Company: NEXT Compression Corp. Owner's WP No. (If used): WP-N/A  
(Alberta Registration No.) (Alberta Registration No.)  
 Spec No(s). used: NGC-1,NGC-2N ; Owner's Spec No(s). (If used): N/A

7. Code: ASME B31.1 Non Boiler External Piping ; ASME B31.1 Boiler External Piping ;  
 B31.5 ; B31.9 ; CSA Z662 Steam Pipelines ;  
 ASME B31.3  - Service Category: Normal , D , M , High Pressure ; Severe Cyclic Condition   
 High Purity

Drawing No. Rev. No. Line No.	Fluid (Air/Stm Etc.)	Des. Press. PSI	Des. Temp. °F (Max. & Min.)	Pressure Test PSIG	Test Medium	Pipe Mat'l Spec. & Grade	C.A. INCH	Pipe NPS & Schedule	Flange Material & Rating	PWHT/ Preheat Temp. °F	NDE
100421-101 LINE: Inlet Sep. Drain REV 4	Condensate	245	250/-20°F	269.5	N2	SA106B	0.125"	1.5" SCH 160	SA105N 150CL	N/A	100% VT
100421-101 LINE: Purge and Fuel Gas REV 4	Natural Gas	245	250/-20°F	269.5	N2	SA106B	0.125"	1" SCH 160	SA105N 150CL	N/A	100% VT
100421-101 LINE: Bypass REV 4	Natural Gas	245	250/-20°F	269.5	N2	SA106B	0.125"	1.5" SCH 160	SA105N 150CL	N/A	100% VT

100421-101 LINE: Inst. Air REV 4	Air	245	250/-20°F	269.5	N2	SA106B	0.125"	1" SCH XH	SA105N 150CL	N/A	100% VT
100421-101 LINE: PSV 100 REV 4	Natural Gas	245	250/-20°F	269.5	N2	SA106B	0.125"	1" SCH 160	SA105N 150CL	N/A	100% VT
100421-101 LINE: Oil Sep. to Oil Cooler REV 4	Lube Oil	667.5	250/-20°F	734.25	N2	SA106B	0.063"	1.5" SCH XH	SA105N 300CL	N/A	100% VT
100421-101 LINE: Oil Cooler to Oil Filter REV 4	Lube Oil	667.5	250/-20°F	734.25	N2	SA106B	0.063"	1.5" SCH XH	SA105N 300CL	N/A	100% VT
100421-101 LINE: Oil Header REV 4	Lube Oil	667.5	250/-20°F	734.25	N2	SA106B	0.063"	1" SCH 160	SA105N 300CL	N/A	100% VT
100421-101 LINE: Oil Header REV 4	Lube Oil	667.5	250/-20°F	734.25	N2	SA213TP 316L	0	0.375" 0.035WT	SA105N 300CL	N/A	100% VT
100421-101 LINE: Oil Header REV 4	Lube Oil	667.5	250/-20°F	734.25	N2	SA213TP 316L	0	0.375" 0.035WT	N/A	N/A	100% VT
100421-101 LINE: Oil Header REV 4	Lube Oil	667.5	250/-20°F	734.25	N2	SA213TP 316L	0	0.375" 0.035WT	N/A	N/A	100% VT
100421-101 LINE: Oil Header REV 4	Lube Oil	667.5	250/-20°F	734.25	N2	SA213TP 316L	0	0.375" 0.035WT	N/A	N/A	100% VT
100421-101 LINE: Oil Header REV 4	Lube Oil	667.5	250/-20°F	734.25	N2	SA213TP 316L	0	0.375" 0.035WT	N/A	N/A	100% VT
100421-101 LINE: Oil Header REV 4	Lube Oil	667.5	250/-20°F	734.25	N2	SA213TP 316L	0	0.375" 0.035WT	N/A	N/A	100% VT

100421-101 LINE: Skim Line REV 4	Lube Oil	655	250/-20°F	1125	N2	SA106B	0.125"	0.5" SCH XXH	SA105N 300CL	N/A	100% VT
100421-101 LINE: PSV 101 REV 4	Natural Gas	655	250/-20°F	1125	N2	SA106B	0.125"	1" SCH 160	SA105N 300CL	N/A	100% VT
100421-101 LINE: Blow Down REV 4	Natural Gas	667.5	250/-20°F	734.25	N2	SA106B	0.125"	1" SCH 160	SA105N 300CL	N/A	100% VT
100421-101 LINE: Gas Cooler REV 4	Natural Gas	450	250/-20°F	495	N2	SA106B	0.125"	2.5" SCH XH	SA105N 300CL	N/A	100% VT

Partial Data Reports certified by sub-contractors are listed below and attached to this Data Report

No.	Line No.	Spool No.	Dwg. No. (with Rev. No.)	Sub-contractor (Name)	AQP No. (if from Alberta)	Expiry (if from Alberta)

**Remarks:** For partial data report provide information about the code work that was not completed by the subcontractor (e.g., hydrostatic test, PWHT etc.). For final data report provide information about the code work that was not completed by subcontractors and subsequently completed by the primary contractor (e.g., hydrostatic test of entire assembly, PWHT etc.)

This AB-83 Covers the Pneumatic Testing portion.

**Endorse certificate 'A' or 'B'**

**A. CERTIFICATE OF COMPLIANCE**

Signed by the subcontractor when supplying this certificate as a  
**Partial Data Report**

We certify that the statements in this Data Report are correct and that materials, construction and workmanship of the piping fabrication conform to the registered quality system and the applicable Piping code(s).

Date: \_\_\_\_\_  
Contractor

\_\_\_\_\_  
Print Authorized Representative's Name                      Signature

**This certificate is not valid unless it forms part of a Final Data Report signed by Primary Contractor**

**B. CERTIFICATE OF COMPLIANCE**

Signed by the primary contractor when supplying this certificate as a  
**Final Data Report**

We certify that the statements in this Data Report are correct and that piping job no. 100421A described in this Data Report was constructed in accordance with the Province of Alberta Safety Codes Act and Regulations, and applicable ASME Piping Code(s).

Date: \_\_\_\_\_ NEXT Compression Corp.  
Contractor

Christian Lejeune \_\_\_\_\_  
Print Authorized Representative's Name                      Signature

**CERTIFICATE OF INSPECTION**

I, the undersigned, employed by \_\_\_\_\_ have verified that all required examination and testing has been completed, and inspected the piping described in this construction data report to the extent necessary to be satisfied that it conforms to all applicable examination requirements of the Code and of the engineering design, and state that, to the best of my knowledge and belief, the contractor has constructed this piping in accordance with the Alberta Safety Codes Act and Regulations. By signing this certificate neither the inspector nor his or her employer makes any warranty, expressed or implied, concerning the piping described in this construction data report. Furthermore, neither the inspector nor his or her employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

Date: \_\_\_\_\_ Date: \_\_\_\_\_

\_\_\_\_\_  
Owner's Inspector Name (please print)                      ABSA Safety Codes Officer (please print)  
(BOILER EXTERNAL PIPING ONLY)

\_\_\_\_\_  
Owner's Inspector Signature:                      ABSA Safety Codes Officer's Signature

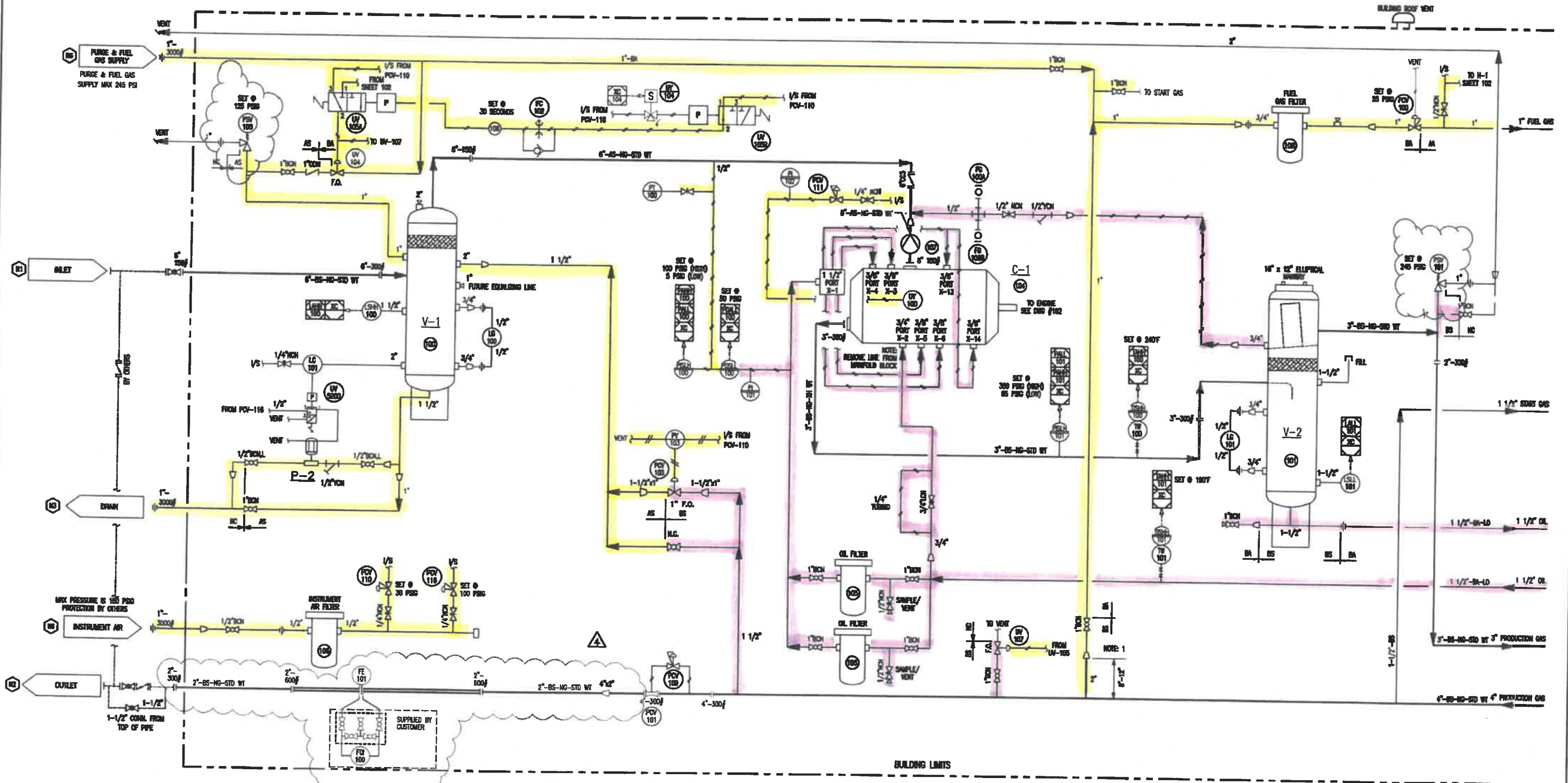


System	Volume ft3	Test Pressure psig	Allowable Volume ft3	Safe Distance ft
1	0.34	269.5	21.16	15.2
2	0.23	734.25	6.8	21.3
3	0.56	495	10.58	24

**V-1**  
**INLET SEPARATOR**  
 SIZE: 24" O.D. x 67 1/2" H  
 MAWP: 345 PSIG @ 250°F  
 MOUNT: -20/250°F  
 CA: 0.125"  
 WEIGHT: 1340 LBS

**C-1**  
**GAS COMPRESSOR**  
 MANUFACTURER: SULLAIR  
 MODEL: P-200  
 HP: 100  
 RPM: 1800  
 MAX PS: 300 PSIG  
 MAX TD: 175 PSIG  
 WEIGHT: 1200 LBS

**V-2**  
**OIL SEPARATOR**  
 SIZE: 24" O.D. x 67 1/2" H  
 MAWP: 450 PSIG @ 250°F  
 MOUNT: -20/250°F  
 CA: 0.125"  
 WEIGHT: 1200 LBS



THIS DRAWING IS THE EXCLUSIVE PROPERTY OF CONCEPT COMPRESSION CORP. AND CANNOT BE REPRODUCED WITHOUT THE PERMISSION OF CONCEPT COMPRESSION CORP.

**NPT/SW PIPE WT CHART**

SIZE	PIPE SPECIFICATION					
	NC	AA	BA	CA	AS	BS
1/2"	80	80	80	160	XXH	XXH
3/4"	80	80	80	160	160	XXH
1"	80	80	80	160	160	XXH
1 1/4"	80	80	80	160	160	XXH
1 1/2"	80	80	80	160	160	XXH
2"	80/120	80/200	80/250	160/250	160/250	160/250

**GENERAL NOTES**

- ELECTRICAL CLASSIFICATION: CLASS 1, DIV. 2, GROUP D
- COMPRESSOR OIL TYPE: COGN1
- ENGINE OIL TYPE: ESSO GAN-40 OR EQUAL
- COOLANT TYPE: 50/50 ED
- LUBE OIL CAPACITIES: ENGINE: 7.5 GALLONS; COMPRESSOR: 22 GALLONS
- COOLANT CAPACITY: 45 US GALLONS
- SYSTEM TOTAL: 45 US GALLONS
- TURN TO BE SEE FITTINGS TO BE CHROMIUM PLATED w/ SS PRIMARY FERROUS & CS SECONDARY FERROUS.
- INTRINSICALLY SAFE WIRING TO BE TWO CONDUCTOR, 18 AWG, PVC COVERING AND PVC SHEATH, TINNED COPPER WITH STAINLESS STEEL Braid.
- ALL PROCESS PIPING TO COMPLY WITH ANSI B31.3

**NOTES**

1. TAKE FROM TOP OF PIPE

REV	DESCRIPTION	DATE	BY	APPV
4	CHANGE ORDER 1.1.	JUN 21/21	R.R.	J.J.L.
3	REWORK SCOPE ADDED	JUN 09/21	R.R.	J.J.L.
2	AS-BUILT	SEP 21/05	T.K.	
1	ADD ENGINE, CHANGE TO SOLID	SEP 02/05	J.A.	
0	ISSUED FOR CONSTRUCTION	APR 06/05	J.S.	

P&ID  
 NEXT S200E  
 NGC JOB#  
 15630

**NEXT**  
 COMPRESSION

**KELT EXPLORATION**  
 BOOSTER  
 LSD: TBA

100421-101

System	Volume ft3	Test Pressure psig	Allowable Volume ft3	Safe Distance ft
1	0.34	269.5	21.16	15.2
2	0.23	734.25	6.8	21.3
3	0.56	495	10.58	24

**H-1A/B**  
BUILDING HEATER  
CENTRIC ROOM HEATER  
MODEL: W03-80-200-1 120C  
RATED INPUT: 1000 BR/HR  
MAKE: CES-CHI  
WEIGHT: 30 LBS

**E-1**  
OIL COOLER  
MODEL: FP 10x20x36  
M.A.N.P.: 450 PSIG  
SURFACE AREA: 44.6 SQ FT  
WEIGHT: 50 LBS (DRY)

**E-2**  
GAS COOLER  
MODEL: FPA 10x20L-80  
M.A.N.P.: 450 PSIG  
SURFACE AREA: 76.150 SQ FT  
WEIGHT: 84.6 LBS (DRY)

**CP-1**  
MURPHYMATIC CONTROL PANEL  
MODEL: TDM-EM-T  
ELECTRONIC WIREABLE  
WEIGHT: 30 LBS

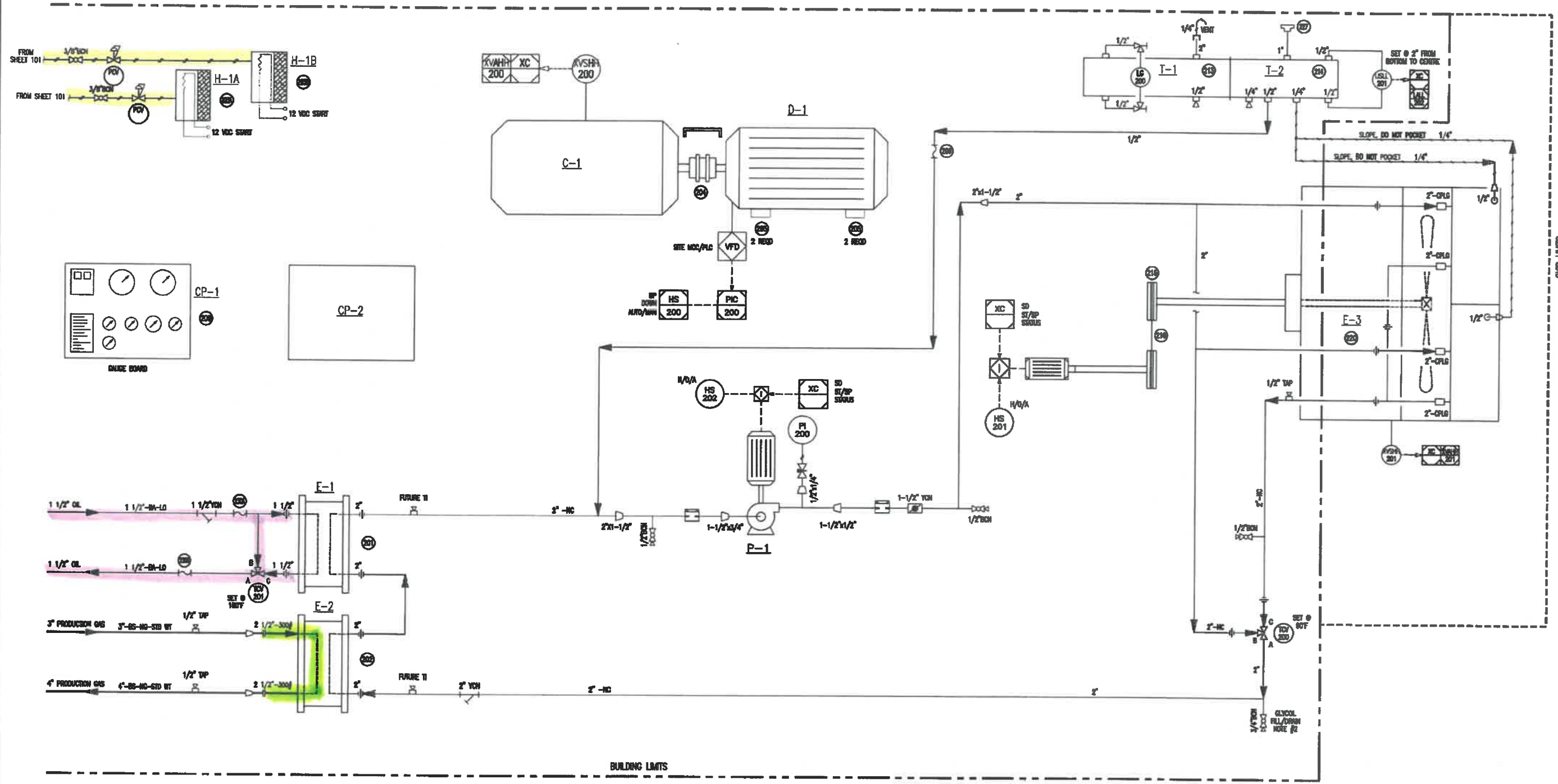
**CP-2**  
ALLEN BRADLEY CONTROL PANEL  
MODEL: MICRO 820

**D-1**  
DRIVER  
MAKE: TECO WESTINGHOUSE  
FRAME SIZE: 447T  
POWER: 200 BHP @ 1800 RPM  
480/3/80  
WEIGHT: 2004 LBS

**T-1**  
DAY TANK  
SERVICE: ENGINE OIL  
VOLUME: 18 GALLONS  
2" x 10"  
WEIGHT: 125 LBS

**T-2**  
SURGE TANK  
SERVICE: GLYCOL  
VOLUME: 6.7 GALLONS  
6" x 10"  
WEIGHT: 125 LBS

**E-3**  
AIR COOLER  
MAKE: AIR-K-HEMPHILL  
MODEL: 80 V  
SERVICE: E-GLYCOL  
FAN MODEL: Z7-ED/AT  
FAN SPEED: 600 RPM  
FAN POWER: 7.2  
WEIGHT: 3000 LBS (DRY)



THIS DRAWING IS THE EXCLUSIVE PROPERTY OF CONCEPT COMPRESSION CORP. AND CANNOT BE REPRODUCED WITHOUT THE PERMISSION OF CONCEPT COMPRESSION CORP.

SIZE	PIPE SPECIFICATION						
	NC	AA	BA	CA	AS	BS	CS
1/2"	80	80	80	150	20H	20H	20H
3/4"	80	80	80	150	160	160	20H
1"	80	80	80	150	160	160	20H
1 1/4"	80	80	80	150	160	160	20H
1 1/2"	80	80	80	150	160	160	20H
2"	80/50	80/50	80/50	150/100	180/100	180/100	20H/100

**GENERAL NOTES**

- SLOPE, DO NOT TRAP. MIN. PRESSURE OF CHARGE +/- 0.5" W.C.
- LOWEST POINT ON SYSTEM
- RUN CAP SUPPLIED WITH ENGINE
- MOUNT AS CLOSE TO COMPRESSOR AS OPERATIONALLY POSSIBLE

**NOTES**

- TAKE OFF FOR STARTER TO BE AS CLOSE TO STARTER AS POSSIBLE

REV.	DESCRIPTION	DATE	BY	APPR.
4	CHANGE ORDER 1.1.	JUN 21/21	R.R.	J.H.
3	RETROFIT SCOPE ADDED	JUN 08/21	R.R.	J.H.
2	AS-BUILT	SEP 21/05	T.K.	
1	ADD BYPASS, CHANGE TO SOLAR	SEP 02/05	J.H.	
0	ISSUED FOR CONSTRUCTION	APRIL 06/05	J.S.	

REV.	DESCRIPTION	DATE	BY	APPR.
4	CHANGE ORDER 1.1.	JUN 21/21	R.R.	J.H.
3	RETROFIT SCOPE ADDED	JUN 08/21	R.R.	J.H.
2	AS-BUILT	SEP 21/05	T.K.	
1	ADD BYPASS, CHANGE TO SOLAR	SEP 02/05	J.H.	
0	ISSUED FOR CONSTRUCTION	APRIL 06/05	J.S.	

P&ID NEXT S200E NGC JOB# 15630		
BY: J. SILVER	DATE: SEP 02/05	
KELT EXPLORATION BOOSTER LSD: TBA		
NO: 100421	DATE: APR 06/05	NO: 100421-102





### PNEUMATIC PRESSURE TEST REPORT

Date: July 08 2021

Customer: KELT EXPLORATION	Safe Distance: 24 FT
NEXT Project Number: 100421A	Design Pressure: 245 PSI
Drawing Number: 100421-101-102 Rev.4	Test Pressure: 270 <b>PSIG</b> (1.1x)

Lines Tested: **SEE COLOR CODED P&ID (YELLOW) HIGHLIGHTED**

	S/N	Range	Calibration Due Date
Gauge 1	PG-500-1	0-500 PSIG	03-29-2022
Gauge 2	PG-7909	0-500 PSIG	11-24-2021
PSV	CO28948	SET @ 305 PSI	05-06-2022

Test Conducted By: QC Department      Test Personnel: NEXT Compression

Results: Passed  Deficiencies

Deficiencies: NO LEAKS FOUND AT TIME OF TEST

Notes:

<b>CHRISTIAN LEJEUNE</b>	<b>N/A</b>	
QC Signature/Production Signature:	Authorized Inspector (if required)	Owners Inspector Signature Name:



### PNEUMATIC PRESSURE TEST REPORT

Date: July 07 2021

Customer: KELT EXPLORATION	Safe Distance: 24 FT
NEXT Project Number: 100421A	Design Pressure: 450 PSI
Drawing Number: 100421-101-102 Rev.4	Test Pressure: 495 <b>PSIG</b> (1.1x)

Lines Tested: **SEE COLOR CODED P&ID (GREEN) HIGHLIGHTED**  
**PLATE COOLER SN 5200270119-0002**

	S/N	Range	Calibration Due Date
Gauge 1	PG-1000-1	0-1000 PSIG	03-29-2022
Gauge 2	SS-1000-4	0-1000 PSIG	11-24-2021
PSV	618037	SET @ 565 PSI	05-06-2022

Test Conducted By: QC Department      Test Personnel: NEXT Compression

Results: Passed  Deficiencies

Deficiencies: NO LEAKS FOUND AT TIME OF TEST

Notes:

<b>CHRISTIAN LEJEUNE</b>	<b>N/A</b>	
QC Signature/Production Signature.	Authorized Inspector (if required)	Owners Inspector Signature Name:



### PNEUMATIC PRESSURE TEST REPORT

Date: July 08 2021

Customer: KELT EXPLORATION	Safe Distance: 24 FT
NEXT Project Number: 100421A	Design Pressure: 667.5 PSI
Drawing Number: 100421-101-102 Rev.4	Test Pressure: 734.5 <b>PSIG</b> (1.1x)

Lines Tested: **SEE COLOR CODED P&ID (PINK) HIGHLIGHTED**

	S/N	Range	Calibration Due Date
Gauge 1	SS-449	0-2000 PSIG	03-29-2022
Gauge 2	SS-812	0-2000 PSIG	11-24-2021
PSV	CO22297	SET @ 800 PSI	05-06-2022

Test Conducted By: QC Department      Test Personnel: NEXT Compression

Results: Passed  Deficiencies

Deficiencies: NO LEAKS FOUND AT TIME OF TEST

Notes:

<b>CHRISTIAN LEJEUNE</b>	<b>N/A</b>	
QC Signature/Production Signature:	Authorized Inspector (if required)	Owners Inspector Signature Name:



Bay 132 5050-106 Ave. SE  
 Calgary AB T2C 5E9  
 Phone: 1 (780) 434 7850 Toll Free: 800.565.3317  
 cal.lab@bhd.ca www.bhd.ca

## Certificate of Calibration

**Certificate Number:** 2021010553

**Asset Number:** BC003526

**Manufacturer:** WGI

**Model Number:** Pressure Gauge

**Description:** WGI Analog Pressure Gauge

**Serial Number:** PG-1000-1

**Customer Asset :** 1000 PSI

**Customer:**

NEXT COMPRESSION

261122 Wagon Wheel Crescent

Rocky View County, AB T4A 0E2

**Customer PO#:**

**Calibration Date:** 29-March-2021

**Temperature:** 22.1 °C

**Calibration Due:** 29-March-2022

**Relative Humidity:** 24.9 %

**Condition as Received** In Tolerance As Found / As Left (Pass)  
/Returned:

**Procedure Name:** Wika 233.5X-4" Master:CAL VER

- BHD Instrumentation Ltd. certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the SI through the National Institute of Standards and Technology (NIST), or other national measurement institutes.
- This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.
- The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.
- This calibration certificate shall not be reproduced except in full without the written approval of BHD Instrumentation Ltd. .

### Standards Used

Cal Standard	Model	Serial Number	Description	Cal Due
CL4117	ADT160A-AP3KG-P	00518130001	Additel ADT160A-AP3KG Pressure Modul	08/04/2021
CL4188	780	82016090002	Additel 780 Pressure Calibrator	06/20/2021

### Measurement Test Data

Test Description	Lower Acceptance Limit	Measured Value	Upper Acceptance Limit	Status	TUR

# Measurement Test Data

Test Description	Lower Acceptance Limit	Measured Value	Upper Acceptance Limit	Status	TUR
----- AS FOUND DATA -----					
PRESSURE TEST					
100 psi	90 psi	100 psi	110 psi	Pass	
500 psi	490 psi	500 psi	510 psi	Pass	
900 psi	890 psi	900 psi	910 psi	Pass	

\*\*\*\* End of Measurement Report \*\*\*\*



Ben Pitka  
Calibration Technician



Wescan Calibration
2228 Pegasus Way NE
Calgary, AB T2E 8M5

CERTIFICATE OF CALIBRATION

Table with 2 columns: Instrument details (Description, Model Number, Instrument Id, Manufacturer, Customer Name) and Calibration details (Work Order, Serial Number, Cal Procedure, Cal Date, Recall Cycle, Next Cal Date, Purchase Order).

Calibration Environment: Temperature 23.0 °C Relative Humidity 30.0 %RH

Received Condition: Within Tolerance

Completed Condition: Within Tolerance

Remarks: ±1 % OF FULL SCALE

Standards Used to Establish Traceability

Table with 4 columns: Instrument Type, Model, Asset #, Cal Due Date. Row 1: PRESSURE GAUGE, DIGITAL; 1KPSIXP2I-DD; 200037C; 13 Dec 2020

Wescan certifies that, at the time of calibration, the above listed instrument meets or exceeds all of the specifications defined on the Test Data Sheet (TDS), otherwise indicated. The Certificate received and completed conditions and the TDS specifications are based on the procedure(s) and/or specification(s) referenced on the TDS unless otherwise indicated.

The above listed instrument has been calibrated using standards that are traceable to the International System of Units (SI) through a National Metrological Institute (such as NRC or NIST). Wescan's quality system meets the requirements of ISO/IEC 17025:2017. Unless otherwise specified, Wescan maintains a minimum of a 4:1 ratio between the equipment under test and the measurement system.

This report consists of two parts with separate page numbering schemes; the Certificate of Calibration and the Test Data Sheet (TDS). Copyright of this report is owned by the issuing laboratory and may not be reproduced, other than in full, except with the prior written permission of the issuing laboratory.

Test data As Found and Final (as left) results are the same unless reported otherwise. Certificate remarks identify if adjustments were performed.

Metrologist: C004

Quality Assurance: R001

Date of Issue: 25 Nov 2020



**Wescan Calibration**  
2228 Pegasus Way NE  
Calgary, AB T2E 8M5

# CERTIFICATE OF CALIBRATION

<b>Description</b>	<b>PRESSURE GAUGE</b>	<b>Work Order</b>	<b>C0892279</b>
<b>Model Number</b>	<b>500 PSI</b>	<b>Serial Number</b>	<b>PG-7909-A</b>
<b>Instrument Id</b>	<b>N/A</b>	<b>Cal Procedure</b>	<b>P1002</b>
<b>Manufacturer</b>	<b>WGI</b>	<b>Cal Date</b>	<b>24 Nov 2020</b>
<b>Customer Name</b>	<b>NEXT COMPRESSION (SHOP 1)</b>	<b>Recall Cycle</b>	<b>52 Weeks</b>
		<b>Next Cal Date</b>	<b>24 Nov 2021</b>
		<b>Purchase Order</b>	<b>49994</b>

**Calibration Environment:** Temperature **23.0 °C** Relative Humidity **30.0 %RH**

**Received Condition:** **Within Tolerance**

**Completed Condition:** **Within Tolerance**

**Remarks:** **±1% OF FULL SCALE**

## Standards Used to Establish Traceability

<u>Instrument Type</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due Date</u>
<b>PRESSURE GAUGE, DIGITAL</b>	<b>500PSIXP2I-DD</b>	<b>200027C</b>	<b>13 Apr 2021</b>

Wescan certifies that, at the time of calibration, the above listed instrument meets or exceeds all of the specifications defined on the Test Data Sheet (TDS), otherwise indicated. The Certificate received and completed conditions and the TDS specifications are based on the procedure(s) and/or specification(s) referenced on the TDS unless otherwise indicated. Any statement of compliance is made without taking measurement uncertainty into account and is based on the instrument's performance against the test limits documented on the test data sheet.

The above listed instrument has been calibrated using standards that are traceable to the International System of Units (SI) through a National Metrological Institute (such as NRC or NIST). Wescan's quality system meets the requirements of ISO/IEC 17025:2017. Unless otherwise specified, Wescan maintains a minimum of a 4:1 ratio between the equipment under test and the measurement system.

This report consists of two parts with separate page numbering schemes; the Certificate of Calibration and the Test Data Sheet (TDS). Copyright of this report is owned by the issuing laboratory and may not be reproduced, other than in full, except with the prior written permission of the issuing laboratory.

Test data As Found and Final (as left) results are the same unless reported otherwise. Certificate remarks identify if adjustments were performed.

Metrologist : **C004**

Quality Assurance: **R001**

Date of Issue: **25 Nov 2020**

F083 Rev 16  
pylcert1

HALIFAX

MONTREAL

OTTAWA

TORONTO

EDMONTON

CALGARY

**NOV 26 2020**



**Wescan Calibration**  
2228 Pegasus Way NE  
Calgary, AB T2E 8M5

## CERTIFICATE OF CALIBRATION

<b>Description</b> <b>PRESSURE GAUGE</b> <b>Model Number</b> <b>500 PSI</b> <b>Instrument Id</b> <b>N/A</b> <b>Manufacturer</b> <b>WGI</b> <b>Customer Name</b> <b>NEXT COMPRESSION (SHOP 1)</b>	<b>Work Order</b> <b>C0892277</b> <b>Serial Number</b> <b>PG-500-1</b> <b>Cal Procedure</b> <b>P1002</b> <b>Cal Date</b> <b>24 Nov 2020</b> <b>Recall Cycle</b> <b>52 Weeks</b> <b>Next Cal Date</b> <b>24 Nov 2021</b> <b>Purchase Order</b> <b>49994</b>
--	--

**Calibration Environment:**    Temperature **23.0 °C**                      Relative Humidity **30.0 %RH**

**Received Condition:**    **Within Tolerance**

**Completed Condition:** **Within Tolerance**

**Remarks:**    **±1% OF FULL SCALE**

### Standards Used to Establish Traceability

<u>Instrument Type</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due Date</u>
<b>PRESSURE GAUGE, DIGITAL</b>	<b>500PSIXP2I-DD</b>	<b>200027C</b>	<b>13 Apr 2021</b>

Wescan certifies that, at the time of calibration, the above listed instrument meets or exceeds all of the specifications defined on the Test Data Sheet (TDS), otherwise indicated. The Certificate received and completed conditions and the TDS specifications are based on the procedure(s) and/or specification(s) referenced on the TDS unless otherwise indicated. Any statement of compliance is made without taking measurement uncertainty into account and is based on the instrument's performance against the test limits documented on the test data sheet.

The above listed instrument has been calibrated using standards that are traceable to the International System of Units (SI) through a National Metrological Institute (such as NRC or NIST). Wescan's quality system meets the requirements of ISO/IEC 17025:2017. Unless otherwise specified, Wescan maintains a minimum of a 4:1 ratio between the equipment under test and the measurement system.

This report consists of two parts with separate page numbering schemes; the Certificate of Calibration and the Test Data Sheet (TDS). Copyright of this report is owned by the issuing laboratory and may not be reproduced, other than in full, except with the prior written permission of the issuing laboratory.

Test data As Found and Final (as left) results are the same unless reported otherwise. Certificate remarks identify if adjustments were performed.

**NOV 26 2020**

Metrologist : **C004**

Quality Assurance: **R001**

Date of Issue: **25 Nov 2020**

F083 Rev 16  
p/cert1

HALIFAX

MONTREAL

OTTAWA

TORONTO

EDMONTON

CALGARY





Wescan Calibration
2228 Pegasus Way NE
Calgary, AB T2E 8M5

CERTIFICATE OF CALIBRATION

Table with 2 columns: Instrument Details (Description, Model Number, Instrument Id, Manufacturer, Customer Name) and Calibration Details (Work Order, Serial Number, Cal Procedure, Cal Date, Recall Cycle, Next Cal Date, Purchase Order).

Calibration Environment: Temperature 23.0 °C Relative Humidity 30.0 %RH

Received Condition: Within Tolerance

Completed Condition: Within Tolerance

Remarks: ±1 % OF FULL SCALE

Standards Used to Establish Traceability

Table with 4 columns: Instrument Type, Model, Asset #, Cal Due Date. Row 1: PRESSURE GAUGE, DIGITAL; 5KPSIXP2I-DD; 200015C; 31 Mar 2021

Wescan certifies that, at the time of calibration, the above listed instrument meets or exceeds all of the specifications defined on the Test Data Sheet (TDS), otherwise indicated. The Certificate received and completed conditions and the TDS specifications are based on the procedure(s) and/or specification(s) referenced on the TDS unless otherwise indicated.

The above listed instrument has been calibrated using standards that are traceable to the International System of Units (SI) through a National Metrological Institute (such as NRC or NIST). Wescan's quality system meets the requirements of ISO/IEC 17025:2017. Unless otherwise specified, Wescan maintains a minimum of a 4:1 ratio between the equipment under test and the measurement system.

This report consists of two parts with separate page numbering schemes; the Certificate of Calibration and the Test Data Sheet (TDS). Copyright of this report is owned by the issuing laboratory and may not be reproduced, other than in full, except with the prior written permission of the issuing laboratory.

Test data As Found and Final (as left) results are the same unless reported otherwise. Certificate remarks identify if adjustments were performed.

Metrologist : C004

Quality Assurance: R001

Date of Issue: 25 Nov 2020





Bay 132 5050-106 Ave. SE  
 Calgary AB T2C 5E9  
 Phone: 1 (780) 434 7850 Toll Free: 800.565.3317  
 cal.lab@bhd.ca www.bhd.ca

## Certificate of Calibration

**Certificate Number:** 2021010486

**Asset Number:** BC003523

**Manufacturer:** WIKA

**Model Number:** 233.54

**Description:** Anlog Pressure Gauge

**Serial Number:** SS-449

**Customer Asset :** 2000 PSI

**Customer:**

NEXT COMPRESSION

261122 Wagon Wheel Crescent

Rocky View County, AB T4A 0E2

**Customer PO#:**

**Calibration Date:** 29-March-2021

**Temperature:** 22.1 °C

**Calibration Due:** 29-March-2022

**Relative Humidity:** 24.9 %

**Condition as Received** In Tolerance As Found / As Left (Pass)  
/Returned:

**Procedure Name:** Wika 233.5X-4" Master:CAL VER

- BHD Instrumentation Ltd. certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the SI through the National Institute of Standards and Technology (NIST), or other national measurement institutes.
- This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.
- The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.
- This calibration certificate shall not be reproduced except in full without the written approval of BHD Instrumentation Ltd. .

### Standards Used

Cal Standard	Model	Serial Number	Description	Cal Due
CL4117	ADT160A-AP3KQ-P	00518130001	Additel ADT160A-AP3KQ Pressure Modul	08/04/2021
CL4188	780	82016090002	Additel 780 Pressure Calibrator	06/20/2021

### Measurement Test Data

Test Description	Lower Acceptance Limit	Measured Value	Upper Acceptance Limit	Status	TUR

Measurement Test Data

Test Description	Lower Acceptance Limit	Measured Value	Upper Acceptance Limit	Status	TUR
----- AS FOUND DATA -----					
PRESSURE TEST					
200 psi	180 psi	<b>200 psi</b>	220 psi	Pass	
1000 psi	980 psi	<b>1000 psi</b>	1020 psi	Pass	
1800 psi	1780 psi	<b>1800 psi</b>	1820 psi	Pass	

\*\*\*\*\* End of Measurement Report \*\*\*\*\*



Ben Pitka  
Calibration Technician



**PRV INSPECTION AND TEST REPORT**

*CS*

BRANCH: Calgary

UVL ID#: 33760C

Work Order: W11000742

Customer PO#:

Customer: NEXT COMPRESSION

Date: 05/06/2019

Facility: LSD:  
 A#: Vessel SN:  
 Cust. Ref.: Valve PO: 46104  
 Cust. WO#: Cust AFE#:

PSV Location:  
 Cust Id:  
 PO LINE#:  
 Cost Centre#:

**VALVE DATA**

Man: MERCER Model: 81-17151T15G11 Serial: C022297 Seat: SOFT  
 Conn: Threaded Inlet: 1" MNPT Orifice: E Outlet: 1" FNPT Vacuum:  
 Set Press: 800 PSI Back Press.: N/A PSI CDTP: N/A PSI Temp: 70 F Cap: 2,774 SCFM  
 Lift Lever  Cap Assembly: Closed RFID: Code Symbol: UV CRN#: 0G8841.5CR

**CUSTOMER INSTRUCTIONS**

Instructions: Full Service Pretest Required?  Reset Required?

**CONDITION AS RECEIVED**

Visual Condition: Fair Data Plate Condition: OK Date of last service: 04/2016  
 Seal Condition: Top: Intact Bottom: N/A Insignia: UVL Fittings Attached: Inlet:  Outlet:   
 Inlet: Oily Inlet Plugged:  Outlet: Oily Outlet Plugged:  Initial Insp. Signoff: Robin Roebuck

**PRETEST 1**

Simmer: 793 PSI Set Press: 796 PSI Reseat: 687 PSI Leakage: 0 BPM Test Gauge: UVC 41/UVC 43  
 Tested By: Harley Stutts Pretest Comments:

**PRETEST 2**

Simmer: Set Press: Reseat: Leakage: Test Gauge: UVC 41/UVC 43  
 Tested By: Pretest Comments:

**COMPONENTS INSPECTION**  
 (0 Like New / 1 Minor / 2 Medium / 3 Major)

ITEM	CLEAN	OILY	RUSTY	CARBON	PITTED	CORRODED	SCALE	VIBRATION	GROOVED	DENTED	GALLING	GOUNDED	OTHER	Machined	Lapped	Polished	Replaced	Replace Next Service	COMMENTS
DISC		2												<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
NOZZLE		2												<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
CAP-LEVER ASSY						1								<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
COMP SCREW and LOC						1								<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
AS FOUND: _____ AS LEFT: _____																			
SPRING and BUTTONS		2												<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SPINDLE / STEM														<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
STEM RETAINER														<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
DISC HOLDER														<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
GUIDE / UPPER RING		2												<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
LOWER RING														<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
RING PIN(S)														<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
BELLOWS														<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
GASKET / SEALS														<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	WORN
CONNECTION ENDS		2												<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
OTHER													3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

DISC: : N/A ACT - N/A NOZZLE: N/A ACT - SOFT SPRING NUMBER: 05-015  
 Disassembly: Febin Sam Babu Inspection: Febin Sam Babu Reassembly: Febin Sam Babu

**FINAL TEST**

Test Medium: Air Simmer: 792 PSI Set Pressure: 800 PSI  
 Reseat: 684 PSI Leakage Acceptable:  B.P. Test: 60 PSI Vacuum:  
 ADJ. RING SETTING (NOTCHES): Upper: N/A Lower: N/A Test Gauge: UVC 41/UVC 43 Set Press Def: POP  
 Tested by: Febin Sam Babu Date Final Tested: 05/07/2019

**FINAL INSPECTION:**

SEAL: Top:  Bottom:  End Protectors Installed:  Painted:  Palletized:  Ship Container:  Flex Gaskets Supplied:   
 Final Inspection: Robin Roebuck Customer Inspection:  
 Comments: - SERVICE RATING: ROUTINE



**PRV INSPECTION AND TEST REPORT**

OK

BRANCH: Calgary

UVL ID#: 34965C

Work Order: W11000742

Customer PO#:

Customer: NEXT COMPRESSION

Date: 05/06/2019

Facility:

LSD:

PSV Location:

A#:

Vessel SN:

Cust Id:

Cust. Ref.:

Valve PO: 46104

PO LINE#:

Cust. WO#:

Cust AFE#:

Cost Centre#:

**VALVE DATA**

Man.: MERCER

Model: 91-17D51V09E1

Serial: C028948

Seat: SOFT

Conn. Threaded

Inlet: 1" MNPT

Orifice: D

Outlet: 1" FNPT

Vacuum:

Set Press. 305 PSI

Back Press.: N/A PSI

CDTP: N/A PSI

Temp: 70 F

Cap: 641 SCFM

Lift Lever

Cap Assembly: Closed

RFID:

Code Symbol: UV

CRN#: 0G8841.5CR

**CUSTOMER INSTRUCTIONS**

Instructions: Full Service

Pretest Required?

Reset Required?

**CONDITION AS RECEIVED**

Visual Condition: Fair

Data Plate Condition: OK

Date of last service: 04/2016

Seal Condition: Top: Intact

Bottom: N/A

Insignia: UVL

Fittings Attached: Inlet:

Outlet:

Inlet: Oily

Inlet Plugged:

Outlet: Clean

Outlet Plugged:

Initial Insp. Signoff:

Robin Roebuck

**PRETEST 1**

Simmer: 302 PSI

Set Press: 306 PSI

Reseat: 282 PSI

Leakage: 1 BPM

Test Gauge: UVC 41/UVC 43

Tested By: Febin Sam Babu

Pretest Comments:

**PRETEST 2**

Simmer:

Set Press:

Reseat:

Leakage:

Test Gauge: UVC 41/UVC 43

Tested By:

Pretest Comments:

**COMPONENTS INSPECTION**

(0 Like New / 1 Minor / 2 Medium / 3 Major)

ITEM	CLEAN	OILY	RUSTY	CARBON	PITTED	CORRODED	SCALE	VIBRATION	GROOVED	DENTED	GALLING	GOUGED	OTHER	Machined	Lapped	Polished	Replaced	Replace Next Service	COMMENTS
DISC		1												<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	WORN
NOZZLE		1												<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	WORN
CAP-LEVER ASSY	1													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
COMP SCREW and LOC	1													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
AS FOUND: _____ AS LEFT: _____																			
SPRING and BUTTONS		1												<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SPINDLE / STEM														<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
STEM RETAINER														<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
DISC HOLDER														<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
GUIDE / UPPER RING		1												<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
LOWER RING														<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
RING PIN(S)														<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
BELLOWS														<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
GASKET / SEALS														<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
CONNECTION ENDS		1												<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
OTHER														<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

DISC: : N/A ACT - N/A NOZZLE: N/A ACT - VITON SPRING NUMBER: 05-009

Disassembly: Febin Sam Babu Inspection: Febin Sam Babu Reassembly: Febin Sam Babu

**FINAL TEST**

Test Medium: Air

Simmer: 305 PSI

Set Pressure: 305 PSI

Reseat: 213 PSI

Leakage Acceptable:

B.P. Test: 60 PSI

Vacuum:

ADJ. RING SETTING (NOTCHES): Upper: N/A

Lower: N/A

Test Gauge: UVC 41/UVC 43

Set Press Def: POP

Tested by: Febin Sam Babu

Date Final Tested: 05/23/2019

**FINAL INSPECTION:**

SEAL: Top:  Bottom:  End Protectors Installed:  Painted:  Palletized:  Ship Container:  Flex Gaskets Supplied:

Final Inspection: Robin Roebuck

Customer Inspection:

Comments: - SERVICE RATING: MAJOR





PRV INSPECTION AND TEST REPORT

08

BRANCH: Calgary  
Work Order: W11000742

UVL ID#: 33897C  
Customer PO#:

Customer: NEXT COMPRESSION Date: 05/06/2019  
Facility: LSD: PSV Location:  
A#: Vessel SN: Cust Id:  
Cust. Ref.: Valve PO: 46104 PO LINE#:  
Cust. WO#: Cust AFE#: Cost Centre#:

**VALVE DATA**  
Man: MERCER Model: 81-17151V13G11 Serial: 618037 Seat: SOFT  
Conn: Threaded Inlet: 1" MNPT Orifice: E Outlet: 1" FNPT Vacuum:  
Set Press: 565 PSI Back Press.: N/A PSI CDTP: N/A PSI Temp: 70 Cap: 1,972 SCFM  
Lift Lever  Cap Assembly: Closed RFID: Code Symbol: UV CRN#: 0G8841.5C

**CUSTOMER INSTRUCTIONS**  
Instructions: Full Service Pretest Required?  Reset Required?

**CONDITION AS RECEIVED**  
Visual Condition: Fair Data Plate Condition: OK Date of last service: 04/2016  
Seal Condition: Top: Intact Bottom: N/A Insignia: UVL Fittings Attached: Inlet:  Outlet:   
Inlet: Oily Inlet Plugged:  Outlet: Clean Outlet Plugged:  Initial Insp. Signoff: Robin Roebuck

**PRETEST 1**  
Simmer: 587 PSI Set Press: 592 PSI Reseat: 530 PSI Leakage: 0 BPM Test Gauge: UVC 41/UVC 43  
Tested By: Harley Stutts Pretest Comments:

**PRETEST 2**  
Simmer: 577.000 PSI Set Press: 583.000 PSI Reseat: 523 PSI Leakage: 0 BPM Test Gauge: UVC 41/UVC 43  
Tested By: Harley Stutts Pretest Comments:

**COMPONENTS INSPECTION**  
(0 Like New / 1 Minor / 2 Medium / 3 Major)

ITEM	CLEAN	OILY	RUSTY	CARBON	PITTED	CORRODED	SCALE	VIBRATION	GROOVED	DENTED	GALLING	GOUGED	OTHER	Machined	Lapped	Polished	Replaced	Replace Next Service	COMMENTS
DISC		1												<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	WORN
NOZZLE		1											3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	WORN
CAP-LEVER ASSY						1								<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
COMP SCREW and LOC						1								<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
AS FOUND: _____ AS LEFT: _____																			
SPRING and BUTTONS		1												<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SPINDLE / STEM														<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
STEM RETAINER														<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
DISC HOLDER														<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
GUIDE / UPPER RING		1												<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
LOWER RING														<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
RING PIN(S)														<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
BELLOWS														<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
GASKET / SEALS													3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	CRUSHED
CONNECTION ENDS		1												<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
OTHER														<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

DISC: : N/A ACT - N/A NOZZLE: N/A ACT - VITON SPRING NUMBER: 05-013  
Disassembly: Febin Sam Babu Inspection: Febin Sam Babu Reassembly: Febin Sam Babu

**FINAL TEST**  
Test Medium: Air Simmer: 558 PSI Set Pressure: 565 PSI  
Reseat: 492 PSI Leakage Acceptable:  B.P. Test: 60 PSI Vacuum:  
ADJ. RING SETTING (NOTCHES): Upper: N/A Lower: N/A Test Gauge: UVC 41/UVC 43 Set Press Def: POP  
Tested by: Febin Sam Babu Date Final Tested: 05/23/2019

**FINAL INSPECTION:**  
SEAL: Top:  Bottom:  End Protectors Installed:  Painted:  Palletized:  Ship Container:  Flex Gaskets Supplied:   
Final Inspection: Robin Roebuck Customer Inspection:  
Comments: INSPECTION: -COMPRESSION SCREW & LOCKNUT SEIZED TOGETHER. PROBLEM CORRECTED FOR THIS SERVICING, BUT REPLACE COMPRESSION SCREW NEXT SERVICE.  
- SERVICE RATING: MAJOR

DCR Painting  
 127290 1016 Drive East  
 Okotoks, AB, T1S1A2

PAINT RECORD

<b>Client:</b> NEXT Compression	<b>Date:</b> July 8, 2021
<b>Job #:</b> 100421 Retrofit	
<b>Project:</b>	
<b>PO #:</b>	
<b>Description of item coated:</b> Full unit repainted	
<b>Notes:</b> Unit was pressure washed by NEXT prior to overhaul.	
Primer on bare steel only	
DFT not taken	

<b>Surface Preparation:</b> Solvent wipe, air blow and vacuum best as possible
Unit painted inside shop conditions

Material Info	Manufacturer	Prod. Code	Batch #	Color	Recommended DFT	Recorded DFT		Avg. DFT
						Low	High	
1 <sup>st</sup> coat	Cloverdale	Rustex 710	S20E9526	Grey				
2 <sup>nd</sup> coat	Cloverdale	Industrial Enamel 74	W21E9724	Old SAGE Tan				
3 <sup>rd</sup> coat								
Thinner								

DFT Measuring Tool	Manufacturer	Calibration Date	Number of Reading on Report

Component							
<b>Total Avg. DFT</b>							

Environmental Conditions (Upon request only)			
Description	Primer/1 <sup>st</sup> coat	Inter./ 2 <sup>nd</sup> coat	Top/ 3 <sup>rd</sup> coat
<b>Date</b>			
<b>Time</b>			
<b>Ambient Temp. °C</b>			
<b>Substrate Temp. °C</b>			
<b>Dew Point Temp °C</b>			
<b>Relative Humidity %</b>			

Completed by Christian Sato



# NEXT COMPRESSION

**(2)**

**VESSELS**





Process Systems

## **DATA MANUALS**

**JOB # 15630/ 100421**

**Customer:  
Concept Compression**

**Description:  
185 hp Compressor Skid**

### **Contents**

**Oil Separator Data Manual (15660-11)**

**Inlet Scrubber Data Manual (15660-2)**

**Skid Piping Data Manual**

5120 – 6th Street N.E. Calgary, Alberta, Canada T2K 4W5  
main: 403.274.6106 fax: 403.274-6149 toll free: 800.256.1598

[www.ngc-ltd.com](http://www.ngc-ltd.com)





Process Systems

# **DATA MANUALS**

**JOB # 15630/ 100421**

**Customer:  
Concept Compression**

## **Description:**

**Oil Separator  
S/N: 15660-11**

### **Contents**

**U-1A Data Report**

**U4 Data Report**

**Name Plate Stencil**

**Vessel Travel Sheet**

**NDE Report**

5120 – 6th Street N.E. Calgary, Alberta, Canada T2K 4W5  
main: 403.274.6106 fax: 403.274-6149 toll free: 800.256.1598

[www.ngc-ltd.com](http://www.ngc-ltd.com)



**FORM U-1A MANUFACTURERS DATA REPORT FOR PRESSURE VESSELS** ④ 530137  
 (Alternative Form for Single Chamber, Completely Shop-Fabricated Vessels Only)  
 As Required by the Provisions of the ASME Code Rules, Section VIII, Division 1

1. Manufactured and certified by NGC Process Systems Ltd., 5110 - 6<sup>th</sup> Street, NE, Calgary AB, T2K 4W5  
(Name and Address of Manufacturer)

2. Manufactured for Concept Compression, #2, 3530 - 11A Street N.E. Calgary, AB  
(Name and address of purchaser)

3. Location of installation: Equipment for Stock  
(Name and address)

4. Type: Vertical 15660-11 R6809.213 D-14213-09-01 Rev 1 NA 2005  
( horiz. or vert., tank) (Mfg's. serial No.) (CRN) (Drawing No.) (Nat'l. Bd. No.) (Year built)

5. The chemical and physical properties of all parts meet the requirements of material specifications of the ASME BOILER AND PRESSURE VESSEL CODE. The design, construction, and workmanship conform to ASME Rules, Section VIII, Division 1 2001  
Year

to 2003 NA NA  
Address (Date) Code case No. Special Service per UG-20(d)

6. Shell: SA-106-B 0.500" 0.125" 1 ft 7 in 6 ft 11 in S/S  
Mel. (Spec. No., Grade) Nom. Thk. (in.) Cor. Allow. (in.) Diam. I.C. (ft. 5 in.) Length (overall) (ft. 8 in.)

7. Seams: S N/A 100 N/A Type 1 Spot\* 1  
Long (Welded, Dbl., Singl., Lap, Butt) R.T. (Spot or Full) Et (%) H.T. Temp. (°F) Time (hr) Crth (Welded, Dbl., Singl., Lap, Butt) R.T. (Spot, Partial, or Full) No. of Courses

8. Heads: (a) Mall. SA-516-70N  
(Spec. No., Grade)

Location (Top Bottom, End)	Minimum Thickness	Corrosion Allowance	Crown Radius	Knuckle Radius	Elliptical Ratio	Cylindrical Apex Angle	Hemispherical Radius	Flat Diameter	Side to Pressure (Convex or Concave)
(a) Top	0.6875"	0.125"			2:1				Concave
(a) Bottom	0.4375"	0.125"			2:1				Concave

(b) Mall. SA-516-70N  
(Spec. No., Grade)

If removable, bolts used (desc. & other fastenings) \_\_\_\_\_

9. MAWP 450 psi at max. temp. 250 F  
(Mell., Spec. No., Gr., Size, No.)

Min. design metal temp. -20 °F at 450 psi. Hydro., pneu., or comb. test pressure 585 psi.

10. Nozzles, inspection and safety valve openings:

Purpose (Inlet, Outlet, Drain)	No.	Diam. Or Size	Type	Matl.	Nom. Thk.	Reinforcement Matl.	How Attached	Location
				SEE ATTACHED	U-4	FORM		

11. Supports: Skirt Yes Lugs \_\_\_\_\_ Legs \_\_\_\_\_ Other \_\_\_\_\_ Attached: welded to bottom head  
(Yes/No) (No.) (No.) (Describe) (Where and how)

12. Remarks: Manufacturer's Partial Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the following items of the report:  
(Name of part, item number, Mfg's. name and certifying stamp)

\* Code UW 11(a) 5(b) Vol. 16.4 cu. ft. Built to Draw # D-15660-09-02 Rev 0  
 Description: Oil Separator  
 Impact Test Exempt per UG 20(f) (1-5)

**CERTIFICATE OF SHOP COMPLIANCE**

We certify that the statements made in this report are correct and that all details of design, material, construction, and workmanship of this vessel conform to the ASME Code for Pressure Vessels, Section VIII, Division 1. "U" Certificate of Authorization No. 32,986 expires: Dec. 14, 2007

Date 06/17/05 Co. name NGC Process Systems Ltd. Signed \_\_\_\_\_  
(Manufacturer) (Representative)

**CERTIFICATE OF SHOP INSPECTION**

Vessel constructed by NGC Process Systems Ltd. at 5110 - 6<sup>th</sup> Street, NE, Calgary, AB

I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and / or the State or Province of Alberta and employed by ABSA

Have inspected the component described in this Manufacturer's Data Report on JUN 17 2005, and state that, to the best of my knowledge and belief, the Manufacturer has constructed this pressure vessel in accordance with ASME Code, Section VIII, Division 1. By signing this certificate neither the Inspector nor his employer makes any warranty, expressed or implied, concerning the pressure vessel described in this Manufacturer's Data Report. Furthermore, neither the Inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

Date JUN 17 2005 Signed \_\_\_\_\_ Commissions AB212 A  
(Authorized Inspector) (Nat'l. Board (incl. endorsements), State, Prov. and No.)

This form (E0017) may be obtained from the ASME Order Dept., 22 Law Drive, Box 2300, Fairfield, NJ 07007-2300.

530133

**FORM U-4 MANUFACTURER'S DATA REPORT SUPPLEMENTARY SHEET**  
**As Required by the Provisions of the ASME Code Rules, Section VIII, Division 1**

1. Manufactured and certified by NGC Process Systems Ltd., 5110 6<sup>th</sup> Street, NE, Calgary, AB, T2K 4W6  
(Name and address of Manufacturer)

2. Manufactured for Concept Compression, #2, 3530 - 11A Street N.E. Calgary, AB  
(Name and address of Purchaser)

3. Location of installation Concept Compression, Equipment for Stock  
(Name and address)

4. Type: Vertical Oil Separator 15680-11  
(Horizontal, vertical, or spherical) (Tank, separator, heat exch. etc.) (Mfg's. serial No.)

R5809.213 D-14213-09-01 Rev 1 N/A 2005  
(CRN) (Drawing No.) (Nat'l Bf. No.) (Year Built)

Data Report  
 Item Number 10  
 Continued from Form U1a

Remarks

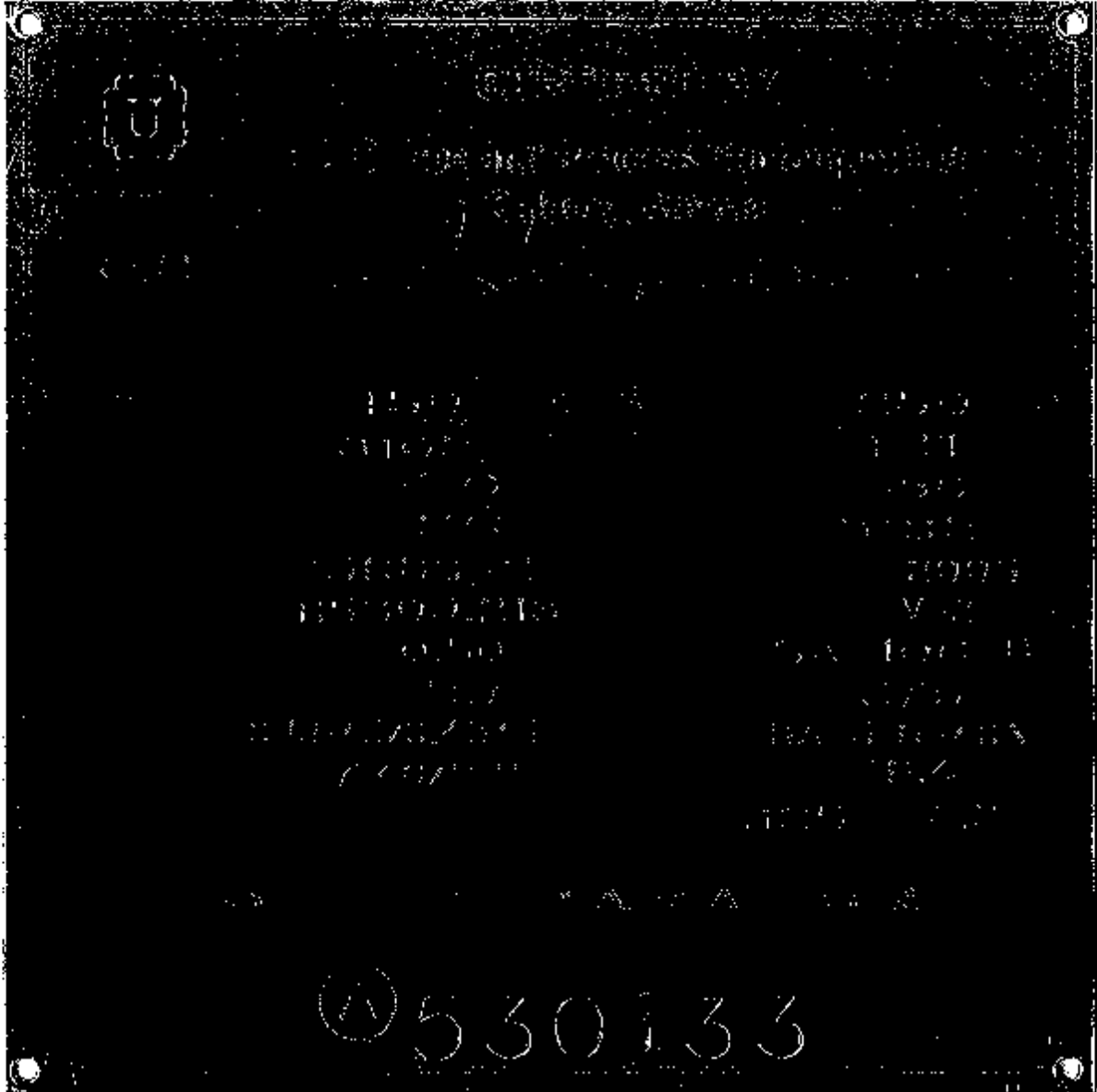
Purpose (Inlet, Outlet, Drain)	MK No.	No.	Diam. or Size	Type	Mat'l	Nom. Thk.	Reinforce- ment Mat'l	How Attached	Location
Inlet	N1	1	3"	CL 300	SA-105/ SA-106B	0.438"	NA	Fig. UW 16.1(c)	Shell
Outlet	N2	1	3"	CL 300	SA-105/ SA-234WPB	0.438"	NA	Fig. UW 16.1(c)	Top Head
Drain	N3 a/b	2	1 1/2"	Pipe	SA-234-WPB/ SA-106B	0.400"	NA	Fig. UW 16.1(c)	Bottom Head
* C / Inspection	C1	1	1 1/2"	Coupling	SA-105N	CL 6000	NA	Fig. UW 16.1(c)	Shell
LSHH	C2	1	1 1/2"	Coupling	SA-105N	CL 6000	NA	Fig. UW 16.1(c)	Shell
LG	C3 a/b	2	3/4"	T.O.L	SA-105N	CL 6000	NA	Fig. UW 16.1(a)	Shell
Oil Drain	C4	1	1"	T.O.L	SA-105N	CL 6000	NA	Fig. UW 16.1(a)	Shell
PSV	C5	1	1 1/2"	E.O.L	SA-105N	CL 3000	NA	Fig. UW 16.1(a)	N2
Inspection	C6	1	12"x16"	Ring	SA-106C	0.750"	NA	Fig. UW 16.1(c)	Top Head

Certificate of Authorization: Type "U" No. 32988 Expires Dec 14, 2007

Date 06/17/05 Name NGC Process Systems Ltd. Signed [Signature]  
(Manufacturer) (Representative)

Date JUN 17 2005 Name [Signature] Commission AB2127  
(Authorized Inspector) (Nat'l Board incl. Endorsement, State, Province and No.)

(12/91) This form (E00119) may be obtained from the ASME Order Dept., 22 Law Drive, Box 2300, Fairfield, NJ 07007-2300



# VESSEL TRAVEL SHEET (FRONT)

**DO NOT START CONSTRUCTION WITHOUT AI REVIEW**

AI REVIEW: *[Signature]* REVIEW DATE: MAR 11 2005

SERIAL NO.: 15660-*[Signature]* JOB NO.: 15660 VESSEL TYPE: Oil Separator

DRAWING NO.: D-15660-09-02 REVISION NO.: 0

Seq	Item	Comments	Q.C.	Date	A.I. Hold Points	A.I.	Date	Owner	Date
1.	Calculations in file		<i>[Signature]</i>	03/10/05	*	<i>[Signature]</i>	MAR 11 2005		
2.	Release of Approved Drawing		<i>[Signature]</i>	03/10/05	*	<i>[Signature]</i>	MAR 11 2005		
3.	Heat Numbers Recorded		<i>[Signature]</i>	06/07/05	*	<i>[Signature]</i>	JUN 07 2005		
4.	M.T.R.'s Checked		<i>[Signature]</i>		*				
5.	W.P.S. Checked		<i>[Signature]</i>		*				
6.	Welders Qualified		<i>[Signature]</i>		*				
7.	Thickness Recorded		<i>[Signature]</i>		*				
8.	Shell & Head Fitted		<i>[Signature]</i>		*	<i>[Signature]</i>	JUN 07 2005		
9.	Nozzles & Fittings Fitted		<i>[Signature]</i>		*				
10.	Nozzle Orientation		<i>[Signature]</i>		*				
11.	Nozzle & Flange Rating Checked		<i>[Signature]</i>	06/07/05					
12.	Impact Tests	Exempt per UG-20(1-5)							
13.	Internals Checked		<i>[Signature]</i>	05/18/05		<i>[Signature]</i>	MAY 18 2005		
14.	Partial Internal - Head		<i>[Signature]</i>	"		<i>[Signature]</i>	MAY 18 2005		
15.	Partial Internal - Nozzle		<i>[Signature]</i>	05/18/05		<i>[Signature]</i>	MAY 18 2005		
16.	Final Internal Inspection	Shell Side	<i>[Signature]</i>	05/24/05	**	<i>[Signature]</i>	MAY 24 2005		
		Tube Side	<i>[Signature]</i>	06/07/05		<i>[Signature]</i>	JUN 07 2005		
17.	Weld Size Checked		<i>[Signature]</i>	06/07/05					
18.	Welder I.D. Checked		<i>[Signature]</i>						
19.	Radiography	RT 2	<i>[Signature]</i>	06/07/05	*	<i>[Signature]</i>	JUN 17 2005		
20.	Other N.D.E.	N/A							
21.	Final Ext. Prior to P.W.H.T.	N/A							
22.	PWHT Chart Checked	As per QCM Rev. 1							
23.	Final External Inspection		<i>[Signature]</i>	06/07/05	**	<i>[Signature]</i>	JUN 07 2005		
24.	Hydrostatic Test 585 psig	Gauge # PT-200	<i>[Signature]</i>	06/07/05	**	<i>[Signature]</i>	JUN 07 2005		
	As per QCM Rev. 1	Gauge # PT-204	<i>[Signature]</i>	06/07/05		<i>[Signature]</i>	JUN 07 2005		
25.	CRN Drawing	R-5809.213	<i>[Signature]</i>	JUN 17 2005		<i>[Signature]</i>	JUN 17 2005		
26.	N.C.R. #								
27.	Nameplate Stamped		<i>[Signature]</i>	JUN 17 2005					
28.	Manuf. Data Report		<i>[Signature]</i>	JUN 17 2005					
29.	Completed as built drawing	DUE ON:							
30.	Other								
31.	Nameplate Installed								

NOTE: \* DENOTES A.I. INSP. POINT AND \*\* DENOTES A.I. HOLD POINT

DESCRIPTION	GMAW	GTAW	SMAW	SAW	FCAW	WELDER ID	THICKNESS	
							QC	HEAT / SLAB # (Item b)
Shell 20" X-1 SA-135B							✓	943180
CS1 (Flange)	✓				✓	L	✓	17451-86020
CS2 (Head 2)	✓				✓	L	✓	53277-77571
N1 (c joint) 3" S160	✓		✓			W	✓	95915
N1 Elbow SA-234-W/PB	✓		✓			V	✓	04F00044
N1(d joint) 3" S160			✓		✓	W/L	✓	730426
N2(c joint) 3" S160	✓		✓			C	✓	95915
N2(d joint)			✓		✓	L	✓	730426
N2 Elbow SA-234-W/PB	✓		✓			C	✓	04F0044
N2 6" Half Pipe							✓	1
N3a(d joint) 1/2" Tee			✓			L	✓	6141
N3a Pipe	✓		✓			C	✓	394
N3b Pipe	✓		✓			C	✓	394
C1(1 1/2") 6000#CPLG			✓		✓	W/L	✓	2294
C2(1 1/2") 6000#CPLG			✓		✓	W/L	✓	2294
C3a (3/4") 6000#TOL			✓			V	✓	55994
C3b (3/4") 6000#TOL			✓			V	✓	55994
C4 (1") 6000#TOL			✓		✓	W/L	✓	55254
C5(1 1/2") 3000#EOL			✓			E	✓	55999
C6(12"X16") RING			✓		✓	C/L	✓	30108
Name Plate Bracket	✓		✓			W	✓	39427
Skirt					✓	L	✓	1

Exposure Device #: 16696 Source #: A618  
 Cobalt 60  IR 192  X-Ray  EFSS: 1150  
 Film Brand: AGFA #Film/cassette: 1  
 Code: ASME UW52

Job / P.O. #: 15660-11 IRISNDT #: 215271 Date: JUNE 6/05  
 Client: NBC #1  
 Location: CALGARY  
 Item: 20" x 1/2" TANK CIRC SPOT Material: C.S.

Film #	Size, Location, Thickness	Welder ID	IRISNDT Proc.	SOD Inches	O.F.D. Inches	# of Fps.	Work Location	Film Type	Type and Location of Discontinuities (circle rejectable discontinuities)	Accept/Reject
<u>C15</u>	<u>0-6</u>	<u>L</u>	<u>R-1</u>	<u>9.5</u>	<u>.5</u>	<u>1</u>	<u>1</u>	<u>D7</u>		<input checked="" type="checkbox"/>
<u>1 SPOT ON 1/2" TANK CIRC</u>										

Number of Radiation Barrier Warning Signs Erected \_\_\_\_\_ Number of Radiation Barrier Warning Signs Returned \_\_\_\_\_

Work Location Legend (insert number): [1] Inside Fab. Shop [2] Yard/Lay-down Area [3] Piping/Modular Fab. Area [4] N/A (Other)

IRIS Procedure:  
 Single Wall Exposure:  
 RT 1, 2, 2A, 6, 7  
 Double Wall Exposure:  
 RT 3, 3A, 4, 5, 8

S.O.D. = Minimum Source-to-object distance  
 O.F.D. = Distance source side of Object to film at min. S.O.D.

AB - Arc Burns  
 BT - Burn Through  
 CK - Crack  
 EP - Excessive Penetration  
 P - Porosity

EUC - External Undercut  
 IUC - Internal Undercut  
 HB - Hollow Bead  
 IP - Incomplete Penetration  
 S - Slag

IC - Internal Concavity  
 LF - Lack of Fusion  
 LC - Low Cover  
 MA - Misalignment

Unit # 161 Kilometres: \_\_\_\_\_  
 In 0545 Out 0600 Hrs. 25  
 In \_\_\_\_\_ Out \_\_\_\_\_ Hrs. \_\_\_\_\_  
 Final: AL  
RT

Film Quantity:  
1-3 1/2 x 8 1/2 D7

Interpretation by: ALops SNT-TC-1A II  
A. Law C.A.S.B. II  
 C.G.S.B. 0373  
 I am in full agreement with report contents.  
 Client Representative: \_\_\_\_\_

Edmonton (780) 437-4747  
 Calgary (403) 279-8121  
 Nisku (780) 955-7818  
 Barrhead (780) 674-3018

Fort McMurray (780) 743-1536  
 Grande Prairie (780) 532-2283  
 High Level (780) 841-0470  
 Lloydminster (780) 876-8456

Gold Lake (780) 594-1114  
 Red Deer (403) 347-1742  
 Tulsa, OK (918) 446-8773  
 Houston, TX (713) 481-4010

Mailing Address  
 5908 - 96 Street  
 Edmonton, Alberta  
 T8E 3G3





Process Systems

# **DATA MANUALS**

**JOB # 15630/ 100421**

**Customer:  
Concept Compression**

**Description:  
Inlet Separator  
S/N: 15660-2**

## **Contents**

**U-1A Data Report**

**U4 Data Report**

**Name Plate Stencil**

**Vessel Travel Sheet**

**NDE Report**

5120 – 6th Street N.E. Calgary, Alberta, Canada T2K 4W5  
main: 403.274.6106 fax: 403.274-6148 toll free: 800.256.1598

[www.ngc-ltd.com](http://www.ngc-ltd.com)



**FORM U-1A MANUFACTURERS DATA REPORT FOR PRESSURE VESSELS**  
 (Alternative Form for Single Chamber, Completely Shop-Fabricated Vessels Only)  
 As Required by the Provisions of the ASME Code Rules, Section VIII, Division 1

②524131  
 June 15/05

1. Manufactured and certified by NGC Process Systems Ltd., 5110 - 6<sup>th</sup> Street, NE, Calgary AB, T2K 4W5  
(Name and Address of Manufacturer)

2. Manufactured for Concept Compression, #2, 3530 - 11A Street N.E., Calgary, AB  
(Name and address of purchaser)

3. Location of installation Equipment for Stock  
(Name and address)

4. Type Vertica 15660-2 R5810 213 D-14212-09-01 Rev 0 NA 2005  
(Type of Vert. Tank) (Mfg's serial No.) (CRN) (Drawing No.) (Nat. Std. No.) (Year built)

5. The chemical and physical properties of all parts meet the requirements of material specifications of the ASME BOILER AND PRESSURE VESSEL CODE. The design, construction, and workmanship conform to ASME Rules, Section VIII, Division 1 2004  
Year

6. Shell: NA NA NA NA  
Address (Date) Code case Nos. Special Service per UG-129(c)

7. Seams: S N/A 85 N/A Type 1 None 1  
Mfld. (Spec. No., Grade) Nom. Thk. (in.) Cor. Allow. (in.) Diam. I.D. (ft. & in.) Length (overall) (ft. & in.)

8. Heads: (a) Matl. SA-516-70N (b) Matl. SA-516-70N  
(Spec. No., Grade) (Spec. No., Grade)

Location (Top Bottom, Ends)	Minimum Thickness	Corrosion Allowance	Crown Radius	Knuckle Radius	Elliptical Ratio	Corrus Apex Angle	Hemispherical Radius	Flat Diameter	Side to Pressure (Convex or Concave)
(a) Top	0.3125"	0.125"			2:1				Concave
(a) Bottom	0.3125"	0.125"			2:1				Concave

If removable, bolts used (describe other fastenings) \_\_\_\_\_  
(Wall, Spec. No., Gr., Size, No.)

9. MAWP 245 psi at max. temp. 250 F  
 Min. design metal temp. -20 °C at 245 psi. Hydro., pneu., or comb. test pressure 319 psi.

10. Nozzles, inspection and safety valve openings:

Purpose (Inlet, Outlet, Drain)	No.	Diam. Or Size	Type	Matl.	Nom. Thk.	Reinforcement Matl.	How Attached	Location
				SEE ATTACHED	U-4	FORM		

11. Supports: Skirt Yes Lugs No Legs No Other Attached: welded to bottom head  
(Yes/No) (No.) (No.) (Describe) (Where and how)

12. Remarks: Manufacturer's Partial Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the following items of the report \_\_\_\_\_  
(Name of part, item number, Mfg's name and identifying stamp)

Vol. 25.7 cu. ft. Built to Dwg # D-15660 06-01 Rev 0  
 Description: Inlet Separator  
 Impact Test Exempt per UG 20(f) (1-5)

**CERTIFICATE OF SHOP COMPLIANCE**

We certify that the statements made in this report are correct and that all details of design, material, construction, and workmanship of this vessel conform to the ASME Code for Pressure Vessels, Section VIII, Division 1, "U" Certificate of Authorization No. 32.986 expires Dec. 14, 2007  
 Date June 14/05 Co. name NGC Process Systems Ltd. Signed \_\_\_\_\_  
(Manufacturer) (Representative)

**CERTIFICATE OF SHOP INSPECTION**

Visited constructed by NGC Process Systems Ltd. at 5110 - 6<sup>th</sup> Street NE, Calgary, AB  
 I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and / or the State or Province of Alberta and employed by ABSA  
 have inspected the component described in this Manufacturer's Data Report on JUN 15 2005 and state that, to the best of my knowledge and belief, the Manufacturer has constructed this pressure vessel in accordance with ASME Code, Section VIII, Division 1. By signing this certificate neither the Inspector nor his employer makes any warranty, expressed or implied, concerning the pressure vessel described in this Manufacturer's Data Report. Furthermore, neither the Inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.  
 Date JUN 15 2005 Signed [Signature] Commissions ALTA #58  
(Authorized Inspector) (Nat'l Board (incl. endorsements), State, Prov. and No.)

This form (E801) may be obtained from the ASME Order Dept., 222 New York Ave., 2200, Fairfield, NJ 07007-3339

524131

**FORM U-4 MANUFACTURER'S DATA REPORT SUPPLEMENTARY SHEET**  
**As Required by the Provisions of the ASME Code Rules, Section VIII, Division 1**

- Manufactured and certified by NGC Process Systems Ltd., 5110 6<sup>th</sup> Street, NE, Calgary, AB, T2K 4W5  
(Name and address of Manufacturer)
  - Manufactured for Concept Compression, #2, 3530 - 11A Street N.E. Calgary, AB  
(Name and address of Purchaser)
  - Location of installation Equipment for Stock  
(Name and address)
  - Type: Vertical Inlet Separator 15660-2  
(Horiz., vert. or sphere) (Tank, separator, heat exch., etc.) (Mfg's. serial No.)
- R5810-213 D-14212-09-01 Rev 0 N/A 2005  
(CRN) (Drawing No.) (Nat'l Bd. No.) (Year Built)

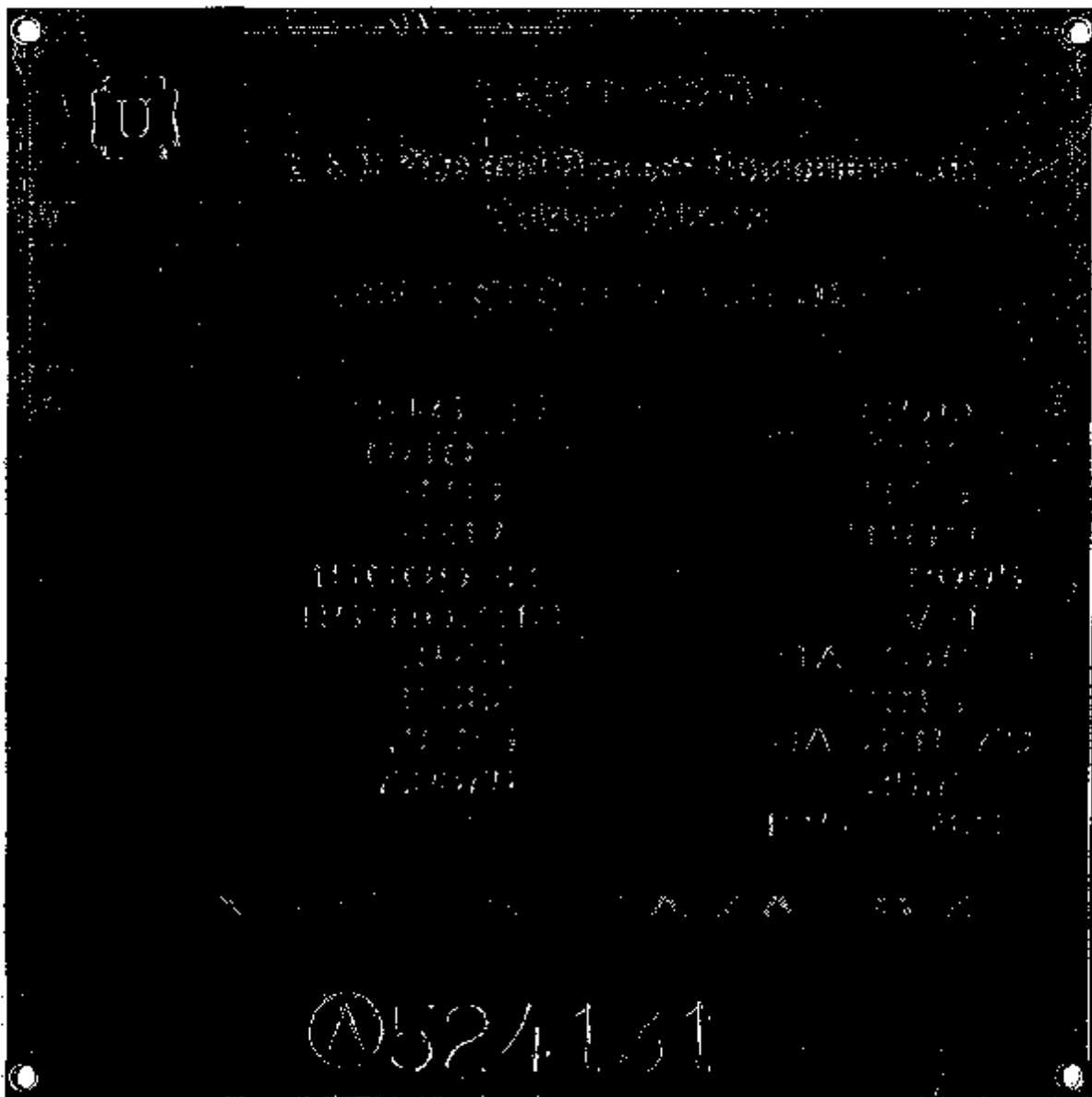
Data Report Item Number 10 Continued from Form U1a		Remarks							
Purpose (Inlet, Outlet, Drain)	MK No.	No	Diam. or Size	Type	Mat'l	Nom. Thk.	Reinforce- ment Mat'l	How Attached	Location
Inlet	N1	1	6"	CL 300	SA-105/ SA-106B	0.864"	NA	Fig. UW 16.1(c)	Shell
Outlet	N2	1	6"	CL 150	SA-105/ SA-234WPB	0.864"	NA	Fig. UW 16.1(c)	Shell
Drain	N3	1	1 1/2"	Pipe	SA-234-WPB/ SA-106B	0.400"	NA	Fig. UW 16.1(c)	Bottom Head
/ Inspection	C1	1	2"	Coupling	SA-105N	CL 3000	NA	Fig. UW 16.1(c)	Shell
LSHH	C2	1	1 1/2"	Coupling	SA-105N	CL 3000	NA	Fig. UW 16.1(c)	Shell
LG	C3 a/b	2	3/4"	T.O.L	SA-105N	CL 6000	NA	Fig. UW 16.1(a)	Shell/ Bottom Head
Equalizing Conn.	C4	1	1"	T.O.L.	SA-105N	CL 6000	NA	Fig. UW 16.1(a)	N1
Inspection	C5	1	2"	T.O.L.	SA-105N	CL 3000	NA	Fig. UW 16.1(a)	Shell
PSV	C6	1	1"	T.O.L.	SA-105N	CL 6000	NA	Fig. UW 16.1(a)	Shell
	C7	1	2"	T.O.L.	SA-105N	CL 3000	NA	Fig. UW 16.1(a)	Shell

Certificate of Authorization: Type "U" No. 32986 Expires Dec 14, 2007

Date June 14/05 Name NGC Process Systems Ltd. Signed [Signature]  
(Manufacturer) (Representative)

Date JUN 15 2005 Name [Signature] Commission ALTA #58  
(Authorized Inspector) (Nat'l Board Incl. Endorsement, State, Province and No.)

(12/91) This form (E00118) may be obtained from the ASME Order Dept., 22 Law Drive, Box 2300, Fairfield, NJ 07007-2300



# VESSEL TRAVEL SHEET (FRONT)

**DO NOT START CONSTRUCTION WITHOUT AI REVIEW**

AI REVIEW: *[Signature]* REVIEW DATE: MAR 11 2005  
 SERIAL NO.: 15660-2 JOB NO.: 15660 VESSEL TYPE: Inlet Separator

DRAWING NO.: D-15660-09-01 REVISION NO.: 0

Seq	Item	Comments	Q.C.	Date	A.I. Hold Points	A.I.	Date	Owner	Date
1.	Calculations in file		W	03/10/05	*	T.D.	MAR 11 2005		
2.	Release of Approved Drawing		W	03/10/05	*	T.D.	MAR 11 2005		
3.	Heat Numbers Recorded		W	JUN 14 2005		[Signature]	JUN 14 2005		
4.	M.T.R.'s Checked		W	JUN 14 2005		[Signature]	JUN 15 2005		
5.	W.P.S. Checked		W	JUN 14 2005					
6.	Welders Qualified		W	JUN 14 2005					
7.	Thickness Recorded		W	JUN 14 2005					
8.	Shell & Head Fitted		W	JUN 14 2005		[Signature]	JUN 14 2005		
9.	Nozzles & Fittings Fitted		W	JUN 14 2005					
10.	Nozzle Orientation		W	JUN 14 2005					
11.	Nozzle & Flange Rating Checked		W	JUN 14 2005					
12.	Impact Tests	Exempt per UG-200(1-5)							
13.	Internals Checked		W	05/19/05					
14.	Partial Internal - Head	Bottom	W	05/17/05		T.D. May 17/05			
15.	Partial Internal - Nozzle		W	05/17/05		T.D. May 17/05			
	Final Internal Inspection	Shell Side	W	05/19/05	**	T.D. May 19/05			
		Tube Side							
17.	Weld Size Checked		W	JUN 14 2005					
18.	Welder I.D. Checked		W	JUN 14 2005					
19.	Radiography	Long: NA Circ: NA							
20.	Other N.D.E.								
21.	Final Ext. Prior to P.W.H.T.								
22.	PWHT Chart Checked	As per QCM Rev. 1							
23.	Final External Inspection		W	JUN 14 2005		[Signature]	JUN 14 2005		
24.	Hydrostatic Test 319 psig As per QCM Rev. 1	Gauge # PF 209 Gauge # R 193	W	JUN 14 2005	**	[Signature]	June 14 05		
25.	CRN Drawing	R-5810.213	W	JUN 14 2005		[Signature]	JUN 15 2005		
26.	N.C.R. #								
27.	Nameplate Stamped		W	JUN 14 2005		[Signature]	JUN 15 2005		
28.	Manuf. Data Report		W	JUN 14 2005		[Signature]	JUN 15 2005		
29.	Completed as built drawing	DUE ON:							
30.	Other								
31.	Nameplate Installed								

NOTE: \* DENOTES A.I. INSP. POINT AND \*\* DENOTES A.I. HOLD POINT

**VESSEL TRAVEL SHEET (BACK)**

SN: 15660-~~3~~ 2.

DESCRIPTION	GMAW	GTAW	SMAW	SAW	FCAW	WELDER ID	THICKNESS	HEAT / SLAB # (item b)	
								QC	
Shell 24" STD								✓	935937
CS1 (Head 1)	✓				✓	H		✓	102162-A91
CS2 (Head 2)	✓				✓	H		✓	102162-A90
N1 (c joint) 6" 300#XXH	✓		✓			C		✓	59444L
N1 (d joint) 6"XXH			✓			H		✓	16985
V1 Elbow SA-234-WPH	✓		✓			C		✓	04000018
N2 (c joint) 6" 150#XXH	✓		✓			C		✓	30583
N2 (d joint)			✓			H		✓	16985
N3 (d joint) 1 1/2"XXH			✓			H		✓	39Y
N3 Elbow 1/2"XXH	✓		✓			✓		✓	326818
C1 (2")3000#CPLG			✓			H		✓	FBCB
C2 (1 1/2")3000#CPLG			✓			H		✓	76397
C3a (3/4") 6000#TOL			✓			H		✓	55994
C3b (3/4") 6000#TOL			✓			H		✓	55994
C4 (1") 6000#TOL			✓			H		✓	56254
C5 (2") 3000#TOL			✓			H		✓	FALD
C6 (1")6000#TOL			✓			H		✓	56254
C7 (2")3000#TOL			✓			H		✓	FALD
Name Plate Bracket					✓	H		✓	39427
Skirt					✓	H		✓	922499



Process Systems

# **DATA MANUAL**

**JOB # 15630/ 100421**

**Customer:**

**Concept Compression**

**Description:**

**185 hp Compressor Skid**

**Piping**

**Contents**

**AB-83 Data Report for Piping**

**NDE Reports**

**PSV Reports**

5120 – 6th Street N.E. Calgary, Alberta, Canada T2K 4W5  
main: 403.274.6106 fax: 403.274-6149 toll free: 800.256.1598

[www.ngc-ltd.com](http://www.ngc-ltd.com)







# CONSTRUCTION DATA REPORT FOR PIPING SYSTEMS

In accordance with the provisions of the Safety Codes Act

Shop Construction ; Field Construction ; Final Data Report   
 Partial Data Report  (from one ABSA-authorized Contractor to another  
 ABSA- authorized Contractor).

**Complete both sides of this Form**

1. Constructed By: NGC Process Systems Ltd. Owner's Job No: 15630  
(Name of ABSA authorized primary contractor or subcontractor)  
5110 - 6<sup>th</sup> Street NE, Calgary, AB T2K 4W5  
(Address)  
 Alberta Quality Program No. AQP-1282(s) Expiry Date: December 15, 2007

2. Constructed For: Concept Compression, #2 3530 11A Street NE, Calgary, Alberta  
(Name of primary contractor if different from above)  
(Address)  
 Alberta Quality Program No. AQP- Expiry Date: \_\_\_\_\_  
(Required when the primary contractor undertakes some/all of the quality functions, e.g., Mat'l supply, NDE, PWHT, Tie-in, fabrication, hydro test, final assembly etc.)

3. Owner: \_\_\_\_\_  
(Name and address)  
(Location of installation)  
 Alberta Quality Program No. AQP- Expiry Date: \_\_\_\_\_  
(Required when the owner undertakes some/all of the quality functions, e.g., Mat'l supply, NDE, PWHT, Tie-in, fabrication, hydro test, final assembly etc.)

4. Piping Design Alberta Registration No.: PP-  
(Required if aggregate piping volume is over 0.5m<sup>3</sup>)  
 5. WP No.: WP-1801.2 ; Company: NGC Process Systems Ltd. ; Owner's WP No. (If used): WP-  
(Alberta Registration No.) (Alberta Registration No.)  
 WPS No(s). used: E&D 1, E&D 2 ; Owner's WPS No(s). (If used): \_\_\_\_\_

6. Code: ASME B31.1 Non Boiler External Piping ; ASME B31.1 Boiler External Piping   
 ASME B31.3  - Service category: Normal ; D ; M ; High Pressure ; B31.5 ; B31.9

Drawing No. Rev. No Line No.	Fluid (Air/Strm. Etc.)	Des. Press. kPa	Des. Temp. °C	Test Press. kPa	Test Medium	Pipe Mat'l Spec. & Grade	C.A. mm	Pipe NPS & Schedule	Flange Material & Rating	PWHT/ Preheat Temp. °C	R.I. %	Other NDE
100421-101	HC	1689	121	2534	H2O	SA-105N SA-106B	0.125	6" STD	300# 150#	NO	10	Visual
100421-101	HC	1689	121	2534	H2O	SA-105N SA-106B	0.125	8" STD	150#	NO	10	Visual
100421-101	HC	3102	121	4654	H2O	SA-105N SA-106B	0.125	3" XH	300#	NO	10	Visual
100421-101	HC	3102	121	4654	H2O	SA-105N SA-106B	0.125	3" STD	300#	NO	10	Visual
100421-101	HC	3102	121	4654	H2O	SA-105N SA-106B	0.125	4" STD	300#	NO	10	Visual

Partial Data Reports, properly identified and certified by ABSA-authorized contractors, as listed below are attached to and form part of this Data Report

No.	Line No.	Spool No.	Drg. No. (with Rev. No.)	Contractor (Name)	AQP No.	Expiry date

**Remarks:** Provide additional comments including noting any code work that was not performed by the ABSA-authorized contractor(s) supplying this document as a Partial Data Report but which must be completed by another ABSA-authorized contractor who assumes overall responsibility for conformance with the Safety Codes Act & Regulations and applicable ASME Codes, and who assures that all required code work is completed prior

to putting the piping system into service.

**Endorse certificate 'A' or 'B'**

**A. CERTIFICATE OF COMPLIANCE**

Signed by the subcontractor when supplying this certificate as a  
Partial Data Report

We certify that the statements in this Data Report are correct and that materials, construction and workmanship of the piping fabrication conform to the registered quality system and the applicable Piping code(s).

Date: \_\_\_\_\_  
Subcontractor: \_\_\_\_\_

Print Authorized Representative's Name \_\_\_\_\_ Signature \_\_\_\_\_

**This certificate is not valid unless it forms part of a Final Data Report signed by Primary Contractor**

**B. CERTIFICATE OF COMPLIANCE**

Signed by the primary contractor when supplying this certificate as a  
Final Data Report

We certify that the statements in this Data Report are correct and that piping job no. 15630 described in this Data Report was constructed in accordance with the Province of Alberta Safety Codes Act and Regulations, and applicable ASME Piping Code(s).

Date: Sept. 29/05 NGC Process Systems Ltd.  
Primary Contractor

Terra Delbridge  
Print Authorized Representative's Name \_\_\_\_\_ Signature \_\_\_\_\_

**CERTIFICATE OF INSPECTION**

I, the undersigned, employed by \_\_\_\_\_ have inspected the piping job no. \_\_\_\_\_ described in this Construction Data Report and state that, to the best of my knowledge and belief, the Contractor has constructed this piping in accordance with the applicable Sections of the ASME Piping Codes and Province of Alberta Safety Codes Act and Regulations.

Date: \_\_\_\_\_  
Print Owner's Inspector's Name \_\_\_\_\_ Owner's Inspector's Signature \_\_\_\_\_

Date: \_\_\_\_\_  
Name: \_\_\_\_\_ Sign.: \_\_\_\_\_  
ABSA Safety Codes Officer  
(BOILER EXTERNAL PIPING ONLY)

Current version of this Form may be obtained from [www.absa.ca](http://www.absa.ca)

JOB # 15638

LINE SIZE	LINE #	SPOOL #	REQUIRED HYDRO PRESSURE	ACTUAL HYDRO PRESSURE (PSI)	GAUGE #	DATE	HYDRO EMPLOYEE SIGNATURE	FOREMAN SIGNATURE
		Inlet 150# X	428 psi	430	308/PI 310	5/12/05	SH111	
		Inlet 300# X	1080 psi					
		300#						
		Inlet 500# X	2160 psi		308/PI 310			
		600#						
		Suction spool	428 psi	430		5/12/05	SH111	
		Suction Spool	428 psi	428	309/PI 190	5/12/05	SH111	
		Suction Spool Elbow	1080 psi					
		Compressor Discharge spool	1080 psi	1085	PI 197/198	5/12/05	SH111	
		Outlet spool	1080 psi	1085	PI 308/PI 310	5/12/05	SH111	
		11	1080	1085	PI 212/213	5/12/05	SH111	
		11	1080	1100	PI 308/PI 310	5/12/05	SH111	

Exposure Device #: 16691 Source #: A639  
 Cobar: 60  IR 192  X-Ray  EFSS: .13  
 Film Brand: Agfa #Film/cassette: 1  
 Code: ASME B31.3 (N)

Job / P.O. #: 15630 IRISNDT #: 215463 Date: June 20/05  
 Client: NGC #1  
 Location: Calgary  
 Item: Piping Material: C.S.

Film #	Size, Location, Thickness	Welder ID	IRISNDT Proc.	SOD Inches	OFD Inches	# of Exp.	Work Location	Film Type	Type and Location of Discontinuities (Circle rejectable discontinuities)	Accept	Reject
X1	2 1/2 STD	R	RT3	2.6	.263	3	1		100% 5/8	/	/
X2	↓	DD		↓	↓	↓	↓			/	/
X3	3" STD	G		3.3	.216	↓	↓			/	/
X4	4" STD	R		4.3	.237	↓	↓			/	/
X5	↓	R	↓	↓	↓	↓	↓			/	/

2-2 1/2 STD  
 1-3" STD  
 2-4" STD

Number of Radiation Barrier Warning Signs Erected \_\_\_\_\_ Number of Radiation Barrier Warning Signs Returned \_\_\_\_\_

Work Location Legend (insert number): [1] Inside Fab. Shop [2] Yard/Lay-down Area [3] Piping/Modular Fab. Area [4] N/A (Other)

IRIS Procedure:  
 Single Wall Exposure: RT 1, 2, 2A, 6, 7  
 Double Wall Exposure: RT 3, 3A, 4, 5, 8

S.O.D. = Minimum Source-to-object distance  
 O.F.D. = Distance source side of Object to film at min. S.O.D.

AB - Arc Burns  
 BT - Burn Through  
 CK - Crack  
 EP - Excessive Penetration  
 P - Porosity

EUC - External Undercut  
 IUC - Internal Undercut  
 HB - Hollow Bead  
 IP - Incomplete Penetration  
 S - Slag

IG - Internal Concavity  
 LF - Lack of Fusion  
 LC - Low Cover  
 MA - Misalignment

Unit # 267 Kilometres: \_\_\_\_\_  
 In 2300 - Out 2345 Hrs. .75  
 In \_\_\_\_\_ - Out \_\_\_\_\_ Hrs. \_\_\_\_\_  
 Incl: CF  
NC

Film Quantity:  
9-2 3/4 x 5 1/2 D4  
6-2 3/4 x 8 1/2 D5

Interpretation by: Craig Forget (Print)  
[Signature] (Signature)  
 SNT-TC-1A II  
 C.G.S.B. II (Level)  
 C.G.S.B. # 2049  
 I am in full agreement with report contents.  
 Client Representative: [Signature]

Edmonton (780) 437-4747	Fort McMurray (780) 713-1536	Cold Lake (780) 694-1114	Mailing Address
Calgary (403) 279-6121	Grande Prairie (780) 532-2283	Red Deer (403) 347-1742	5908 - 98 Street
Nisku (780) 965-7616	High Level (780) 841-0470	Tulsa, OK (918) 446-8778	Edmonton, Alberta
Barrhead (780) 674-8018	Lloydminster (780) 875-6455	Houston, TX (713) 461-4010	T6E 3G3

# TEGA SUPPLY INC.

P.R.V. INSPECTION AND TEST REPORT

P.R.V

CALGARY

BRANCH/LOCATION:

DATE	MAY 30 05	W.O.#:		LDJ#:	14481 - 1
CUSTOMER:	NGL PROCESS	LOCATION:		PO#:	15630-17
	HYDROSEAL	TYPE/MODEL:	14E3MOV00	SN#:	1880-6
CONNECTION TYPE:	NPT	INLET SIZE:	1"	TAG/PSV:	
SET PRESSURE:	200 PSF	BACK PRESS:		CAPACITY:	830 SCFM
CO. DIFF. SET PRESS:		TEMP:		NEW VALVE Spring in Range	
CAP. ASSEMBLY:	CLOSED	CODE SYMBOL:	NB, UV		
RESET REQ. <input checked="" type="checkbox"/>	YES	NEW CAPACITY <input checked="" type="checkbox"/>	752 SCFM	SCALE: 100% PARTIAL BY 200% (SEE)	
NEW SET PRESS <input checked="" type="checkbox"/>	180 PSF	INSIGNIA:	HUS		
SEAL CONDITION:	INTACT	DATA PLATE CONDITION:	GOOD		
DATE OF LAST SERVICE:					

PRE-TEST:  POP PRESSURE:  RESULTS:

COMPONENT INSPECTION	CHECK	AS FOUND CONDITION	REPAIR ACTIONS
DISC	MM	DIM	AC
NOZZLE	MM	DIM	AC
DISC HOLDER	MM	DIM	AC
GUIDE	MM	DIM	AC
SPINDLE STEM		VIS	
SPRING BUTTONS		VIS	
LOWER RING		VIS	
BELLOWS		PER	
GASKETS/O-RINGS		VIS	
OTHER		VIS	
OTHER		VIS	
OTHER		VIS	
OTHER		VIS	
DISC		VIS	
DISC		DIM	
DISC		DIM	
DISC		DIM	

DISASSEMBLY:  INSPECTION:  REASSEMBLY:   
 MEDIUM:  SET PRESS:  COI D SET:

FINAL TEST:

S.A.M.E.R.:  SET POINT:  182

BACK PRESS. TEST:  LEAKAGE:  0

BLOWDOWN RING SETTINGS: UPPER  LOWER  N/A

TEST GAUGE ID: BCC#  11

TEL. NO.

PARTS REQ. NEXT:

COMMENTS:

FINAL INSPECTION:  CUSTOMER/INSPECTOR:




**TEST CERTIFICATE FOR SAFETY / RELIEF VALVES**

4/12/2005

CUSTOMER:  
Tega Supply  
5308-4th St SE  
Calgary AB Canada  
  
PO#T-1193-DB

This document certifies that the safety-relief valves identified below and ordered by the above purchase order were manufactured, assembled and tested to meet the requirements of the ASME Boiler and Pressure Vessel Code, Section VIII. Hydroseal Valve Company, Inc. is authorized by the ASME to apply the 'UV' symbol for valves of this series when used for gas service. The performance data recorded below is provided for your records.

VALVE TYPE	SERIAL NO	SET PRESSURE psig	OPENING PRESSURE psig	RESEAT PRESSURE psig	BODY HEAT NO	BONNET HEAT NO
6HCF00/D5	2256-1	245	245	159		
6HCF00/D5	2256-2	245	246	180		
6HCF00/D5	2256-3	245	248	157		
6HCF00/D5	2256-4	245	248	183		

  
Hydroseal Technical Representative



**RAE Engineering  
and Inspection Ltd.**

Edmonton 780-469-2401  
Grande Prairie 780-832-0031  
Red Deer 403-356-9226  
Calgary 403-210-3305  
[www.raeengineering.ca](http://www.raeengineering.ca)

## INSPECTION SUMMARY REPORT

<b>CLIENT:</b>	NEXT Compression
<b>TO:</b>	Christian Lejeune
<b>CC:</b>	Cobus du Plessis
<b>FROM:</b>	Irwin Garcia
<b>DATE:</b>	21 Jun,2021
<b>REPORT:</b>	21-0073.21.001-IGO-00.197.666
<b>LOCATION(S):</b>	Rigel, LSD 03-07-088-16W6





## 1 SCOPE

RAE Engineering and Inspection Ltd. (RAE) conducted thorough inspections on the vessels of Unit 100421 at Rigel, LSD 03-07-088-16W6.

## 2 GENERAL COMMENTS

2.1 This Inspection Summary Report includes:

- a. Items that must be addressed (Non-conformance Reports (NCRs)).
- b. General recommendations for improvement (Action Items).
- c. Information regarding PSVs.
- d. A summary of the Field Inspections completed.

2.2 The next inspection is typically due in 2025 with 0 exceptions.

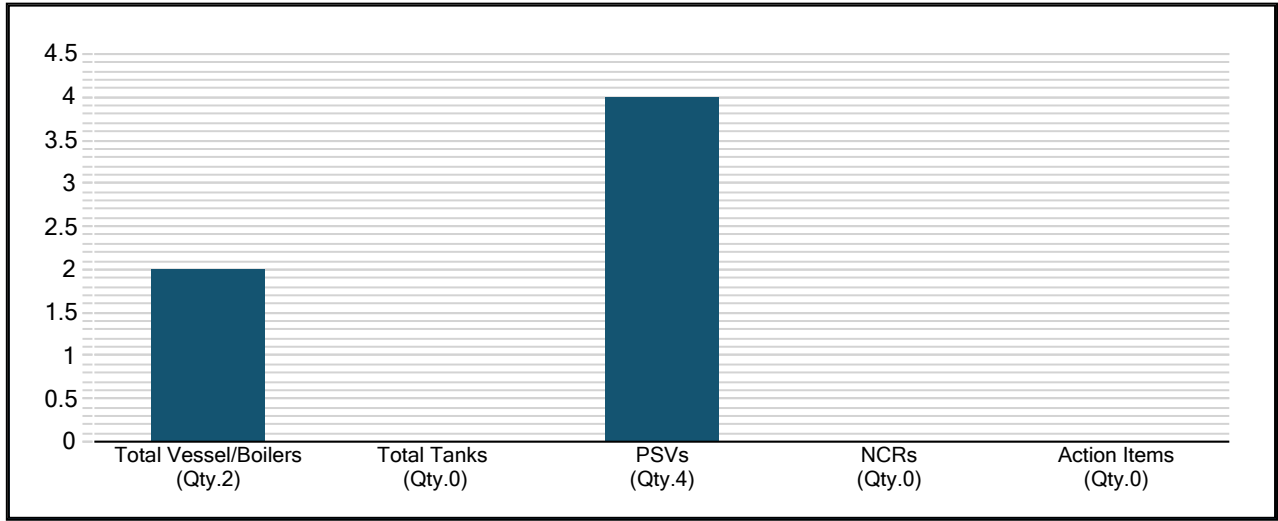
2.3 Contact RAE if there are any questions or concerns.

2.4 Inform the Chief Inspector when NCR corrective actions have been completed.



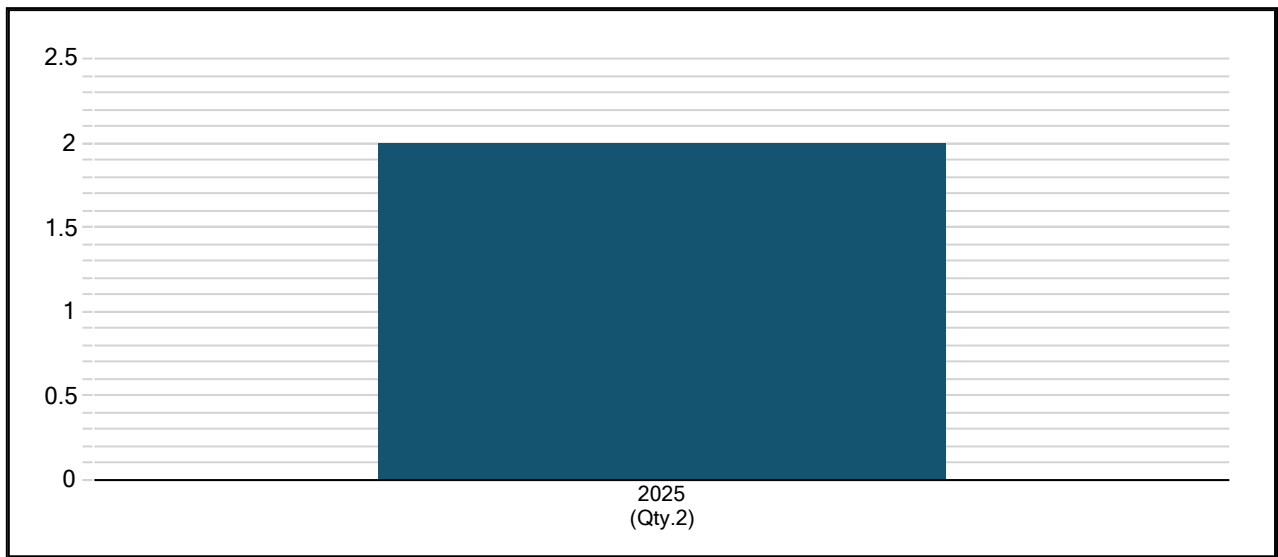
### 3 BASICS INSPECTION STATICS

3.1 This chart shows the quantity of equipment inspected or inventoried, along with the quantity of NCRs and Action Items found. Further details can be found throughout this report.



### 4 NEXT INSPECTION DATES

4.1 This chart shows the years in which the next inspections are required, along with the quantity of equipment to be inspection that year. For specific next inspection dates, see Section 9.





## 5 NON-CONFORMANCES

- 5.1 Non-conformances are code violations that must be addressed as they are not compliant to the code or regulations.
- 5.2 When the non-conformance has been rectified, inform the Chief Inspector.
- 5.3 NCR Summary  
No non-conformances found.

## 6 ACTION ITEMS

- 6.1 Action Items are items found by the Inspector that are recommended to be rectified.  
No Action Items found.

## 7 PSV

- 7.1 The following is a list of PSVs within the scope of the inspection(s) performed under this project. Included is the associated next service date and service interval

LSD	Next Service Date	Service Interval (yrs)	# of PSVs	Notes
	2012	4	2	
	2025	4	2	

## 8 INSPECTION SUMMARY

- 8.1 The following table outlines the equipment inspected, by location, and if there were any recorded NCRs or Action Items.

LSD	Vessels / Boilers Inspected	Vessels/ Boilers Inventoried	Tanks Inspected	Tanks Inventoried	NCR's	Action Items
	2	0	0	0	0	0
Summary Totals	2	0	0	0	0	0

## 9 ITEMIZED INSPECTION LIST

- 9.1 The following summarizes all of the equipment inspected. The list is organized by location name, LSD, vessels/boiler then tanks. Included in the list are comments regarding each piece of equipment.



Reg #	Client Reference	Equipment	Unit #	NCR	Inspection Type	Condition	Recommendations	Next Inspection
LSD:								
Vessels/Boilers: 2								
0524131		INLET SEPARATOR			VE/UT/PS V	Good	1. The vessel is fit-for-service.	09 Jun,2025
0530133		INLET SEPARATOR			VE/VI/UT/PSV	Good	1. The vessel is fit-for-service.	09 Jun,2025



RAE Engineering and Inspection Ltd  
 4810 - 93 Street Edmonton, AB, T6E 5M4  
 ph: 780-469-2401 fx: 780-468-2422

Inspection Date: 3-Jul-19  
 Page: 1 of 4

**Ultrasonic Thickness Examination**

Client: NEXT Compression  
 Address: 261122 Wagon Wheel Crescent  
 Client P.O.#: 53034  
 Client Representative: Christian Lejeune

Project #: 0073.21.001  
 Location/LSD: Rocky View County  
 Procedure: UT-1 - #701B & UT-2 - #702B  
 Acceptance Code: Client Spec., Thickness

**JOB DESCRIPTION**

Item Number: A0524131  
 Item Description: Inlet Separator

Material: Carbon Steel  
 Surface:  Coated  Bare Steel  Machined  
 Condition:  As Ground  Shot Blasted  As Welded  
 Surface Temp:  < 0 °C  0-120 °C  120-260 °C  >260 °C

**EQUIPMENT, TECHNIQUE & CALIBRATION**

Instrument Mfr: GE Model: DMS 2 S/N: 01X121 Cal. Due: 4-Mar-21  
 Cal Block S/N: 11-1200 1 or 2 Point Cal:  1  2 Calibrated Range: 0.1 to 0.5" Couplant: UTX


	Probe Model	Freq MHz	Angle	Dia. (in)	Probe Type		Manufacturer	Serial #	Cable length	Delay line	Vel. (m/sec)	Transfer Value	Ref dB	Ref %FSH	Scan dB	Range (mm)
					Single	Dual										
1	FH2E	5.0	0°	0.25	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Dakota	984B	4'	<input type="checkbox"/>	5850	NA	50	80	As Needed	25.4
2					<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>						
3					<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>						
4					<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>						

**Scope:** Conduct 0° straight beam ultrasonic testing on **equipment** assessing the **components** for any signs of wall thinning due to corrosion, erosion, laminations or inclusions.

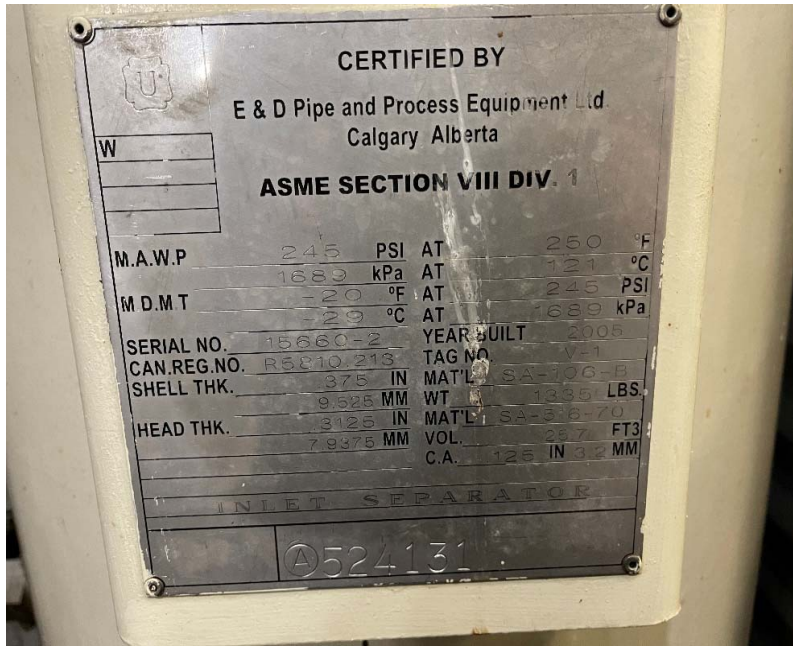
**Results:** The measurements obtained from the inspection locations show the thickness of all of the components inspected to be at or around nominal. There were no signs of wall thinning, internal corrosion, erosion, laminations or inclusions at the time of inspection. All piping measurements were within the 12.5% mill tolerance, as per ASTM specifications.

Please see the following pages for the pictures of the nameplate and the overall view, the isometric drawings, and the thickness measurements.

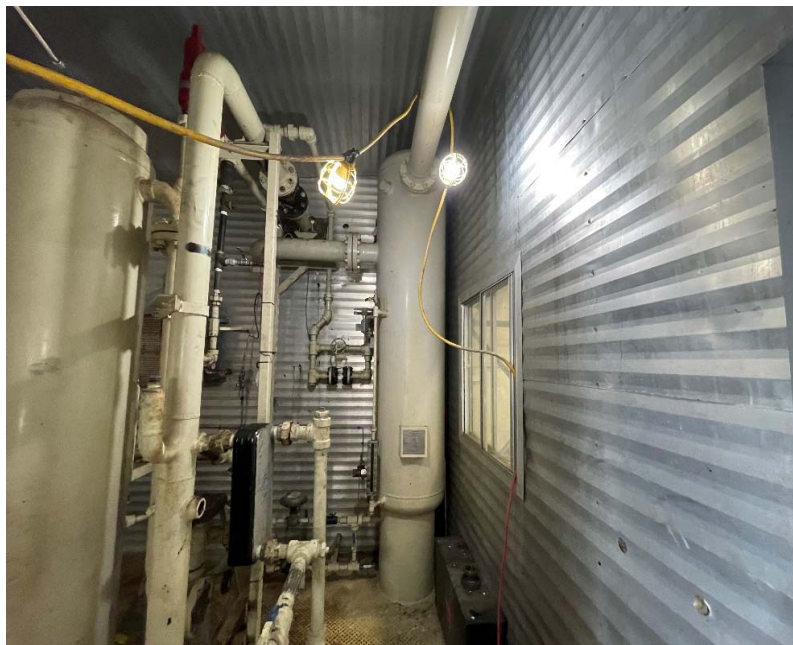
Client Representative	PRINT	SIGNATURE	CGSB#:	CGSB Level:
1 <sup>ST</sup> Technician	Irwin Garcia PRINT	 SIGNATURE	SNT#: 710B-037	SNT Level: 1
2 <sup>ND</sup> Technician	PRINT	SIGNATURE	CGSB#:	CGSB Level:
			SNT#:	SNT Level:

	RAE Engineering and Inspection Ltd 4810 - 93 Street Edmonton, AB, T6E 5M4 ph: 780-469-2401 fx: 780-468-2422	Date:	3-Jul-19	Ultrasonic Thickness Examination
		Page:	2 of 4	
Client:	NEXT Compression	RAE Report #:	21-0073.21.001-IG-UT-01	
Item Number:	A0524131	Project #:	0073.21.001	
Item Description:	Inlet Separator	Location/LSD:	Rocky View County	
		Procedure:	UT-1 - #701B & UT-2 - #702B	
		Acceptance Code:	Client Spec., Thickness	

**Photographs of Equipment and Nameplate**



**View of Nameplate**



**Overall View of Equipment**

Client Representative	PRINT	SIGNATURE			
1 <sup>ST</sup> Technician	Irwin Garcia PRINT	<i>Irwin Garcia</i> SIGNATURE	CGSB#:	CGSB Lvl:	
2 <sup>ND</sup> Technician	PRINT	SIGNATURE	SNT#:	SNT Lvl:	1
	PRINT	SIGNATURE	CGSB#:	CGSB Lvl:	
			SNT#:	SNT Lvl:	



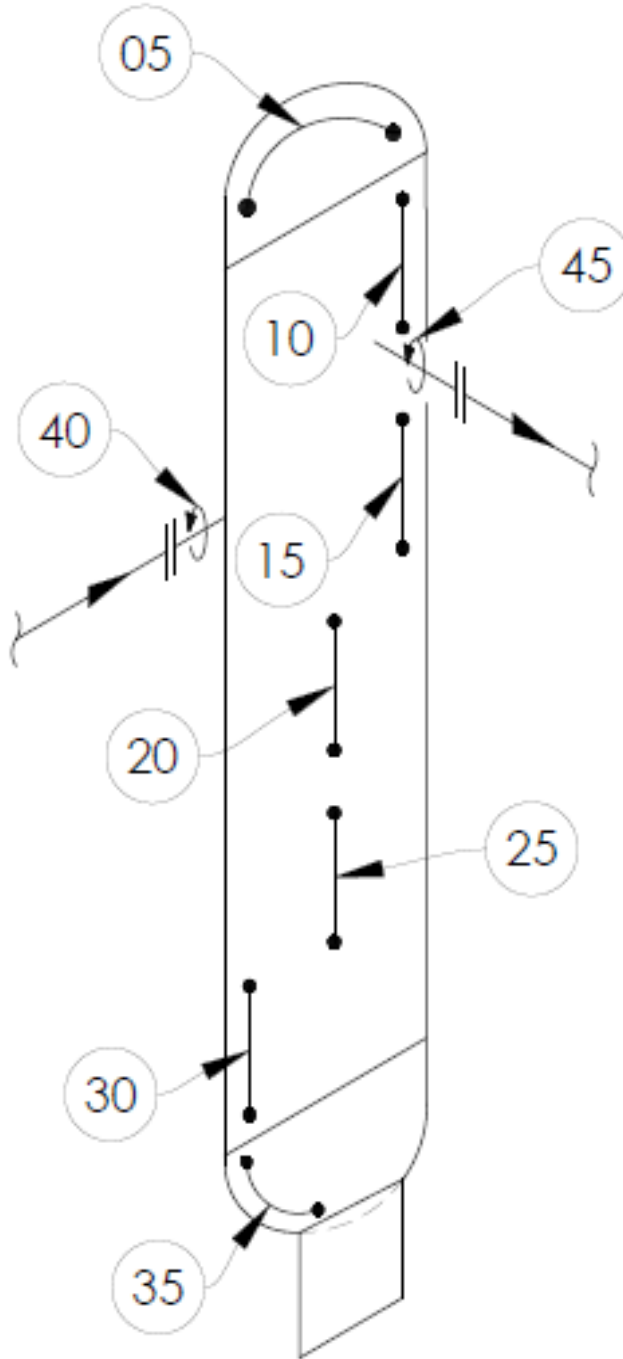
RAE Engineering and Inspection Ltd  
 4810 - 93 Street Edmonton, AB, T6E 5M4  
 ph: 780-469-2401 fx: 780-468-2422

Date: 3-Jul-19  
 Page: 3 of 4

Ultrasonic Thickness Examination

Client:	NEXT Compression	RAE Report #:	21-0073.21.001-IG-UT-01
Item Number:	A0524131	Project #:	0073.21.001
Item Description:	Inlet Separator	Location/LSD:	Rocky View County
		Procedure:	UT-1 - #701B & UT-2 - #702B
		Acceptance Code:	Client Spec., Thickness

ISO Drawing of Equipment and TMLs



Client Representative	PRINT	SIGNATURE			
1 <sup>ST</sup> Technician	Irwin Garcia PRINT	<i>Irwin Garcia</i> SIGNATURE	CGSB#:	710B-037	CGSB Lvl: 1
2 <sup>ND</sup> Technician	PRINT	SIGNATURE	CGSB#:		CGSB Lvl:
			SNT#:		SNT Lvl:





RAE Engineering and Inspection Ltd  
 4810 - 93 Street Edmonton, AB, T6E 5M4  
 ph: 780-469-2401 fx: 780-468-2422

Date:	3-Jul-19	Ultrasound Thickness Examination
Page:	4 of 4	
RAE Report #:	21-0073.21.001-IG-UT-01	
Project #:	0073.21.001	
Location/LSD:	Rocky View County	
Procedure:	UT-1 - #701B & UT-2 - #702B	
Acceptance Code:	Client Spec., Thickness	

Client:	NEXT Compression
Item Number:	A0524131
Item Description:	Inlet Separator

Measurements in: inches							TML Data											
TML	Description						1	2	3	4	5	6	7	8	9	10	11	12
05	Top Head						0.388	0.375	0.363	0.365	0.365	0.364	0.364	0.365	0.363	0.363	0.379	0.370
	Nom.	0.313	Min.	0.188	Direc.	L-R								Min. =	0.363	Ave. =	0.369	
10	Top Shell						0.377	0.379	0.381	0.385	0.380	0.383	0.387	0.383	0.385	0.395		
	Nom.	0.375	Min.	0.250	Direc.	T-B								Min. =	0.377	Ave. =	0.384	
15	Mid Shell						0.387	0.393	0.399	0.407	0.406	0.401	0.408	0.404	0.407	0.405	0.397	0.401
	Nom.	0.375	Min.	0.250	Direc.	T-B								Min. =	0.387	Ave. =	0.401	
20	Mid Shell						0.438	0.443	0.446	0.435	0.425	0.425	0.425	0.426	0.427	0.433	0.413	0.411
	Nom.	0.375	Min.	0.250	Direc.	T-B								Min. =	0.411	Ave. =	0.429	
25	Mid Shell						0.401	0.401	0.400	0.397	0.398	0.401	0.402	0.390	0.406	0.403	0.393	0.395
	Nom.	0.375	Min.	0.250	Direc.	T-B								Min. =	0.390	Ave. =	0.399	
30	Bottom Shell						0.372	0.375	0.370	0.376	0.369	0.373	0.373	0.381	0.390	0.391	0.399	0.399
	Nom.	0.375	Min.	0.250	Direc.	T-B								Min. =	0.369	Ave. =	0.381	
35	Bottom Head						0.404	0.383	0.358	0.370	0.362	0.352	0.353	0.344	0.331	0.332		
	Nom.	0.313	Min.	0.188	Direc.	L-R								Min. =	0.331	Ave. =	0.359	
40	6" XXH Nozzle						0.898	0.880	0.872	0.860								
	Nom.	0.864	Min.	0.756	Direc.	RHR								Min. =	0.860	Ave. =	0.878	
45	6" XXH Nozzle						0.851	0.878	0.885	0.894								
	Nom.	0.864	Min.	0.756	Direc.	RHR								Min. =	0.851	Ave. =	0.877	

Client Representative	PRINT	SIGNATURE	Scan Direction: T=Top, B=Bottom, N=North, S=South, E=East, W=West, L=Left, R=Right, RHR=Right Hand Rule
1 <sup>ST</sup> Technician	Irwin Garcia PRINT	<i>Irwin Garcia</i> SIGNATURE	CGSB#: 710B-037 SNT#: 1
2 <sup>ND</sup> Technician	PRINT	SIGNATURE	CGSB Lvl: SNT Lvl:



RAE Engineering and Inspection Ltd  
 4810 - 93 Street Edmonton, AB, T6E 5M4  
 ph: 780-469-2401 fx: 780-468-2422

Inspection Date:	9-Jun-21	<b>Ultrasonic Thickness Examination</b>	
Page:	1 of 4		
RAE Report #:	21-0073.21.001-IG-UT-02		
Client:	NEXT Compression	Project #:	0073.21.001
Address:	261122 Wagon Wheel Crescent	Location/LSD:	Rocky View County
Client P.O.#:	53034	Procedure:	UT-1 - #701B & UT-2 - #702B
Client Representative:	Christian Lejeune	Acceptance Code:	Client Spec., Thickness

**JOB DESCRIPTION**

Item Number:	A0530133	Material:	Carbon Steel
Item Description:	Oil Separator	Surface	<input type="checkbox"/> Coated <input type="checkbox"/> Bare Steel <input type="checkbox"/> Machined <input type="checkbox"/> As Ground <input type="checkbox"/> Shot Blasted <input type="checkbox"/> As Welded
		Condition:	
		Surface Temp:	<input checked="" type="checkbox"/> < 0 °C <input type="checkbox"/> 0-120 °C <input type="checkbox"/> 120-260 °C <input type="checkbox"/> >260 °C

**EQUIPMENT, TECHNIQUE & CALIBRATION**

Instrument Mfr:	GE	Model:	DMS 2	S/N:	01X121	Cal. Due:	9-Mar-22								
Cal Block S/N:	11-1200	1 or 2 Point Cal:	<input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2	Calibrated Range:	0.1 to 0.5"	Couplant:	UTX								
Probe Model	Freq MHz	Angle	Dia. (in)	Probe Type		Manufacturer	Serial #	Cable length	Delay line	Vel. (m/sec)	Transfer Value	Ref dB	Ref %FSH	Scan dB	Range (mm)
1	FH2E	5.0	0°	0.25	<input type="checkbox"/> Single <input checked="" type="checkbox"/> Dual	Dakota	984B	4'	<input type="checkbox"/>	5850	NA	50	80	As Needed	25.4
2					<input type="checkbox"/> Single <input type="checkbox"/> Dual				<input type="checkbox"/>						
3					<input type="checkbox"/> Single <input type="checkbox"/> Dual				<input type="checkbox"/>						
4					<input type="checkbox"/> Single <input type="checkbox"/> Dual				<input type="checkbox"/>						

**Scope:** Conduct 0° straight beam ultrasonic testing on **equipment** assessing the *components* for any signs of wall thinning due to corrosion, erosion, laminations or inclusions.

**Results:** The measurements obtained from the inspection locations show the thickness of all of the components inspected to be at or around nominal. There were no signs of wall thinning, internal corrosion, erosion, laminations or inclusions at the time of inspection. All piping measurements were within the 12.5% mill tolerance, as per ASTM specifications.

Please see the following pages for the pictures of the nameplate and the overall view, the isometric drawings, and the thickness measurements.

Client Representative	PRINT	SIGNATURE	CGSB#:	CGSB Level:
1 <sup>ST</sup> Technician	Irwin Garcia	<i>Irwin Garcia</i>	SNT#:	SNT Level:
2 <sup>ND</sup> Technician	PRINT	SIGNATURE	CGSB#:	CGSB Level:
			SNT#:	SNT Level:

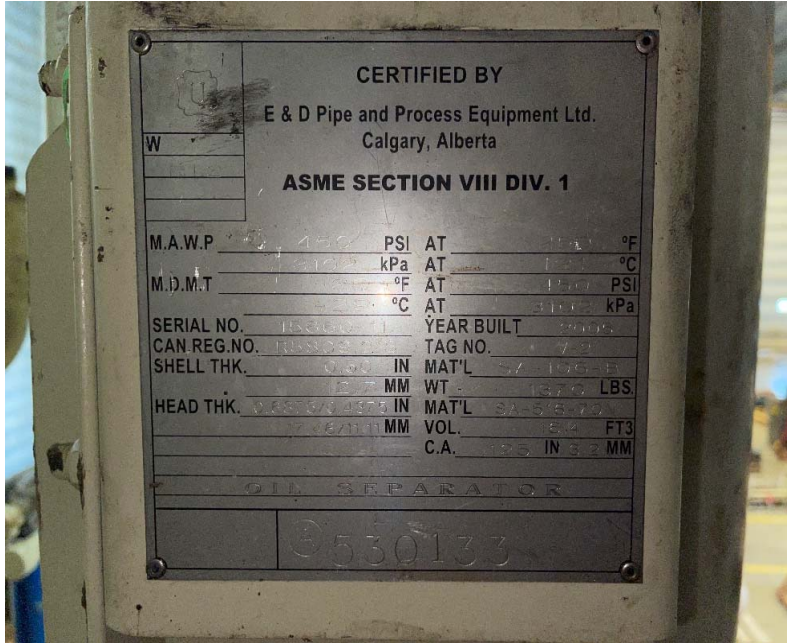


RAE Engineering and Inspection Ltd  
 4810 - 93 Street Edmonton, AB, T6E 5M4  
 ph: 780-469-2401 fx: 780-468-2422

Date:	9-Jun-21	Ultrasonic Thickness Examination
Page:	2 of 4	
RAE Report #:	21-0073.21.001-IG-UT-02	
Project #:	0073.21.001	
Location/LSD:	Rocky View County	
Procedure:	UT-1 - #701B & UT-2 - #702B	
Acceptance Code:	Client Spec., Thickness	

Client:	NEXT Compression
Item Number:	A0530133
Item Description:	Oil Separator

Photographs of Equipment and Nameplate



View of Nameplate



Overall View of Equipment

Client Representative	PRINT	SIGNATURE			
1 <sup>ST</sup> Technician	Irwin Garcia PRINT	<i>Irwin Garcia</i> SIGNATURE	CGSB#:	CGSB Lvl:	
2 <sup>ND</sup> Technician	PRINT	SIGNATURE	SNT#:	SNT Lvl:	1
	PRINT	SIGNATURE	CGSB#:	CGSB Lvl:	
			SNT#:	SNT Lvl:	



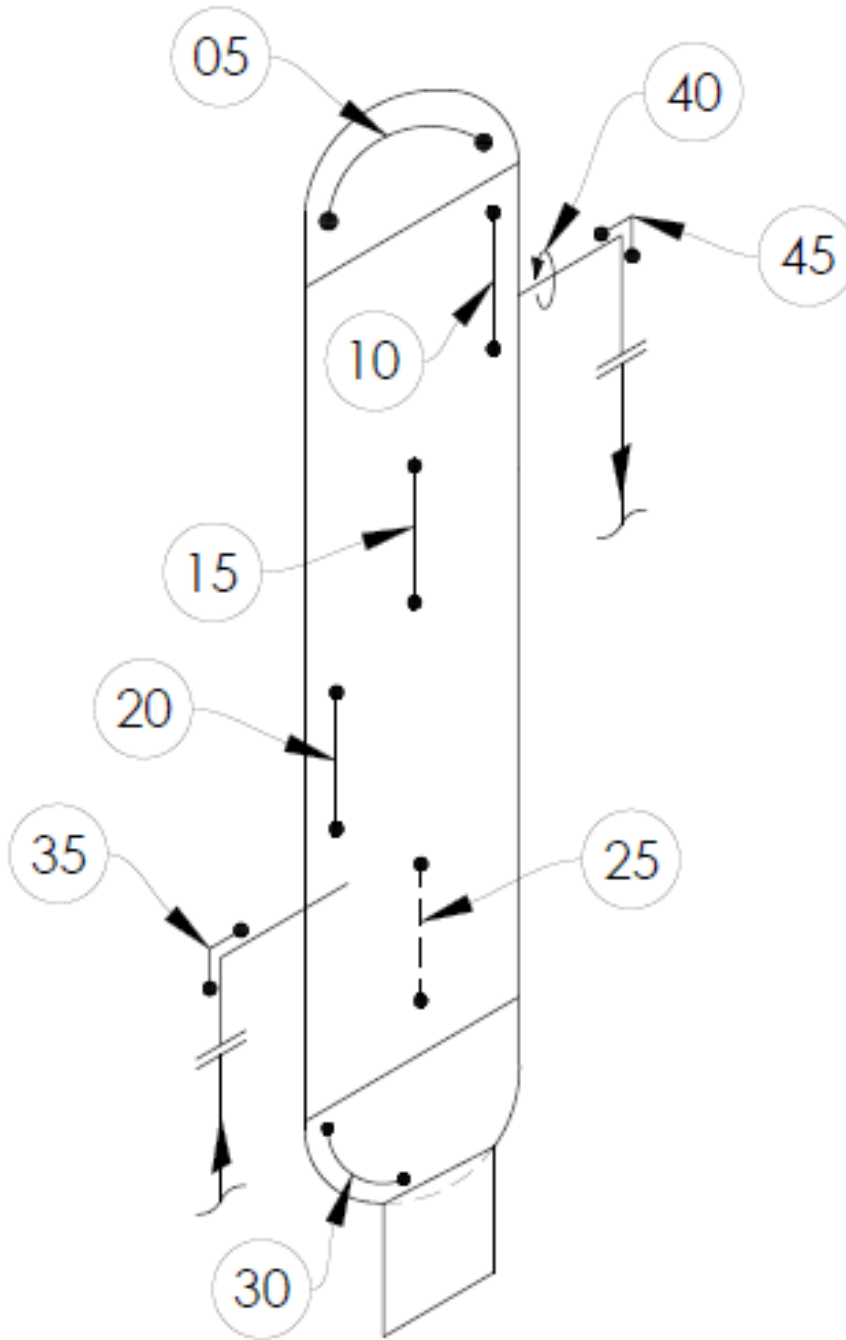
RAE Engineering and Inspection Ltd  
 4810 - 93 Street Edmonton, AB, T6E 5M4  
 ph: 780-469-2401 fx: 780-468-2422

Date: 9-Jun-21  
 Page: 3 of 4

Ultrasonic Thickness Examination

Client:	NEXT Compression	RAE Report #:	21-0073.21.001-IG-UT-02
Item Number:	A0530133	Project #:	0073.21.001
Item Description:	Oil Separator	Location/LSD:	Rocky View County
		Procedure:	UT-1 - #701B & UT-2 - #702B
		Acceptance Code:	Client Spec., Thickness

ISO Drawing of Equipment and TMLs



Client Representative	PRINT	SIGNATURE			
1 <sup>ST</sup> Technician	Irwin Garcia PRINT	<i>Irwin Garcia</i> SIGNATURE	CGSB#:	710B-037	CGSB Lvl: 1
2 <sup>ND</sup> Technician	PRINT	SIGNATURE	CGSB#:		CGSB Lvl:
			SNT#:		SNT Lvl:



RAE Engineering and Inspection Ltd  
 4810 - 93 Street Edmonton, AB, T6E 5M4  
 ph: 780-469-2401 fx: 780-468-2422

Date: 9-Jun-21

9-Jun-21

Ultrasonic Thickness Examination

Page: 4 of 4

4 of 4

RAE Report #:

21-0073.21.001-IG-UT-02

Client:

NEXT Compression

Project #:

0073.21.001

Item Number:

A0530133

Location/LSD:

Rocky View County

Item Description:

Oil Separator

Procedure:

UT-1 - #701B & UT-2 - #702B

Acceptance Code:

Client Spec., Thickness

Measurements in: inches TML Data

TML	Description						1	2	3	4	5	6	7	8	9	10	11	12
05	Top Head						0.772	0.766	0.758	0.756	0.758	0.760	0.762	0.760	0.766	0.771	0.772	0.787
	Nom.	0.688	Min.	0.563	Direc.	L-R									Min. =	0.756	Ave. =	0.766
10	Top Shell						0.530	0.532	0.548	0.548	0.536	0.530	0.535	0.531	0.532	0.530	0.557	0.534
	Nom.	0.500	Min.	0.375	Direc.	T-B									Min. =	0.530	Ave. =	0.537
15	Mid Shell						0.550	0.549	0.548	0.549	0.550	0.551	0.546	0.552	0.549	0.551	0.541	0.545
	Nom.	0.500	Min.	0.375	Direc.	T-B									Min. =	0.541	Ave. =	0.548
20	Mid Shell						0.546	0.545	0.545	0.550	0.548	0.542	0.537	0.538	0.536	0.537	0.539	0.556
	Nom.	0.500	Min.	0.375	Direc.	T-B									Min. =	0.536	Ave. =	0.543
25	Bottom Shell						0.533	0.533	0.529	0.532	0.529	0.532	0.543	0.534	0.538	0.537	0.534	0.530
	Nom.	0.500	Min.	0.375	Direc.	T-B									Min. =	0.529	Ave. =	0.534
30	Bottom Head						0.545	0.538	0.516	0.518	0.512	0.508	0.514	0.513				
	Nom.	0.438	Min.	0.313	Direc.	L-R									Min. =	0.508	Ave. =	0.521
35	3" Sch 160 90° Elbow						0.454	0.446	0.444	0.450	0.446	0.445	0.444	0.444				
	Nom.	0.438	Min.	0.383	Direc.	T-B									Min. =	0.444	Ave. =	0.447
40	3" Sch 160 Nozzle						0.437	0.464	0.470	0.453								
	Nom.	0.438	Min.	0.383	Direc.	RHR									Min. =	0.437	Ave. =	0.456
45	3" Sch 160 90° Elbow						0.459	0.467	0.463	0.464	0.463	0.465	0.466					
	Nom.	0.438	Min.	0.383	Direc.	T-B									Min. =	0.459	Ave. =	0.464

Client Representative	PRINT	SIGNATURE	Scan Direction: T=Top, B=Bottom, N=North, S=South, E=East, W=West, L=Left, R=Right, RHR=Right Hand Rule
1 <sup>ST</sup> Technician	Irwin Garcia PRINT	<i>Irwin Garcia</i> SIGNATURE	CGSB#: 710B-037 SNT#: 1
2 <sup>ND</sup> Technician	PRINT	SIGNATURE	CGSB Lvl: SNT Lvl:







**(3)**

**PROCESS SPOOLING**



**Certificate of Authorization Permit**

**Quality Management System**

Expiry Date: **December 14, 2022**

Reg. No.: **AQP-1282**

**NEXT COMPRESSION CORP.**

**5110 - 6 STREET N.E.  
CALGARY, ALBERTA**

having complied with the provisions of the SAFETY CODES ACT, is hereby authorized to perform the activities identified in the following table:

	<b>Construction</b>	<b>Repair</b>	<b>Alter</b>
<b>Pressure Vessels</b>			
ASME Section VIII-1 Pressure Vessels	Shop	Shop	Shop
<b>Pressure Piping</b>			
ASME B31.1 Power Piping	Shop/Field	Shop/Field	Shop/Field
ASME B31.3 Process Piping	Shop/Field	Shop/Field	Shop/Field
<b>Fittings</b>			
Category A,B,E,H	Shop	---	---



*As a condition of this permit, the holder is required to participate in interim audits by a safety codes officer to verify that the quality management system is being maintained in a manner acceptable to a safety codes officer.*

Dated at Edmonton, this 15th day of October, 2020

*W. Pothmann*

Chief Inspector and Administrator

**Certificate No.: 14227**



Partial Data Reports certified by sub-contractors are listed below and attached to this Data Report

No.	Line No.	Spool No.	Dwg. No. (with Rev. No.)	Sub-contractor (Name)	AQP No. (if from Alberta)	Expiry (if from Alberta)

**Remarks:** For partial data report provide information about the code work that was not completed by the subcontractor (e.g., hydrostatic test, PWHT etc.). For final data report provide information about the code work that was not completed by subcontractors and subsequently completed by the primary contractor (e.g., hydrostatic test of entire assembly, PWHT etc.)

**Endorse certificate 'A' or 'B'**

**A. CERTIFICATE OF COMPLIANCE**  
Signed by the subcontractor when supplying this certificate as a  
**Partial Data Report**

We certify that the statements in this Data Report are correct and that materials, construction and workmanship of the piping fabrication conform to the registered quality system and the applicable Piping code(s).

Date: \_\_\_\_\_  
Contractor

\_\_\_\_\_  
Print Authorized Representative's Name                      Signature

**This certificate is not valid unless it forms part of a Final Data Report signed by Primary Contractor**

**B. CERTIFICATE OF COMPLIANCE**  
Signed by the primary contractor when supplying this certificate as a  
**Final Data Report**

We certify that the statements in this Data Report are correct and that piping job no. 100421A described in this Data Report was constructed in accordance with the Province of Alberta Safety Codes Act and Regulations, and applicable ASME Piping Code(s).

Date: 07-05-201 NEXT Compression Corp.  
Contractor

Christian Lejeune  
Print Authorized Representative's Name                      Signature

**CERTIFICATE OF INSPECTION**

I, the undersigned, employed by \_\_\_\_\_ have verified that all required examination and testing has been completed, and inspected the piping described in this construction data report to the extent necessary to be satisfied that it conforms to all applicable examination requirements of the Code and of the engineering design, and state that, to the best of my knowledge and belief, the contractor has constructed this piping in accordance with the Alberta Safety Codes Act and Regulations. By signing this certificate neither the inspector nor his or her employer makes any warranty, expressed or implied, concerning the piping described in this construction data report. Furthermore, neither the inspector nor his or her employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

Date: \_\_\_\_\_ Date: \_\_\_\_\_

\_\_\_\_\_  
Owner's Inspector Name (please print)                      ABSA Safety Codes Officer (please print)  
(BOILER EXTERNAL PIPING ONLY)

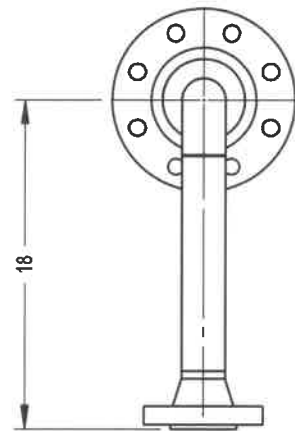
\_\_\_\_\_  
Owner's Inspector Signature:                      ABSA Safety Codes Officer's Signature

THIS DRAWING IS THE EXCLUSIVE PROPERTY OF NEXT COMPRESSION, AND CANNOT BE REPRODUCED OR DISTRIBUTED WITHOUT THE EXPRESS WRITTEN PERMISSION OF NEXT COMPRESSION.

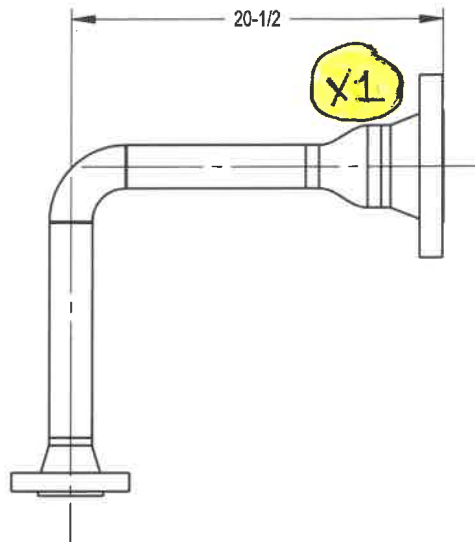


**BILL OF MATERIAL**

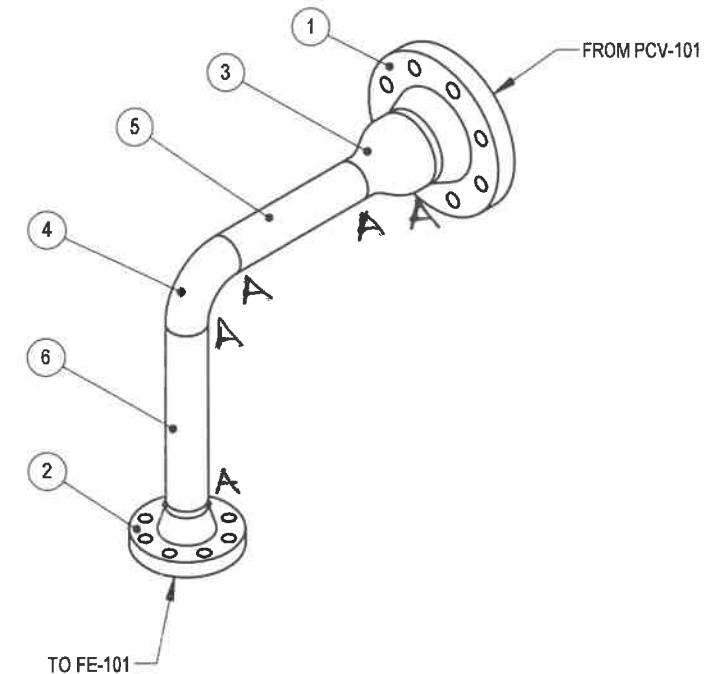
HEAT NO.	ITEM NO.	QTY.	ITEM CODE	DESCRIPTION	LENGTH
812259	1	1	3007423	FLANGE, RFWN, 4"-XS/SCH80/80S, 300CL, A/SA105N	
913004	2	1	3007486	FLANGE, RFWN, 2"-XS/SCH80/80S, 4/600CL, A/SA105N	
62m20m072	3	1	3013385	REDUCER, CONC, BW, 4"-XS/SCH80/80S x 2"-XS/SCH80/80S, A/SA234-WPB	
A372	4	1	3011762	ELBOW, 90LR, BW, 2"-XS/SCH80/80S, A/SA234-WPB	
m1418	5	1	3000039	PIPE, SMLS, 2"-XS/SCH80/80S, A/SA106-B	9 3/4"
m1418	6	1	3000039	PIPE, SMLS, 2"-XS/SCH80/80S, A/SA106-B	11 5/8"



**ELEVATION**



**SIDE**



**ISOMETRIC**

**As-Welded**

Joint	NGC WPS
Butt Weld	NGC.2N R3
Socket Weld	NGC.1 R3
Fillet Weld	NGC.1 R3
Slip-On Weld	NGC.1 R3

- NOTES (UNLESS OTHERWISE SPECIFIED IN THE DRAWING):
- ALL DIMENSIONS ARE IN INCHES.
  - LINEAR DIM TOLERANCE IS  $\pm 1/16"$ , ANGULAR DIM TOLERANCE IS  $\pm 0.5^\circ$ .
  - ALL DIMENSIONS ARE FITTING/FITTING.
  - ALL FLANGE HOLES TO STRADDLE MAJOR VERTICAL/HORIZONTAL CENTERLINES.
  - SPOOL DESIGNATION NO. TO BE STAMPED ON ONE FLANGE (LARGEST) PER SHOWN FORMAT.
  - THE FOLLOWING MATERIALS MAY BE SUBSTITUTED: SA-106 GR.B WITH SA-333 GR.6, SA-105 WITH SA-350 LF2 CL.1, SA-234 WPB WITH SA-420 WPL6.
  - REFER TO NEXT STANDARD WELDING PROCEDURE FWP-017 FOR WELD DETAILS.
  - ESTIMATED WEIGHT: 51.83 LBS.

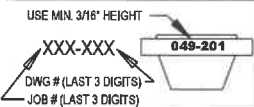
JOINT	VENDOR WPS	GENERAL DATA	DESIGN DATA
BUTT WELD		CODE: ASME B31.3 (2018)	SPECIFICATION: BS
SOCKET WELD		FLUID CAT.: NORMAL (SOUR)	DESIGN PRESSURE: 655 PSIG
FILLET WELD		SURF. PREP.: SSPC-SP2	DESIGN TEMP.: 300°F/20°F
SLIP-ON WELD			TEST PRESSURE: 1125 PSIG
		PRIME: NEXT STANDARD	TEST MEDIUM: WATER
			HOLD TIME: 15 MIN.
		PAINT: NEXT STANDARD	PWHT: NONE
			RADIOGRAPHY: 20% ABW
			C.A.: 1/8"

REVISIONS				
REV	DESCRIPTION	DATE	BY	APPR
0	ISSUED FOR CONSTRUCTION	06/21/21	RR	JH
1	MATL THICKNESS WAS STD	7/05/21	RR	JH

**NEXT COMPRESSION**  
 261122 WAGON WHEEL CRES. ROCKY VIEW COUNTY ALBERTA, CANADA. T4A 0E2. 1 (800) 256-1598  
 WWW.NEXTCOMP.CA

LABOUR CODE: **F-6200**      MATL CODE: **F-6201**

TITLE:			
PROJECT:		KELT EXPLORATION FUELLED INC STOCK RETROFIT	
DRAWN BY:	RR	PROJECT NO.:	100421
DRAWN DATE (MM/DD/YY):	06/21/21	CUSTOMER REF NO.:	
SHEET:	1 OF 1	NEXT DWG. NO.:	100421-6201
		REV.:	1

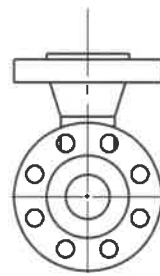




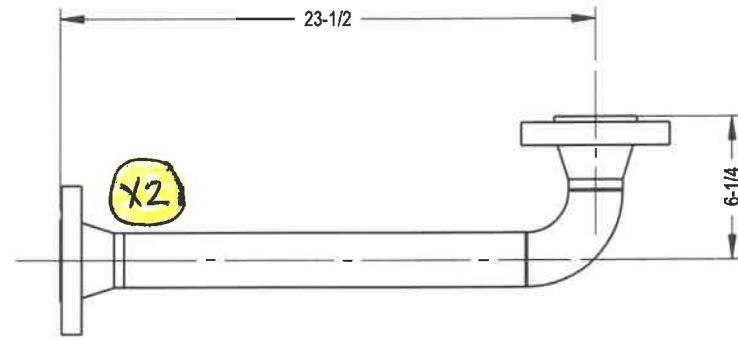
THIS DRAWING IS THE EXCLUSIVE PROPERTY OF NEXT COMPRESSION, AND CANNOT BE REPRODUCED OR DISTRIBUTED WITHOUT THE EXPRESS WRITTEN PERMISSION OF NEXT COMPRESSION.



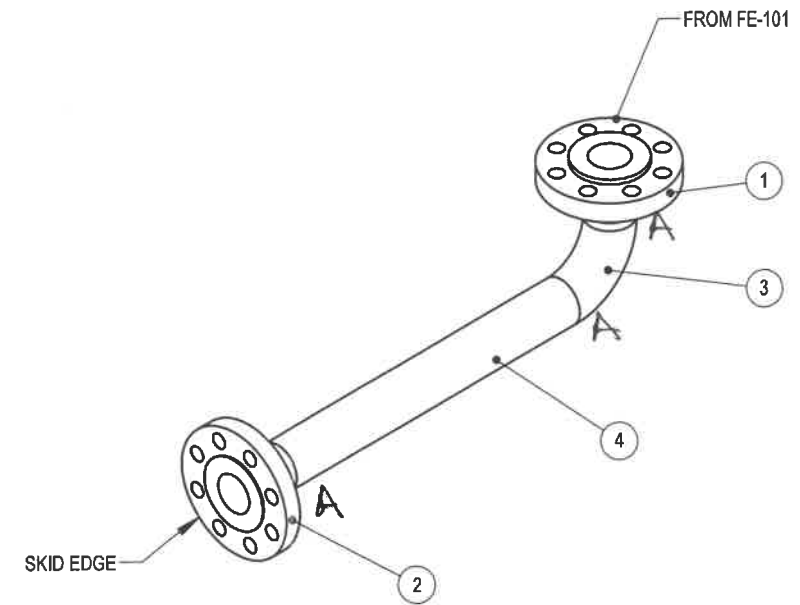
BILL OF MATERIAL					
HEAT NO.	ITEM NO.	QTY.	ITEM CODE	DESCRIPTION	LENGTH
9130001	1	1	3007486	FLANGE, RFWN, 2"-XS/SCH80/80S, 4/600CL, A/SA105N	
9130000	2	1	3007411	FLANGE, RFWN, 2"-XS/SCH80/80S, 300CL, A/SA105N	
63A011023	3	1	3011762	ELBOW, 90LR, BW, 2"-XS/SCH80/80S, A/SA234-WPB	
M418.	4	1	3000039	PIPE, SMLS, 2"-XS/SCH80/80S, A/SA106-B	17 1/2



ELEVATION



SIDE



ISOMETRIC

**As-Welded**

Joint	NGC WPS
Butt Weld	NGC.2N R3
Socket Weld	NGC.1 R3
Fillet Weld	NGC.1 R3
Slip-On Weld	NGC.1 R3

NOTES (UNLESS OTHERWISE SPECIFIED IN THE DRAWING):

- ALL DIMENSIONS ARE IN INCHES.
- LINEAR DIM TOLERANCE IS  $\pm 1/16"$ , ANGULAR DIM TOLERANCE IS  $\pm 0.5^\circ$ .
- ALL DIMENSIONS ARE FITTING/FITTING.
- ALL FLANGE HOLES TO STRADDLE MAJOR VERTICAL/HORIZONTAL CENTERLINES.
- SPOOL DESIGNATION NO. TO BE STAMPED ON ONE FLANGE (LARGEST) PER SHOWN FORMAT.
- THE FOLLOWING MATERIALS MAY BE SUBSTITUTED: SA-106 GR.B WITH SA-333 GR.6, SA-105 WITH SA-350 LF2 CL.1, SA-234 WPB WITH SA-420 WPL6.
- REFER TO NEXT STANDARD WELDING PROCEDURE FWP-017 FOR WELD DETAILS.
- ESTIMATED WEIGHT: 27.55 LBS.

JOINT	VENDOR WPS	GENERAL DATA	DESIGN DATA
BUTT WELD		CODE: ASME B31.3 (2018)	SPECIFICATION: BS
SOCKET WELD		FLUID CAT.: NORMAL (SOUR)	DESIGN PRESSURE: 655 PSIG
FILLET WELD		SURF. PREP.: SSPC-SP2	DESIGN TEMP.: 300°F/20°F
SLIP-ON WELD		PRIME: NEXT STANDARD	TEST PRESSURE: 1125 PSIG
			TEST MEDIUM: WATER
			HOLD TIME: 15 MIN.
			PWHT: NONE
			RADIOGRAPHY: 20% ABW
			C.A.: 1/8"

REVISIONS				
REV	DESCRIPTION	DATE	BY	APPR
0	ISSUED FOR CONSTRUCTION	06/21/21	RR	JH
1	MATERIAL THICKNESS WAS STD	7/05/21	RR	JH

**NEXT COMPRESSION**  
 281122 WAGON WHEEL CRES. ROCKY VIEW COUNTY  
 ALBERTA, CANADA, T4A 0E2 1 (800) 256-1598  
 WWW.NEXTCOMP.CA

LABOUR CODE: **F-6200**      MATL CODE: **F-6201**

TITLE:			
PROJECT:		KELT EXPLORATION FUELLED INC STOCK RETROFIT	
DRAWN BY:	RR	PROJECT NO.:	100421
DRAWN DATE (MM/DD/YY):	06/21/21	CUSTOMER REF NO.:	
SHEET:	1 OF 1	NEXT DWG. NO.:	100421-6202
		REV.:	1

**Attention:** John Gogorenko  
NEXT COMPRESSION CORP  
261122 WAGON WHEEL CRESCENT  
ROCKYVIEW, AB T4A 0E2

The welding procedure, tracking number 2019-04309, originally received on June 17, 2019 was surveyed and accepted in accordance with the requirements of ASME section IX for registration as follows:

**Reg. No. :** WP-3850.2

**Accepted on:** June 19, 2019

**Reg Type:** REVISION TO ACC. DESIGN

**Spec. No. :** NGC-2N REV 3

An invoice covering survey and registration fees will be forwarded from our Revenue Accounts.

If you have any question don't hesitate to contact me by phone at (780) 433-0281 ext 3342 or fax (780) 437-7787 or e-mail Reinhart@absa.ca.

*Please note:*

- (1) Construction shall be completed per the requirements of the applicable construction code, and*
- (2) the acceptance of this registration does not allow the use of this welding procedure in the construction, modification, on any boiler, pressure vessel, pressure piping system or fitting in Alberta unless the contractor/manufacturer has registered a Quality Control System for such work with ABSA.*

Sincerely,



REINHART, JASON, P. Eng.  
DOP Cert. No. D00003629

## Welding Procedure Specification (WPS) Qualified in Accordance with ASME BPVC Section IX

WPS No.: NGC-2N Revision No.: 3  
 Supporting PQR No.(s): PQ16 (Rev. 1), PQ22 (Rev. 1), PQ7 (Rev. 1), 7018-AW-1 (Rev. 0), 7018-AW-2 (Rev. 0),  
PQ1 (Rev. 1), GM-AW-1  
 Process (es): GMAW-S / SMAW P.W.H.T.: As welded, without P.W.H.T.

### WPS SUMMARY

Qualified	Normal Appl.	Notch Toughness Appl.*
ASME Section IX Base Metal	P-No. 1 to P-No. 1	P-No. 1 Grp. 1/2 to P-No. 1 Grp. 1/2
Base Metal Thickness (Groove)	0.062 to 8.00 in.	0.116 to 8.00 in.
Filler Metal	GMAW-S: ER70S-6, SMAW: E7018, E7018-1	GMAW-S: ER70S-6, SMAW: E7018-1
Weld Metal Deposited Thickness	GMAW-S: 0.255 in. maximum SMAW: 8.00 in. maximum	

\* With control of the supplementary-essential variables as specified in this WPS, this WPS is qualified for use where proven notch toughness properties are specified to -50 °F and warmer.

This WPS is qualified in accordance with ASME section IX, and it shall be applied in conjunction with relevant code of construction/standard/specification.

### RECORD OF REVISION

3	June 7, 2019	Format update and company name change, formerly NGC Compression Solutions Ltd. Replaced PQR PQ14 (Rev. 1) with GM-AW-1 & PQ1 (Rev. 1).
Revision	Date	Revision Description

### PROVINCIAL REGISTRATION

2019-04309

# ABSA

**SAFETY CODES ACT - PROVINCE OF ALBERTA  
WELDING PROCEDURE**

**Reg. No.:** WP-3850.2

**Spec No.:** NGC-2N REV 3


**Processes:** GMAW/SMAW

**Base Mat'ls:** P-No. 1 Gr.1/2 to  
P-No. 1 Gr.1/2

**Filler Mat'ls:** F-No. 6/4, A-No. 1/1

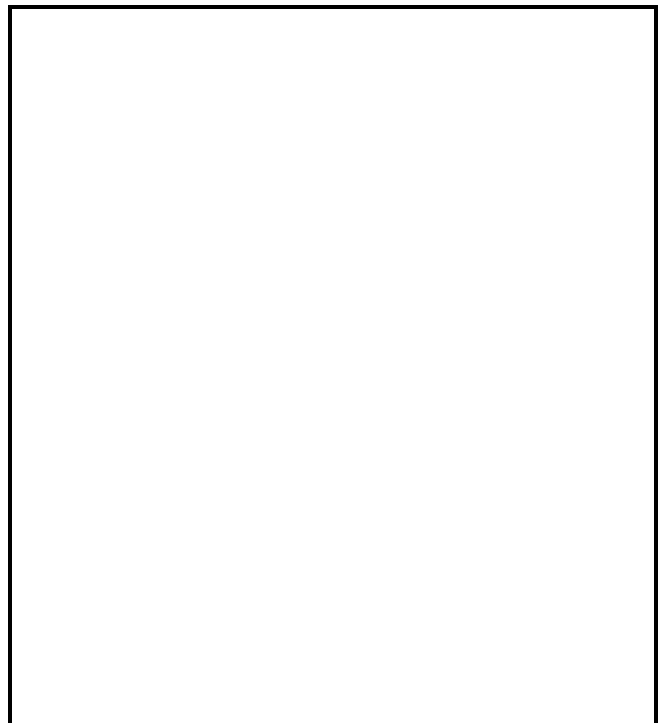
**Thk. Qual. For:** 203. mm **P.W.H.T.:** No

MIN TH QUAL 2.9mm, CVN -46°C

**Signed:** 

**Date:** 2019-06-19 **JASON REINHART, P. Eng.**

This stamp and signature have been affixed electronically to this registered procedure as required by Section 21(1) of the Pressure Equipment Safety Regulation, in accordance with the Electronic Transactions Act.





## WELDING PROCEDURE SPECIFICATION (WPS)

Company Name NEXT COMPRESSION CORP.  
WPS No. NGC-2N Revision No. 3 Date June 7, 2019  
Supporting PQR No. (s) PQ16 (Rev. 1), PQ22 (Rev. 1), PQ7 (Rev. 1), 7018-AW-1 (Rev. 0), 7018-AW-2 (Rev. 0),  
PQ1 (Rev. 1), GM-AW-1  
Welding Process (es) Gas metal-arc welding - short circuiting (GMAW-S) + Shielded metal-arc welding (SMAW)

### JOINTS (QW-402)

Joint Design All ASME joint designs, reference construction drawing for joint details. Where joint details  
are not specified, refer to typical joint detail sheet attached.  
Backing With or without (Permanent backing strip may only be used with design approval).  
Backing material (Type) Qualified base metal / weld metal.  
Root Spacing 0 - 0.250 in. Retainers Not allowed

### BASE METALS (QW-403)

	Normal Appl.	Notch Toughness Appl.
Base Metal P-No., Group No.	P-No. 1 to P-No. 1	P-No. 1, Grp. 1/2 to P-No. 1, Grp. 1/2
Base metal thickness	Groove Weld	0.062 to 8.00 in.
	Fillet Weld	All base metal thickness
Maximum Thickness per Pass	0.375 in.	0.250 in.

### FILLER METALS (QW-404)

	GMAW-S	SMAW
Specification No. (SFA)	5.18	5.1
AWS No. (Class)	Normal Appl.: ER70S-6	E7018, E7018-1
	Notch Toughness Appl.: ER70S-6	E7018-1
F-No.	F-No. 6	F-No. 4
A-No.	A-No. 1*	A-No. 1
Size of Filler Metal	0.030 to 0.045 in.	3/32 to 1/4 in.
Filler Metal Product form	Solid wire	N/A
Supplemental Filler Metal	Without	N/A
Alloy Elements	Without	N/A
Weld Metal Deposited Thickness	Groove <u>0.255 in. maximum</u>	8.00 in. maximum
	Fillet <u>All Fillet size</u>	All Fillet size

Note \* ER70S-6 shall meet the chemical composition requirements of ASME Sect. II, Part C. Weld deposit chemical composition of ER70S-6 to be verified and ensure the Mn ≤ 1.6% if A-No. 1 is required

### POSITIONS (QW-405)

Position(s) of Groove All Positions Position(s) of Fillet All Positions  
Welding Progression Normal Appl.: GMAW-S: Uphill or downhill SMAW: Uphill  
Notch Toughness Appl.: GMAW-S: Downhill SMAW: Uphill

### PREHEAT (QW-406)

Minimum Preheat Temperature 50 °F. If base metal and/or ambient temperatures below 32 °F, the weld joint and  
adjacent areas shall be heated to 65 °F, prior to the start of welding.  
Interpass Temperature Normal Appl.: 50 - 600 °F Notch Toughness Appl.: 50 - 450 °F  
If welding is interrupted, the weld joint and adjacent areas shall be reheated the  
minimum preheat temperature.  
Preheat Maintenance Not required

Note Preheating temperatures, interpass temperature and preheat maintenance to be used may be superseded but not  
outside the range specified. Ensure temperatures are adequate per job specification and code of constructions.

**POSTWELD HEAT TREATMENT (QW-407)**

P.W.H.T. None  
 Temperature N/A Time N/A

**GAS (QW-408)**

	Gas Composition	Flow Rate
Shielding	75% Ar, 25% CO2	20 - 50 CFPH
Trailing	Not Required	N/A
Backing	Not Required	N/A

**ELECTRICAL CHARACTERISTICS (QW-409)**

Current Direct current (DC) Polarity Reverse - electrode positive (EP)  
 Mode of Metal Transfer GMAW-S: Short circuiting, including waveform controlled short circuiting, i.e. Miller RMD, Lincoln STT, etc.  
 Maximum Heat Input Normal Appl.: N/A Notch Toughness Appl.: See table below

Base Metal Thickness (in.)	GMAW-S (J/in.)	SMAW (J/in.)
0.116 ≤ T < 0.500	26,372	62,727
0.500 ≤ T < 8.00	26,372	78,000

**Typical Welding Parameters <sup>(1) (2)</sup>**

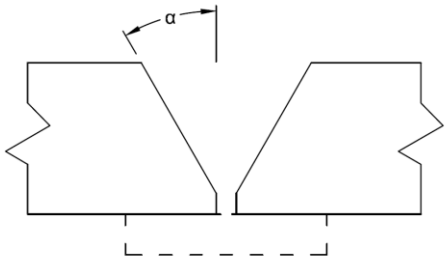
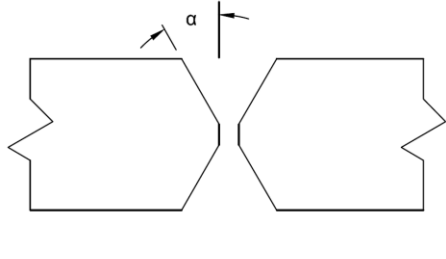
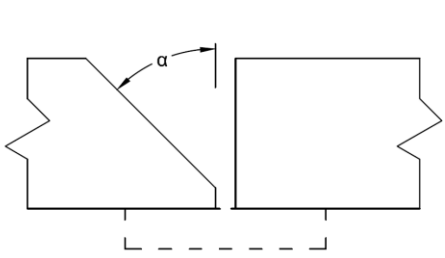
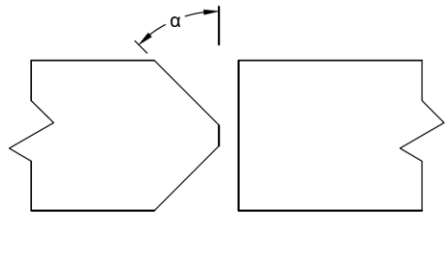
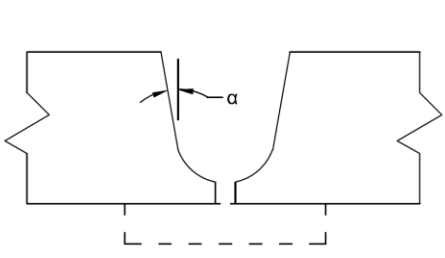
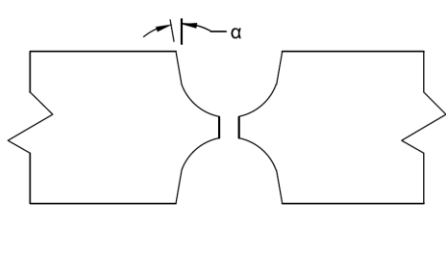
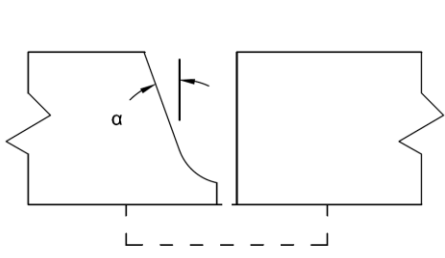
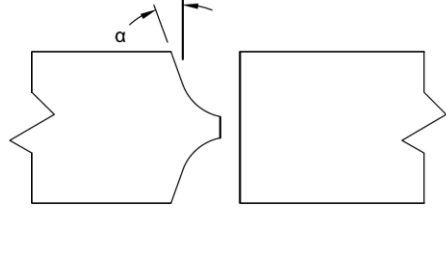
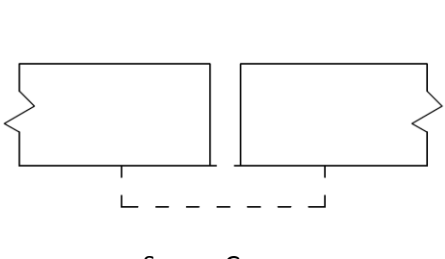
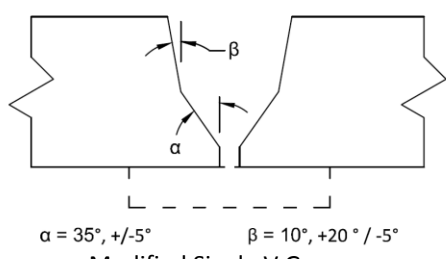
Process	Filler Metal		Current		Volts	Travel Speed (in./min.)
	Classification <sup>(3)</sup>	Size (in.)	Type & Polarity	Amps		
GMAW-S	ER70S-6	0.030	DCEP	70 - 130	13 - 21	1.5 - 10
GMAW-S	ER70S-6	0.035	DCEP	80 - 160	14 - 22	2.0 - 25
GMAW-S	ER70S-6	0.045	DCEP	100 - 200	14 - 23	3.0 - 35
SMAW	E7018/E7018-1	3/32	DCEP	50 - 120	18 - 26	1.0 - 12
SMAW	E7018/E7018-1	1/8	DCEP	80 - 150	19 - 28	1.5 - 15
SMAW	E7018/E7018-1	5/32	DCEP	100 - 200	20 - 30	3.0 - 16
SMAW	E7018/E7018-1	3/16	DCEP	150 - 270	22 - 31	4.0 - 18
SMAW	E7018/E7018-1	1/4	DCEP	215 - 360	23 - 32	5.0 - 20

Note: <sup>(1)</sup> Welding parameters will vary with position, joint configuration, consumable brand, etc. Welding consumable manufacturer's recommendations should be followed.  
<sup>(2)</sup> Notch Toughness Appl.: Combination of welding parameters shall be adjusted to insure that the specified maximum heat input is not exceeded. Heat input shall be determined using instantaneous energy or power in lieu of the amperage and voltage ranges for waveform controlled welding (i.e., Miller RMD or Lincoln STT).  
<sup>(3)</sup> Notch Toughness Appl.: SMAW electrodes to be limited to E7018-1 only.

**TECHNIQUE (QW-410)**

String or Weave Bead Either Orifice, Gas Cup or Nozzle Size GMAW-S: 0.375 to 0.750 in.  
 Initial and Interpass Cleaning Mechanical - grinding, power brush, chipping, etc.  
 Method of Back Gouging Grinding or air carbon arc, etc., if required. Grind to clean metal where thermal process is used.  
 Oscillation N/A Contact Tube to Work Distance GMAW-S: 0.250 to 0.500 in.  
 Multiple or Single Pass per Side Normal Appl.: Either Notch Toughness Appl.: Multiple  
 Multiple or Single Electrodes Single Electrode Spacing N/A  
 Manual or Automatic GMAW-S: Semi-automatic SMAW: Manual  
 Peening Not allowed Use of Thermal Processes for P-No. 11A & No. 11B Base Metal N/A

**TYPICAL JOINT DESIGNS**

 <p><math>\alpha = 30^\circ, \pm 7.5^\circ</math> Single V Groove</p>	 <p><math>\alpha = 30^\circ, \pm 7.5^\circ</math> Double V Groove</p>
 <p><math>\alpha = 45^\circ, \pm 10^\circ</math> Single Bevel Groove</p>	 <p><math>\alpha = 45^\circ, \pm 10^\circ</math> Double Bevel Groove</p>
 <p><math>\alpha = 10^\circ, +20^\circ / -5^\circ</math> Single U Groove</p>	 <p><math>\alpha = 10^\circ, +20^\circ / -5^\circ</math> Double U Groove</p>
 <p><math>\alpha = 20^\circ, +10^\circ / -5^\circ</math> Single J Groove</p>	 <p><math>\alpha = 20^\circ, +10^\circ / -5^\circ</math> Double J Groove</p>
 <p>Square Groove</p>	 <p><math>\alpha = 35^\circ, \pm 5^\circ</math>      <math>\beta = 10^\circ, +20^\circ / -5^\circ</math> Modified Single V Groove</p>

Note: Permanent backing strip may only be used with design approval. Retainer is not allowed. 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.

## QW-483 PROCEDURE QUALIFICATION RECORD (PQR)

Company Name E&D Pipe and Process Equipment Ltd.  
Procedure Qualification Record No. PQ16 (Rev. 1)  
Date Originally Qualified November 26, 1997 Revision Date October 4, 2018  
Revision(s) Rev. 1 (Editorial) - Addition of (QW-403) Deposited Weld Metal Per Pass,  
(QW-404) Filler Metal Product Form, Supplemental Filler Metal,  
Alloy Elements, (QW-408) Trailing Gas. Clarification to (QW-407)  
Postweld Heat Treatment (Without). Correction to Maximum Heat Input  
values (calculated from average current and voltage). Company Name  
changed back to original qualifying organization. Company Name  
changed for recertification to NGC Compression Solutions Ltd. (formerly  
NGC Process Systems Ltd.). Removed Welding Procedure  
Specification No.  
Rev. 0 (Editorial) - Format update and Company Name change (PQR originally  
qualified by E&D Pipe and Process Equipment Ltd.). Addition of Mode of  
Metal Transfer for GMAW. Correction to (QW-150) Tensile Test results  
to match lab report. September 26, 2011.  
Welding Process(es) GMAW / SMAW Type(s) Semi-automatic / Manual

### JOINTS (QW-402)

Type Butt joint, single vee groove, see next page

### BASE METALS (QW-403)

Material Spec. SA 333 to SA 350 Type or Grade Gr. 6 to Gr. LF2  
P-No. P1 Grp.1 To P-No. P1 Grp.2 Thickness 12.7 mm (0.500 in.)  
Diameter 219.1 mm (8.625 in.) O.D. Other 8 inch Schedule 80  
Deposited Weld Metal (Per Pass) Did not exceed 12.7 mm (0.500 in.)

### FILLER METALS (QW-404)

	GMAW	SMAW
Specification No. (SFA)	<u>SFA 5.18</u>	<u>SFA 5.1</u>
AWS No. (Class)	<u>ER70S-6</u>	<u>E7018-1</u>
Filler Metal F-No.	<u>F6</u>	<u>F4</u>
Filler Metal A-No.	<u>(*)</u>	<u>A1</u>
Filler Metal Product Form	<u>Bare Solid Wire</u>	<u>N/A</u>
Supplemental Filler Metal	<u>Without</u>	<u>N/A</u>
Alloy Elements	<u>Without</u>	<u>N/A</u>
Size of Electrode	<u>See attached sketch</u>	
Other	<u>* Chemical composition meets the requirements of ASME Sec II, Part C, for ER70S-6</u>	
Deposited Weld Metal Thickness	<u>2.54 mm (0.100 in.)</u>	<u>10.2 mm (0.400 in.)</u>

### POSITION (QW-405)

Position of Groove GMAW: Special - Pipe rolled with nozzle tip at 30° from top SMAW: 1G  
Weld Progression GMAW: Vertical down SMAW: N/A

### PREHEAT (QW-406)F

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

### POSTWELD HEAT TREATMENT (QW-407)

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

**GAS (QW-408)**

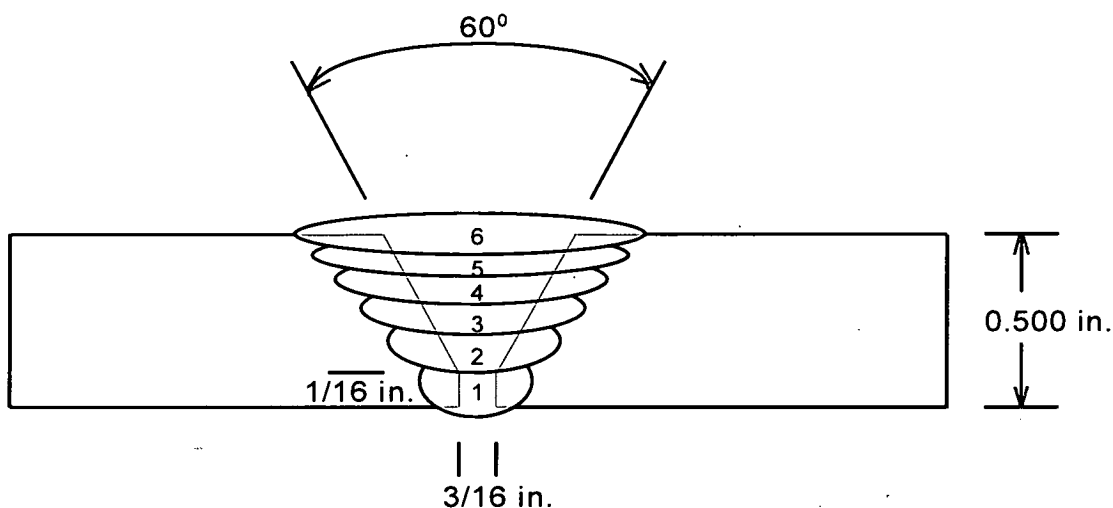
Shielding     75% Argon, 25% Carbon Dioxide, 12.5 litres per minute (25 cfph)      
 Backing     None     Trailing     Without    

**ELECTRICAL CHARACTERISTICS (QW-409)**

Current     Direct     Polarity     Reverse, electrode positive      
 Amps     See below     Volts     See below      
 Heat Input     GMAW: 37,000 J/in. maximum SMAW: 70,408 J/in. maximum      
 Mode of Metal Transfer     GMAW: Short Circuiting Arc    

**TECHNIQUE (QW-410)**

String or Weave     Weave     Travel Speed     See below      
 Multiple or Single Pass Per Side     GMAW: Single SMAW: Multiple      
 Multiple or Single Electrodes     Single    



Pass	Process	Filler Metal	Diameter mm (in.)	Current & Polarity	Amperage Range	Voltage Range	Travel Speed mm/min (ipm.)
1	GMAW	ER70S-6	0.89 (0.035)	DCRP	105 - 115	18 - 19	83.8 (3.3)
2	SMAW	E7018-1	4.0 (5/32)	DCRP	160 - 170	21 - 22	175 (6.9)
3	SMAW	E7018-1	5.0 (3/16)	DCRP	240 - 260	22 - 24	160 (6.3)
4	SMAW	E7018-1	5.0 (3/16)	DCRP	240 - 260	22 - 24	157 (6.2)
5	SMAW	E7018-1	5.0 (3/16)	DCRP	240 - 260	22 - 24	142 (5.6)
6	SMAW	E7018-1	5.0 (3/16)	DCRP	240 - 260	22 - 24	124 (4.9)

**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	19.1 (0.752)	11.4 (0.449)	218 (0.338)	106 900 (24,100)	490 (71,100)	Partial Cup & Cone Weld Metal
T2	19.1 (0.752)	11.3 (0.445)	216 (0.335)	109 700 (24,700)	508 (73,600)	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 IMPACT TOUGHNESS**

Type of Test Charpy V Notch Orientation Transverse  
 Test Temperature -46°C (-50°F) Specimen Size 10 X 10 mm

Specimen No.	Notch Location	Impact Values J (ft. lbs)
U2.1	Weld Metal	84.9 (62.6)
U2.2	Weld Metal	83.0 (61.2)
U2.3	Weld Metal	122 (90.2)
U3.1	P1 Grp.1 HAZ	>261 (>192)
U3.2	P1 Grp.1 HAZ	>261 (>192)
U3.3	P1 Grp.1 HAZ	197 (145)
V3.1	P1 Grp.2 HAZ	>261 (>192)
V3.2	P1 Grp.2 HAZ	163 (120)
V3.3	P1 Grp.2 HAZ	>261 (>192)

**OTHER TESTS**

See attached Rockwell hardness test report C97-906.4

Welders Name Wayne MacMillan Certificate File No. W-9348  
 Tests Conducted By Ludwig & Associates Ltd.  
 Laboratory Test No. C97-906.4

*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 NGC Compression Solutions Ltd.

Date OCT 11 2018 Signed 



# LUDWIG & ASSOCIATES LTD.

Materials and Welding Engineering

## LABORATORY TEST REPORT

**CUSTOMER:** E&D PIPE & PROCESS EQUIPMENT LTD. **Laboratory Test No.:** C97-906.4  
 #2, Building B, 624 Beaverdam Road N.E. **Date:** December 1, 1997  
 Calgary, Alberta  
 T2K 4W6

**Attention:** Stewart Adams

---

**PQR Number:** PQ16  
**Material:** SA 333 Gr. 6 to SA 350 Gr. LF2  
**Size:** 219.1 mm (8.625 in.) O.D. x 12.7 mm (0.500 in.) w.t.  
**Thermal Condition:** As Welded

---

### TENSILE TEST QW-150

SAMPLE NUMBER	T1 QW-462.1(b)	T2 QW-462.1(b)
WIDTH mm (in)	19.1 (0.752)	19.1 (0.752)
THICKNESS mm (in)	11.4 (0.449)	11.3 (0.445)
AREA sq mm (sq in)	218 (0.338)	216 (0.335)
ULT. LOAD N (lbs)	108 900 (24,100)	109 700 (24,700)
UTS MPa (psi)	490 (71,100)	508 (73,600)
FRACTURE TYPE	Partial Cup & Cone	Partial Cup & Cone
FRACTURE LOCATION	Weld Metal	Weld Metal

### GUIDED-BEND TEST QW-160

SAMPLE WIDTH:	9.53 mm (0.375 in.)	SAMPLE THICKNESS:	12.7 mm (0.500 in.)
PLUNGER SIZE:	38.1 mm (1.500 in.)	YOKE SIZE:	60.3 mm (2.375 in.)
QW-462.2	Side Bend	Side Bend	Side Bend
SAMPLE NUMBER(S)	S1	S2	S3
RESULTS	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, 1995 edition and latest addenda.

Laboratory Test Conducted By:

  
 Matthew Van Camp / Steve Rieberger, C.E.T.





# LUDWIG & ASSOCIATES LTD.

Materials and Welding Engineering

## LABORATORY TEST REPORT

**CUSTOMER:** E&D PIPE & PROCESS EQUIPMENT LTD. **Laboratory Test No.:** C97-906.4  
#2, Building B, 624 Beaverdam Road N.E. **Date:** November 28, 1997  
Calgary, Alberta  
T2K 4W6

**Attention:** Stewart Adams

**PQR Number:** PQ16  
**Material:** SA 333 Gr. 6 to SA 350 Gr. LF2  
**Size:** 219.1 mm (8.625 in.) O.D. x 12.7 mm (0.500 in.) w.t.  
**Thermal Condition:** As Welded

### NOTCH-TOUGHNESS TEST

**TYPE OF TEST:** Charpy V-Notch **ORIENTATION:** Transverse  
**TEST TEMPERATURE:** -46°C (-50°F) **SPECIMEN SIZE:** 10 x 10 mm

Specimen Number	Notch Location	Impact Values Joules (ft.lbs)	
U2.1	Weld Metal	84.9	(62.6)
U2.2	Weld Metal	83.0	(61.2)
U2.3	Weld Metal	122	(90.2)
U3.1	P1 Grp. 1 HAZ	>261	(>192)
U3.2	P1 Grp. 1 HAZ	>261	(>192)
U3.3	P1 Grp. 1 HAZ	197	(145)
V3.1	P1 Grp. 2 HAZ	>261	(>192)
V3.2	P1 Grp. 2 HAZ	163	(120)
V3.3	P1 Grp. 2 HAZ	>261	(>192)

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, 1995 edition and latest addenda.

Laboratory Test Conducted By: \_\_\_\_\_

*Matthew Van Camp / Steve Rieberger*  
Matthew Van Camp / Steve Rieberger, C.E.T.

## LABORATORY TEST REPORT

**CUSTOMER:** E&D PIPE & PROCESS EQUIPMENT LTD. **Laboratory Test No.:** C97-906.4  
 #2, Building B, 624 Beaverdam Road N.E. **Date:** November 28, 1997  
 Calgary, Alberta  
 T2K 4W6

**Attention:** Stewart Adams

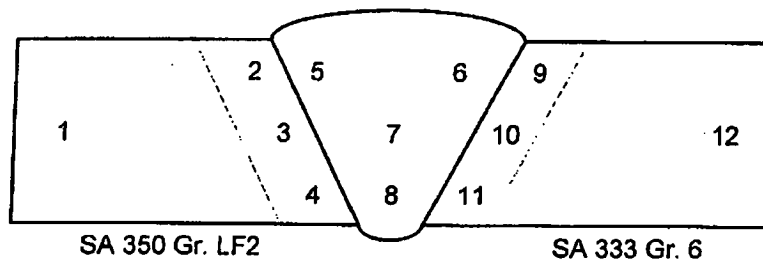
---

**PQR Number:** PQ16  
**Material:** SA 333 Gr. 6 to SA 350 Gr. LF2  
**Size:** 219.1 mm (8.625 in.) O.D. x 12.7 mm (0.500 in.) w.t.  
**Thermal Condition:** As Welded

---

### HARDNESS TEST

**TYPE OF TEST:** Rockwell **SCALE:** "B" scale  
**INSTRUMENT TYPE:** Newage Digital Versitron



1) 80 HRB	5) 83 HRB	9) 89 HRB
2) 88 HRB	6) 81 HRB	10) 89 HRB
3) 88 HRB	7) 85 HRB	11) 92 HRB
4) 87 HRB	8) 89 HRB	12) 82 HRB

We certify the test results in this report and that the specimen(s) were prepared and tested in accordance with the requirements of ASTM E18 - 94.

Laboratory Test Conducted By: \_\_\_\_\_

*Matthew Van Camp / Steve Rieberger*  
 Matthew Van Camp / Steve Rieberger, C.E.T.

## QW-483 PROCEDURE QUALIFICATION RECORD (PQR)

Company Name E&D Pipe and Process Equipment Ltd.  
Procedure Qualification Record No. PQ22 (Rev. 1)  
Date Originally Qualified August 18, 1999 Revision Date September 28, 2018  
Revision(s) Rev. 1 (Editorial) - Addition of (QW-403) Deposited Weld Metal Per Pass.  
Clarification to (QW-407) Postweld Heat Treatment (Without).  
Company Name changed back to original qualifying organization.  
Company Name changed for recertification to NGC Compression  
Solutions Ltd. (formerly NGC Process Systems Ltd.). Removed Welding  
Procedure Specification No.  
Rev. 0 (Editorial) - Company Name changed to NGC Process Systems Ltd.  
(formerly E&D Pipe and Process Equipment Ltd.). Format update,  
March 18, 2005.  
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. 60N to Gr. 70N  
P-No. P1 Grp. 1 To P-No. P1 Grp. 2 Thickness 38.1 mm (1.50 in.)  
Diameter N/A Other Plate  
Deposited Weld Metal (Per Pass) Did not exceed 38.1 mm (0.500 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.) 35.7 mm (1.406 in.)

### POSITION (QW-405)

Position of Groove 3G  
Weld Progression Vertical up

### PREHEAT (QW-406)

Preheat Temperature 66°C (150°F) Interpass Temp. (Max.) 232°C (450°F)

### POSTWELD HEAT TREATMENT (QW-407)

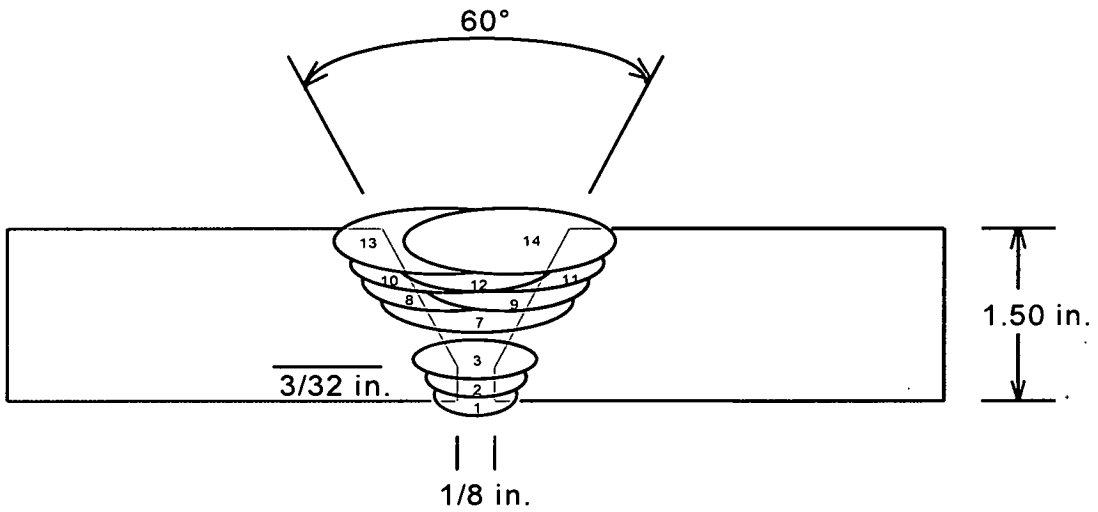
With or Without Without  
Temperature N/A Time N/A

### ELECTRICAL CHARACTERISTICS (QW-409)

Current Direct Polarity Reverse, electrode positive  
Amps See next page Volts See next page  
Heat Input F3: 35 310 J/in. max. F4: 77 538 J/in. max.

**TECHNIQUE (QW-410)**

String or Weave     F3: String    F4: Weave     Travel Speed     See below      
 Multiple or Single Pass Per Side     Multipass from groove side      
 Multiple or Single Electrodes     Single    



Pass	Process	Filler Metal	Diameter mm (in.)	Current & Polarity	Amperage Range	Voltage Range	Travel Speed mm/min (ipm.)
1	SMAW	E6010	3.2 (1/8)	DCRP	80 - 85	22 - 27	99 (3.9)
2 & 3	SMAW	E7018-1	2.4 (3/32)	DCRP	91 - 102	21 - 26	75 - 85 (2.9 - 3.4)
4 & 5	SMAW	E7018-1	3.2 (1/8)	DCRP	132 - 140	19 - 24	66 - 84 (2.6 - 3.3)
6 & 7	SMAW	E7018-1	4.0 (5/32)	DCRP	165 - 185	20 - 22	71 - 76 (3.2 - 3.7)
8 & 9	SMAW	E7018-1	3.2 (1/8)	DCRP	132 - 140	19 - 24	66 - 84 (2.6 - 3.3)
10 & 11	SMAW	E7018-1	4.0 (5/32)	DCRP	165 - 185	20 - 22	71 - 76 (3.2 - 3.7)
12 - 14	SMAW	E7018-1	3.2 (1/8)	DCRP	132 - 140	19 - 24	66 - 84 (2.6 - 3.3)

**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	19.1 (0.752)	37.7 (1.48)	720 (1.12)	370 100 (83,200)	514 (74,500)	Partial cup & cone Weld metal
T2	19.2 (0.756)	37.6 (1.48)	722 (1.12)	369 000 (83,000)	511 (74,100)	Partial cup & cone Parent metal (Gr. 60N)

**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 IMPACT TOUGHNESS**

Type of Test Charpy V Notch Orientation Transverse  
 Test Temperature -46°C (-50°F) Specimen Size 10 x 10 mm

Specimen No.	Notch Location	Impact Values J (ft. lbs)
P2.1	Weld Metal	62.9 (46.4)
P2.2	Weld Metal	63.7 (47.0)
P2.3	Weld Metal	16.8 (12.4)
P3.1	Gr. 60N - HAZ	157 (116)
P3.2	Gr. 60N - HAZ	153 (113)
P3.3	Gr. 60N - HAZ	169 (125)
Q3.1	Gr. 70N - HAZ	195 (144)
Q3.2	Gr. 70N - HAZ	121 (89.0)
Q3.3	Gr. 70N - HAZ	186 (137)

**OTHER TESTS**

Vickers hardness survey, see attached report - C99-638.2

Welders Name Murray Schultz Certificate File No. W-5936  
 Tests Conducted By Ludwig & Associates Ltd.  
 Laboratory Test No. C99-638.2

*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 NGC Compression Solutions Ltd.

Date SEP 28 2018 Signed 



# LUDWIG & ASSOCIATES LTD.

Materials and Welding Engineering

## LABORATORY TEST REPORT

**CUSTOMER:** E & D Pipe and Process Equipment Ltd.  
#2, Bldg. B., 624 Beaverdam Road N.E.  
Calgary, Alberta  
T2K 4W5

**Laboratory Test No.:** C99-638.2  
**Date:** August 20, 1999

**Attention:** John MacDonald

**PQR Number:** PQ22  
**Material:** SA 516 Gr. 60N to SA 516 Gr. 70N (Ht. No.: 81982-13994)  
**Size:** 38.1 mm (1.50 in.)  
**Thermal Condition:** As Welded

### TENSILE TEST QW-150

SAMPLE NUMBER	T1 QW-462.1(a)	T2 QW-462.1(a)
WIDTH mm (in)	19.1 (0.752)	19.2 (0.756)
THICKNESS mm (in)	37.7 (1.48)	37.6 (1.48)
AREA sq mm (sq in)	720 (1.12)	722 (1.12)
ULT. LOAD N (lbs)	370 100 (83,200)	369 000 (83,000)
UTS MPa (psi)	514 (74,500)	511 (74,100)
FRACTURE TYPE	Partial Cup & Cone	Partial Cup & Cone
FRACTURE LOCATION	Weld Metal	Parent Metal (SA 516 Gr. 60N)

### GUIDED-BEND TEST QW-160

SAMPLE WIDTH:	9.52 mm (0.375 in.)	SAMPLE THICKNESS:	38.1 mm (1.50 in.)
PLUNGER SIZE:	38.1 mm (1.50 in.)	YOKE SIZE:	60.3 mm (2.375 in.)
QW-462.2	Side Bend	Side Bend	Side Bend
SAMPLE NUMBER(S)	S1	S2	S3
RESULTS	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, 1998 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.

Laboratory Test Conducted By:

Troy Drummond, T.T. / Sabine Heinemann, C.E.T.



# LUDWIG & ASSOCIATES LTD.

Materials and Welding Engineering

## LABORATORY TEST REPORT

**CUSTOMER:** E & D Pipe and Process Equipment Ltd.  
#2, Bldg. B., 624 Beaverdam Road N.E.  
Calgary, Alberta  
T2K 4W5

**Laboratory Test No.:** C99-638.2  
**Date:** August 23, 1999

**Attention:** John MacDonald

**PQR Number:** PQ22

**Material:** SA 516 Gr. 60N to SA 516 Gr. 70N (Ht. No.: 81982-13994)

**Size:** 38.1 mm (1.50 in.)

**Thermal Condition:** As Welded

### NOTCH-TOUGHNESS TEST

**TYPE OF TEST:** Charpy V-Notch  
**TEST TEMPERATURE:** -46°C (-50°F)

**ORIENTATION:** Transverse  
**SPECIMEN SIZE:** 10 x 10 mm

Specimen Number	Notch Location	Impact Values Joules (ft.lbs)	
P2.1	Weld Metal	62.9	(46.4)
P2.2	Weld Metal	63.7	(47.0)
P2.3	Weld Metal	16.8	(12.4)
P3.1	Gr. 60N - HAZ	157	(116)
P3.2	Gr. 60N - HAZ	153	(113)
P3.3	Gr. 60N - HAZ	169	(125)
Q3.1	Gr. 70N - HAZ	195	(144)
Q3.2	Gr. 70N - HAZ	121	(89.0)
Q3.3	Gr. 70N - HAZ	186	(137)

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, 1998 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.

Laboratory Test Conducted By:

Troy Drummond, T.T. / Sabine Heinemann, C.E.T.





# LUDWIG & ASSOCIATES LTD.

## Materials and Welding Engineering

### LABORATORY TEST REPORT

**CUSTOMER:** E & D Pipe and Process Equipment Ltd.  
#2, Bldg. B., 624 Beaverdam Road N.E.  
Calgary, Alberta  
T2K 4W5

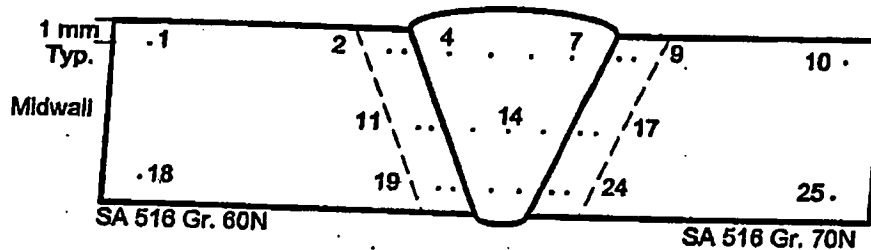
**Laboratory Test No.:** C99-638.2  
**Date:** August 23, 1999

**Attention:** John MacDonald

**PQR Number:** PQ22  
**Material:** SA 516 Gr. 60N to SA 516 Gr. 70N (Ht. No.: 81982-13994)  
**Size:** 38.1 mm (1.50 in.)  
**Thermal Condition:** As Welded

### HARDNESS TEST

**TYPE OF TEST:** Vickers  
**INSTRUMENT TYPE:** Buehler Micromet  
**LOAD:** 1000 g



1) 155 HV	8) 174 HV	15) 184 HV	22) 188 HV
2) 169 HV	9) 163 HV	16) 192 HV	23) 177 HV
3) 195 HV	10) 156 HV	17) 181 HV	24) 179 HV
4) 197 HV	11) 175 HV	18) 156 HV	25) 161 HV
5) 204 HV	12) 184 HV	19) 176 HV	
6) 205 HV	13) 202 HV	20) 182 HV	
7) 184 HV	14) 199 HV	21) 195 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 E384 - 89 (Reapproved 1997). The information regarding material identification (i.e. size, thickness, heat number, etc.) has been provided by the customer whose name appears on this report.

Laboratory Test Conducted By: Sabine Heinemann  
Troy Drummond, T.T. / Sabine Heinemann, C.E.T.

## QW-483 PROCEDURE QUALIFICATION RECORD (PQR)

Company Name E&D Pipe and Process Equipment Ltd.  
 Procedure Qualification Record No. PQ7 (Rev. 1)  
 Date Originally Qualified September 10, 1996 Revision Date September 28, 2018  
 Revision(s) Rev. 1 (Editorial) - Addition of (QW-403) Deposited Weld Metal Per Pass,  
(QW-404) Filler Metal Product Form, Supplemental Filler Metal,  
Alloy Elements, Alloy Flux, Flux Type, Recrushed Slag. Clarification to  
(QW-407) Postweld Heat Treatment (Without). Correction to (QW-404)  
SAW Flux/Wire Classification (formerly reported as F7A6 or A8-EM12K).  
Addition of Certificate of Conformance to establish F7A6-EM12K A-No.  
Company Name changed back to original qualifying organization.  
Company Name changed for recertification to NGC Compression  
Solutions Ltd. (formerly NGC Process Systems Ltd.). Removed Welding  
Procedure Specification No.  
Rev. 0 (Editorial) - Company Name changed to NGC Process Systems Ltd.  
(formerly E&D Pipe and Process Equipment Ltd.). Format update,  
March 18, 2005.

Welding Process(es) GMAW / SMAW / SAW Type(s) Semi-auto. / Manual / Machine

### 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. 60N to Gr. 70N  
 P-No. P1 Grp. 1 To P-No. P1 Grp. 2 Thickness 38.1 mm (1.50 in.)  
 Diameter N/A Other Plate  
 Deposited Weld Metal (Per Pass) Did not exceed 12.7 mm (0.500 in.)

### FILLER METALS (QW-404)

	GMAW	SMAW
Specification No. (SFA)	<u>SFA 5.18</u>	<u>SFA 5.1</u>
AWS No. (Class)	<u>ER70S-6</u>	<u>E7018-1</u>
Filler Metal F-No.	<u>F6</u>	<u>F4</u>
Filler Metal A-No.	<u>*</u>	<u>A1</u>
Filler Metal Product Form	<u>Bare Solid Wire</u>	<u>N/A</u>
Supplemental Filler Metal	<u>Without</u>	<u>N/A</u>
Alloy Elements	<u>Without</u>	<u>N/A</u>
Size of Electrode	<u>See attached sketch</u>	
Other	<u>*Chemical composition meets the requirements of ASME Sec. II, Part C, for ER70S-6</u>	
Deposited Weld Metal Thickness	<u>6.35 mm (0.125 in.)</u>	<u>15.9 mm (0.625 in.)</u>

### FILLER METALS (QW-404)

	SAW
Specification No. (SFA)	<u>SFA 5.17</u>
AWS No. (Class)	<u>EM12K</u>
Flux / Wire Classification	<u>F7A6-EM12K</u>
Filler Metal F-No.	<u>F6</u>
Filler Metal A-No.	<u>A1 **</u>
Supplemental Filler Metal	<u>Without</u>
Alloy Elements	<u>Without</u>
Alloy Flux	<u>Without</u>
Flux Type	<u>Neutral</u>
Recrushed Slag	<u>Without</u>
Size of Electrode	<u>See attached sketch</u>
Deposited Weld Metal Thickness	<u>19.1 mm (0.750 in.)</u>
Trade Name	<u>Canadian Liquid Air (LA59 flux with LA 12K wire)</u>
Other	<u>**See attached manufacturer's certificate of conformance</u>

**POSITION (QW-405)**

Position of Groove GMAW: Plate placed 30° off flat position SMAW: 3G SAW: 1G  
 Weld Progression GMAW: Vertical down SMAW: Vertical Up SAW: N/A

**PREHEAT (QW-406)**

Preheat Temperature 66°C (150°F) Interpass Temp. (Max.) 232°C (450°F)

**POSTWELD HEAT TREATMENT (QW-407)**

With or Without Without  
 Temperature None Time N/A

**GAS (QW-408)**

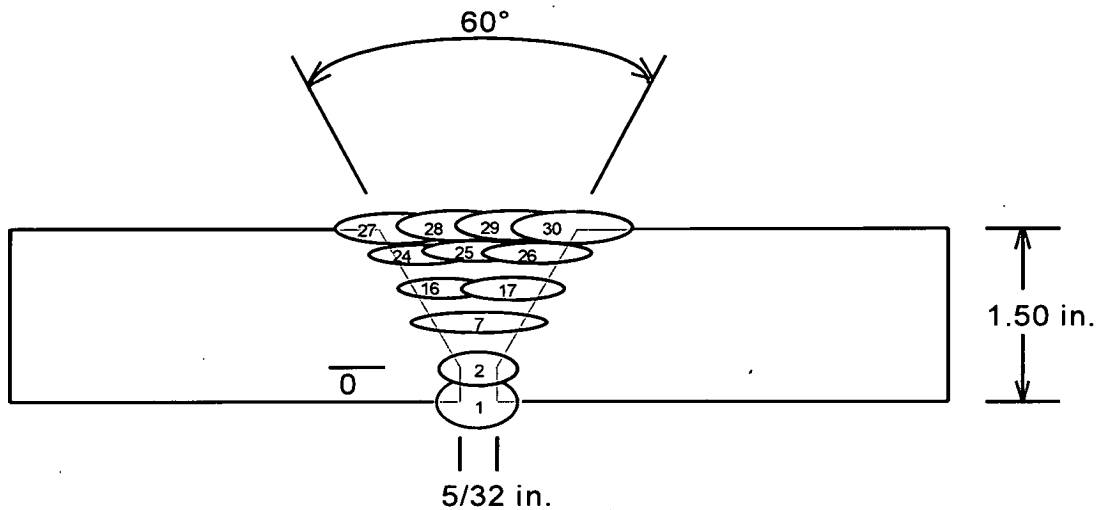
Shielding (GMAW) 75% Argon, 25% CO2, 16 liters per minute (32 cfph)  
 Backing None  
 Trailing Without

**ELECTRICAL CHARACTERISTICS (QW-409)**

Current Direct Polarity Reverse, electrode positive  
 Amps See below Volts See below  
 Heat Input GMAW: 24 545 J/in. max. SMAW: 61 800 J/in. max. SAW: 62 896 J/in. max.  
 Mode of metal transfer for GMAW Short circuiting arc

**TECHNIQUE (QW-410)**

String or Weave GMAW: Weave SMAW: String & Weave SAW: String  
 Travel Speed See below  
 Multiple or Single Pass Per Side GMAW: Single SMAW & SAW: Multiple  
 Multiple or Single Electrodes Single electrode



Pass	Process	Filler Metal	Diameter mm (in.)	Current & Polarity	Amperage Range	Voltage Range	Travel Speed mm/min (ipm.)
1	GMAW	ER70S-6	0.89 (0.035)	DCRP	95 - 105	18	112 (4.4)
2 - 9	SMAW	E7018-1	3.2 (1/8)	DCRP	115 - 135	22 - 24	74 - 132 (2.9 - 5.2)
10-13	SAW	F7A6-EM12K	3.2 (1/8)	DCRP	500 - 525	28 - 29	368 - 394 (14.5 - 15.5)
14-26	SAW	F7A6-EM12K	3.2 (1/8)	DCRP	450 - 475	29 - 30	368 - 381 (14.5 - 15.0)
27-30	SAW	F7A6-EM12K	3.2 (1/8)	DCRP	450 - 475	31 - 32	381 (15.0)

**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	18.8 (0.740)	34.6 (1.362)	650 (1.008)	348 500 (78,400)	536 (77,700)	Partial cup & cone Base metal
T2	18.9 (0.744)	35.0 (1.378)	662 (1.026)	357 300 (80,400)	540 (78,300)	Partial cup & cone Base 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 IMPACT TOUGHNESS**

Type of Test           Charpy V Notch           Orientation           Transverse            
 Test Temperature           -46°C (-50°F)           Specimen Size           10 X 10 mm          

Specimen No.	Notch Location	Impact Values J (ft. lbs)
A2.1	Weld metal	114 (84.2)
A2.2	@ 1/16 in.	126 (93.0)
A2.3	from surface	121 (89.2)
B2.1	Weld metal	32.5 (24.0)
B2.2	@ 1/4 t.	30.1 (22.2)
B2.3	opposite side	29.5 (21.8)
A3.1	P1 Grp. 1 - HAZ	169 (125)
A3.2	P1 Grp. 1 - HAZ	191 (141)
A3.3	P1 Grp. 1 - HAZ	38.5 (28.4)
B3.1	P1 Grp. 2 - HAZ	179 (132)
B3.2	P1 Grp. 2 - HAZ	>261 (>192)
B3.3	P1 Grp. 2 - HAZ	203 (150)

**OTHER TESTS**

          Rockwell Hardness Test, see attached report - C96-570.4          

Welders Name           James Patrick / Robert Devylder           Certificate File No.           W-4272 / - - -            
 Tests Conducted By           Ludwig & Associates Ltd.            
 Laboratory Test No.           C96-570.4          

*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           NGC Compression Solutions Ltd.          

Date           OCT 01 2018          

Signed           



# LUDWIG & ASSOCIATES LTD.

Welding Consulting and Engineering

## LABORATORY TEST REPORT

**CUSTOMER:** E & D PIPE AND PROCESS EQUIPMENT LTD.    **Laboratory Test No.:** C96-570.4  
 #2, Building B, 624 Beaverdam Road N.E.    **Date:** September 13, 1996  
 Calgary, Alberta  
 T2K 4W6

**Attention:** Arnie Hillis

---

**PQR Number:** PQ7  
**Material:** SA 516 Gr. 70N to SA 516 Gr. 60N  
**Thickness:** 38.1 mm (1.500 in.)  
**Thermal Condition:** As Welded

---

### TENSILE TEST QW-462.1(a)

SAMPLE NUMBER	T1	T2
WIDTH mm (in)	18.8 (0.740)	18.9 (0.744)
THICKNESS mm (in)	34.6 (1.362)	35.0 (1.378)
AREA sq mm (sq in)	650 (1.008)	662 (1.026)
ULT. LOAD N (lbs)	348 500 (78,400)	357 300 (80,400)
UTS MPa (psi)	536 (77,700)	540 (78,300)
FRACTURE TYPE	Partial Cup & Cone	Partial Cup & Cone
FRACTURE LOCATION	Base Metal	Base Metal

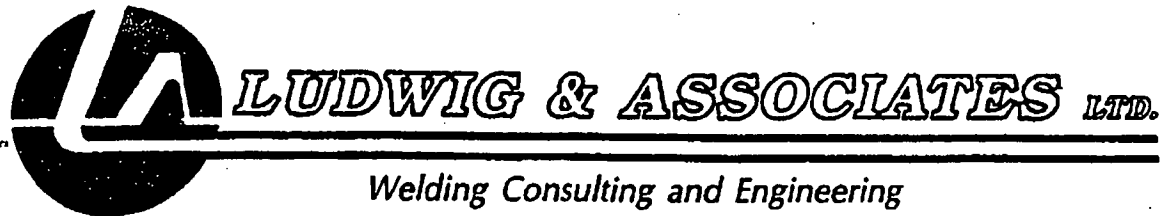
### GUIDED-BEND TEST QW-462.2

SAMPLE WIDTH:	9.53 mm (0.375 in.)	SAMPLE THICKNESS:	38.1 mm (1.500 in.)
PLUNGER SIZE:	38.1 mm (1.500 in.)	YOKE SIZE:	60.3 mm (2.375 in.)
SAMPLE TYPE	Side Bend	Side Bend	Side Bend
SAMPLE NUMBER(S)	S1	S2	S3
RESULTS	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, 1995 edition and latest addenda.

Laboratory Test Conducted By: \_\_\_\_\_

Patrick Voisin, C.E.T.



## LABORATORY TEST REPORT

**CUSTOMER:** E & D PIPE AND PROCESS EQUIPMENT LTD.    **Laboratory Test No.:** C96-570.4  
 #2, Building B, 624 Beaverdam Road N.E.                      **Date:** September 16, 1996  
 Calgary, Alberta  
 T2K 4W6

**Attention:** Arnie Hillis

**PQR Number:** PQ7  
**Material:** SA 516 Gr. 70N to SA 516 Gr. 60N  
**Thickness:** 38.1 mm (1.500 in.)  
**Thermal Condition:** As Welded

### NOTCH-TOUGHNESS TEST

**TYPE OF TEST:** Charpy V-Notch    **ORIENTATION:** Transverse  
**TEST TEMPERATURE:** -46°C (-50°F)    **SPECIMEN SIZE:** 10 x 10 mm

Specimen Number	Notch Location	Impact Values Joules (ft.lbs)	
A2.1	Weld Metal	114	(84.2)
A2.2	@ 1/16 in.	126	(93.0)
A2.3	from surface	121	(89.2)
B2.1	Weld Metal	32.5	(24.0)
B2.2	@ 1/4 t	30.1	(22.2)
B2.3	opposite side	29.5	(21.8)
A3.1	P1, Grp. 1 - HAZ	169	(125)
A3.2	P1, Grp. 1 - HAZ	191	(141)
A3.3	P1, Grp. 1 - HAZ	38.5	(28.4)
B3.1	P1, Grp. 2 - HAZ	179	(132)
B3.2	P1, Grp. 2 - HAZ	>261	(>192)
B3.3	P1, Grp. 2 - HAZ	203	(150)

*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, 1995 edition and latest addenda.*

Laboratory Test Conducted By: Pat Voisin  
Patrick Voisin, C.E.T.





# PRODUCT CERTIFICATE

Customer AIR LIQUIDE CANADA

Order n°: PO 1219465

Specification: AWS A5.17

Quantity : 20.000 Kg

Product: LA 59 / Blueshield LA 12K

Grains Size : 2+16 (EN 14174)

Batch n°: 27115050/13370751

## TEST REPORT (EN 10204 - 3.1)

The under mentioned test results have been obtained on the basis of non specific inspection and testing, performed on lots of the same classification, manufacturing processes and material requirements of the above mentioned lot.

### 1 - CHEMICAL AND PHYSICAL CHARACTERISTICS OF THE FLUX

Chemical Composition of the flux (%)						Grain Size Cumulated				
MnO	Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	CaO	CaF <sub>2</sub>	MgO	> 0,200	> 0.500	> 0.800	> 1,00	> 1,60
2.16	23.27	13.52	0.98	23.69	30.25	99,5	83,2	56,9	39,1	0,0

### 2 - MECHANICAL TEST ACCORDING TO AWS A 5.17

Welding Parameters							
Wire Diam mm	Current Amps	Voltage Volt	Travel Speed cm/min	Stick Out mm	Passes/Layers n°	Preheat °F (°C)	Interpass °F (°C)
4,0	525	29	42	28	16/8	N.A.	300 (150)

Chemical composition (%)									
Elements	C	Mn	Si	S	P	Cu(total)	Cr	Mo	Ni
Wire Blueshield LA 12K	0,122	1,03	0,23	0,002	0,009	0,07			
All Weld Metal	0,091	1,372	0,522	0,0163	0,020	0,111	0,0779	0,0087	0,072

Weld Metal Test LA 59 Blueshield LA 12K	Mechanical properties					Note
	Tensile Strength (N/mm <sup>2</sup> )	Yield Point (N/mm <sup>2</sup> )	Elongation 4d (%)	Impact Value Average in Joule		
				-40°C	-51°C	
594	504	31,3	107	48	AW	
566	446	30,3	131	65	PWHT *	

\* PWHT at 1150±25°F (620±15°C) for 60minutes (according to AWS A5.17 p.9.4)

All above test results comply with requirements of class AWS A 5.17:

**F7A6-F7P6-EM12K**

3 - HYDROGEN DIFFUSIBLE TEST ACCORDING TO AWS A4.3 93 :

4,04 ML/100g

4 - WALL NEUTRALITY NUMBER ACCORDING TO AWS RULE :

30

5 - BASICITY INDEX :

2,0

Date  
26/02/15

Issued by QA Manager  
(Claudio Bevilacqua)

Signature  
*Claudio Bevilacqua*  
Pro - Air Liquide Welding Italia S.p.A.

Stabilimento di Ardenno (SO)  
RESPONSABILE ASSICURAZIONE QUALITÀ





## QW-483 PROCEDURE QUALIFICATION RECORD (PQR)

Company Name NGC Compression Solutions Ltd.  
Procedure Qualification Record No. 7018-AW-1 (Rev. 0) Date August 16, 2018  
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 With metal backing, see next page Retainers Without

### BASE METALS (QW-403)

Material Specification No. SA 516 Type or Grade Gr. 60/70  
P-No. P1 Groups 1/2 To P-No. P1 Groups 1/2 Thickness 0.232 in.  
Heat Number 429693 - 29255-02 Carbon Equivalent (1) 0.37  
Other 0.375 in. plate machined to 0.232 in. thickness  
Deposited Weld Metal (Per Pass) Did not exceed 0.094 in.  
(1) Per CSA Z662 Carbon Equivalent formula. See chemical composition of heat analysis on attached material test report.

### FILLER METALS (QW-404)

SMAW  
Specification No. (SFA) SFA 5.1  
AWS No. (Class) E7018-1 (2)  
F-No. F4  
A-No. A1  
Diameter See attached sketch  
Deposited Weld Metal Thickness 0.232 in.  
(2) Air Liquide Canada Inc.: Blueshield LA 18 Plus

### POSITION (QW-405)

Position of Groove 3G Weld Progression Vertical up

### PREHEAT (QW-406)

Preheat Temperature 50 °F Interpass Temp. (Max.) 350 °F  
Preheat Maintenance Weld was allowed to cool to ambient temperature in still air after welding was completed.

### POSTWELD HEAT TREATMENT (QW-407)

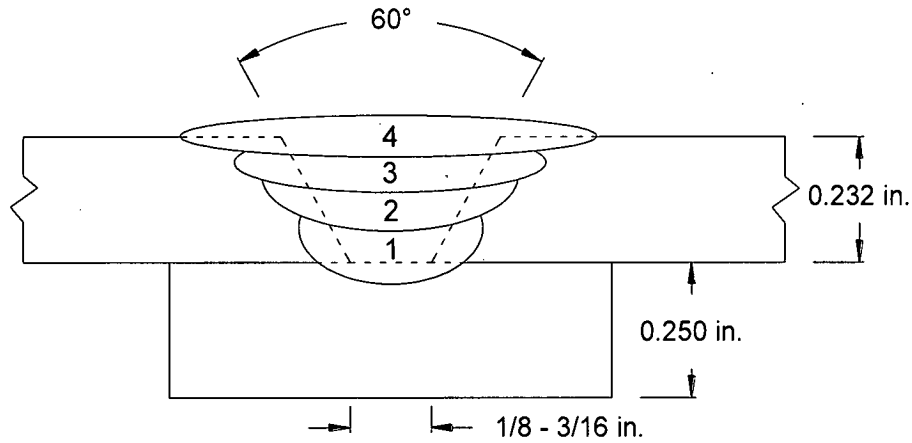
With or Without Without  
Temperature N/A Time N/A

### ELECTRICAL CHARACTERISTICS (QW-409)

Current Direct Polarity Reverse, electrode positive  
Amps See next page Volts See next page  
Heat Input 62,727 J/in. maximum

**TECHNIQUE (QW-410)**

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



Pass	Process	Filler Metal	Diameter in.	Current Type & Polarity	Amperage Range	Voltage Range	Travel Speed i.p.m.
1	SMAW	E7018-1	3/32	DCRP	97 - 103	20 - 24	5.6
2	SMAW	E7018-1	3/32	DCRP	97 - 103	20 - 24	5.6
3	SMAW	E7018-1	3/32	DCRP	97 - 103	20 - 24	5.6
4	SMAW	E7018-1	3/32	DCRP	97 - 103	21 - 25	2.2

PQR NO. 7018-AW-1 (Rev. 0)

### CHARPY V-NOTCH IMPACT TEST

Type of Test Charpy V-Notch Orientation Transverse  
Weld Thickness E7018-1 (t) = 0.232 in.

Governing Specification	Notch Location	Specimen Size in.	Test Temperature ° F	Specimen Number	Impact Values ft·lbf
ASME VIII Div.1 - 2017	Weld metal within 1/16 in. of weld surface	0.394 x 0.197	-50	H2.1	78
				H2.2	75
				H2.3	75
&					
ASME B31.3 - 2016	HAZ within 1/4 - 1/2t from weld surface	0.394 x 0.197	-50	H3.1	77
				H3.2	35
				H3.3	79

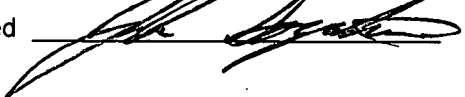
### OTHER TESTS

Vickers Hardness - see attached Laboratory Test Report No.: C18-633.1

Welders Name Shauna Hall Certificate File No. W-29884  
Tests Conducted By SGS Canada Inc.  
Laboratory Test No. C18-633.1

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.

Manufacturer NGC Compression Solutions Ltd.

Date SEP 28 2018 Signed 



### CHARPY V-NOTCH IMPACT TEST

**Customer:** NGC Compression Solutions Ltd.  
2b, 624 Beaver Dam Road N.E.  
Calgary, Alberta  
T2K 4W6

**Laboratory Test No.:** C18-633.1  
**Date:** August 24, 2018

**Attention:** John Gogorenko

<b>PQR No.:</b>	7018-AW-1 (Rev. 0)	<b>Welding Process:</b>	SMAW
<b>Material:</b>	SA 516 Gr. 60/70	<b>Heat No.:</b>	429693 - 29255-02
<b>Thickness:</b>	5.89 mm (0.232 in.)		
<b>Filler Metal:</b>	E7018-1		
<b>Weld Thickness:</b>	5.89 mm (0.232 in.)		
<b>Thermal Condition:</b>	As Welded		

<b>Specimen Size:</b>	10 x 5 mm (0.394 x 0.197 in.)	<b>Instrument:</b>	Satec, SI-1C SN:1363
<b>Orientation:</b>	Transverse	<b>Capacity:</b>	325 J (240 ft-lbf)
<b>Test Temperature:</b>	-46 °C (-50 °F)	<b>Verified Range:</b>	1.7 - 260 J (1.3 - 192 ft-lbf)
<b>Governing Spec.:</b>	ASME Section VIII, Div. I, UG-84 – 2017 & ASME B31.3 - 2016	<b>Calibration Date:</b>	June 5, 2018

Specimen Number	Notch Location	Impact Values	
		Joules	(ft-lbf)
H2.1	Weld Metal within 1.5 mm (1/16") of weld surface	106	(78)
H2.2		102	(75)
H2.3		102	(75)
H3.1	HAZ 1/4-1/2t from weld surface	104	(77)
H3.2		47	(35)
H3.3		107	(79)

Note: Metric values calculated by direct conversion.

**Test Conducted By:** Kamaldeep Brar, T.T. (Calgary)

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



This report (or certificate) is issued by the Company under its General Conditions for Inspection and Testing Services (copy available upon request). The issuance of this report (or certificate) does not exonerate buyers or sellers from exercising all their rights and discharging all their liabilities under the Contract of Sale. Stipulations to the contrary are not binding on the Company. The Company's responsibility under this report (or certificate) is limited to proven negligence and will in no case be more than ten times the amount of the fees or commission. Except by special arrangement, samples, if drawn, will not be retained by the Company for more than 30 days. The information stated in this report (or certificate) is derived from the results of inspection or testing procedures carried out in accordance with the instructions of our Client, and/or our assessment of such results on the basis of any technical standards, trade custom or practice, or other circumstances which should in our professional opinion be taken into account.



### HARDNESS TEST

**Customer:** NGC Compression Solutions Ltd.  
2b, 624 Beaver Dam Road N.E.  
Calgary, Alberta  
T2K 4W6

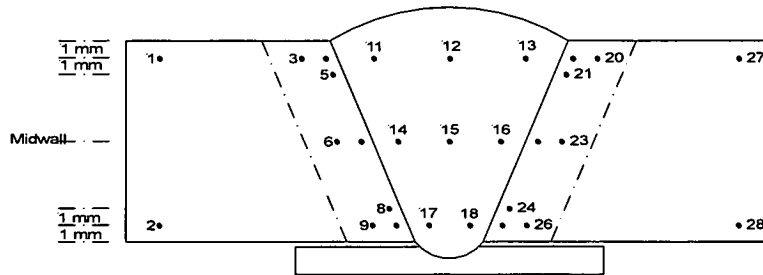
**Laboratory Test No.:** C18-633.1  
**Date:** August 23, 2018

**Attention:** John Gogorenko

<b>PQR No.:</b>	7018-AW-1 (Rev. 0)	<b>Welding Process:</b>	SMAW
<b>Material:</b>	SA 516 Gr. 60/70	<b>Heat No.:</b>	429693 - 29255-02
<b>Thickness:</b>	5.89 mm (0.232 in.)		
<b>Filler Metal:</b>	E7018-1		
<b>Weld Thickness:</b>	5.89 mm (0.232 in.)		
<b>Thermal Condition:</b>	As Welded		

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

**Instrument:** DuraScan 667  
**Calibration Date:** November 21, 2017



Parent Metal		HAZ		Weld Metal		HAZ		Parent Metal	
1	151	3	163	11	187	19	188	27	154
2	172	4	183	12	195	20	164	28	162
		5	204	13	178	21	194		
		6	184	14	170	22	195		
		7	187	15	167	23	195		
		8	176	16	168	24	177		
		9	168	17	161	25	172		
		10	173	18	158	26	164		

**Test Conducted By:** Parm Sangha, C.E.T. (Calgary)

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



This report (or certificate) is issued by the Company under its General Conditions for Inspection and Testing Services (copy available upon request). The issuance of this report (or certificate) does not exonerate buyers or sellers from exercising all their rights and discharging all their liabilities under the Contract of Sale. Stipulations to the contrary are not binding on the Company. The Company's responsibility under this report (or certificate) is limited to proven negligence and will in no case be more than ten times the amount of the fees or commission. Except by special arrangement, samples, if drawn, will not be retained by the Company for more than 30 days. The information stated in this report (or certificate) is derived from the results of inspection or testing procedures carried out in accordance with the instructions of our Client, and/or our assessment of such results on the basis of any technical standards, trade custom or practice, or other circumstances which should in our professional opinion be taken into account.

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 1/...
A05 Established inspecting body DH	A06 Purchaser EDMONTON STEEL, EDMON Final receiver EDMONTON STEEL, EDMON	A07.1 No. ED10682-J1010ER A07.2 No.		B01 Product HEAVY PLATES
B02/ Steel design. SA516-60	SA20-S5			 20255
B03 Any suppl. requirements	ASME-III:2013 DIL-HUE-1:R33-2014-04-04			

B01-B99 Description of the product

B14 Item No.	B08 Number of pieces	B09 Thickness	B10 Width	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
			INCH						
01	1	0,3750 x	96,50000 x	480,00000	2234	N	429693	29242-01	CPL-321 SA 516 Gr. 60 0.375 in. Heat No.: 429693 - 29255-02 Received On: July 13, 2018 P.O. No.: 200091 (Int. Req. C2292)   Reviewed By:
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	

 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	 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)

<b>A02 INSPECTION CERTIFICATE 3.1 AS PER EN 10204:2004</b> <b>INSPECTION CERTIFICATE 3.1 AS PER ISO 10474:2013</b> <b>MATERIAL TEST REPORT (MTR)</b>		<b>A10 Advice of dispatch No./</b> <b>Date of dispatch</b> 558728-23.02.16	<b>A08/ Manufacturer's order/</b> <b>A03 Certificate No.</b> 411465-004	<b>Sheet</b> 5/...
<b>A05 Established inspecting body</b> DH	<b>A06 Purchaser</b> EDMONTON STEEL, EDMON <b>Final receiver</b> EDMONTON STEEL, EDMON	<b>A07.1 No.</b> ED10682-J1010ER <b>A07.2 No.</b>	<b>B01 Product</b> HEAVY PLATES	
<b>B02/ Steel design.</b> SA516-60		SA20-S5		
<b>B03 Any suppl.</b> ASME-III:2013 <b>requirements</b> DIL-HUE-1:R33-2014-04-04				

**B01-B99 Description of the product**

B14 Item No.	B08 Number of pieces	B09 Thickness	B10 Width	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
INCH									
15	1	1,3750 x	121,00000 x	480,00000	10273	N	429485	13840-01	
15	1	1,3750 x	121,00000 x	480,00000	10273	N	429485	13840-02	
15	1	1,3750 x	121,00000 x	480,00000	10273	N	429485	13840-03	
15	1	1,3750 x	121,00000 x	480,00000	10273	N	429485	13854-01	
15	1	1,3750 x	121,00000 x	480,00000	10273	N	429485	13854-02	
15	1	1,3750 x	121,00000 x	480,00000	10273	N	429485	13854-03	
15	1	1,3750 x	121,00000 x	480,00000	10273	N	429485	13857-01	
15	1	1,3750 x	121,00000 x	480,00000	10273	N	429485	13857-02	
15	1	1,3750 x	121,00000 x	480,00000	10273	N	429485	13857-03	
**	9				92457				
***	91				461182				

**B04 Product delivery condition**

**ITEM NO.: 01-15**  
 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

**B06 Marking of the product**

**ITEM NO.: 01-15**  
 STEEL DESIGNATION SA516 70 MTLTV SA516 60 MTLTV  
 HEAT NO. / TRADEMARK / ROLLED PLATE NO.-TEST NO. / INSPECTOR'S STAMP

<p>Manufacturer's mark</p>	Z01/Z02/Z03 We hereby certify, that the above mentioned materials have been delivered in accordance with the terms of order.			AG der Dillinger Hüttenwerke Postfach 1580, D-66748 Dillingen/Saar Inspection department	A01
		B. BALDAUF Test House Manager	Inspector's stamp	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](http://www.dillinger.de/certificate))

<b>A02 INSPECTION CERTIFICATE 3.1 AS PER EN 10204:2004</b> <b>INSPECTION CERTIFICATE 3.1 AS PER ISO 10474:2013</b> <b>MATERIAL TEST REPORT (MTR)</b>		<b>A10 Advice of dispatch No./</b> <b>Date of dispatch</b> 558728-23.02.16	<b>A08/ Manufacturer's order/</b> <b>A03 Certificate No.</b> 411465-004	<b>Sheet</b> 11/...
<b>A05 Established inspecting body</b> DH	<b>A06 Purchaser</b> EDMONTON STEEL, EDMON <b>Final receiver</b> EDMONTON STEEL, EDMON	<b>A07.1 No.</b> ED10682-J1010ER <b>A07.2 No.</b>	<b>B01 Product</b> HEAVY PLATES	
<b>B02/ Steel design.</b> SA516-60 <b>B03 Any suppl.</b> ASME-IIA:2013 <b>requirements</b> DIL-HUE-1:R33-2014-04-04		SA20-S5		

**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

<b>A04</b>  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	 Inspector's stamp	AG der Dillinger Hüttenwerke Postfach 1580, D-66748 Dillingen/Saar Inspection department	<b>A01</b> 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 1/...
A05 Established inspecting body DH	A06 Purchaser EDMONTON STEEL, EDMON Final receiver EDMONTON STEEL, EDMON	A07.1 No. ED10682-J1010ER	A07.2 No.	B01 Product HEAVY PLATES
B02/ Steel design. SA516-70	SA20-S5			
B03 Any suppl. ASME- IIA:2013 requirements DIL-HUE-1:R33-2014-04-04				

B01-B99 Description of the product

B14 Item No.	B08 Number of places	B09 Thickness	B10 Width	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
		INCH							
01	1	0,3750 x	96,50000 x	480,00000	2234	N	429693	29242-01	CPL-321 SA 516 Gr. 70 0.375 in. Heat No.: 429693 - 29255-02 Received On: July 13, 2018 P.O. No.: 200091 (Int. Req. C2292)  Reviewed By: <i>Christof Lind</i>
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	

<p>Manufacturer's mark</p>	Z01/Z02/Z03 We hereby certify, that the above mentioned materials have been delivered in accordance with the terms of order.	<p>B. BALDAUF Test House Manager</p>	<p>Inspector's stamp</p>	AG der Dillinger Hüttenwerke Postfach 1580, D-66748 Dillingen/Saar Inspection department	Date 23.02.16	A01 PP 1
	Date 23.02.16					

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 5/...
A05 Established inspecting body DH	A06 Purchaser EDMONTON STEEL, EDMON Final receiver EDMONTON STEEL, EDMON	A07.1 No. ED10682-J1010ER 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			

B01-B99 Description of the product

B14 Item No.	B08 Number of pieces	B09 Thickness	B10 Width	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
		INCH							
15	1	1,3750 x	121,00000 x	480,00000	10273	N	429485	13840-01	
15	1	1,3750 x	121,00000 x	480,00000	10273	N	429485	13840-02	
15	1	1,3750 x	121,00000 x	480,00000	10273	N	429485	13840-03	
15	1	1,3750 x	121,00000 x	480,00000	10273	N	429485	13854-01	
15	1	1,3750 x	121,00000 x	480,00000	10273	N	429485	13854-02	
15	1	1,3750 x	121,00000 x	480,00000	10273	N	429485	13854-03	
15	1	1,3750 x	121,00000 x	480,00000	10273	N	429485	13857-01	
15	1	1,3750 x	121,00000 x	480,00000	10273	N	429485	13857-02	
15	1	1,3750 x	121,00000 x	480,00000	10273	N	429485	13857-03	
**	9				92457				
***	91				461182				

B04 Product delivery condition

ITEM NO.: 01-15  
 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

B06 Marking of the product

ITEM NO.: 01-15  
 STEEL DESIGNATION SA516 70 MTLTV SA516 60 MTLTV  
 HEAT NO. / TRADEMARK / ROLLED PLATE NO.-TEST NO. / INSPECTOR'S STAMP

A04  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	 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)

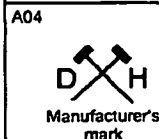
A02 INSPECTION CERTIFICATE 3.1 AS PER EN 10204:2004 INSPECTION CERTIFICATE 3.1 AS PER ISO 10474:2013 MATERIAL TEST REPORT (MTR)		A10 Advice of dispatch No./ Date of dispatch 558728-23.02.16	A08/ Manufacturer's order/ A03 Certificate No. 411465-004	Sheet 11/...
A05 Established inspecting body DH	A06 Purchaser EDMONTON STEEL, EDMON Final receiver EDMONTON STEEL, EDMON	A07.1 No. ED10682-J1010ER 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



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

*B. Baldauf*

B. BALDAUF  
Test House Manager



Inspector's stamp

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

Date 23.02.16

PP 1

A01

## QW-483 PROCEDURE QUALIFICATION RECORD (PQR)

Company Name NGC Compression Solutions Ltd.  
Procedure Qualification Record No. 7018-AW-2 (Rev. 0) Date August 16, 2018  
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 With metal backing, see next page Retainers Without

### BASE METALS (QW-403)

Material Specification No. SA 516 Type or Grade Gr. 60/70  
P-No. P1 Groups 1/2 To P-No. P1 Groups 1/2 Thickness 0.500 in.  
Heat Number 444127 - 34214-02 Carbon Equivalent (1) 0.38  
Other Plate product form  
Deposited Weld Metal (Per Pass) Did not exceed 0.094 in.  
(1) Per CSA Z662 Carbon Equivalent formula. See chemical composition of heat analysis on attached material test report.

### FILLER METALS (QW-404)

SMAW  
Specification No. (SFA) SFA 5.1  
AWS No. (Class) E7018-1 (2)  
F-No. F4  
A-No. A1  
Diameter See attached sketch  
Deposited Weld Metal Thickness 0.500 in.  
(2) Air Liquide Canada Inc.: Blueshield LA 18 Plus

### POSITION (QW-405)

Position of Groove 3G Weld Progression Vertical up

### PREHEAT (QW-406)

Preheat Temperature 50 °F Interpass Temp. (Max.) 450 °F  
Preheat Maintenance Weld was allowed to cool to ambient temperature in still air after welding was completed.

### POSTWELD HEAT TREATMENT (QW-407)

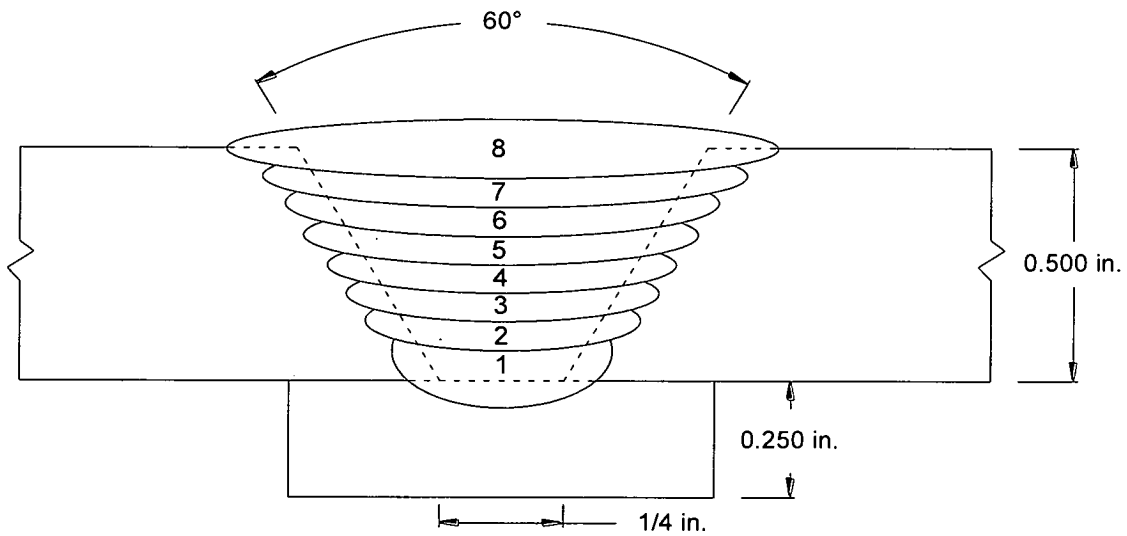
With or Without Without  
Temperature N/A Time N/A

### ELECTRICAL CHARACTERISTICS (QW-409)

Current Direct Polarity Reverse, electrode positive  
Amps See next page Volts See next page  
Heat Input 78,000 J/in. maximum

**TECHNIQUE (QW-410)**

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



Pass	Process	Filler Metal	Diameter in.	Current Type & Polarity	Amperage Range	Voltage Range	Travel Speed i.p.m.
1	SMAW	E7018-1	3/32	DCRP	100 - 108	20 - 24	4.5
2	SMAW	E7018-1	3/32	DCRP	100 - 108	20 - 24	4.4
3	SMAW	E7018-1	3/32	DCRP	100 - 108	20 - 24	4.3
4	SMAW	E7018-1	1/8	DCRP	130 - 138	21 - 25	6.0
5	SMAW	E7018-1	1/8	DCRP	128 - 136	21 - 25	4.2
6	SMAW	E7018-1	1/8	DCRP	128 - 136	21 - 25	4.3
7	SMAW	E7018-1	1/8	DCRP	126 - 134	21 - 25	4.5
8	SMAW	E7018-1	1/8	DCRP	126 - 134	21 - 25	2.3

PQR NO. 7018-AW-2 (Rev. 0)

**CHARPY V-NOTCH IMPACT TEST**

Type of Test Charpy V-Notch Orientation Transverse  
Weld Thickness E7018-1 (t) = 0.500 in.

Governing Specification	Notch Location	Specimen Size in.	Test Temperature °F	Specimen Number	Impact Values ft·lbf
ASME VIII Div.1 - 2017	Weld metal within 1/16 in. of weld surface	0.394 x 0.394	-50	N2.1	111
				N2.2	120
				N2.3	104
& ASME B31.3 - 2016	HAZ within 1/4 - 1/2t from weld surface	0.394 x 0.394	-50	N3.1	126
				N3.2	162
				N3.3	185

**OTHER TESTS**

Vickers Hardness - see attached Laboratory Test Report No.: C18-633.3

Welders Name Shauna Hall Certificate File No. W-29884  
Tests Conducted By SGS Canada Inc.  
Laboratory Test No. C18-633.3

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.

Manufacturer NGC Compression Solutions Ltd.

Date SEP 28 2018 Signed 



### CHARPY V-NOTCH IMPACT TEST

**Customer:** NGC Compression Solutions Ltd.  
2b, 624 Beaver Dam Road N.E.  
Calgary, Alberta  
T2K 4W6

**Laboratory Test No.:** C18-633.3  
**Date:** August 24, 2018

**Attention:** John Gogorenko

<b>PQR No.:</b>	7018-AW-2 (Rev. 0)	<b>Welding Process:</b>	SMAW
<b>Material:</b>	SA 516 Gr. 60/70	<b>Heat No.:</b>	444127 - 34214-02
<b>Thickness:</b>	12.7 mm (0.500 in.)		
<b>Filler Metal:</b>	E7018-1		
<b>Weld Thickness:</b>	12.7 mm (0.500 in.)		
<b>Thermal Condition:</b>	As Welded		

<b>Specimen Size:</b>	10 x 10 mm (0.394 x 0.394 in.)	<b>Instrument:</b>	Satec, SI-1C SN:1363
<b>Orientation:</b>	Transverse	<b>Capacity:</b>	325 J (240 ft-lbf)
<b>Test Temperature:</b>	-46 °C (-50 °F)	<b>Verified Range:</b>	1.7 - 260 J (1.3 - 192 ft-lbf)
<b>Governing Spec.:</b>	ASME Section VIII, Div. I, UG-84 – 2017 & ASME B31.3 - 2016	<b>Calibration Date:</b>	June 5, 2018

Specimen Number	Notch Location	Impact Values	
		Joules	(ft-lbf)
N2.1	Weld Metal within 1.5 mm (1/16") of weld surface	150	(111)
N2.2		163	(120)
N2.3		141	(104)
N3.1	HAZ 1/4-1/2t from weld surface	171	(126)
N3.2		220	(162)
N3.3		251	(185)

*Note: Metric values calculated by direct conversion.*

**Test Conducted By:** Pam Sangha, C.E.T. (Calgary)

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



This report (or certificate) is issued by the Company under its General Conditions for Inspection and Testing Services (copy available upon request). The issuance of this report (or certificate) does not exonerate buyers or sellers from exercising all their rights and discharging all their liabilities under the Contract of Sale. Stipulations to the contrary are not binding on the Company. The Company's responsibility under this report (or certificate) is limited to proven negligence and will in no case be more than ten times the amount of the fees or commission. Except by special arrangement, samples, if drawn, will not be retained by the Company for more than 30 days. The information stated in this report (or certificate) is derived from the results of inspection or testing procedures carried out in accordance with the instructions of our Client, and/or our assessment of such results on the basis of any technical standards, trade custom or practice, or other circumstances which should in our professional opinion be taken into account.



### HARDNESS TEST

**Customer:** NGC Compression Solutions Ltd.  
2b, 624 Beaver Dam Road N.E.  
Calgary, Alberta  
T2K 4W6

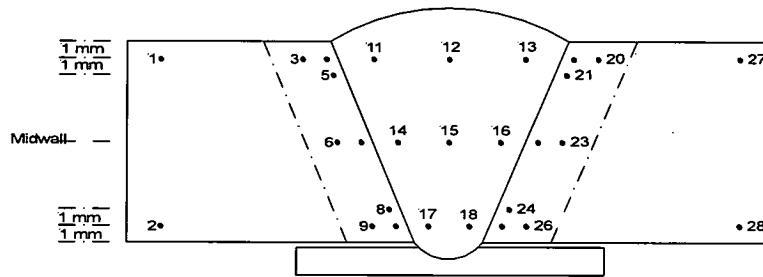
**Laboratory Test No.:** C18-633.3  
**Date:** August 24, 2018

**Attention:** John Gogorenko

<b>PQR No.:</b>	7018-AW-2 (Rev. 0)	<b>Welding Process:</b>	SMAW
<b>Material:</b>	SA 516 Gr. 60/70	<b>Heat No.:</b>	444127 - 34214-02
<b>Thickness:</b>	12.7 mm (0.500 in.)		
<b>Filler Metal:</b>	E7018-1		
<b>Weld Thickness:</b>	12.7 mm (0.500 in.)		
<b>Thermal Condition:</b>	As Welded		

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

**Instrument:** DuraScan 667  
**Calibration Date:** November 21, 2017



Parent Metal		HAZ		Weld Metal		HAZ		Parent Metal	
1	156	3	168	11	196	19	193	27	155
2	157	4	189	12	193	20	169	28	154
		5	195	13	193	21	192		
		6	167	14	163	22	175		
		7	170	15	163	23	173		
		8	172	16	162	24	173		
		9	171	17	179	25	181		
		10	178	18	181	26	186		

**Test Conducted By:** Pam Sangha, C.E.T. (Calgary)

**Certified By:** \_\_\_\_\_

Eric Dacyk, C.E.T.




This report (or certificate) is issued by the Company under its General Conditions for Inspection and Testing Services (copy available upon request). The issuance of this report (or certificate) does not exonerate buyers or sellers from exercising all their rights and discharging all their liabilities under the Contract of Sale. Stipulations to the contrary are not binding on the Company. The Company's responsibility under this report (or certificate) is limited to proven negligence and will in no case be more than ten times the amount of the fees or commission. Except by special arrangement, samples, if drawn, will not be retained by the Company for more than 30 days. The information stated in this report (or certificate) is derived from the results of inspection or testing procedures carried out in accordance with the instructions of our Client, and/or our assessment of such results on the basis of any technical standards, trade custom or practice, or other circumstances which should in our professional opinion be taken into account.



QM-System: Certification as per ISO 9001

**DILLINGER** 

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

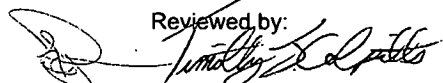
<b>A02</b> INSPECTION CERTIFICATE 3.1 AS PER EN 10204:2004 INSPECTION CERTIFICATE 3.1 AS PER ISO 10474:2013 MATERIAL TEST REPORT (MTR)		<b>A10</b> Advice of dispatch No./ Date of dispatch  599766-29.04.17	<b>A08/</b> Manufacturer's order/ <b>A03</b> Certificate No.  423453-001  Sheet 1/...
<b>A05</b> Established inspecting body DH	<b>A06</b> Purchaser EDMONTON STEEL, EDMON  Final receiver EDMONTON STEEL, EDMON	<b>A07.1</b> No. ED10701-J1010ER  <b>A07.2</b> No.	
<b>B02/</b> Steel design. SA516-60  <b>B03</b> Any suppl. ASME-IIA:2015 requirements DIL-HUE-1:R34-2016-08-19		SA20-S5  <div style="text-align: center;">                       20796                 </div>	


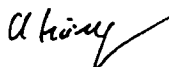

**A01-A99 Further commercial information**

B14 Item No.	B07.2 Heat No.	B07.1 Rol.plate / Test No.	B16 Agreed order amendment Document No.	Date
02	444127	34223-01	T-1-2GRNOJ	03.04.17
03	444134	34556-02	T-1-2GRNOM	03.04.17

**B01-B99 Description of the product**

B14 Item No.	B08 Number of pieces	B09 Thickness	B10 Width	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
			INCH						
01	1	0,5000 x	96,50000 x	480,00000	2979	N	444127	34203-01	ITEM001
01	1	0,5000 x	96,50000 x	480,00000	2979	N	444127	34203-02	ITEM001
01	1	0,5000 x	96,50000 x	480,00000	2979	N	444127	34203-03	ITEM001
01	1	0,5000 x	96,50000 x	480,00000	2979	N	444127	34206-01	ITEM001
01	1	0,5000 x	96,50000 x	480,00000	2979	N	444127	34206-02	ITEM001
01	1	0,5000 x	96,50000 x	480,00000	2979	N	444127	34206-03	ITEM001
01	1	0,5000 x	96,50000 x	480,00000	2979	N	444127	34213-01	ITEM001
01	1	0,5000 x	96,50000 x	480,00000	2979	N	444127	34213-02	ITEM001
01	1	0,5000 x	96,50000 x	480,00000	2979	N	444127	34213-03	ITEM001
01	1	0,5000 x	96,50000 x	480,00000	2979	N	444127	34214-01	ITEM001
01	1	0,5000 x	96,50000 x	480,00000	2979	N	444127	34214-02	ITEM001
01	1	0,5000 x	96,50000 x	480,00000	2979	N	444127	34214-03	ITEM001
**	12				35748				
02	1	0,5000 x	120,50000 x	480,00000	3720	N	444127	34209-01	ITEM002
02	1	0,5000 x	120,50000 x	480,00000	3720	N	444127	34209-02	ITEM002
02	1	0,5000 x	120,50000 x	480,00000	3720	N	444127	34215-01	ITEM002
02	1	0,5000 x	120,50000 x	480,00000	3720	N	444127	34215-02	ITEM002
02	1	0,5000 x	120,50000 x	480,00000	3720	N	444127	34216-01	ITEM002

CPL-316  
 SA 516 Gr. 60  
 0.500 in.  
 Heat No.: 444127 - 34214-02  
 Received on: May 7, 2018  
 P.O. No.: 197049 (Int. Req. C2223)  
 Reviewed by: 

 Manufacturer's mark	Z01/Z02/Z03 We hereby certify, that the above mentioned materials have been delivered in accordance with the terms of order.	 DR. CH. KÖNIG Test House Manager	 Inspector's stamp	AG der Dillinger Hüttenwerke Postfach 1580, D-66748 Dillinger/Saar Inspection department	A01 Date 02.05.17 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 599766-29.04.17	A08/ Manufacturer's order/ A03 Certificate No. 423453-001	Sheet 4/...
A05 Established inspecting body DH	A06 Purchaser EDMONTON STEEL, EDMON Final receiver EDMONTON STEEL, EDMON	A07.1 No. ED10701-J1010ER A07.2 No.	B01 Product HEAVY PLATES	
B02/ Steel design. SA516-60		SA20-S5		
B03 Any suppl. ASME-IIA:2015 requirements DIL-HUE-1:R34-2016-08-19				

**B01-B99 Description of the product**

B14 Item No.	B08 Number of pieces	B09 Thickness	B10 Width	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
		INCH							
05	1	0,7500 x	96,50000 x	480,00000	4469	N	444131	34467-02	ITEM005
05	1	0,7500 x	96,50000 x	480,00000	4469	N	444131	34467-03	ITEM005
**	6				26814				
***	62				237422				

**B04 Product delivery condition**




ITEM NO.: 01-05  
 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

**B06 Marking of the product**

ITEM NO.: 01-05  
 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.: 01-05  
 THICKNESS REDUCTION RATIO >= 3,0 IS FULFILLED - CP. A/SA20(M) PAR. 5.3

A04 	Z01/Z02/Z03 We hereby certify, that the above mentioned materials have been delivered in accordance with the terms of order.	 DR. CH. KÖNIG Test House Manager	 Inspector's stamp	AG der Dillinger Hüttenwerke Postfach 1580, D-66748 Dillingen/Saar Inspection department	A01
		Date 02.05.17	PP 1		

QM-System: Certification as per ISO 9001



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

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  599766-29.04.17	A08/ Manufacturer's order/ A03 Certificate No.  423453-001	Sheet  8/...
A05 Established inspecting body DH	A06 Purchaser EDMONTON STEEL, EDMON Final receiver EDMONTON STEEL, EDMON	A07.1 No. ED10701-J1010ER 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 % - Heat analysis

B07.2 Heat	C70	C	SI	MN	P	S	N	CU	MO	NI	CR	V	NR	SN	TI
444127	Y	0,172	0,369	1,15	0,008	0,0010	0,0056	0,023	0,006	0,027	0,029	0,000	0,000	0,001	0,002
444129	Y	0,167	0,379	1,18	0,009	0,0007	0,0066	0,036	0,007	0,047	0,044	0,001	0,001	0,001	0,002
444131	Y	0,174	0,364	1,16	0,008	0,0009	0,0065	0,029	0,014	0,036	0,040	0,001	0,001	0,001	0,002
444134	Y	0,169	0,351	1,16	0,009	0,0009	0,0066	0,026	0,015	0,033	0,078	0,001	0,001	0,000	0,002

B07.2 Heat	C70	B	CA	AL-T
444127	Y	0,0004	0,0018	0,032
444129	Y	0,0003	0,0012	0,038
444131	Y	0,0004	0,0014	0,040
444134	Y	0,0001	0,0012	0,036

C94 Heat analysis Carbon equivalent / Alloying restrictions

B07.2 Heat	FO-02=	0,37	FO-51=	0,000	FO-55=	0,09	FO-78=	0,04	FO-91=	6,7
444127										
444129										
444131										
444134										

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

A04  Manufacturer's mark	Z01/Z02/Z03 We hereby certify, that the above mentioned materials have been delivered in accordance with the terms of order.	 DR. CH. KÖNIG Test House Manager	 Inspector's stamp	AG der Dillinger Hüttenwerke Postfach 1580, D-66748 Dillingen/Saar Inspection department	A01
		Date 02.05.17	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 599766-29.04.17	A08/ Manufacturer's order/ A03 Certificate No. 423453-001	Sheet 1/...
A05 Established inspecting body DH	A06 Purchaser EDMONTON STEEL, EDMON Final receiver EDMONTON STEEL, EDMON	A07.1 No. ED10701-J1010ER 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			




**A01-A99 Further commercial information**




B14 Item No.	B07.2 Heat No.	B07.1 Rol.plate / Test No.	B16 Agreed order amendment Document No.	Date
02	444127	34223-01	T-1-2GRNOJ	03.04.17
03	444134	34556-02	T-1-2GRNOM	03.04.17

**B01-B99 Description of the product**

B14 Item No.	B08 Number of pieces	B09 Thickness	B10 Width	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
INCH									
01	1	0,5000 x	96,50000 x	480,00000	2979	N	444127	34203-01	ITEM001
01	1	0,5000 x	96,50000 x	480,00000	2979	N	444127	34203-02	ITEM001
01	1	0,5000 x	96,50000 x	480,00000	2979	N	444127	34203-03	ITEM001
01	1	0,5000 x	96,50000 x	480,00000	2979	N	444127	34206-01	ITEM001
01	1	0,5000 x	96,50000 x	480,00000	2979	N	444127	34206-02	ITEM001
01	1	0,5000 x	96,50000 x	480,00000	2979	N	444127	34206-03	ITEM001
01	1	0,5000 x	96,50000 x	480,00000	2979	N	444127	34213-01	ITEM001
01	1	0,5000 x	96,50000 x	480,00000	2979	N	444127	34213-02	ITEM001
01	1	0,5000 x	96,50000 x	480,00000	2979	N	444127	34213-03	ITEM001
01	1	0,5000 x	96,50000 x	480,00000	2979	N	444127	34214-01	ITEM001
01	1	0,5000 x	96,50000 x	480,00000	2979	N	444127	34214-02	ITEM001
01	1	0,5000 x	96,50000 x	480,00000	2979	N	444127	34214-03	ITEM001
**	12				35748				
02	1	0,5000 x	120,50000 x	480,00000	3720	N	444127	34209-01	ITEM002
02	1	0,5000 x	120,50000 x	480,00000	3720	N	444127	34209-02	ITEM002
02	1	0,5000 x	120,50000 x	480,00000	3720	N	444127	34215-01	ITEM002
02	1	0,5000 x	120,50000 x	480,00000	3720	N	444127	34215-02	ITEM002
02	1	0,5000 x	120,50000 x	480,00000	3720	N	444127	34216-01	ITEM002

CPL-316  
SA 516 Gr. 70  
0.500 in.  
Heat No.: 444127 - 34214-02  
Received on: May 7, 2018  
P.O. No.: 197049 (Int. Req. C2223)

Reviewed: 

 Manufacturer's mark	Z01/Z02/Z03 We hereby certify, that the above mentioned materials have been delivered in accordance with the terms of order.	 DR. CH. KÖNIG Test House Manager	 Inspector's stamp	AG der Dillinger Hüttenwerke Postfach 1580, D-66748 Dillingen/Saar Inspection department	A01 Date 02.05.17 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  599766-29.04.17	A08/ Manufacturer's order/ A03 Certificate No.  423453-001	Sheet  4/...
---	--	--	---	--------------------

A05 Established inspecting body DH	A06 Purchaser EDMONTON STEEL, EDMON Final receiver EDMONTON STEEL, EDMON	A07.1 No. ED10701-J1010ER A07.2 No.	B01 Product HEAVY PLATES
---------------------------------------	---	--	-----------------------------

B02/ Steel design. SA516-70	SA20-S5
B03 Any suppl. ASME-IIA:2015 requirements DIL-HUE-1:R34-2016-08-19	

**B01-B99 Description of the product**

B14 Item No.	B08 Number of pieces	B09 Thickness	B10 Width	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
		INCH							
05	1	0,7500 x	96,50000 x	480,00000	4469	N	444131	34467-02	ITEM005
05	1	0,7500 x	96,50000 x	480,00000	4469	N	444131	34467-03	ITEM005
**	6				26814				
***	62				237422				

**B04 Product delivery condition**

ITEM NO.: 01-05  
 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

**B06 Marking of the product**

ITEM NO.: 01-05  
 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.: 01-05  
 THICKNESS REDUCTION RATIO >= 3,0 IS FULFILLED - CF. A/SA20(M) PAR. 5.3

 Manufacturer's mark	Z01/Z02/Z03 We hereby certify, that the above mentioned materials have been delivered in accordance with the terms of order.	 DR. CH. KÖNIG Test House Manager	 Inspector's stamp	AG der Dillinger Hüttenwerke Postfach 1580, D-66748 Dillingen/Saar Inspection department	A01
			Date 02.05.17	PP 1	

QM-System: Certification as per ISO 9001



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

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  599766-29.04.17	A08/ Manufacturer's order/ A03 Certificate No.  423453-001	Sheet  8/...
A05 Established inspecting body DH	A06 Purchaser EDMONTON STEEL, EDMON Final receiver EDMONTON STEEL, EDMON	A07.1 No. ED10701-J1010ER A07.2 No.	B01 Product HEAVY PLATES	
B02/ Steel design. SA516-70	SA20-S5			
B03 Any suppl. ASME-IIA:2015 requirements DIL-HUE-1:R34-2016-08-19				

C70-C99 Chemical composition % - Heat analysis

B07.2 Heat	C70	C	SI	MN	P	S	N	CU	MO	NI	CR	V	NB	SN	TI
444127	Y	0,172	0,369	1,15	0,008	0,0010	0,0056	0,023	0,006	0,027	0,029	0,000	0,000	0,001	0,002
444129	Y	0,167	0,379	1,18	0,009	0,0007	0,0066	0,036	0,007	0,047	0,044	0,001	0,001	0,001	0,002
444131	Y	0,174	0,364	1,16	0,008	0,0009	0,0065	0,029	0,014	0,036	0,040	0,001	0,001	0,001	0,002
444134	Y	0,169	0,351	1,16	0,009	0,0009	0,0066	0,026	0,015	0,033	0,078	0,001	0,001	0,000	0,002

B07.2 Heat	C70	B	CA	AL-T
444127	Y	0,0004	0,0018	0,032
444129	Y	0,0003	0,0012	0,038
444131	Y	0,0004	0,0014	0,040
444134	Y	0,0001	0,0012	0,036

C94 Heat analysis Carbon equivalent / Alloying restrictions

B07.2 Heat	FO-02=	FO-51=	FO-55=	FO-78=	FO-91=
444127	0,37	0,000	0,09	0,04	6,7
444129	0,38	0,002	0,13	0,05	7,1
444131	0,38	0,002	0,12	0,05	6,7
444134	0,39	0,002	0,15	0,09	6,9

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

A04  Manufacturer's mark	Z01/Z02/Z03 We hereby certify, that the above mentioned materials have been delivered in accordance with the terms of order.	 DR. CH. KÖNIG Test House Manager	 Inspector's stamp	AG der Dillinger Hüttenwerke Postfach 1580, D-66748 Dillingen/Saar Inspection department	A01
		Date 02.05.17	PP	1	

## QW-483 PROCEDURE QUALIFICATION RECORD (PQR)

Company Name E&D Pipe and Process Equipment Ltd.  
Procedure Qualification Record No. PQ1 (Rev. 1)  
Date Originally Qualified December 8, 1994 Revision Date September 28, 2018  
Revision(s) Rev. 1 (Editorial) - Addition of (QW-403) Deposited Weld Metal Per Pass.  
Clarification to (QW-407) Postweld Heat Treatment (Without).  
Company Name changed back to original qualifying organization.  
Company Name changed for recertification to NGC Compression  
Solutions Ltd. (formerly NGC Process Systems Ltd.). Removed Welding  
Procedure Specification No.  
Rev. 0 (Editorial) - Company Name changed to NGC Process Systems Ltd.  
(formerly E&D Pipe and Process Equipment Ltd.). Format update,  
March 18, 2005.  
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 106 Type or Grade Gr. B  
P-No. P1 To P-No. P1 Thickness 9.53 mm (0.375 in.)  
Diameter 141.3 mm (5.563 in.) O.D. Other Schedule 80  
Deposited Weld Metal (Per Pass) Did not exceed 9.53 mm (0.375 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  
Other \_\_\_\_\_  
Deposited Weld Metal Thickness 2.39 mm (0.094 in.) 7.14 mm (0.281 in.)

### POSITION (QW-405)

Position of Groove Root pass: 5G Fill & cap: 1G - rotated  
Weld Progression Root pass: Vertical up Fill & cap: N/A

### PREHEAT (QW-406)

Preheat Temperature 15°C (60°F) Interpass Temp. (Max.) Not recorded

### POSTWELD HEAT TREATMENT (QW-407)

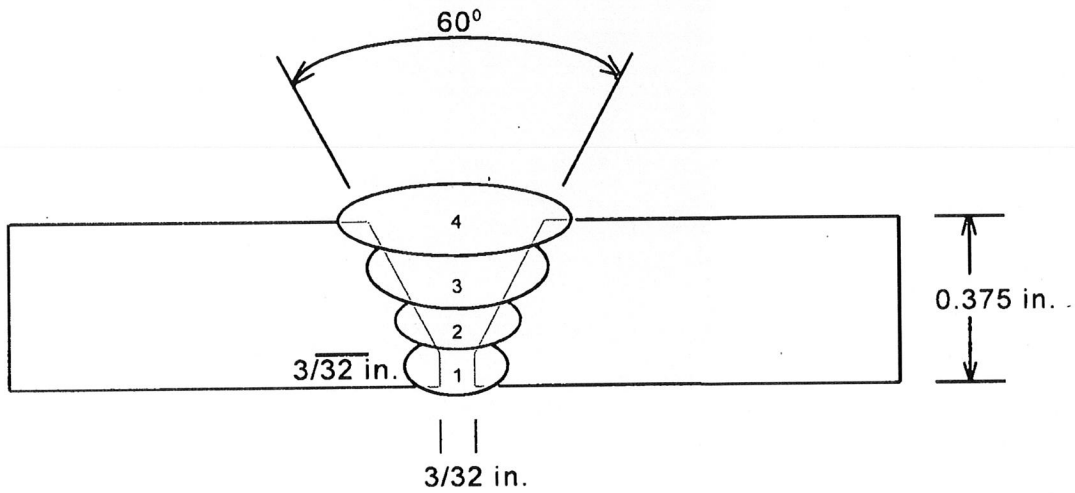
With or Without Without  
Temperature N/A Time N/A

### ELECTRICAL CHARACTERISTICS (QW-409)

Current Direct Polarity Reverse, electrode positive  
Amps See next page Volts See next page  
Heat Input N/A

**TECHNIQUE (QW-410)**

String or Weave Both Travel Speed See below  
 Multiple or Single Pass Per Side Multipass from groove side  
 Multiple or Single Electrodes Single electrode



Pass	Process	Filler Metal	Diameter mm (in.)	Current & Polarity	Amperage Range	Voltage Range	Travel Speed mm/min (ipm.)
1	SMAW	E6010	3.2 (1/8)	DCRP	75 - 85	22 - 24	75 (3.0)
2	SMAW	E7018 -1	2.4 (3/32)	DCRP	100 - 110	21 - 23	185 (7.3)
3	SMAW	E7018 -1	4.0 (5/32)	DCRP	170 - 180	20 - 22	140 (5.5)
4	SMAW	E7018 -1	5.0 (3/16)	DCRP	240 - 260	20 - 22	170 (6.6)



PQR NO. PQ1 (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	19.2 (0.756)	8.51 (0.335)	163 (0.253)	76 000 (17,100)	466 (67,600)	Partial cup & cone base metal
T2	19.3 (0.760)	7.95 (0.313)	153 (0.238)	72 000 (16,200)	471 (68,200)	Partial cup & cone base 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

**OTHER TESTS**

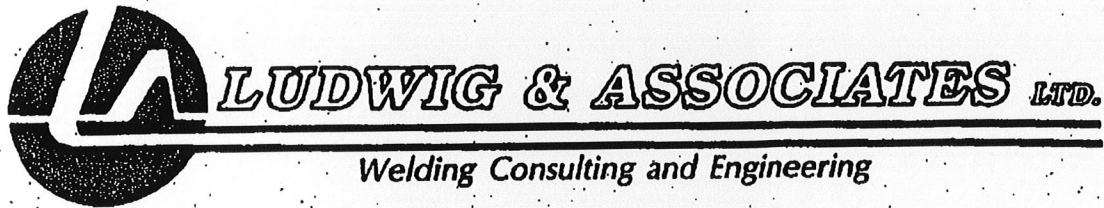
See attached Rockwell hardness test report C94-686.4

Welders Name Douglas McMillan Certificate File No. W-2450  
 Tests Conducted By Ludwig & Associates Ltd.  
 Laboratory Test No. C94-686.4

*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 NGC Compression Solutions Ltd.

Date SEP 28 2018 Signed 



## LABORATORY TEST REPORT

**CUSTOMER:** E & D PIPE AND PROCESS EQUIPMENT LTD.    **Laboratory Test No.:** C94-686.4  
 #2, Bldg. B, 824 Beaver Dam Road N.E.    **Date:** December 12, 1994  
 Calgary, AB  
 T2K-4W6

**Attention:** Donald Shalenko

**PQR Number:** PQ1  
**Material:** SA 106 Gr. B  
**Size:** 141.3 mm (5.563 in.) O.D. x 9.53 mm (0.375 in.) w.t.  
**Thermal Condition:** As Welded

### TENSILE TEST (QW-150)

SAMPLE NUMBER	T1	T2
WIDTH mm (in)	19.2    (0.756)	19.3    (0.760)
THICKNESS mm (in)	8.51    (0.335)	7.95    (0.313)
AREA sq mm (sq in)	163    (0.253)	153    (0.238)
ULT. LOAD N (lbs)	76 000    (17,100)	72 000    (16,200)
UTS MPa (psi)	466    (67,600)	471    (68,200)
FRACTURE TYPE	Partial Cup & Cone	Partial Cup & Cone
FRACTURE LOCATION	Base Metal	Base Metal

### GUIDED-BEND TEST (QW-160)

SAMPLE WIDTH:	9.53 mm (0.375 in.)	SAMPLE THICKNESS:	9.53 mm (0.375 in.)
PLUNGER SIZE:	38.1 mm (1.500 in.)	YOKE SIZE:	60.3 mm (2.375 in.)
SAMPLE TYPE	Side Bend	Side Bend	Side Bend
SAMPLE NUMBER(S)	S1	S2	S3
RESULTS	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, 1992 edition and latest addenda.*

Laboratory Test Conducted By: \_\_\_\_\_

*Pat Voisin*

Patrick Voisin, C.E.T.



# LUDWIG & ASSOCIATES LTD.

Welding Consulting and Engineering

## LABORATORY TEST REPORT

**CUSTOMER:** E & D PIPE AND PROCESS EQUIPMENT LTD. **Laboratory Test No.:** C94-888.4  
 #2, Bldg. B, 624 Beaver Dam Road N.E. **Date:** December 9, 1994  
 Calgary, AB  
 T2K-4W6

**Attention:** Donald Shalenko

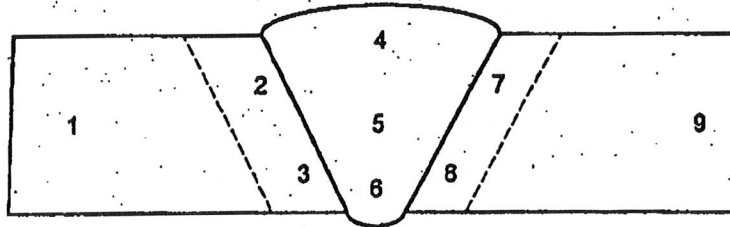
---

**PQR Number:** PQ1  
**Material:** SA 106 Gr. B  
**Size:** 141.3 mm (5.563 in.) O.D. x 9.53 mm (0.375 in.) w.t.  
**Thermal Condition:** As Welded

---

### HARDNESS TEST

**TYPE OF TEST:** Rockwell **SCALE:** "B" scale  
**INSTRUMENT TYPE:** Newage Digital Versitron



- |             |             |             |
|-------------|-------------|-------------|
| 1) 68.5 HRB | 2) 78.2 HRB | 3) 78.2 HRB |
| 4) 84.2 HRB | 5) 79.2 HRB | 6) 79.6 HRB |
| 7) 77.7 HRB | 8) 78.3 HRB | 9) 69.4 HRB |

We certify the test results in this report and that the specimen(s) were prepared and tested in accordance with the requirements of ASTM E18 - 92.

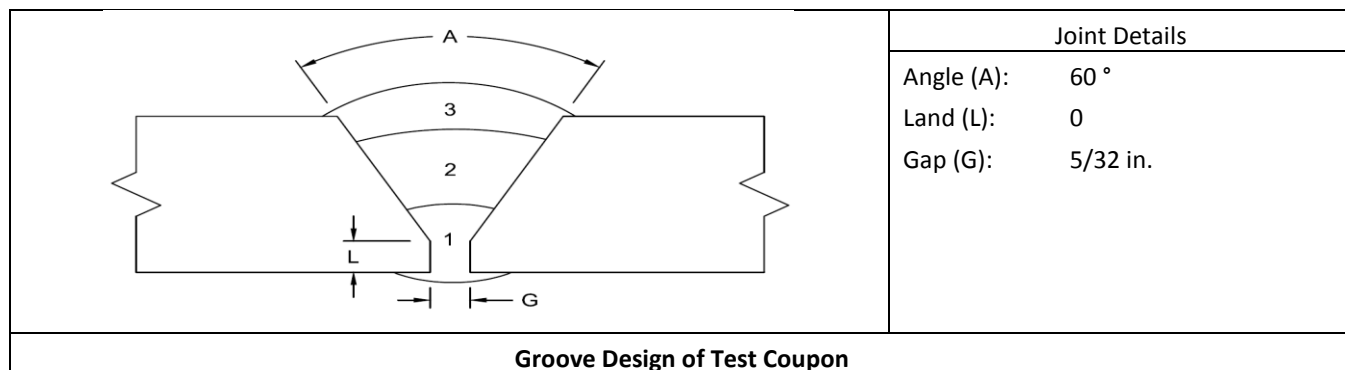
Laboratory Test Conducted By: Pat Voisin  
 Patrick Voisin, C.E.T.

**PROCEDURE SPECIFICATION RECORDS (PQR)**

Company Name           NEXT COMPRESSION CORP.            
 PQR Number           GM-AW-1           Revision No.           0           Date           May 23, 2019            
 Welding Process (es)           Gas metal-arc welding, short-circuiting arc (GMAW-S)          

**JOINTS (QW-402)**

Groove Design           Single V-groove, see below           Retainers           Without            
 Backing           Without           Backing material           N/A          



**BASE METALS (QW-403)**

Material Spec. and Type/Grade or UNS Number           ASME SA 516 Grade 60/70 to ASME SA 516 Grade 60/70            
 P-No. / Group No.           P-No. 1, Grp. 1 / 2 to P-No. 1, Grp. 1 / 2           Thermal condition           Normalized            
 Diameter of Coupon           N/A - plate           Thickness of Coupon           0.375 in. machined to 0.232 in.            
 Maximum Pass Thickness           0.125 in.           Heat Number           367999 - 14789-01            
 Carbon Equivalent           0.377 (per CSA Z662: C.E. = C + F (Mn/6 + Si/24 + Cu/15 + Ni/20 + Cr/5 + Mo/5 + V/5 + Cb/5 + 5B)          

**FILLER METALS (QW-404)**

SFA Specification           5.18            
 AWS Classification           ER70S-6            
 Filler Metal F-No.           F-No. 6            
 Weld Metal Analysis A-No.           A-No. 1\*            
 Size of Filler Metal           See next page QW-409, Recorded Welding Parameters            
 Filler Metal Product form           Solid wire            
 Supplemental Filler Metal           Without            
 Alloy Elements           Without            
 Weld Metal Thickness           0.232 in.            
 Filler Metal Trade Name           Air Liquide, Blueshield LA-S6          

\* A-No. was established from the chemical composition of weld deposit reported on the Certificate of Conformance for (see attached).

**POSITIONS (QW-405)**

Position(s) of Groove           Plate at 45° off from flat            
 Welding Progression           Downhill

**PREHEAT (QW-406)**

Preheat Temperature 70 °F Maximum Interpass Temperature 450 °F  
 Preheat Maintenance No

**POSTWELD HEAT TREATMENT (QW-407)**

P.W.H.T. None  
 Temperature N/A Time N/A

**GAS (QW-408)**

	Gas Composition	Flow Rate
Shielding	75% Ar, 25% CO <sub>2</sub>	35 CFPH
Trailing	Without	N/A
Backing	Without	N/A

**ELECTRICAL CHARACTERISTICS (QW-409)**

Current Direct current (DC) Polarity Reverse - electrode positive (EP)  
 Mode of Metal Transfer Short-circuiting arc  
 Maximum Heat Input 26,372 J/in.

**Recorded Welding Parameters**

Pass No.	Process	Filler Metal		Current		Volts	Travel Speed (in./min.)
		Classification	Size (in.)	Type & Polarity	Amps		
1	GMAW-S	ER70S-6	0.035	DCEP	100 - 110	18	4.3
2	GMAW-S	ER70S-6	0.035	DCEP	100 - 110	18	6.8
3	GMAW-S	ER70S-6	0.035	DCEP	100 - 110	18	7.2

**TECHNIQUE (QW-410)**

String or Weave Bead Weave  
 Orifice, Gas Cup or Nozzle Size 0.375 in.  
 Method of Cleaning Mechanical - Grinding & power brushing  
 Method of Back Gouging Not used  
 Oscillation N/A  
 Contact Tube to Work Distance 0.250 to 0.500 in.  
 Multiple or Single Pass per Side Multiple pass from groove side  
 Multiple or Single Electrodes Single  
 Electrode Spacing N/A  
 Manual or automatic Semi-automatic  
 Peening Not used  
 Use of Thermal Processes for P-No. 11A & No. 11B Base Metal N/A

**Tensile Test (QW-150)**

Sample Type: Figure QW-462.1(a) Tension - Reduced Section - Plate

Specimen No.	Width mm	Thickness mm	Area mm <sup>2</sup>	Ultimate Load - N	UTS		Type of Fracture / Location
					MPa	ksi	
T1	19.1	5.58	107	55,410	520	75.4	Ductile / Base Metal
T2	19.1	5.54	106	54,890	519	75.3	Ductile / Base Metal

**Guided-Bend Tests (QW-160)**

Sample Type: Figure QW-462.3(a) Face and Root Bends - Transverse

Specimen No.	R1	R2	F1	F2
Bend Type	Root Bend	Root Bend	Face Bend	Face Bend
Results	Pass	Pass	Pass	Pass

**Toughness Tests (ASME BPCV Section VIII, Div. 1, UG-84 - 2017, ASME B31.3-2016)**

Test Temperature: -46 °C (-50 °F)

Specimen No.	Welding Process	Deposit Thickness	Single-sided or Two-sided weld	Specimen Size - mm	Notch Location	Impact Values	
						Joules	ft-lbf
Q1	GMAW	0.232 in.	Single-sided	10 x 5	Weld metal near the surface	28	21
Q2						83	61
Q3						71	52
R1	GMAW	0.232 in.	Single-sided	10 x 5	HAZ	57	42
R2						51	38
R3						53	39

**Other Tests**


Type of Test	Test Report No.
Vickers hardness test (HV10)	L19-261.1C, D

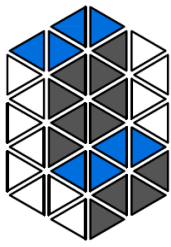
Welder's Name Shauna Hall ABSA File No. W-29884

Tests Conducted by Lattice Metals & Welding Consulting Ltd. Laboratory Test No. L19-261.1A, B, C, D

We certify that 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 Boiler and Pressure Vessel Code.

Organization NEXT COMPRESSION CORP.

Date JUN 14 2019 Certified by 



# LATTICE METALS & WELDING CONSULTING LTD.

## LABORATORY TEST REPORT

**Customer:** Next Compression  
261122 Wagon Wheel Cres  
Rocky View No. 44, Alberta  
T4A 0E2

**LMW File No.:** L19-261.1A  
**Date Tested:** May 31, 2019  
**P.O. Number:** 46171

**Contact:** John Gogorenko

---

**PQR Number:** GM-AW-1  
**Material:** ASME SA 516 Gr. 60/70  
**Thickness:** 0.375 in. machined to 0.232 in.  
**Thermal Condition:** As welded

---

Test Code/Standard: ASME BPVC Section IX - 2017  
LMW Mechanical Test Procedure(s): MT-1.0 / MT-2.0

### TENSILE TEST

Test Equipment: UTM - Model No. WAW-1000D / Serial No. W1403  
Sample Type: Figure QW-462.1(a) Tension - Reduced Section - Plate

Specimen No.	Width mm	Thickness mm	Area mm <sup>2</sup>	Ultimate Load - N	UTS		Type of Fracture / Location
					MPa	ksi	
T1	19.1	5.58	107	55,410	520	75.4	Ductile / Base Metal
T2	19.1	5.54	106	54,890	519	75.3	Ductile / Base Metal

### GUIDED BEND TEST

Sample Type: Figure QW-462.3(a) Face and Root Bends - Transverse

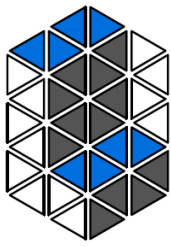
Specimen No.	R1	R2	F1	F2
Bend Type	Root Bend	Root Bend	Face Bend	Face Bend
Results	Pass	Pass	Pass	Pass

Lab Test Conducted by: Dan Nguyen, C.E.T.

We certify that the statements in this record are acceptable, in accordance with the requirements of test code/standard listed above. The information regarding material identification has been provided by the customer whose name appears on this report.

Test Results Certified By:

Dan Nguyen, CSA W178.2 Level III Welding Inspector / CSA W178.1 Welding Inspection Supervisor



# LATTICE METALS & WELDING CONSULTING LTD.

## LABORATORY TEST REPORT

**Customer:** Next Compression  
261122 Wagon Wheel Cres  
Rocky View No. 44, Alberta  
T4A 0E2

**LMW File No.:** L19-261.1B  
**Date Tested:** May 31, 2019  
**P.O. Number:** 46171

**Contact:** John Gogorenko

---

**PQR Number:** GM-AW-1  
**Material:** ASME SA 516 Gr. 60/70  
**Thickness:** 0.375 in. machined to 0.232 in.  
**Thermal Condition:** As welded

---

Test Code/Standard: ASME BPCV Section VIII, Div. 1, UG-84 - 2017, ASME B31.3-2016 clause 323.3, ASTM A370-18  
LMW Mechanical Test Procedure(s): MT-4.0

### **CHARPY V-NOTCH IMPACT TEST**

Test Equipment: Model No. JB-300B / Serial No. W1404  
Verified Range: 6.3 - 240 Joules (4.6 - 177 ft-lbf)

Striker Radius: 8 mm  
Test Temperature: -46 °C (-50 °F)

Specimen No.	Welding Process	Deposit Thickness	Single-sided or Two-sided weld	Specimen Size - mm	Notch Location	Impact Values	
						Joules	ft-lbf
Q1	GMAW	0.232 in.	Single-sided	10 x 5	Weld metal near the surface	28	21
Q2						83	61
Q3						71	52
R1	GMAW	0.232 in.	Single-sided	10 x 5	HAZ	57	42
R2						51	38
R3						53	39

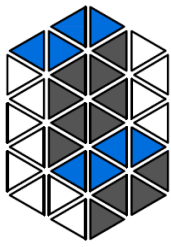
Note: Impact values ft-lbf is a direct conversion from Joules

Lab Test Conducted by: Dan Nguyen, C.E.T.

We certify that the statements in this record are acceptable, in accordance with the requirements of test code/standard listed above. The information regarding material identification has been provided by the customer whose name appears on this report.

Test Results Certified By:   
Dan Nguyen, CSA W178.2 Level III Welding Inspector / CSA W178.1 Welding Inspection Supervisor





# LATTICE METALS & WELDING CONSULTING LTD.

## LABORATORY TEST REPORT

**Customer:** Next Compression  
 261122 Wagon Wheel Cres  
 Rocky View No. 44, Alberta  
 T4A 0E2

**LMW File No.:** L19-261.1C  
**Date Tested:** May 31, 2019  
**P.O. Number:** 46171

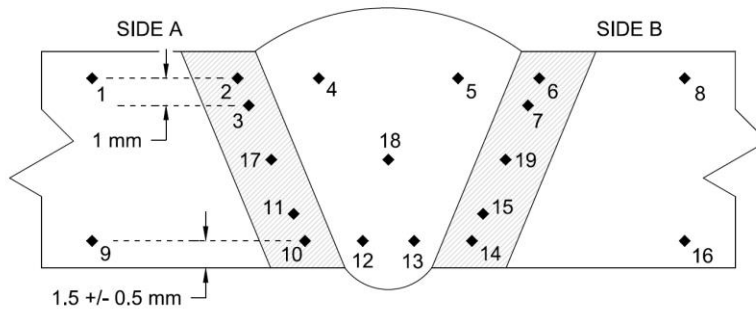
**Contact:** John Gogorenko

**PQR Number:** GM-AW-1  
**Material:** ASME SA 516 Gr. 60/70  
**Thickness:** 0.375 in. machined to 0.232 in.  
**Thermal Condition:** As welded

**Test Code/Standard:** ASTM E92-17  
**LMW Mechanical Test Procedure(s):** MT-5.0

### HARDNESS TEST

**Instrument:** Vickers Hardness Tester - Model No. 900-398 / Serial No. PH 10235  
**Type of Hardness:** Vickers 10 kg load - HV10



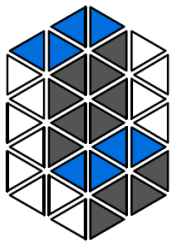
Hardness Survey as per ANSI/NACE MR0175/ISO 15156-2:2015 Figure 2

HARDNESS TEST RESULTS									
SIDE A				WELD METAL		SIDE B			
BASE METAL		HAZ				HAZ		BASE METAL	
1	156	2	190	4	192	6	200	8	159
9	167	3	187	5	197	7	186	16	165
		17	197	18	186	19	194		
		11	198	12	196	15	192		
		10	179	13	183	14	186		

Lab Test Conducted by: Dan Nguyen, C.E.T.

We certify that the statements in this record are acceptable, in accordance with the requirements of test code/standard listed above. The information regarding material identification has been provided by the customer whose name appears on this report.

Test Results Certified By:   
 Dan Nguyen, CSA W178.2 Level III Welding Inspector / CSA W178.1 Welding Inspection Supervisor



# LATTICE METALS & WELDING CONSULTING LTD.

## LABORATORY TEST REPORT

**Customer:** Next Compression  
 261122 Wagon Wheel Cres  
 Rocky View No. 44, Alberta  
 T4A 0E2

**LMW File No.:** L19-261.1D  
**Date Tested:** May 31, 2019  
**P.O. Number:** 46171

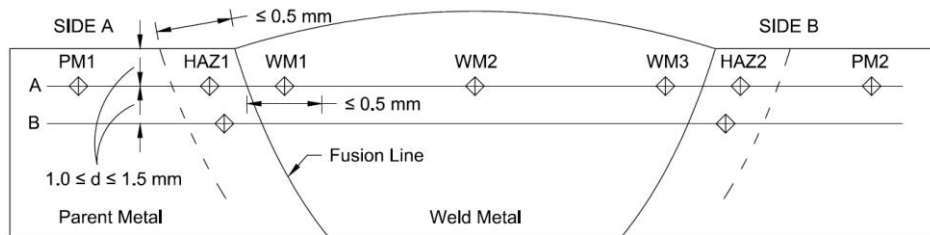
**Contact:** John Gogorenko

**PQR Number:** GM-AW-1  
**Material:** ASME SA 516 Gr. 60/70  
**Thickness:** 0.375 in. machined to 0.232 in.  
**Thermal Condition:** As welded

**Test Code/Standard:** ASTM E92-17  
**LMW Mechanical Test Procedure(s):** MT-5.0

### HARDNESS TEST

**Instrument:** Vickers Hardness Tester - Model No. 900-398 / Serial No. PH 10235  
**Type of Hardness:** Vickers 10 kg load - HV10



HARDNESS TEST RESULTS				
Test Location	1A	1B	2A	2B
PM1	156	---	167	---
HAZ1	190	---	179	---
WM1	192	---	196	---
WM2	196	---	190	---
WM3	197	---	183	---
HAZ2	200	---	186	---
PM2	159	---	165	---

Hardness Survey as per ANSI/NACE MR0103/ISO 17945:2015 in accordance with NACE SP0472-2015.

Lab Test Conducted by: Dan Nguyen, C.E.T.

We certify that the statements in this record are acceptable, in accordance with the requirements of test code/standard listed above. The information regarding material identification has been provided by the customer whose name appears on this report.

Test Results Certified By:   
 Dan Nguyen, CSA W178.2 Level III Welding Inspector / CSA W178.1 Welding Inspection Supervisor



# CERTIFICATE OF WELD TESTING

Product : Blueshield LA S-6

Specification/Classification: ASME SFA 5.18

Issue Date: 3/3/2014

Lot: V05G11L3

ER70S-6

The above named product is of the same classification, manufacturing process and material requirements as the electrode used for testing. All tests required by the customer specifications, for wire diameters 0.9 mm (0.035 in), were performed. The actual analysis and mechanical properties were as follows:

### Chemical analysis (%)

	Carbon	Manganese	Silicon	Sulphur	Phosphorus	Nickel	Chromium	Molybdenum	Copper	Vanadium
Required Wire Analysis	0.06-0.15	1.40-1.85	0.8-1.15	0.035 max	0.025 max	0.15	0.15	0.15	0.50	0.03
Actual deposit analysis	0.08	0.98	0.59	0.007	0.006	0.02	0.02	<0.01	0.09	<0.01
Actual chemical analysis	0.10	1.46	0.91	0.008	0.006	0.03	0.02	<0.02	0.08	<0.02

### RADIOGRAPHIC TEST

Met requirements: Yes

### MECHANICAL PROPERTIES

AS WELDED


### WELDING PARAMETERS:

	Shielding Gas:	TEST RESULTS:	ASME SFA 5.18	Actual Results
Electrode Diameter mm (In):	Blueshield 8	Shielding Gas		Blueshield 8
Amperage, Current Polarity:	0.9 (0.035)	Tensile Streight MPa (ksi)	70 000 min	82 500
Arc Voltage:	200, DCEP	Yield Streight MPa (ksi)	58 000 min	67 500
Weld Travel Speed mm/min (ipm):	25.1	Elongation (%)	22	34
	382 ipm	Charpy V-Notch Impact		
		avg. minimum) ft-lb @-50F		81, 67, 67, 80, 73

No. of Passes/layers: 17/7

Preheat Temp °C (°F): 15 (60)C

Interpass Temp. °C (°F): 165 (325)

  
 Yves Morin Plant Manager



Erklärungen 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.B AS PER EN 10204:1991+A1:1995 + AS PER ISO 10474:1991 MATERIAL TEST REPORT (MTR)		A10 Advice of dispatch No./ Date of dispatch 412679-18.02.12	A08/ Manufacturer's order/ A03 Certificate No. 370683-001	Sheet 1/...
A05 Established inspecting body DH EDMONTON STEEL, EDMON A07.1 No. ED10582-J1010-ER Final receiver EDMONTON STEEL, EDMON A07.2 No. SA20-S5		B01 Product HOT ROLLED PLATES		

B02/ Steel design. SA516-70  
B03 Any suppl. requirements ASME-II-A:10  
DIL-HUE-1:R28-2010-11-22



**B01-B99 Description of the product**

B14 Item No.	B08 Number of pieces	B09 Thickness	B10 Width	B11 Length	B12 Theoretical mass	B04 Product delivery condition	B07.2 Heat No.	B07.1 Rolled plate No./ Test No.	A09 Purchaser article number
01	1	0,3750	X 120,50000	X 480,00000	2790	N	357314	78708-01	
01	1	0,3750	X 120,50000	X 480,00000	2790	N	367289	93149-01	
01	1	0,3750	X 120,50000	X 480,00000	2790	N	367289	93149-02	
01	1	0,3750	X 120,50000	X 480,00000	2790	N	367999	14692-01	
01	1	0,3750	X 120,50000	X 480,00000	2790	N	367999	14692-02	
01	1	0,3750	X 120,50000	X 480,00000	2790	N	367999	14695-01	
01	1	0,3750	X 120,50000	X 480,00000	2790	N	367999	14695-02	
01	1	0,3750	X 120,50000	X 480,00000	2790	N	367999	14719-01	
01	1	0,3750	X 120,50000	X 480,00000	2790	N	367999	14719-02	
01	1	0,3750	X 120,50000	X 480,00000	2790	N	367999	14753-01	
01	1	0,3750	X 120,50000	X 480,00000	2790	N	367999	14753-02	
01	1	0,3750	X 120,50000	X 480,00000	2790	N	367999	14771-01	
01	1	0,3750	X 120,50000	X 480,00000	2790	N	367999	14771-02	
01	1	0,3750	X 120,50000	X 480,00000	2790	N	367999	14773-01	
01	1	0,3750	X 120,50000	X 480,00000	2790	N	367999	14773-02	
01	1	0,3750	X 120,50000	X 480,00000	2790	N	367999	14776-01	
01	1	0,3750	X 120,50000	X 480,00000	2790	N	367999	14776-02	
01	1	0,3750	X 120,50000	X 480,00000	2790	N	367999	14779-01	
01	1	0,3750	X 120,50000	X 480,00000	2790	N	367999	14779-02	
01	1	0,3750	X 120,50000	X 480,00000	2790	N	367999	14782-01	
01	1	0,3750	X 120,50000	X 480,00000	2790	N	367999	14782-02	
01	1	0,3750	X 120,50000	X 480,00000	2790	N	367999	14785-01	
01	1	0,3750	X 120,50000	X 480,00000	2790	N	367999	14789-01	

PL-25

A04	Z01/Z02/Z03 We hereby certify, that the above mentioned materials have been delivered in accordance with the terms of order.	Inspector's stamp DR. CH. DILG Test House Manager	Date 20.02.12	PP: 1
			AG der Dillinger Hüttenwerke Postfach 1580, D-66748 Dillingen/Saar Inspection department	



**QM-System: Certification as per ISO 9001**

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.B AS PER EN 10204:1991+AI:1995 + AS PER ISO 10474:1991  
 MATERIAL TEST REPORT (MTR)

A05 Established inspecting body A06 Purchaser EDMONTON STEEL, EDMON A07.1 No. ED10582-J1010-ER  
 DH Final receiver EDMONTON STEEL, EDMON A07.2 No. SA20-S5

A08/Manufacturer's order/  
 A03 - Certificate No.: 370683-001

A10 Advice of dispatch No./  
 Date of dispatch 412679-18.02.12

B01 Product  
 HOT ROLLED PLATES

Sheet 3/...

B02/ Steel design. SA516-70  
 B03 Any suppl. ASME-II-A:10  
 requirements DIL-HUE-1:R28-2010-11-22.

**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

**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 PAR. 5.3)

**C10-C29 Tensile test**

B14 Item No.	B07.1 Heat No.	B05 Rol.plate/ Test No.	Reference (heat)treatment	C01 C02/ C01 Temp. GR.F	C03 C10 C11 KSI RP02	C12 RM	C13 %	A LO=8IN
01	357314	78708	K1 Q	RT	52,9	74,5	26	
01	367289	93149	K1 Q	RT	53,2	77,1	24	
01	367999	14692	K1 Q	RT	52,2	75,7	25	
01	367999	14695	K1 Q	RT	53,1	76,1	25	
01	367999	14719	K1 Q	RT	51,2	75,3	23	
01	367999	14753	K1 Q	RT	51,9	75,7	25	
01	367999	14771	K1 Q	RT	52,3	75,8	24	
01	367999	14773	K1 Q	RT	52,6	76,4	25	
01	367999	14776	K1 Q	RT	51,8	75,7	28	

*PL-25  
 SA516 60.70  
 H# #: 367999  
 3/8" plate  
 Reviewed by SLJ  
 Sept 29, C14-C15 2016*

A04 Z01/Z02/Z03 We hereby certify that the above-mentioned materials have been delivered in accordance with the terms of order.

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

DR. CH. DILG  
 Test House Manager

Inspector's stamp Date 20.02.12

PP 1

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  
 A03: INSPECTION CERTIFICATE 3.1.B AS PER EN 10204:2004+A1:1995 + AS PER ISO 100474:1991  
 MATERIAL TEST REPORT (MTR)

A05 Established inspecting body: A06 Purchaser: EDMONTON STEEL, EDMON A07.1 No. ED10582-J1010-ER  
 DH: Final receiver: EDMONTON STEEL, EDMON A07.2 No. SA20-S5

B02/ Steel design: SA516-70  
 B03: Any suppl. ASME-II-A:10  
 requirements: DIL-HUE-1:R28-2010-11-22

A10 Advice of dispatch No./Date of dispatch: 412679-18.02.12  
 A08/ Manufacturer's order/ Certificate No.: 370683-001  
 B01: Product: HOT ROLLED PLATES

Sheet: 6/...

C40-C49 Impact test

B14 Item No.	B07.2 Heat No.	B07.1 Roll 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	367999	14773		K1	LV	-51	3/4	CHP-V	AV 148	161	110	140
01	367999	14776		K1	LV	-51	3/4	CHP-V	AV 165	148	149	154
01	367999	14779		K1	LV	-51	3/4	CHP-V	AV 98	101	106	102
01	367999	14782		K1	LV	-51	3/4	CHP-V	AV 151	156	102	136
01	367999	14785		K1	LV	-51	3/4	CHP-V	AV 142	145	94	127
01	367999	14789		K1	LV	-51	3/4	CHP-V	AV 152	93	108	118
01	367999	14801		K1	LV	-51	3/4	CHP-V	AV 108	164	134	135
01	367999	14802		K1	LV	-51	3/4	CHP-V	AV 140	134	130	135
01	367999	14823		K1	LV	-51	3/4	CHP-V	AV 91	121	163	125
01	367999	14828		K1	LV	-51	3/4	CHP-V	AV 139	131	134	135
01	367999	14829		K1	LV	-51	3/4	CHP-V	AV 94	89	88	90
01	367999	14845		K1	LV	-51	3/4	CHP-V	AV 136	112	134	127
01	367999	14847		K1	LV	-51	3/4	CHP-V	AV 135	131	137	134
01	367999	14852		K1	LV	-51	3/4	CHP-V	AV 146	103	89	113

C70-C99 Chemical composition % - Heat analysis

B07.2 Heat	C70	C	SI	MN	P	S	N	CU	MO	NI	CR	NB	SN	TI
357314	Y	0,162	0,363	1,16	0,011	0,0008	0,0071	0,028	0,015	0,049	0,040	0,000	0,001	0,003
367289	Y	0,179	0,363	1,17	0,011	0,0011	0,0062	0,032	0,015	0,037	0,027	0,000	0,001	0,002
367999	Y	0,170	0,343	1,16	0,009	0,0006	0,0087	0,033	0,011	0,055	0,029	0,000	0,000	0,002

*PL-25*

A04 Z01/202/203 We hereby certify, that the above mentioned materials have been delivered in accordance with the terms of order.

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

*U. Nij*  
 DR. CH. DILG  
 Test House Manager

Inspector's stamp: Date: 20.02.12 PP 1





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.B AS PER EN 10204:1991+A1:1995 + AS PER ISO 10474:1991  
 MATERIAL TEST REPORT (MTR)

A10 Advice of dispatch No./ Date of dispatch  
 412679-18.02.12

A08/ Manufacturer's order/ A03 - Certificate No.  
 370683-001

Sheet  
 1/

A05 Establishing/inspecting body A06 Purchaser EDMONTON STEEL, EDMON A07.1 No. ED10582-J1010-ER  
 DH Final receiver EDMONTON STEEL, EDMON A07.2 No. SA20-S5

B02/ Steel design. SA516-60  
 B03 Any suppl. ASME-II-A:10 requirements DIL-HUE-1:R28-2010-11-22



**B01-B99 Description of the product**

B14 Item No.	B08 Number of pieces	B09 Thickness	B10 Width	B11 Length	B12 Theoretical mass	B04 Product condition	B07.2 Heat No.	B07.1 Rolled plate No./ Test No.	A09 Purchaser article number
01	1	0,3750	x 120,50000	x 480,00000	2790	N	357314	78708-01	
01	1	0,3750	x 120,50000	x 480,00000	2790	N	367289	93149-01	
01	1	0,3750	x 120,50000	x 480,00000	2790	N	367289	93149-02	
01	1	0,3750	x 120,50000	x 480,00000	2790	N	367999	14692-01	
01	1	0,3750	x 120,50000	x 480,00000	2790	N	367999	14692-02	
01	1	0,3750	x 120,50000	x 480,00000	2790	N	367999	14695-01	
01	1	0,3750	x 120,50000	x 480,00000	2790	N	367999	14695-02	
01	1	0,3750	x 120,50000	x 480,00000	2790	N	367999	14719-01	
01	1	0,3750	x 120,50000	x 480,00000	2790	N	367999	14719-02	
01	1	0,3750	x 120,50000	x 480,00000	2790	N	367999	14753-01	
01	1	0,3750	x 120,50000	x 480,00000	2790	N	367999	14753-02	
01	1	0,3750	x 120,50000	x 480,00000	2790	N	367999	14771-01	
01	1	0,3750	x 120,50000	x 480,00000	2790	N	367999	14771-02	
01	1	0,3750	x 120,50000	x 480,00000	2790	N	367999	14773-01	
01	1	0,3750	x 120,50000	x 480,00000	2790	N	367999	14773-02	
01	1	0,3750	x 120,50000	x 480,00000	2790	N	367999	14776-01	
01	1	0,3750	x 120,50000	x 480,00000	2790	N	367999	14776-02	
01	1	0,3750	x 120,50000	x 480,00000	2790	N	367999	14779-01	
01	1	0,3750	x 120,50000	x 480,00000	2790	N	367999	14779-02	
01	1	0,3750	x 120,50000	x 480,00000	2790	N	367999	14782-01	
01	1	0,3750	x 120,50000	x 480,00000	2790	N	367999	14782-02	
01	1	0,3750	x 120,50000	x 480,00000	2790	N	367999	14785-01	
01	1	0,3750	x 120,50000	x 480,00000	2790	N	367999	14789-01	

PL-25

A04 Z01Z02Z03 We hereby certify, that the above mentioned materials have been delivered in accordance with the terms of order.

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

DR. CH. DILG  
 Test House Manager

Inspector's stamp  
 Date 20.02.12

PP 1



**QM-System** . Certification as per ISO-9001



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	A10 Advice of dispatch No./ Date of dispatch	A08/ Manufacturer's order/ Certificate No.	Sheet
INSPECTION: CERTIFICATE 3.1.B AS PER EN 10204:1991+A1:1995 + AS PER ISO 10474:1991	412679-18.02.12	370683-001	3/...
MATERIAL TEST REPORT (MTR)			
A05 Established inspecting body	A06 Purchaser	B01 Product	
DH	EDMONTON STEEL, EDMON	HOT ROLLED PLATES	
	EDMONTON STEEL, EDMON		
A07.1 No. ED10582-J1010-ER			
A07.2 No. SA20-S5			
B02/ Steel design. SA516-60			
B03 Any suppl. ASME-II-A:10			
requirements DIL-HUE-1:R28-2010-11-22			

**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

**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 PAR. 5.3)

**C10-C29 Tensile test**

B14 Item No.	B07.2 Heat No.	B05 Rol./plate/ Test No.	B05 Reference (heat) treatment	C01 C02/ C01 Temp. GR.F	C03 C01	C10 KSI	C11 RP02	C12 RM	C13	A %	C14-C15 L0=8IN
01	357314	78708	K1 Q	RT	RT	52,9	52,9	74,5		26	
01	367289	93149	K1 Q	RT	RT	53,2	53,2	77,1		24	
01	367999	14692	K1 Q	RT	RT	52,2	52,2	75,7		25	
01	367999	14695	K1 Q	RT	RT	53,1	53,1	76,1		25	
01	367999	14719	K1 Q	RT	RT	51,2	51,2	75,3		23	
01	367999	14753	K1 Q	RT	RT	51,9	51,9	75,7		25	
01	367999	14771	K1 Q	RT	RT	52,3	52,3	75,8		24	
01	367999	14773	K1 Q	RT	RT	52,6	52,6	76,4		25	
01	367999	14776	K1 Q	RT	RT	51,8	51,8	75,7		28	

A04



Manufacturers' mark

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

*Gu Nif*

DR.:CH. DILG  
Test House/Manager



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

Inspector's stamp Date 20.02.12

PP 1

A01



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	A10. Advice of dispatch No./ Date of dispatch	Sheet
	INSPECTION CERTIFICATE 3.1.B AS PER EN 10204:1991+A1:1995 + AS PER ISO 10474:1991	412679-18.02.12	
	MATERIAL TEST REPORT (MTR)		
A05	Established inspecting body DH	A06: Purchaser EDMONTON STEEL, EDMON	A07.1 No. ED10582-J11010-ER
		Final receiver EDMONTON STEEL, EDMON	A07.2 No.
B02/	Steel design, SA516-60		
B03	Any suppl. requirements.		

SA20-S5

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 Individual values AV=FT.LBF	C43 Mean value
01	367999	14773		K1	LV	-51	3/4	CHP-V	AV	148	161	140
01	367999	14776		K1	LV	-51	3/4	CHP-V	AV	165	148	154
01	367999	14779		K1	LV	-51	3/4	CHP-V	AV	98	101	102
01	367999	14782		K1	LV	-51	3/4	CHP-V	AV	151	156	136
01	367999	14785		K1	LV	-51	3/4	CHP-V	AV	142	145	127
01	367999	14789		K1	LV	-51	3/4	CHP-V	AV	152	93	118
01	367999	14801		K1	LV	-51	3/4	CHP-V	AV	108	164	135
01	367999	14802		K1	LV	-51	3/4	CHP-V	AV	140	134	135
01	367999	14823		K1	LV	-51	3/4	CHP-V	AV	91	121	125
01	367999	14828		K1	LV	-51	3/4	CHP-V	AV	139	131	135
01	367999	14829		K1	LV	-51	3/4	CHP-V	AV	94	89	90
01	367999	14845		K1	LV	-51	3/4	CHP-V	AV	136	112	127
01	367999	14847		K1	LV	-51	3/4	CHP-V	AV	135	131	134
01	367999	14852		K1	LV	-51	3/4	CHP-V	AV	146	103	113

C70-C99 Chemical composition % - Heat analysis												
B07.2 Heat	C70	C	SI	MN	P	S	N	CU	MO	NI	CR	TI
357314	Y	0,162	0,363	1,16	0,011	0,0008	0,0071	0,028	0,015	0,049	0,040	0,003
367289	Y	0,179	0,363	1,17	0,011	0,0011	0,0062	0,032	0,015	0,037	0,027	0,002
367999	← Y	0,170	0,343	1,16	0,009	0,0006	0,0087	0,033	0,011	0,055	0,029	0,002

pl-25

A04

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

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

AHB

DR. CH. DILLIG  
Test House Manager

Inspector's stamp Date 20.02.12

PP 1



**QM-System** Certification as per ISO 9001

Erläuterungen: siehe Rückseite/Explications voir au verso/S'ée reverse for explanations (www.dillinger.de/certificate)

<p>A02 INSPECTION CERTIFICATE 3.1 AS PER EN 10204:2004 INSPECTION CERTIFICATE 3.1.B AS PER EN 10204:1991+A1:1995 + AS PER ISO 10474:1991 MATERIAL TEST REPORT (MTR)</p>	<p>A10 Advice of dispatch No./ Date of dispatch: 412679-18.02.12</p>	<p>A08/Manufacturer's order/ A03 Certificate No. 370683-001</p>	<p>Sheet 7/...</p>
<p>A05 Established inspecting body DH</p>	<p>A06 Purchaser EDMONTON STEEL, EDMON A07.1 No. ED10582-J1010-ER</p>	<p>B01 Product HOT ROLLED PLATES</p>	
<p>B02/ Steel design. SA516-60</p>	<p>Final receiver EDMONTON STEEL, EDMON A07.2 No. SA20-S5</p>		
<p>B03 Any suppl. requirements DIL-HUE-1:R28-2010-11-22</p>			

**C70-C99 Chemical composition % - Heat analysis**

C70	B	CA	AL-T
357314	Y	0,0000	0,0015
367289	Y	0,0002	0,0020
367999	Y	0,0000	0,0021

*pl-25*

**C94 Heat analysis Carbon equivalent / Alloying restrictions**

B07.2 Heat	FO-02=	0,37	FO-51=	0,000	FO-55=	0,13	FO-78=	0,06	FO-91=	7,2
357314	FO-02=	0,39	FO-51=	0,000	FO-55=	0,11	FO-78=	0,04	FO-91=	6,5
367289	FO-02=	0,38	FO-51=	0,000	FO-55=	0,13	FO-78=	0,04	FO-91=	6,8

**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


  

**C70-C99 Chemical composition % - Product analysis**

B07.2 Heat	C01	C	SI	MN	P	S	N	CU	MO	NI	CR	V	NB	SN	TI
357314	78708	K1	0,150	0,374	1,16	0,012	0,0008	0,0073	0,028	0,016	0,040	0,001	0,000	0,000	0,003
367289	52082	K1	0,175	0,348	1,14	0,010	0,0012	0,0056	0,030	0,017	0,026	0,000	0,000	0,001	0,002
367289	93149	K1	0,165	0,379	1,20	0,010	0,0008	0,0063	0,030	0,016	0,026	0,000	0,000	0,001	0,002
367999	14847	K1	0,170	0,339	1,13	0,009	0,0005	0,0084	0,033	0,012	0,030	0,000	0,000	0,001	0,002

A04 Z01/Z02/Z03 We hereby certify, that the above mentioned materials have been delivered in accordance with the terms of order.



Manufacturers' mark

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

DR. CH. DILG.  
Test House Manager

Date 20.02.12

Inspector's stamp

PP 1

**Attention:** John Gogorenko  
NEXT COMPRESSION CORP  
261122 WAGON WHEEL CRESCENT  
ROCKYVIEW, AB T4A 0E2

The welding procedure, tracking number 2019-04112, originally received on June 07, 2019 was surveyed and accepted in accordance with the requirements of ASME section IX for registration as follows:

**Reg. No. :** WP-3850.2

**Accepted on:** June 13, 2019

**Reg Type:** REVISION TO ACC. DESIGN

**Spec. No. :** NGC-1 REV 3

An invoice covering survey and registration fees will be forwarded from our Revenue Accounts.

If you have any question don't hesitate to contact me by phone at (780) 433-0281 ext 3342 or fax (780) 437-7787 or e-mail Reinhart@absa.ca.

*Please note:*

- (1) Construction shall be completed per the requirements of the applicable construction code, and*
- (2) the acceptance of this registration does not allow the use of this welding procedure in the construction, modification, on any boiler, pressure vessel, pressure piping system or fitting in Alberta unless the contractor/manufacturer has registered a Quality Control System for such work with ABSA.*

Sincerely,



REINHART, JASON, P. Eng.  
DOP Cert. No. D00003629

**Welding Procedure Specification (WPS) Qualified in Accordance with ASME BPVC Section IX**

WPS No.: NGC-1 Revision No.: 3  
 Supporting PQR No.(s): PQ1 (Rev. 1), PQ22 (Rev. 1)  
 Process (es): SMAW P.W.H.T.: As welded, without P.W.H.T.

**WPS SUMMARY**

Qualified	Normal Applications without proven notch toughness properties required
ASME Section IX Base Metal	P-No. 1 to P-No. 1
Base Metal Thickness (Groove)	0.062 to 8.00 in.
Filler Metal	E6010, E7018, E7018-1
Deposited Weld Metal Thickness	F-No. 3: 0.188 in. maximum      F-No. 4: 8.00 in. maximum

This WPS is qualified in accordance with ASME section IX, and it shall be applied in conjunction with relevant code of construction/standard/specification.

**RECORD OF REVISION**

Revision	Date	Revision Description
3	June 7, 2019	Format update and company name change, formerly NGC Compression Solutions Ltd.

**PROVINCIAL REGISTRATION**

2019-04112

## ABSA

**SAFETY CODES ACT - PROVINCE OF ALBERTA  
WELDING PROCEDURE**

**Reg. No.:** WP-3850.2


**Spec No.:** NGC-1 REV 3

**Processes:** SMAW/SMAW

**Base Mat'ls:** P-No. 1 to P-No. 1

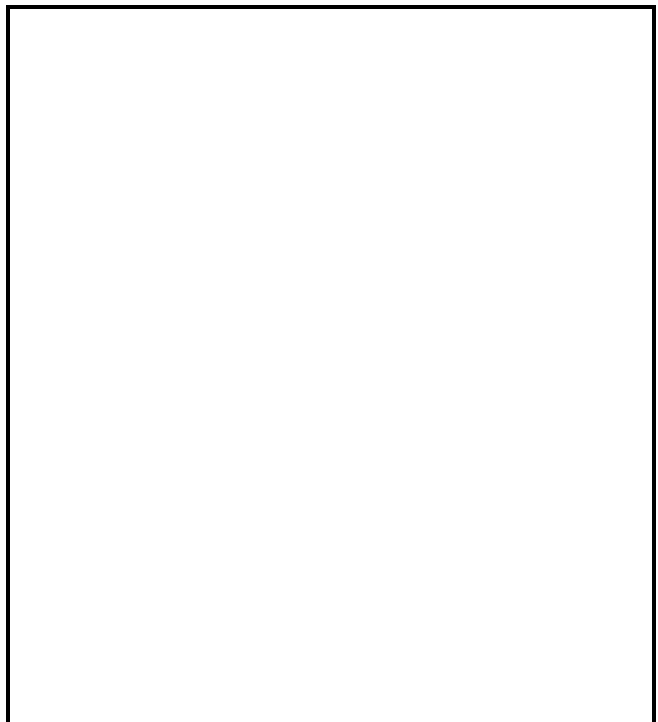
**Filler Mat'ls:** F-No. 3/4, A-No. 1/1

**Thk. Qual. For:** 203. mm      **P.W.H.T.:** No

**Signed:** 

**Date:** 2019-06-13      **JASON REINHART, P. Eng.**

This stamp and signature have been affixed electronically to this registered procedure as required by Section 21(1) of the Pressure Equipment Safety Regulation, in accordance with the Electronic Transactions Act.



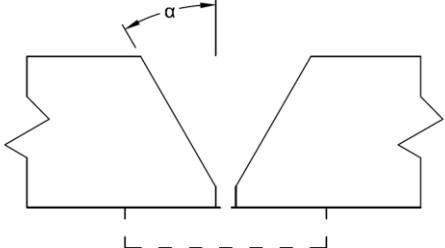
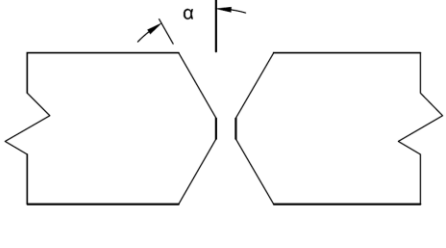
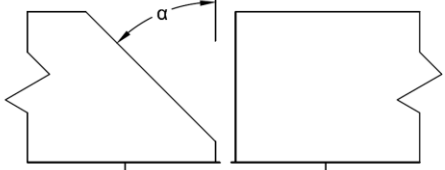
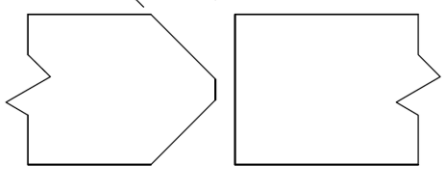
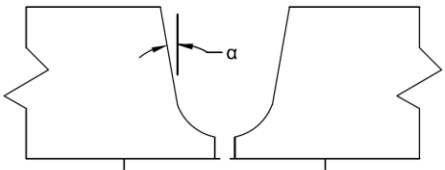
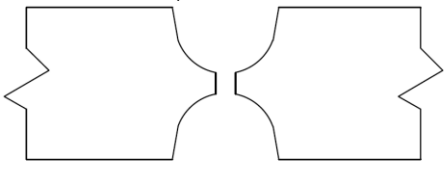
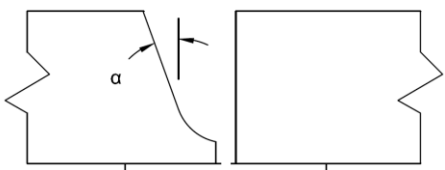
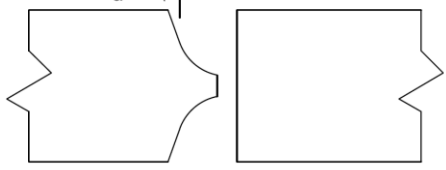
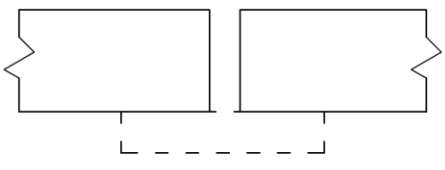
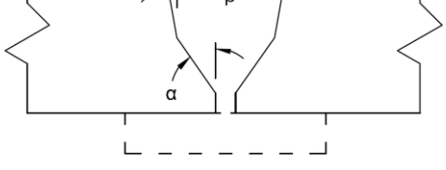


**ELECTRICAL CHARACTERISTICS (QW-409)**Current                                  Direct current (DC)                                  Polarity                                  Reverse - electrode positive (EP)Maximum Heat Input                                  N/A                                 **Typical Welding Parameters**

Process	Filler Metal		Current		Volts	Travel Speed (in./min.)
	Classification	Size (in.)	Type & Polarity	Amps		
SMAW	E6010	3/32	DCEP	40 - 80	18 - 28	1.0 - 12
SMAW	E6010	1/8	DCEP	70 - 130	19 - 30	1.5 - 14
SMAW	E6010	5/32	DCEP	90 - 165	21 - 31	2.0 - 16
SMAW	E6010	3/16	DCEP	120 - 300	21 - 32	3.0 - 18
SMAW	E7018/E7018-1	3/32	DCEP	50 - 120	18 - 26	1.0 - 12
SMAW	E7018/E7018-1	1/8	DCEP	80 - 150	19 - 28	1.5 - 15
SMAW	E7018/E7018-1	5/32	DCEP	100 - 200	20 - 30	3.0 - 16
SMAW	E7018/E7018-1	3/16	DCEP	150 - 270	22 - 31	4.0 - 18
SMAW	E7018/E7018-1	1/4	DCEP	215 - 360	23 - 32	5.0 - 20
Note: Welding parameters will vary with position, joint configuration, consumable brand, etc. Welding consumable manufacturer's recommendations should be followed.						

**TECHNIQUE (QW-410)**String or Weave Bead                                  Either                                 Initial and Interpass Cleaning                                  Mechanical - grinding, power brush, chipping, etc.                                 Method of Back Gouging                                  Grinding or air carbon arc, etc., if required. Grind to clean metal where                                   
                                 thermal process is used.                                 Multiple or Single Pass per Side                                  Either                                 Manual or automatic                                  Manual                                 Peening                                  Not allowed                                 Use of Thermal Processes for P-No. 11A & P-No. 11B Base Metal                                  N/A

**TYPICAL JOINT DESIGNS**

 <p style="text-align: center;"><math>\alpha = 30^\circ, \pm 7.5^\circ</math> Single V Groove</p>	 <p style="text-align: center;"><math>\alpha = 30^\circ, \pm 7.5^\circ</math> Double V Groove</p>
 <p style="text-align: center;"><math>\alpha = 45^\circ, \pm 10^\circ</math> Single Bevel Groove</p>	 <p style="text-align: center;"><math>\alpha = 45^\circ, \pm 10^\circ</math> Double Bevel Groove</p>
 <p style="text-align: center;"><math>\alpha = 10^\circ, +20^\circ / -5^\circ</math> Single U Groove</p>	 <p style="text-align: center;"><math>\alpha = 10^\circ, +20^\circ / -5^\circ</math> Double U Groove</p>
 <p style="text-align: center;"><math>\alpha = 20^\circ, +10^\circ / -5^\circ</math> Single J Groove</p>	 <p style="text-align: center;"><math>\alpha = 20^\circ, +10^\circ / -5^\circ</math> Double J Groove</p>
 <p style="text-align: center;">Square Groove</p>	 <p style="text-align: center;"><math>\alpha = 35^\circ, \pm 5^\circ</math>      <math>\beta = 10^\circ, +20^\circ / -5^\circ</math> Modified Single V Groove</p>

Note: Permanent backing strip may only be used with design approval. Retainer is not allowed. 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.



## QW-483 PROCEDURE QUALIFICATION RECORD (PQR)

Company Name E&D Pipe and Process Equipment Ltd.  
Procedure Qualification Record No. PQ1 (Rev. 1)  
Date Originally Qualified December 8, 1994 Revision Date September 28, 2018  
Revision(s) Rev. 1 (Editorial) - Addition of (QW-403) Deposited Weld Metal Per Pass.  
Clarification to (QW-407) Postweld Heat Treatment (Without).  
Company Name changed back to original qualifying organization.  
Company Name changed for recertification to NGC Compression  
Solutions Ltd. (formerly NGC Process Systems Ltd.). Removed Welding  
Procedure Specification No.  
Rev. 0 (Editorial) - Company Name changed to NGC Process Systems Ltd.  
(formerly E&D Pipe and Process Equipment Ltd.). Format update,  
March 18, 2005.  
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 106 Type or Grade Gr. B  
P-No. P1 To P-No. P1 Thickness 9.53 mm (0.375 in.)  
Diameter 141.3 mm (5.563 in.) O.D. Other Schedule 80  
Deposited Weld Metal (Per Pass) Did not exceed 9.53 mm (0.375 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  
Other \_\_\_\_\_  
Deposited Weld Metal Thickness 2.39 mm (0.094 in.) 7.14 mm (0.281 in.)

### POSITION (QW-405)

Position of Groove Root pass: 5G Fill & cap: 1G - rotated  
Weld Progression Root pass: Vertical up Fill & cap: N/A

### PREHEAT (QW-406)

Preheat Temperature 15°C (60°F) Interpass Temp. (Max.) Not recorded

### POSTWELD HEAT TREATMENT (QW-407)

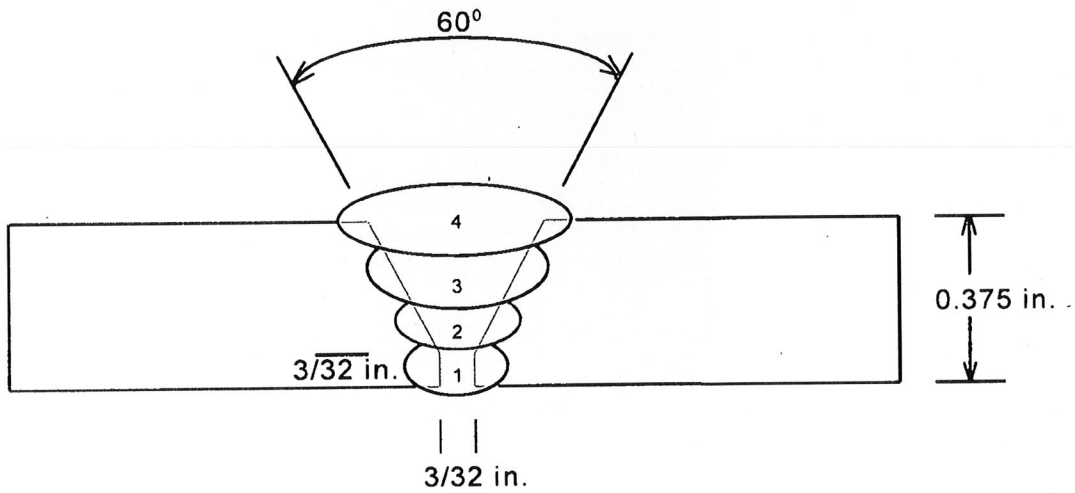
With or Without Without  
Temperature N/A Time N/A

### ELECTRICAL CHARACTERISTICS (QW-409)

Current Direct Polarity Reverse, electrode positive  
Amps See next page Volts See next page  
Heat Input N/A

**TECHNIQUE (QW-410)**

String or Weave Both Travel Speed See below  
 Multiple or Single Pass Per Side Multipass from groove side  
 Multiple or Single Electrodes Single electrode



Pass	Process	Filler Metal	Diameter mm (in.)	Current & Polarity	Amperage Range	Voltage Range	Travel Speed mm/min (ipm.)
1	SMAW	E6010	3.2 (1/8)	DCRP	75 - 85	22 - 24	75 (3.0)
2	SMAW	E7018 -1	2.4 (3/32)	DCRP	100 - 110	21 - 23	185 (7.3)
3	SMAW	E7018 -1	4.0 (5/32)	DCRP	170 - 180	20 - 22	140 (5.5)
4	SMAW	E7018 -1	5.0 (3/16)	DCRP	240 - 260	20 - 22	170 (6.6)

PQR NO. PQ1 (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	19.2 (0.756)	8.51 (0.335)	163 (0.253)	76 000 (17,100)	466 (67,600)	Partial cup & cone base metal
T2	19.3 (0.760)	7.95 (0.313)	153 (0.238)	72 000 (16,200)	471 (68,200)	Partial cup & cone base 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

**OTHER TESTS**

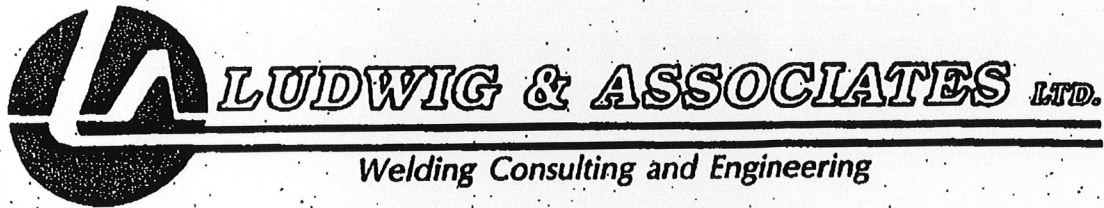
See attached Rockwell hardness test report C94-686.4

Welders Name Douglas McMillan Certificate File No. W-2450  
 Tests Conducted By Ludwig & Associates Ltd.  
 Laboratory Test No. C94-686.4

*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 NGC Compression Solutions Ltd.

Date SEP 28 2018 Signed 



## LABORATORY TEST REPORT

**CUSTOMER:** E & D PIPE AND PROCESS EQUIPMENT LTD.    **Laboratory Test No.:** C94-686.4  
 #2, Bldg. B, 624 Beaver Dam Road N.E.    **Date:** December 12, 1994  
 Calgary, AB  
 T2K-4W6

**Attention:** Donald Shalenko

**PQR Number:** PQ1  
**Material:** SA 106 Gr. B  
**Size:** 141.3 mm (5.563 in.) O.D. x 9.53 mm (0.375 in.) w.t.  
**Thermal Condition:** As Welded

### TENSILE TEST (QW-150)

SAMPLE NUMBER	T1		T2	
WIDTH mm (in)	19.2	(0.756)	19.3	(0.760)
THICKNESS mm (in)	8.51	(0.335)	7.95	(0.313)
AREA sq mm (sq in)	163	(0.253)	153	(0.238)
ULT. LOAD N (lbs)	76 000	(17,100)	72 000	(16,200)
UTS MPa (psi)	466	(67,600)	471	(68,200)
FRACTURE TYPE	Partial Cup & Cone		Partial Cup & Cone	
FRACTURE LOCATION	Base Metal		Base Metal	

### GUIDED-BEND TEST (QW-160)

SAMPLE WIDTH:	9.53 mm (0.375 in.)	SAMPLE THICKNESS:	9.53 mm (0.375 in.)
PLUNGER SIZE:	38.1 mm (1.500 in.)	YOKE SIZE:	60.3 mm (2.375 in.)
SAMPLE TYPE	Side Bend	Side Bend	Side Bend
SAMPLE NUMBER(S)	S1	S2	S3
RESULTS	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, 1992 edition and latest addenda.*

Laboratory Test Conducted By: \_\_\_\_\_

*Pat Voisin*

Patrick Voisin, C.E.T.



# LUDWIG & ASSOCIATES LTD.

Welding Consulting and Engineering

## LABORATORY TEST REPORT

**CUSTOMER:** E & D PIPE AND PROCESS EQUIPMENT LTD. **Laboratory Test No.:** C94-888.4  
 #2, Bldg. B, 624 Beaver Dam Road N.E. **Date:** December 9, 1994  
 Calgary, AB  
 T2K-4W6

**Attention:** Donald Shalenko

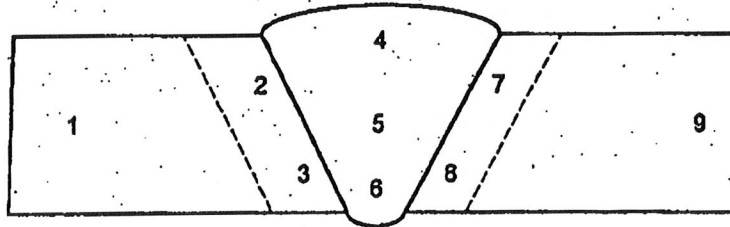
---

**PQR Number:** PQ1  
**Material:** SA 106 Gr. B  
**Size:** 141.3 mm (5.563 in.) O.D. x 9.53 mm (0.375 in.) w.t.  
**Thermal Condition:** As Welded

---

### HARDNESS TEST

**TYPE OF TEST:** Rockwell **SCALE:** "B" scale  
**INSTRUMENT TYPE:** Newage Digital Versitron



- |             |             |             |
|-------------|-------------|-------------|
| 1) 68.5 HRB | 2) 78.2 HRB | 3) 78.2 HRB |
| 4) 84.2 HRB | 5) 79.2 HRB | 6) 79.6 HRB |
| 7) 77.7 HRB | 8) 78.3 HRB | 9) 69.4 HRB |

We certify the test results in this report and that the specimen(s) were prepared and tested in accordance with the requirements of ASTM E18 - 92.

Laboratory Test Conducted By: Pat Voisin  
 Patrick Voisin, C.E.T.

## QW-483 PROCEDURE QUALIFICATION RECORD (PQR)

Company Name E&D Pipe and Process Equipment Ltd.  
Procedure Qualification Record No. PQ22 (Rev. 1)  
Date Originally Qualified August 18, 1999 Revision Date September 28, 2018  
Revision(s) Rev. 1 (Editorial) - Addition of (QW-403) Deposited Weld Metal Per Pass.  
Clarification to (QW-407) Postweld Heat Treatment (Without).  
Company Name changed back to original qualifying organization.  
Company Name changed for recertification to NGC Compression  
Solutions Ltd. (formerly NGC Process Systems Ltd.). Removed Welding  
Procedure Specification No.  
Rev. 0 (Editorial) - Company Name changed to NGC Process Systems Ltd.  
(formerly E&D Pipe and Process Equipment Ltd.). Format update,  
March 18, 2005.  
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. 60N to Gr. 70N  
P-No. P1 Grp. 1 To P-No. P1 Grp. 2 Thickness 38.1 mm (1.50 in.)  
Diameter N/A Other Plate  
Deposited Weld Metal (Per Pass) Did not exceed 38.1 mm (0.500 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.) 35.7 mm (1.406 in.)

### POSITION (QW-405)

Position of Groove 3G  
Weld Progression Vertical up

### PREHEAT (QW-406)

Preheat Temperature 66°C (150°F) Interpass Temp. (Max.) 232°C (450°F)

### 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 F3: 35 310 J/in. max. F4: 77 538 J/in. max.





PQR NO. PQ22 (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	19.1 (0.752)	37.7 (1.48)	720 (1.12)	370 100 (83,200)	514 (74,500)	Partial cup & cone Weld metal
T2	19.2 (0.756)	37.6 (1.48)	722 (1.12)	369 000 (83,000)	511 (74,100)	Partial cup & cone Parent metal (Gr. 60N)

**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 IMPACT TOUGHNESS**

Type of Test Charpy V Notch Orientation Transverse  
 Test Temperature -46°C (-50°F) Specimen Size 10 x 10 mm

Specimen No.	Notch Location	Impact Values J (ft. lbs)
P2.1	Weld Metal	62.9 (46.4)
P2.2	Weld Metal	63.7 (47.0)
P2.3	Weld Metal	16.8 (12.4)
P3.1	Gr. 60N - HAZ	157 (116)
P3.2	Gr. 60N - HAZ	153 (113)
P3.3	Gr. 60N - HAZ	169 (125)
Q3.1	Gr. 70N - HAZ	195 (144)
Q3.2	Gr. 70N - HAZ	121 (89.0)
Q3.3	Gr. 70N - HAZ	186 (137)


**OTHER TESTS**

Vickers hardness survey, see attached report - C99-638.2

Welders Name Murray Schultz Certificate File No. W-5936  
 Tests Conducted By Ludwig & Associates Ltd.  
 Laboratory Test No. C99-638.2

*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 NGC Compression Solutions Ltd.

Date SEP 28 2018 Signed 





# LUDWIG & ASSOCIATES LTD.

Materials and Welding Engineering

## LABORATORY TEST REPORT

**CUSTOMER:** E & D Pipe and Process Equipment Ltd.  
#2, Bldg. B., 624 Beaverdam Road N.E.  
Calgary, Alberta  
T2K 4W5

**Laboratory Test No.:** C99-618.2  
**Date:** August 20, 1999

**Attention:** John MacDonald

**PQR Number:** PQ22  
**Material:** SA 516 Gr. 60N to SA 516 Gr. 70N (Ht. No.: 81982-13994)  
**Size:** 38.1 mm (1.50 in.)  
**Thermal Condition:** As Welded

### TENSILE TEST QW-150

SAMPLE NUMBER	T1 QW-462.1(a)	T2 QW-462.1(a)
WIDTH mm (in)	19.1 (0.752)	19.2 (0.756)
THICKNESS mm (in)	37.7 (1.48)	37.6 (1.48)
AREA sq mm (sq in)	720 (1.12)	722 (1.12)
ULT. LOAD N (lbs)	370 100 (83,200)	369 000 (83,000)
UTS MPa (psi)	514 (74,500)	511 (74,100)
FRACTURE TYPE	Partial Cup & Cone	Partial Cup & Cone
FRACTURE LOCATION	Weld Metal	Parent Metal (SA 516 Gr. 60N)

### GUIDED-BEND TEST QW-160

SAMPLE WIDTH:	9.52 mm (0.375 in.)	SAMPLE THICKNESS:	38.1 mm (1.50 in.)
PLUNGER SIZE:	38.1 mm (1.50 in.)	YOKE SIZE:	60.3 mm (2.375 in.)
QW-462.2	Side Bend	Side Bend	Side Bend
SAMPLE NUMBER(S)	S1	S2	S3
RESULTS	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, 1998 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.

Laboratory Test Conducted By: Sabine Heine  
Troy Drummond, T.T. / Sabine Heine, C.E.T.



# LUDWIG & ASSOCIATES LTD.

Materials and Welding Engineering

## LABORATORY TEST REPORT

**CUSTOMER:** E & D Pipe and Process Equipment Ltd.  
#2, Bldg. B., 624 Beaverdam Road N.E.  
Calgary, Alberta  
T2K 4W5

**Laboratory Test No.:** C99-638.2  
**Date:** August 23, 1999

**Attention:** John MacDonald

**PQR Number:** PQ22  
**Material:** SA 516 Gr. 60N to SA 516 Gr. 70N (Ht. No.: 81982-13994)  
**Size:** 38.1 mm (1.50 in.)  
**Thermal Condition:** As Welded

### NOTCH-TOUGHNESS TEST

**TYPE OF TEST:** Charpy V-Notch  
**TEST TEMPERATURE:** -46°C (-50°F)

**ORIENTATION:** Transverse  
**SPECIMEN SIZE:** 10 x 10 mm

Specimen Number	Notch Location	Impact Values Joules (ft.lbs)	
P2.1	Weld Metal	62.9	(46.4)
P2.2	Weld Metal	63.7	(47.0)
P2.3	Weld Metal	16.8	(12.4)
P3.1	Gr. 60N - HAZ	157	(116)
P3.2	Gr. 60N - HAZ	153	(113)
P3.3	Gr. 60N - HAZ	169	(125)
Q3.1	Gr. 70N - HAZ	195	(144)
Q3.2	Gr. 70N - HAZ	121	(89.0)
Q3.3	Gr. 70N - HAZ	186	(137)

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, 1998 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.

Laboratory Test Conducted By: \_\_\_\_\_

*Sabine H*  
Troy Drummond, T.T. / Sabine Heinemann, C.E.T.



# LUDWIG & ASSOCIATES LTD.

Materials and Welding Engineering

## LABORATORY TEST REPORT

**CUSTOMER:** E & D Pipe and Process Equipment Ltd.  
#2, Bldg. B., 624 Beaverdam Road N.E.  
Calgary, Alberta  
T2K 4W5

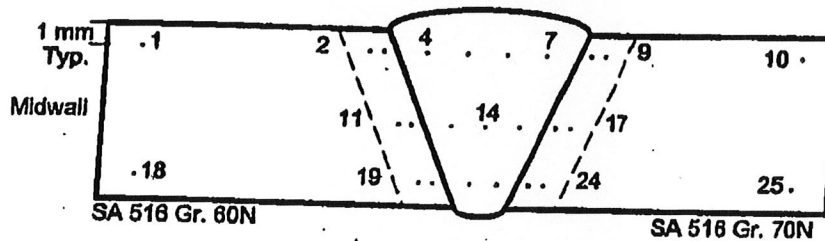
**Laboratory Test No.:** C99-638.2  
**Date:** August 23, 1999

**Attention:** John MacDonald

**PQR Number:** PQ22  
**Material:** SA 516 Gr. 60N to SA 516 Gr. 70N (Ht. No.: 81982-13994)  
**Size:** 38.1 mm (1.50 in.)  
**Thermal Condition:** As Welded

### HARDNESS TEST

**TYPE OF TEST:** Vickers  
**INSTRUMENT TYPE:** Buehler Micromet  
**LOAD:** 1000 g



1) 155 HV	8) 174 HV	15) 184 HV	22) 188 HV
2) 169 HV	9) 163 HV	16) 192 HV	23) 177 HV
3) 195 HV	10) 156 HV	17) 181 HV	24) 179 HV
4) 197 HV	11) 175 HV	18) 156 HV	25) 161 HV
5) 204 HV	12) 184 HV	19) 176 HV	
6) 205 HV	13) 202 HV	20) 182 HV	
7) 184 HV	14) 199 HV	21) 195 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 E384 - 89 (Reapproved 1997). The information regarding material identification (i.e. size, thickness, heat number, etc.) has been provided by the customer whose name appears on this report.

Laboratory Test Conducted By: Sabine Heinemann  
Troy Drummond, T.T. / Sabine Heinemann, C.E.T.



A.O.Q.P. Registration No. 7296

# LATTICE METALS & WELDING CONSULTING LTD.

**Moises D. Valle**

**W-26343**

Name: Moises D. Valle ABSA File No. W-26343  
This card is issued pursuant to the Alberta Safety Codes Act and Pressure Welders' Regulations. The performance qualification is in accordance with Section IX of the ASME Boiler and Pressure Vessel Code and subject to the limitations on this card.

**March 11, 2020**

Date of Test

*[Signature]*  
Signature of Welder or Machine Welding Operator

**Dan Nguyen**

Welding Examiner (Print/Type)

Card No. 3374

## PERFORMANCE QUALIFICATION

Card No. 3374

Process(es)	SMAW	SMAW	Material (P-No.)	P1 thru P15F
Filler Metal Group (F-No.)	F3	F4	Min. Outside Diameter	1.0 in. O.D.
Max. Deposited Weld Metal	0.250 in.	MAX	Positions(s) Qualified	All
Backing	With or Without	With	Backing Gas	N/A
Progression	Uphill	Uphill		

**March 11, 2022**

P.Q. Expiry Date

*[Signature]*  
Welding Examiner Signature

**E-00286**

Examiner File No.



A.O.Q.P. Registration No. 7296

# LATTICE METALS & WELDING CONSULTING LTD.

**Moises D. Valle**

**W-26343**

Name: Moises D. Valle ABSA File No. W-26343  
This card is issued pursuant to the Alberta Safety Codes Act and Pressure Welders' Regulations. The performance qualification is in accordance with Section IX of the ASME Boiler and Pressure Vessel Code and subject to the limitations on this card.

**March 11, 2020**

Date of Test

*[Signature]*  
Signature of Welder or Machine Welding Operator

**Dan Nguyen**

Welding Examiner (Print/Type)

Card No. 3375

## PERFORMANCE QUALIFICATION

Card No. 3375

Process(es)	GMAW	SMAW	Material (P-No.)	P1 thru P15F
Filler Metal Group (F-No.)	F6	F4	Min. Outside Diameter	1.0 in. O.D.
Max. Deposited Weld Metal	0.138 in.	0.622 in.	Positions(s) Qualified	GM: SP15-45°, Flat SM: Flat
Backing	With or Without	With	Backing Gas	With or Without
Progression	Downhill	N/A		

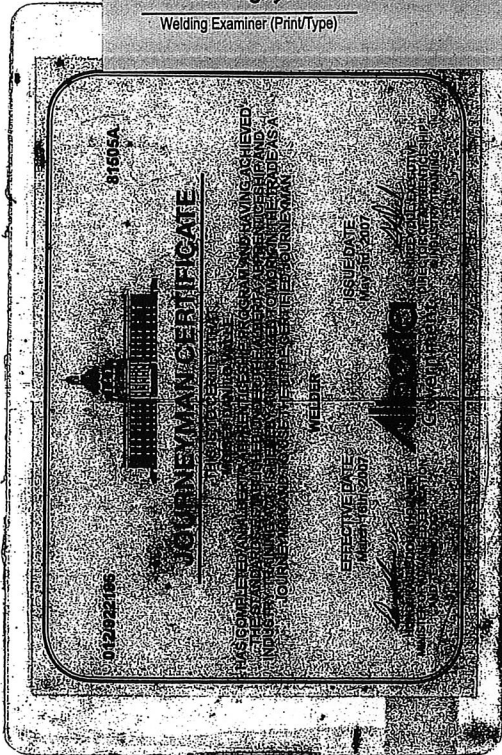
**March 11, 2022**

P.Q. Expiry Date

*[Signature]*  
Welding Examiner Signature

**E-00286**

Examiner File No.



Grade "W" Pressure Welder's Certificate of Competency

This is to certify that **Moises Valle** having complied with provisions of the Safety Codes Act, is authorized to engage in pressure welding in accordance with the prescribed Regulations.

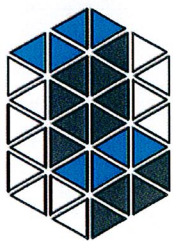
Dated at Edmonton  
February 28, 2008

**W-26343**  
File no.



*[Signature]*  
Chief Inspector and Administrator





# LATTICE METALS & WELDING CONSULTING LTD.

## WELDER QUALIFICATION RECORD

Company Next Compression Corp. Contact John Gogorenko  
 Welder's Name Moises D. Valle ABSA File No.: W-26343  
 WPS No.: NGC-3 (Rev. 3) WPS Reg. No.: 1801.2  
 Base material(s) welded: ASTM A513 Gr. 1026 Thickness: 0.625 in.  Test Coupon  Prod. Weld

### Testing Variables and Qualification Limits

Welding Variables(QW-350)	Actual Values		Range Qualified	
	SMAW	SMAW	SMAW	SMAW
Welding Process(es) Used	Manual	Manual	Manual	Manual
Type of Welding (i.e., Manual, Semi-Automatic) Used	Manual	Manual	Manual	Manual
Base Metal P-Number to P-Number	P1 to P1		P1 thru P15F	
<input type="checkbox"/> Plate <input checked="" type="checkbox"/> Pipe (enter diameter if pipe or tube)	2.50 in. O.D.		1.0 in. O.D. minimum	
Backing (Metal, weld metal, double-welded, etc.)	without	with	with/without	with
Filler Metal or Electrode Specification(s) (SFA)	5.1	5.1		
Filler Metal or Electrode Classification(s)	E6010	E7018-1		
Filler Metal or Electrode F-Number(s)	F3	F4	F3	F4
Deposit Thickness for each process or electrode type	0.125 in.	0.500 in.	0.250 in.	MAX
Process/Electrode 1: <u>E6010</u> 3 layers minimum <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No, Process/Electrode 2: <u>E7018-1</u> 3 layers minimum <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No				
Welding Position (2G, 6G, 3F, etc.)	6G	6G	All	All
Vertical Progression (Uphill or Downhill)	Uphill	Uphill	Uphill	Uphill

### Results

Visual Examination of Weld (QW-302.4) Acceptable

Bend Test:  QW-462.2 Transverse side bends  QW-462.3(a) Transverse face and root bends

Type	Result	Type	Result
Side Bend S1	Pass	Side Bend S3	Pass
Side Bend S2	Pass	Side Bend S4	Pass

Alternative Volumetric Examination Results (QW-191) N/A  RT or  UT

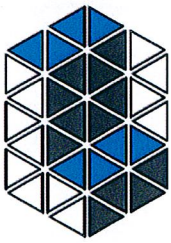
We certify that the statements on this record are correct and that the test coupons were prepared, welded and tested in accordance with the requirements of Section IX of the ASME BPVC and Alberta Welders Regulation.

Accredited Organization Lattice Metals & Welding Consulting Ltd. A.O.Q.P. Registration No. 7296  
 Test Conducted By Dan Nguyen, CSA W178.2 Level III Date of Test March 11, 2020  
 Certified By [Signature] Dan Nguyen, C.E.T. Welding Examiner File No. E-00286  
 Film or specimens evaluated by Dan Nguyen, C.E.T. Company Lattice Metals & Welding Consulting Ltd.  
 Test Certified By Next Compression Corp. Representative [Signature] John Gogorenko

### Record Information

Lattice Metal & Welding Consulting Ltd. testing facility  Calgary  Field  
 Date Coupon is to be retained to: April 11, 2020 Performance Test Reference No.: W20-064.1  
 Test Coupon I.D. No.: 2-42 P.Q. Card No.: 3374





# LATTICE METALS & WELDING CONSULTING LTD.

## WELDER QUALIFICATION RECORD

Company Next Compression Corp. Contact John Gogorenko  
 Welder's Name Moises D. Valle ABSA File No.: W-26343  
 WPS No.: NGC-4N (Rev. 4) WPS Reg. No.: 1801.2  
 Base material(s) welded: ASME SA 106 Gr. B Thickness: 0.436 in.  Test Coupon  Prod. Weld

### Testing Variables and Qualification Limits

Welding Variables(QW-350)	Actual Values		Range Qualified	
	GMAW	SMAW	GMAW	SMAW
Welding Process(es) Used	Semi-Auto	Manual	Semi-Auto	Manual
Type of Welding (i.e., Manual, Semi-Automatic) Used	P1 to P1		P1 thru P15F	
Base Metal P-Number to P-Number	2.375 in. O.D.		1.0 in. O.D. minimum	
<input type="checkbox"/> Plate <input checked="" type="checkbox"/> Pipe (enter diameter if pipe or tube)	without	with	with/without	with
Backing (Metal, weld metal, double-welded, etc.)	5.18	5.1		
Filler Metal or Electrode Specification(s) (SFA)	ER70S-6	E7018-1		
Filler Metal or Electrode Classification(s)	F6	F4	F6	F4
Filler Metal or Electrode F-Number(s)	0.125 in.	0.311 in.	0.138 in.	0.622 in.
Deposit Thickness for each process or electrode type	Process/Electrode 1: <u>GMAW 3 layers minimum</u> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No, Process/Electrode 2: <u>SMAW 3 layers minimum</u> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
Process/Electrode 1: <u>GMAW 3 layers minimum</u> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No, Process/Electrode 2: <u>SMAW 3 layers minimum</u> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	SP 30°	1GR	SP15-45°, Flat	Flat
Welding Position (2G, 6G, 3F, etc.)	Downhill	N/A	Downhill	N/A
Vertical Progression (Uphill or Downhill)	without	N/A	with/without	N/A
Inert Gas Backing for GTAW or GMAW	Short-circ.	N/A	Short-circ.	N/A
Transfer Mode (spray/globular or pulse to short circuit)				

### Results

Visual Examination of Weld (QW-302.4) Acceptable

Bend Test:  QW-462.2 Transverse side bends  QW-462.3(a) Transverse face and root bends

Type	Result	Type	Result
Side Bend S1	Pass	Side Bend S2	Pass
---	---	---	---

Alternative Volumetric Examination Results (QW-191) N/A  RT or  UT

We certify that the statements on this record are correct and that the test coupons were prepared, welded and tested in accordance with the requirements of Section IX of the ASME BPVC and Alberta Welders Regulation.

Accredited Organization Lattice Metals & Welding Consulting Ltd. A.O.Q.P. Registration No. 7296  
 Test Conducted By Dan Nguyen, CSA W178.2 Level III Date of Test March 11, 2020  
 Certified By Dan Nguyen, C.E.T. Welding Examiner File No. E-00286  
 Film or specimens evaluated by Dan Nguyen, C.E.T. Company Lattice Metals & Welding Consulting Ltd.  
 Test Certified By Next Compression Corp. Representative John Gogorenko

### Record Information

Lattice Metal & Welding Consulting Ltd. testing facility  Calgary  Field  
 Date Coupon is to be retained to: April 11, 2020 Performance Test Reference No.: W20-064.2  
 Test Coupon I.D. No.: 2-40 P.Q. Card No.: 3375



A World of NDT Solutions

3231 58th Avenue, S.E., Calgary, Alberta T2C 0B4  
Tel: 403-279-4540 Fax: 403-236-3043

Next Compression Corp  
261122 Wagon Wheel Crescent  
Rocky View No. 44, AB T4A 0E2  
Tel: (403) 250-8810 Fax: (403) 250-8815

Job Number: 100421  
PO Number: 53178

TRAVELER: #210-29001

RADIOGRAPHIC EXAMINATION REPORT #CGY-599008

Date of Exam: Tuesday, Jun 29 2021  
Job Location: Western's Shop  
Assistants: Trevor Mitchell CGSB Lev. II Reg# 6836, SNT Lev. II  
Douglas Corrin CEDO Reg #1040  
Procedure: 200-RT-001 Rev. 15  
Acc Codes: ASME B31.3 Normal (2018)  
Inspected: Pre Heat Treat  
Material: Carbon Steel  
Isotope: IR 192  
Focal Spot: 2x3 mm  
Curies: 50  
Degree: Percentage  
Processing: Automatic  
Units: in

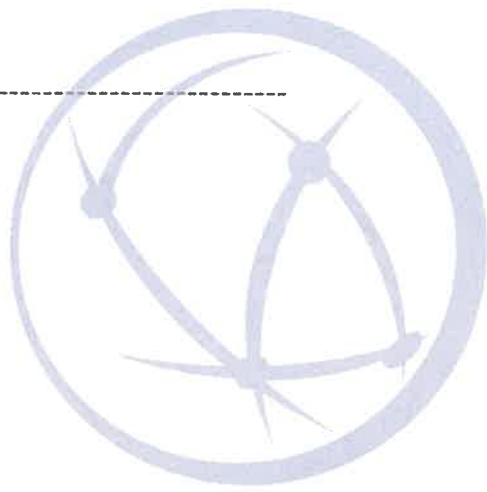
Legend:  
\* (Loading) S = Single  
D = Double  
T = Triple  
# (Result) ACC = Accept  
REJ = Reject  
RETEST = Retest  
@ (Degree) 1 = Slight  
2 = Moderate  
3 = Reject

Note: SFD Does not include reinforcement

Test Information												Result Information			
Comp#	Test#	Tech	IQI	Wldr	Dia	Thk	Len	Sch	SFD	*	Films	Type	#	@ Discontinuity	From - To
1	X1	RT-3	1A	A	4	0.237		STD	4.5	S	3	D5-AGFA- I	ACC		
2	X2	RT-3	1A	A	2	0.218		XH	2.375	S	3	D4-AGFA- I	ACC		

RT-3 (Double Wall Exp, Single Wall Viewing): T.291 h) S.O.D., Nominal wall thickness + inside diam. of pipe. T.291 i) S.S.O.F.D., Wall thickness + max weld reinforcement x 2  
Screen Thickness Utilized 0.010" Front and Back:

Units:	Code
Qty	
1	2/XH/00
1	4/STD/00
1	NDE/REP



Sign Here:

Sign Here:

Trevor Mitchell CGSB Lev. II Reg# 6836, SNT Lev. II

Customer Representative:





# HYDROSTATIC TEST REPORT

Date: 06-30-2021

Customer: Kalt Exploration

Job # 100421A

Drawing #: 100421-6201 / 100421-6202

Description: Process Spools

Tests Conducted by: NEXT COMPRESSION

Test Pressure: 1125 **PSI** Holding Time at Test Pressure: 20min

Charted N/A Recorder #: N/A

Results: NO LEAKS FOUND AT TIME OF TEST

Authorized Inspector Witnessing Test: N/A

Pressure Gauge ID #: SS-450 Calibration Due: 02-22-2022

Pressure Gauge ID #: SS-447 Calibration Due: 02-22-2022

Comments: Spools Blown out after Hydrotest

  
(Signature of QCM/QCI)

  
(Signature of Owners Inspector)

N/A  
(Signature of Authorized Inspector, if applicable)



Wescan Calibration
2228 Pegasus Way NE
Calgary, AB T2E 8M5

CERTIFICATE OF CALIBRATION

Table with 2 columns: Instrument details (Description, Model Number, Instrument Id, Manufacturer, Customer Name) and Calibration details (Work Order, Serial Number, Cal Procedure, Cal Date, Recall Cycle, Next Cal Date, Purchase Order).

Calibration Environment: Temperature 22.7 °C Relative Humidity 24.0 %RH
Received Condition: Within Tolerance
Completed Condition: Within Tolerance
Remarks: +/- 1 % OF FULLSCALE. (+/- 15 psi).

Standards Used to Establish Traceability

Table with 4 columns: Instrument Type, Model, Asset #, Cal Due Date. Row 1: PRESSURE GAUGE, DIGITAL; 5KPSIXP2I-DD; 200015C; 31 Mar 2021

Wescan certifies that, at the time of calibration, the above listed instrument meets or exceeds all of the specifications defined on the Test Data Sheet (TDS), otherwise indicated. The Certificate received and completed conditions and the TDS specifications are based on the procedure(s) and/or specification(s) referenced on the TDS unless otherwise indicated.

The above listed instrument has been calibrated using standards that are traceable to the International System of Units (SI) through a National Metrological Institute (such as NRC or NIST). Wescan's quality system meets the requirements of ISO/IEC 17025:2017. Unless otherwise specified, Wescan maintains a minimum of a 4:1 ratio between the equipment under test and the measurement system.

This report consists of two parts with separate page numbering schemes; the Certificate of Calibration and the Test Data Sheet (TDS). Copyright of this report is owned by the issuing laboratory and may not be reproduced, other than in full, except with the prior written permission of the issuing laboratory.

Test data As Found and Final (as left) results are the same unless reported otherwise. Certificate remarks identify if adjustments were performed.



Wescan Calibration  
2228 Pegasus Way NE  
Calgary, AB T2E 8M5

### CERTIFICATE OF CALIBRATION

<b>Description</b>	<b>PRESSURE GAUGE</b>	<b>Work Order</b>	<b>C0909947</b>
<b>Model Number</b>	<b>4 " LIQUID</b>	<b>Serial Number</b>	<b>N/A</b>
<b>Instrument Id</b>	<b>SS-450</b>	<b>Cal Procedure</b>	<b>33K6-4-427-1</b>
<b>Manufacturer</b>	<b>WIKA</b>	<b>Cal Date</b>	<b>22 Feb 2021</b>
<b>Customer Name</b>	<b>NEXT COMPRESSION (SHOP 1)</b>	<b>Recall Cycle</b>	<b>52 Weeks</b>
		<b>Next Cal Date</b>	<b>22 Feb 2022</b>
		<b>Purchase Order</b>	<b>52261</b>

**Calibration Environment:** Temperature 22.6 °C      Relative Humidity 24.0 %RH

**Received Condition:** Within Tolerance

**Completed Condition:** Within Tolerance

**Remarks:** +/- 1 % OF FULLSCALE. (+/- 20 psi).

#### Standards Used to Establish Traceability

<u>Instrument Type</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due Date</u>
PRESSURE GAUGE, DIGITAL	5KPSIXP2I-DD	200015C	31 Mar 2021

Wescan certifies that, at the time of calibration, the above listed instrument meets or exceeds all of the specifications defined on the Test Data Sheet (TDS), otherwise indicated. The Certificate received and completed conditions and the TDS specifications are based on the procedure(s) and/or specification(s) referenced on the TDS unless otherwise indicated. Any statement of compliance is made without taking measurement uncertainty into account and is based on the instrument's performance against the test limits documented on the test data sheet.

The above listed instrument has been calibrated using standards that are traceable to the International System of Units (SI) through a National Metrological Institute (such as NRC or NIST). Wescan's quality system meets the requirements of ISO/IEC 17025:2017. Unless otherwise specified, Wescan maintains a minimum of a 4:1 ratio between the equipment under test and the measurement system.

This report consists of two parts with separate page numbering schemes; the Certificate of Calibration and the Test Data Sheet (TDS). Copyright of this report is owned by the issuing laboratory and may not be reproduced, other than in full, except with the prior written permission of the issuing laboratory.

Test data As Found and Final (as left) results are the same unless reported otherwise. Certificate remarks identify if adjustments were performed.



Next PO# 52851 1145 # 34  
 Heat Number: MA1418  
 Trans Amp Piping: MA1420  
 Shipments/Seq: 1222

Rev'd By: MW

2" XH SEAMLESS PIPE  
 A/SATOR CR 20# 30#  
 (.218 WT)

Customer: TOYOTA TRUCKS AMERICA, INC  
 P.O. No.: C-18-588 DL 02-DEC-18  
 OC / Leading Site No.: 6180078  
 Specifications: AUSTENITIC 304/304L PER ISO 9001, CSA Z940.1, Q32 2001  
 Process/Type of Pipe: Hot Finished Seamless Carbon Steel Pipe

MAHARASHTRA SEAMLESS LIMITED  
 WORKS (PVT) TEST CERTIFICATE  
 IN 1824 : 21  
 DO X Weld Thick (Inch): 2.375 X 0.218  
 Length Range (Feet): 18 to 21  
 Total Length (Feet):  
 Material Code:

Page 1 of 2  
 QCF-28  
 Test Certificate No.: MS-7000016142003  
 Date: 28-MAY-2023

Seq. No.	Mat. No.	Mat. Size	C	L	S	P	S	C	M	H	Cu	V	Nb	Ti	N	O	S	P	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn	Ag	Cd	Pb	Bi	Fe	C	Mn	Si	Al	Ni	In	As	Se	Te	Zn
----------	----------	-----------	---	---	---	---	---	---	---	---	----	---	----	----	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----



# NEXT COMPRESSION

## Pipe Thickness Report

Date: 04/15/2021

Stresstel UT Thickness Tester #804647 Due Date: 23/09/2021

Procore Digital Caliper #3306125 Due

Starett Digital Caliper #14289994 used with Step Wedge #37980

Step Wedge #47404

Size: 2" Sch: XH

Type: A/S A 106 B Heat# MA 1418

Supplier: Trans AM  
0 (Degrees) .225

Listed. Thk (In) .218 Min. Thk (In) 0.19075

180 (Degrees) .232

90 (Degrees) .231

270 (Degrees) .218

(Hydro Test) 3000 PSI PO # 52651 JOB# 100421A

Performed By: DELROY STEWART Signature: *Delroy Stewart*

NPS/OD"	Std. /40	Min.thk.	XH/80	Min.thk.	Sch 160	Min.thk.	Sch XXH	Min.thk.
3/4" /1.050	0.113	0.098875	0.154	0.13475	0.219	0.191625	0.308	0.2695
1" / 1.315	0.133	0.116375	0.179	0.156625	0.250	0.21875	0.358	0.31325
1-1/2" /1.90	0.145	0.126875	0.200	0.175	0.281	0.245875	0.400	0.350
2" /2.375"	0.154	0.13475	0.218	0.19075	0.344	0.301	0.436	0.3815
3" /3.50"	0.216	0.189	0.300	0.2625	0.438	0.38325	0.600	0.525
4" /4.50"	0.237	0.207375	0.337	0.294875	0.531	0.464625	0.674	0.58975
6" /6.625"	0.280	0.245	0.432	0.378	0.719	0.629125	0.864	0.756
8" /8.625"	0.322	0.28175	0.500	0.4375	0.906	0.79275	0.875	0.765625
10" /10.750	0.365	0.319375	Check listing		1.125	0.984375	1.00	0.875

Listed Thickness Multiply by 0.875" = Minimum Thickness

# NEXT COMPRESSION

## Pipe Thickness Report

Date: 04/15/2021

Stresstel UT Thickness Tester #804647 Due Date: 23/09/2021

Procore Digital Caliper #3306125 Due

Starett Digital Caliper #14289994 used with Step Wedge #37980

Step Wedge #47404

Size: 2" Sch: XH Type: A/SA 106B Heat# MA1418

Supplier: TRANSAM Listed. Thk (In) .218 Min. Thk (In) 0.19075  
0 (Degrees) .224

180 (Degrees) .235

90 (Degrees) .225

270 (Degrees) .230

(Hydro Test) 3000 PSI PO # 52651 JOB# 1001421A

Performed By: DELROY STEWART Signature: Delroy Stewart

NPS/OD"	Std. /40	Min.thk.	XH/80	Min.thk.	Sch 160	Min.thk.	Sch XXH	Min.thk.
3/4" /1.050	0.113	0.098875	0.154	0.13475	0.219	0.191625	0.308	0.2695
1" / 1.315	0.133	0.116375	0.179	0.156625	0.250	0.21875	0.358	0.31325
1-1/2" /1.90	0.145	0.126875	0.200	0.175	0.281	0.245875	0.400	0.350
2" /2.375"	0.154	0.13475	0.218	0.19075	0.344	0.301	0.436	0.3815
3" /3.50"	0.216	0.189	0.300	0.2625	0.438	0.38325	0.500	0.525
4" /4.50"	0.237	0.207375	0.337	0.294875	0.531	0.464625	0.674	0.58975
6" /6.625"	0.280	0.245	0.432	0.378	0.719	0.629125	0.864	0.756
8" /8.625"	0.322	0.28175	0.500	0.4375	0.906	0.79275	0.875	0.765625
10" /10.750	0.365	0.319375	Check listing		1.125	0.984375	1.00	0.875

Listed Thickness Multiply by 0.875" = Minimum Thickness



# NEXT COMPRESSION

## Pipe Thickness Report

Date: 04/15/2021

Stresstel UT Thickness Tester #804647 Due Date: 23/09/2021

Procore Digital Caliper #3306125 Due

Starett Digital Caliper #14289994 used with Step Wedge #37980

Step Wedge #47404

Size: 2" Sch: XH Type: A/SA 106B Heat# MA 1418

Supplier: TRANSAM Listed. Thk (In) .218 Min. Thk (In) 0.19075  
 0 (Degrees) .226

180 (Degrees) .218

90 (Degrees) .230

270 (Degrees) .224

(Hydro Test) 3000 PSI PO # 52651 JOB# 100421A

Performed By: DELROY STEWART Signature: Delroy Stewart

NPS/OD"	Std. /40	Min.thk.	XH/80	Min.thk.	Sch 160	Min.thk.	Sch XXH	Min.thk.
3/4" /1.050	0.113	0.098875	0.154	0.13475	0.219	0.191625	0.308	0.2695
1" / 1.315	0.133	0.116375	0.179	0.156625	0.250	0.21875	0.358	0.31325
1-1/2" /1.90	0.145	0.126875	0.200	0.175	0.281	0.245875	0.400	0.350
2" /2.375"	0.154	0.13475	0.218	0.19075	0.344	0.301	0.435	0.3815
3" /3.50"	0.216	0.189	0.300	0.2625	0.438	0.38325	0.600	0.525
4" /4.50"	0.237	0.207375	0.337	0.294875	0.531	0.464625	0.674	0.58975
6" /6.625"	0.280	0.245	0.432	0.378	0.719	0.629125	0.864	0.756
8" /8.625"	0.322	0.28175	0.500	0.4375	0.906	0.79275	0.875	0.765625
10" /10.750	0.365	0.319375	Check listing		1.125	0.984375	1.00	0.875

Listed Thickness Multiply by 0.875" = Minimum Thickness

# NEXT COMPRESSION

## Pipe Thickness Report

Date: 04/15/2021

Stresstel UT Thickness Tester #804647 Due Date: 23/09/2021

Procore Digital Caliper #3306125 Due

Starett Digital Caliper #14289994 used with Step Wedge #37980

Step Wedge #47404

Size: 2" Sch: XH Type: A/SA 106B Heat# MA 1418

Supplier: TRANS AM Listed. Thk (In) .218 Min. Thk (In) 0.19075  
0 (Degrees) .219

180 (Degrees) .233

90 (Degrees) .218

270 (Degrees) .220

(Hydro Test) 3000 PSI PO # 52651 JOB# 100421A

Performed By: DELROY STEWART Signature: Delroy Stewart

NPS/OD"	Std. /40	Min.thk.	XH/80	Min.thk.	Sch 160	Min.thk.	Sch XXH	Min.thk.
3/4" / 1.050	0.113	0.098875	0.154	0.13475	0.219	0.191625	0.308	0.2695
1" / 1.315	0.133	0.116375	0.179	0.156625	0.250	0.21875	0.358	0.31325
1-1/2" / 1.90	0.145	0.126875	0.200	0.175	0.281	0.245875	0.400	0.350
2" / 2.375"	0.154	0.13475	0.218	0.19075	0.344	0.301	0.436	0.3815
3" / 3.50"	0.216	0.189	0.300	0.2625	0.438	0.38325	0.600	0.525
4" / 4.50"	0.237	0.207375	0.337	0.294875	0.531	0.464625	0.674	0.58975
6" / 6.625"	0.280	0.245	0.432	0.378	0.719	0.629125	0.864	0.756
8" / 8.625"	0.322	0.28175	0.500	0.4375	0.906	0.79275	0.875	0.765625
10" / 10.750	0.365	0.319375	Check listing		1.125	0.984375	1.00	0.875

Listed Thickness Multiply by 0.875" = Minimum Thickness



**Trans Am**

PIPING PRODUCTS LTD.

**Shipped Date**  
Jun 22, 2021

**Sold To**  
Next Compression Corp.  
261122 Wagon Wheel Crescent  
Rocky View County, Ab

**Ship To**  
SAME

Page 1 of 1

**T4A 0E2**

Ordered By Carolyn

Ph# 403 250-8810

Customer P.O.#	Job# / Tag#	T/A Sales Order #
53122		C21-24029

Shipping Instructions	Freight	Date Ordered
DELIVER		Jun 22, 2021

Item	Description	Qty.Ord.	Um	Qty.Ship.	Backorder	Heat #	Mnf
1	2-1/2" STD SR 90 BW ELBOW A/SA420-WPL6 Weight: 4	2	EA	2		858C	CH
2	2" XH LR 90 BW ELBOW A/SA420-WPL6 Weight: 4	2	EA	2		63A01M023 A372	BT CH
<b>Total MTR's Listed</b>						3	
<b>Manufacturer's legend &amp; Alberta CRN #</b>							
BT Thai Benkan Co. Ltd. (Benkan) OA17746.52 Exp. Jun 2025							
CH Chup Hsin Enterprise Co. Ltd. OA12036.2 Exp. Jan 2022							

RECEIVED  
JUN 24 2021

Weight Shipped	Skid	Crate	Sack	Box	Loose	Loose Pipe	Pipe Bundle	Miscellaneous	Trans Am Representative
8 Lbs.				1					Pat Canjar

is a Registered Trademark of Trans Am Piping Products Ltd.

**Packing List / MTR Summary**

9335 Endeavor Drive S.E Calgary, Alberta T3S 0A1  
Ph# (403) 236-0601 Fax# (403) 279-6002





Trans Am

PIPING PRODUCTS LTD.

Shipped Date

Jun 22, 2021

REPRINT PAT

Page 1 of 2

Sold To  
Next Compression Corp.  
261122 Wagon Wheel Crescent  
Rocky View County, Ab

Ship To  
SAME

T4A 0E2  
Ordered By Carolyn

Ph# 403 250-8810

GR 42394-100421A

Customer P.O.# Job# / Tag# T/A Sales Order #

53122 100421A F6201 C21-23970

Shipping Instructions Freight Date Ordered

DELIVER Jun 22, 2021

Item	Description	Qty.Ord.	Um	Qty.Ship.	Backorder	Heat #	Mnf
	CE <= 0.43 MN <= 1.35 P <= 0.025 S <= 0.025 (FLANGES) <= 0.010 (FTG) CR+MO+CU+NI <= 0.70 NB+V+TI <= 0.35 NORMALIZED AL <= 0.020						
1	2-1/2" CL 300 W/N FLANGE RF STD BORE A/SA105N Weight: 23	2	EA	2		18/79539	MFF
3	4X2 XH BW CONC REDUCER A234-WPB Weight: 5	1	EA	1		62M20M072-1	BT
5	2" CL 600 W/N FLANGE RF XH BORE A/SA105N Weight: 20	2	EA	2		913004	SE
6	2" CL 300 W/N FLANGE RF XH BORE A/SA105N Weight: 8	1	EA	1		913006	"
<b>Total MTR's Listed</b>						4	
<b>Manufacturer's legend &amp; Alberta CRN #</b>							
BT Thai Benkan Co. Ltd. (Benkan) OA17746.52 Exp. Jun 2025							

RECEIVED  
JUN 24 2021

Continued Next Page

Weight Shipped	Skid	Crate	Sack	Box	Loose	Loose Pipe	Pipe Bundle	Miscellaneous	Trans Am Representative
Lbs.				2					Pat Canjar

is a Registered Trademark of  
Trans Am Piping Products Ltd.

Packing List / MTR Summary

9335 Endeavor Drive S.E Calgary, Alberta T3S 0A1  
Ph# (403) 236-0601 Fax# (403) 279-6002



ISO 9001:2008  
Certificate # 800363



**Trans Am**

PIPING PRODUCTS LTD.

**Shipped Date**

Jun 22, 2021

**REPRINT PAT**

Page 2 of 2

**Sold To**  
Next Compression Corp.  
261122 Wagon Wheel Crescent  
Rocky View County, Ab

**Ship To**  
SAME

**T4A 0E2**

Ordered By Carolyn

Ph# 403 250-8810

**Customer P.O.#**

**Job# / Tag#**

**T/A Sales Order #**

53122

100421A F6201

C21-23970

**Shipping Instructions**

**Freight**

**Date Ordered**

DELIVER

Jun 22, 2021

Item	Description	Qty.Ord.	Um	Qty.Ship.	Backorder	Heat #	Mnf		
MFF	Metalfar SpA OB11962.2 Exp. Feb 2022								
SE	San Eng Steel Forging Co. Ltd. OB12945.2 Exp. Jan 2023								
<b>Weight Shipped</b>	<b>Skid</b>	<b>Crate</b>	<b>Sack</b>	<b>Box</b>	<b>Loose</b>	<b>Loose Pipe</b>	<b>Pipe Bundle</b>	<b>Miscellaneous</b>	<b>Trans Am Representative</b>
56	Lbs.			2					Pat Canjar

is a Registered Trademark of  
Trans Am Piping Products Ltd.

**Packing List / MTR Summary**

9335 Endeavor Drive S.E Calgary, Alberta T3S 0A1  
Ph# (403) 236-0601 Fax# (403) 279-6002



ISO 9001:2008  
Certificate # 200363





**Trans Am**

PIPING PRODUCTS LTD.

**Shipped Date**

Jun 22, 2021

**REPRINT PAT**

Page 2 of 2

**Sold To**  
Next Compression Corp.  
261122 Wagon Wheel Crescent  
Rocky View County, Ab

**Ship To**  
SAME

**T4A 0E2**

Ordered By Carolyn

Ph# 403 250-8810

**Customer P.O.#**

**Job# / Tag#**

**T/A Sales Order #**

53122

100421A F6201

C21-23970

**Shipping Instructions**

**Freight**

**Date Ordered**

DELIVER

Jun 22, 2021

Item	Description	Qty.Ord.	Um	Qty.Ship.	Backorder	Heat #	Mnf
MFF	Metalfar SpA OB11962.2 Exp. Feb 2022						
SE	San Eng Steel Forging Co. Ltd. OB12945.2 Exp. Jan 2023						

Weight Shipped	Skid	Crate	Sack	Box	Loose	Loose Pipe	Pipe Bundle	Miscellaneous	Trans Am Representative
56	Lbs.			2					Pat Canjar

is a Registered Trademark of Trans Am Piping Products Ltd.

**Packing List / MTR Summary**

9335 Endeavor Drive S.E Calgary, Alberta T3S 0A1  
Ph# (403) 236-0601 Fax# (403) 279-6002



COMPANY WITH MANAGEMENT SYSTEM CERTIFIED BY DNV GL = ISO 9001 = = ISO 14001 =		METALFAR PRODOTTI INDUSTRIALI SPA 23861 CESANA BRIANZA (LC) - ITALY VIA G. PARINI, 28 PHONE + 39 031 655441 - FAX +39 031 655149 certificate@metalfaritaly.com	A01
--	---	--	-----

INSPECTION CERTIFICATE EN 10204:2004 / 3.1 A02 Nr<sup>A03</sup> 2020-C\_MFF-01951 Data / Dated 07.07.2020 Z02

TRANS AM PIPING PRODUCTS LTD 9335 ENDEAVOR DRIVE S.E. T3S0A1 CALGARY, ALBERTA	A05	Ordine / PO CI-20-193 <span style="float: right;">A07</span> Item 008 DDT / Delivery note 2020-3E301-0001681 Packing List 2020-3E401-0001697 Fattura / Invoice 2020-3E401-0001697 <span style="float: right;">A08</span> Ns. rif. / Our ref. 2020-3E201-0000982-0008
---	-----	---

Dest. TRANS AM PIPING PRODUCTS LTD A08  
 9335 - Endeavor Drive S.E.  
 T3S 0A1 Calgary, ALBERTA CA

Cod. colore Heat Code	Nr. colore Heat Nr	Quantità Quantity	Descrizione Description
	18/79539		W/N 300 RF 2.1/2" STD A105N

Mat. in acc. a / Mat. in acc. to <sup>B02</sup> ASTM A105M - 18 , ASME SA105M-19 ASME CODE SECT. II, PART A, ED. 2019  
 NACE MR-0175/2016 ISO 15156-2:2015 - SOUR SERVICE  
 NACE MR-0103/2015 ISO 17945:2015 - SOUR SERVICE  
 CSA Z245.12-17 GRADE 248 CAT.I SOUR SERVICE  
 CSA Z662 :2019  
 Q.A.S.IN ACCORD.WITH PRESS.EQUIPM.DIRECT.2014/68/EU(PED) ANNEX I, PARAGRAPH 4.3  
 CERT.4687-2014-CE-ITA-DNV GL

Ann. mat. / Mat. remarks <sup>B02</sup> MANUFACTURED FROM FULLY KILLED STEEL AND TO FINE GRAIN PRACTICE '5' OR HIGHER

Elementi / Elements <sup>C01-C02</sup>	C	Si	Mn	S	P	Cr	Ni	Mo	Ti	Cu	V	Nb	N
LADLE ANALYSIS	0,185	0,220	1,080	0,008	0,015	0,120	0,070	0,010	0,020	0,200	0,002	0,001	0,009
PRODUCT ANALYSIS	0,181	0,227	1,085	0,007	0,014	0,125	0,074	0,013	0,022	0,193	0,004	0,002	0,011
	Al	B	Ca						CE		F1	F2	PREN
LADLE ANALYSIS	0,028	0,0000	0,000						0,411		0,402	0,130	--
PRODUCT ANALYSIS	0,027	0,0000	0,000						0,407		0,409	0,138	--

CE=C+F(Mn/6+Si/24+Cu/15+Ni/20+(Cr+Mo+V+Nb)/5+5B) F1=Cu+Ni+Cr+Mo+V F2=Cr+Mo

Provetta Test specimen	Forma Shape	σ <sup>C03</sup>	Snervamento > 0,2% Yield Strength > 0,2%	Snervamento > 1,0% Yield Strength > 1,0%	Rottura Tensile	Allungamento Elongation	Contrazione Reduction of area
Sez/Sect mm2 Gauge L.mm	1=O - 2=□	MPa	MPa	MPa	%	%	
126,60 50,80	1 20	347,0			529,0	38,0	68,0

DUREZZA / HARDNESS <sup>C02</sup>	RESILLENZA / IMPACT TEST					
HBW	Provetta / Test Specimen	°C <sup>C03</sup>	1-Joule <sup>C02</sup>	2-Joule <sup>C02</sup>	3-Joule <sup>C02</sup>	Media/Average <sup>C03</sup>
163,0 ; 168,0	10x10 mm	-29	86	71	77	78,0


Tratt. Term. / Heat treatment <sup>C70</sup> NORMALIZED AT 920 °C - COOLED IN STILL AIR GAS FURNACE

Dim in acc. a / Dim. acc. to <sup>B14</sup> ASME/ANSI B16.5 -2017 ; ASME/ANSI B36.10M -2018 ; ASME/ANSI B16.25 -2017

Finitura / Roughness ASME/ANSI B46.1 -2009  
 RE FINISHING 125-250 µin AARH

Marcatura in acc. Marking in acc. to	ANSI/MSS SP-25-2018	Vis. & Dim.	SATISFACTORY	Origine Origin of Steel	EUROPEAN UNION
---	---------------------	-------------	--------------	----------------------------	----------------

Note / Notes 100% MANUFACTURED IN ITALY  
 MATERIAL IN ACCORDANCE WITH ORDER AND SPECIFICATION

**NEXT Compression Corp.**  
 This Material Meets the Requirements of  
 The A.S.M.E. Code Section II, 19 Edition  
 Signed:  Date: 06/21/2021

UFFICIO CONTROLLO QUALITA' QUALITY CONTROL DEPARTMENT 	ENTE UFFICIALE DI COLLAUDO INSPECTION AUTHORITY <span style="float: right;">Z03</span>	MARCHIO PRODUZIONE MANUFACTURER'S SYMBOL <span style="float: right;">A04</span> 
---	---	---





SAN ENG STEEL FORGING CO LTD  
311, Jen Hsin Road, Jen Wu District  
Kaohsiung, Taiwan, R.O.C.  
TEL: 07-3724249; FAX: 07-3712923  
URL: www.saneng.com.tw  
e-mail: saneng@sisr.seed.net.tw

**MILL TEST CERTIFICATE**

Customer: **TRANS AM PIPING PRODUCTS LTD**  
Order No.: **Z016616(4)-T/A**

Certificate No.: **SE16616N**  
Date: **02/19/2020**  
Page: **1 OF 1**

**FORGED CARBON STEEL FLANGES**

ASTM A105-18/ASME SA105-2019

ASME B18.5-17  
CSA Z245.12

Item No.	CODE NO	DESCRIPTION	QUANTITY		CHEMICAL COMPOSITION (%)															
			Min	Max	C	Si	Mn	P	S	Cu	Cr	Ni	Mo	V	Nb	N	Al	B	CE(%)	
1	B0389000	600 WNR/ XS 2" A105N	0.350	0.100	0.600	0.035	0.040	0.400	0.300	0.400	0.120	0.080	0.020	-	-	-	-	-	3.000	0.398
2	B0389000	600 WNR/ XS 2" A105N	0.197	0.220	1.080	0.014	0.006	0.010	0.035	0.046	0.005	0.003	0.005	0.005	0.005	0.005	0.005	0.024	3.000	0.392
3	B0837000	300 HUB BLRF 8" A105N	0.200	0.270	1.110	0.012	0.008	0.009	0.023	0.049	0.005	0.002	0.005	0.003	0.003	0.003	0.025	3.000	0.392	0.391
			197																	

Item No.	Heat No.	T.S.(MPa)	Y.S.(MPa)	E.L.(%)	Hardness (HBS)	R.A.(%)	Impact Test			Material Supplier	REMARKS
							Temp.	Min	Max		
1	913004	511.0	359.0	36.0	151/148	70.5	1	2	3	NTMK, RUSSIA	HEAT TREATMENT(2) 880°CX4HRS CONFORMS WITH NACE MR0103/ISO 15945-1:2015 AND NACE MR0175/ISO 15156:2015 CLAUSE 7.2.1.4 REGION 3 AND ANNEX A. CONFORMS WITH Z245.12 CAT 1 GR248 SOUR SERVICE- (FOR USE AS WELDING NECK AND BLIND FLANGES ONLY) MAN TO C RATIO IS GREATER THAN 3.0" FULLY KILLED IN ELECTRIC FURNACE FINE GRAIN PRACTICE COUNTRY OF ORIGIN: TAIWAN NO WELD REPAIR WAS PERFORMED TEST SPECIMEN SIZE: 12.5MM BROWN/10000
2	815552	515.0	330.0	37.0	152/150	70.4				NTMK, RUSSIA	
3	J7K8488	522.0	368.0	35.8	152/150	70.4				NIPPON STEEL, JP	

\*1: T.S. = Tensile Strength, Y.S.=Yield Strength, E.L.=Elongation, R.A.=Reduction of Area.  
 \*2: N=Normalized, A=Annealed, Q=Quenched, T=Tempered, S=T=Solution Treated, S.R=Stress Relieved, A.C=Air Cooled, F=C=Fluance Cooled, W/C=Water Cooled, O=C=Oil Cooled.  
 \*3: C.E. Value = C + (Mn / 5) + (Cr + Mo + V) / 5 + (Ni + Cu) / 15

Manager of Quality Assurance Dept



**NEXT Compression Corp.**  
 This Material Meets the Requirements of  
 The A.S.M.E. Code Section II, 19 Edition

Signed: *[Signature]* Date: *06/24/2021*



SAN ENG STEEL FORGING CO LTD  
 311, Jen Hsin Road, Jen Wu District,  
 Kaohsiung, Taiwan, R.O.C  
 TEL: 07-3724249; FAX: 07-3712923  
 URL: www.saneng.com.tw  
 e-mail: saneng@sis.seed.net.tw

**MILL TEST CERTIFICATE**

Customer: **TRANS AM PIPING PRODUCTS LTD.**  
 Order No.: **701534234-17A**

Certificate No.: **SE153428**  
 Date: **10/31/2019**  
 Page: **1 OF 1**

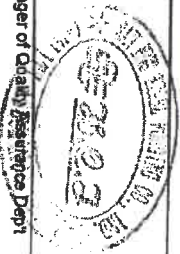
CL 300 W/N FLANGE RF XH  
 BORNEA/SA105N

Item No.	CODE NO	DESCRIPTION	QUANTITY		CHEMICAL COMPOSITION (%)											DIMENSIONAL SPECIFICATIONS			
			Min	Max	C	Si	Mn	P	S	Cu	Cr	Ni	Mo	V	Nb	N	Al	B	CE(%)
1	B0219000	300 WNRFXS 2" A105N			0.350	0.100	0.600	0.035	0.040	0.400	0.300	0.400	0.120	0.080	0.020	-	-	-	-
2	B0219000	300 WNRFXS 2" A105N			0.207	0.280	1.030	0.015	0.009	0.011	0.034	0.050	0.005	0.004	0.005	0.003	0.029	3.000	0.401
					0.206	0.240	1.030	0.014	0.005	0.010	0.037	0.048	0.005	0.005	0.004	0.029	3.000	0.391	
Heat No.			T.S.( <sup>1</sup> ) (MPa)		Y.S.( <sup>1</sup> ) (MPa)		E.L.(%)		Hardness (HB)		R.A.(%)		Impact Test		Material Supplier		REMARKS		
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Temp: Joule						
1	815551		516.0	329.0	35.0	152/150	69.5		187				1		NTMK, RUSSIA		880 CHRS CONFORMS WITH NACE MR0103/SO17845-1:2015 AND NACE MR0175/SO1576:2015 CLAUSE 7.2.1.4 REGION 3 AND ANNEX A. CONFORMS WITH Z248, 12 CAT I GR248 SCUR SERVICE-17(FOR USE AS WELDING NECK AND BLIND FLANGES ONLY) MNTO C RATIO IS GREATER THAN 3.0" FULLY KILLED IN ELECTRIC FURNACE FINE GRAIN PRACTICE COUNTRY OF ORIGIN: TAIWAN NO WELD REPAIR WAS PERFORMED TEST SPECIMEN SIZE: 12.5MM BORON/10000		
2	913006		519.0	339.0	35.8	152/150	71.1						2		NTMK, RUSSIA				

\*1: T.S. = Tensile Strength, Y.S.=Yield Strength, E.L.=Elongation, R.A.=Reduction of Area.  
 \*2: N=Normalized, A=Annealed, Q=Quenched, T=Tempered, S.T=Solution Treated, S.R=Stress Relieved, A.C=Air Cooled, F.C=Furnace Cooled, W.C=Water Cooled, O.C=Oil Cooled.  
 \*3: CE Value = C + (Mn/5) + (Cr + Mo \*N)/5 + (Ni + Cu) /15

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

Manager of Quality Assurance Dept



**NEXT Compression Corp.**

This Material Meets the Requirements of  
 The A.S.M.E. Code Section II, 1 Edition

Signed: *[Signature]* Date: 06/24/2021





**NEXT Compression Corp.**

This Material Meets the Requirements of  
The A.S.M.E. Code Section II, B Edition

Signed:  Date: 06/24/2021

Purchaser: TRANS-AM PIPING PRODUCTS LTD.

**INSPECTION CERTIFICATE**



Thai Benkan Co., Ltd.  
58 Soi Wadpradai, Bangpru, Praprasang,  
Samutprakarn, 10130 Thailand.

E-No. TA-397 Purchase Order No. CI-19-525 C102 Job No.         


TO EN10204 3.1/ISO 10474 3.1

D M Y Certificate No.         

No.	MFG. No.	Specification for Material Made from Seamless Pipe ASTM A234WPB CSA Z46.1-17 GR.2M1 CSS NACE MR0175 ISO 15168-2:2015 & L99102:2016	Product & Size	Quantity	Specification for Inspection ASME B16.3-2018, B16.25-2017	Heat Treatment (Note 1)	Visual Examination	Dimensional Inspection
1	62M00M045	180 EL WPB 4 XS	(T=1)		Good		Good	Good
2	62M20M073	RC WPB 4 X 2 1/2 XS			A		HBW : 130 - 150	0.0002
3	62M20M082	RC WPB 4 X 2 STD/XS			N		HBW : 130 - 145	0.0002
4	62M20M096	RE WPB 2 X 1 XS			N		HBW : 125 - 140	0.0005
5	62M20M072-1	RC WPB 4 X 2 XS			N		HBW : 118 - 145	0.0005
							HBW : 130 - 145	<0.0001

Base Material Heat No.	C	Si	Mn	P	S	Cu	Ni	Cr	Mo	V	Nb	C.E.	Tension Test *2		E
													YS	TS	
1	18327858	13	15	75	13	4	2	7	2	<1	1	28	282	445	38
2	26385	15	24	83	12	3	10	8	3	2	3	32	311	483	36
3	593160	18	24	105	8	5	7	3	5	3	10	1	281	483	34
4	593161	16	32	106	7	3	6	6	4	10	1	36	308	498	33
5	19105567	15	24	65	9	9	4	4	1	29	0	28	318	489	37

Note 1) A : Hot formed with final temperature between 620 °C-980 °C, Cooled in still air. N : Normalizing 910 °C±40 Minutes, Cooled in still air.  
\*2: Gauge length = 80.0 mm. Longitudinal.  
The product was manufactured, sampled and inspected as specified in this Standard and the purchase order and was found to have met such requirements.  
C.E. = C+(Mn/6)+(Cr+Mo+V)/5-(Ni+Cu)/15  
\* 1 : "T" symbolized wall thickness in mm. \* 2 : YS Yield strength, TS = Tensile strength, E = Elongation.  
We hereby certify that the product described herein has been manufactured in accordance with the specifications concerned and also with the purchaser's requirements and that the test results shown herein are correct.  
Note for WPB: For each reduction of 0.01 % below the specified carbon maximum, an increase of 0.06 % manganese above the specified maximum will be permitted, up to a maximum of 1.65 % from TZ-6H/2.

  
Rattanasak Kamphanon  
Quality Assurance Manager  
Thai Benkan Co., Ltd.

Item# 3  
Rev'd By: MW  
A F 6201  
A 234 WPB  
CONC REDUCER  
4 X 2 XH BW

**NEXT Compression Corp.**

This Material Meets the Requirements of  
The A.S.M.E. Code Section II 19 Edition

Signed: *[Signature]* Date: 06/04/2021

Purchaser: **TRANS-AM PIPING PRODUCTS LTD.**

**INSPECTION CERTIFICATE**

TO EN10204 3.1



Thai Benkan Co., Ltd.  
58 Soi Watkrumai, Bangkru, Prapokhonng,  
Samutprakan, 10130 Thailand

Purchase Order No. CI-20-123 Job No.           

D M Y Certificate No. 04/09/2020 T - 2020080917

E-No.	TA-453	Specification for Material Made from Seamless Pipe <small>ASTM A213/A213M-18/ASME SA213/A213M-18 WPL6 CSA Z245.1-17 Gr.2H CAT 55 MSC RESINANCE WPL6/7/9/2015/18-215MFR0102.15</small>	Specification for Inspection <b>ASME B16.9-2018, B16.25-2017</b>	Visual Examination <b>Good</b>	Dimensional Inspection <b>Good</b>												
						MFG. No. <b>69A01M023</b>	Product & Size <b>90 EL WPL6 2 XS</b>	Quantity <b>(T=1)</b>	Hardness Actual Data <b>HBW: 121-138</b>								
Material Heat No.		191145	T1 : max 0.05% (x 100)	B : Max 0.0005 %	Ca : Max 0.0005%												
Chemical Composition %			0.00	0.0004	0.0020												
Specifi- cation	C	SI	Mn	P	S	Cu	Ni	Cr	Mo	Al	V	Nb	C.E.	*2 Tension Test		Hardness MAX 197HB : GOOD	
	X	X	X	X	X	X	X	X	X	X	X	X	X	YS	TS	E	Impact Test (J)
Min.	100	100	100	1000	1000	100	100	100	100	1000	1000	1000	100	241	415	30	10 X 2.5 X 2V AT -45 C ° longitudinal
Max.	30	40	135	35	25	40	40	30	12	80	80	20	40	585		31	AVE. 32
	13	26	100	9	2	6	3	9	1	36	10	10	32	298	454	36	33

NORMALIZING 910 C X 40 MINUTES. COOLED IN STILL AIR  
The product was manufactured, sampled, tested, and inspected as specified in this Standard and the purchase order, and was found to have met such requirements.

**ORIGINAL**

*[Signature]*  
Akiyutsu Kondo

Quality Assurance Manager  
Thai Benkan Co., Ltd

MAGNETIC PARTICLE EXAMINATION FOR TEE ONLY :

CE = C+Mn/6+(C+Mn+V)/5+(Ni+Cu)/15  
We hereby certify that the product described herein has been manufactured in accordance with the specifications concerned and also with the purchaser's requirements and that the test results shown herein are correct.

\* 1 : "T" symbolized wall thickness in mm. \* 2 : YS Yield strength TS = Tensile strength E = Elongation  
Form T7-4/VI

Rev 1 By: MW  
Date: 07/13/2019

XH LR 80 BW ELBOW  
A/SA4420-WPL6

**NEXT Compression Corp.**

This Material Meets the Requirements of  
The A.S.M.E. Code Section II 1g Edition

Signed: [Signature] Date: 06/24/2002



**INSPECTION CERTIFICATE**

Customer : **TRANS AM PIPING PRODUCTS LTD.**  
Product : **SEAMLESS LOW TEMPERATURE CARBON STEEL BUTT WELD FITTINGS**  
Spec : **ASTM A420-20/ASME SA420-19 WPL6  
CSA Z245.11-17 Gr 241 Cat II SS  
NACE MR0175/ISO 15156-2-15  
NACE MR0103-15/EN 10204-3.1**

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

Certificate No : **00900050-0101**  
Order No : **CI-20-225**  
Date : **2020/07/21**

Item	Description	Quantity	Heat ID	Heat No	Raw Material Certificate No.	NDE Test	Impact Test			REMARK																																																																																																																							
							Test Temp °C	Charpy V-Notch Impact Value J	Ave. J																																																																																																																								
2	45 E L/R WPL6 STD	2"	C925	17320925	BAOSTEEL BGSAG1801240000200	-45	10 X 2.5 X 55	28	26	30																																																																																																																							
3	90 E L/R WPL6 XS	2"	A372	17319372	BAOSTEEL BGSAG17110100001500	-45	10 X 5.0 X 55	38	40	40																																																																																																																							
<table border="1"> <thead> <tr> <th rowspan="2">Specification</th> <th colspan="11">Chemical Composition%</th> <th colspan="3">Tensile Test</th> <th rowspan="2">Hardness Test</th> <th rowspan="2">Heat Treatment</th> <th rowspan="2">REMARK</th> </tr> <tr> <th>C</th> <th>SI</th> <th>Mn</th> <th>P</th> <th>S</th> <th>CU</th> <th>NI</th> <th>CR</th> <th>MO</th> <th>V</th> <th>Nb</th> <th>C.E</th> <th>YS P.S.I</th> <th>T.S P.S.I</th> <th>E %</th> <th>HB</th> </tr> </thead> <tbody> <tr> <td>X100</td> <td>X100</td> <td>X100</td> <td>X1000</td> <td>X1000</td> <td>X100</td> <td>X100</td> <td>X100</td> <td>X100</td> <td>X1000</td> <td>X1000</td> <td>X100</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Min.</td> <td>15</td> <td>50</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>35000</td> <td>60000</td> <td>30</td> <td>197</td> <td></td> </tr> <tr> <td>Max.</td> <td>30</td> <td>40</td> <td>135</td> <td>35</td> <td>40</td> <td>40</td> <td>40</td> <td>30</td> <td>12</td> <td>80</td> <td>20</td> <td>50</td> <td>85000</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>13</td> <td>16</td> <td>76</td> <td>7</td> <td>2</td> <td>4</td> <td>2</td> <td>5</td> <td>2</td> <td>&lt;1</td> <td>&lt;1</td> <td>27</td> <td>46722</td> <td>72000</td> <td>30.0</td> <td>138</td> </tr> <tr> <td></td> <td>13</td> <td>15</td> <td>76</td> <td>9</td> <td>3</td> <td>3</td> <td>2</td> <td>3</td> <td>1</td> <td>&lt;1</td> <td>&lt;1</td> <td>27</td> <td>50640</td> <td>69600</td> <td>31.0</td> <td>139</td> </tr> </tbody> </table>											Specification	Chemical Composition%											Tensile Test			Hardness Test	Heat Treatment	REMARK	C	SI	Mn	P	S	CU	NI	CR	MO	V	Nb	C.E	YS P.S.I	T.S P.S.I	E %	HB	X100	X100	X100	X1000	X1000	X100	X100	X100	X100	X1000	X1000	X100						Min.	15	50										35000	60000	30	197		Max.	30	40	135	35	40	40	40	30	12	80	20	50	85000					13	16	76	7	2	4	2	5	2	<1	<1	27	46722	72000	30.0	138		13	15	76	9	3	3	2	3	1	<1	<1	27	50640	69600	31.0	139
Specification	Chemical Composition%											Tensile Test			Hardness Test	Heat Treatment	REMARK																																																																																																																
	C	SI	Mn	P	S	CU	NI	CR	MO	V	Nb	C.E	YS P.S.I	T.S P.S.I				E %	HB																																																																																																														
X100	X100	X100	X1000	X1000	X100	X100	X100	X100	X1000	X1000	X100																																																																																																																						
Min.	15	50										35000	60000	30	197																																																																																																																		
Max.	30	40	135	35	40	40	40	30	12	80	20	50	85000																																																																																																																				
	13	16	76	7	2	4	2	5	2	<1	<1	27	46722	72000	30.0	138																																																																																																																	
	13	15	76	9	3	3	2	3	1	<1	<1	27	50640	69600	31.0	139																																																																																																																	

C.E. = C+Mn / 6 + (Cr+Mo+V)/5 + (Ni+Cu)/15  
We hereby certify that the material herein described has been manufactured, sampled, tested and inspected in accordance with, and was found to meet, the requirements of above specifications and purchaser's order.

Chief of Quality Assurance Section

[Signature]





Trans Am

PIPING PRODUCTS LTD.

Shipped Date

Jun 25, 2021

REPRINT PAT

Page 1 of 1

Sold To
Next Compression Corp.
261122 Wagon Wheel Crescent
Rocky View County, Ab

Ship To
5110 6th St NE
Calgary, Ab

T4A 0E2
Ordered By Carolyn

Ph# 403 250-8810

Handwritten: CR 102442-100421A

Table with 3 columns: Customer P.O.# (53168), Job# / Tag# (100421A / F6001), T/A Sales Order # (C21-24384)

Table with 3 columns: Shipping Instructions (DELIVER), Freight, Date Ordered (Jun 25, 2021)

Main table with columns: Item, Description, Qty.Ord., Um, Qty.Ship., Backorder, Heat #, Mnf. Includes items 1 and 2, and a 'Total MTR's Listed' row.

RECEIVED
JUL 07 2021
DS

Summary table with columns: Weight Shipped, Skid, Crate, Sack, Box, Loose, Loose Pipe, Pipe Bundle, Miscellaneous, Trans Am Representative (Pat Canjar)

is a Registered Trademark of Trans Am Piping Products Ltd.

Packing List / MTR Summary

9335 Endeavor Drive S.E Calgary, Alberta T3S 0A1
Ph# (403) 236-0601 Fax# (403) 279-6002







**Trans Am**

PIPING PRODUCTS LTD.

**Shipped Date**

Jun 30, 2021

**Sold To**  
Next Compression Corp.  
261122 Wagon Wheel Crescent  
Rocky View County, Ab

**Ship To**  
5110 6th St NE  
Calgary, Ab

Page 1 of 1

**T4A 0E2**  
Ordered By Carolyn

Ph# 403 250-8810

*GR 42442 - 100421A*

<b>Customer P.O.#</b>	<b>Job# / Tag#</b>	<b>T/A Sales Order #</b>
53168	100421A / F6001	C21-24384-01

<b>Shipping Instructions</b>	<b>Freight</b>	<b>Date Ordered</b>
DELIVER		Jun 25, 2021

Item	Description	Qty.Ord.	Um	Qty.Ship.	Backorder	Heat #	Mnf
1	DELIVERY MONDAY-THURSDAY ONLY BETWEEN 6AM-4PM  NUMBER 403-295-4672  11/2X1/2 XXH CONC SWAGE NIPPLE A234-WPB TBE	1	EA	1		K4044	KED
<b>Manufacturer's legend &amp; Alberta CRN #</b>							
KED Keddco Mfg. Ltd. (Swages & BP)							
OA7470.52 Exp. Jul 2021							
				<b>Total MTR's Listed</b>		1	

**RECEIVED**  
 JUL 07 2021  
*DS*

<b>Weight Shipped</b>	<b>Skid</b>	<b>Crate</b>	<b>Sack</b>	<b>Box</b>	<b>Loose</b>	<b>Loose Pipe</b>	<b>Pipe Bundle</b>	<b>Miscellaneous</b>	<b>Trans Am Representative</b>
Lbs.				1					Pat Canjar

is a Registered Trademark of Trans Am Piping Products Ltd.

**Packing List / MTR Summary**

9335 Endeavor Drive S.E Calgary, Alberta T3S 0A1  
Ph# (403) 236-0601 Fax# (403) 279-6002







SAN ENG STEEL FORGING CO LTD  
311, Jen Hsin Road, Jen Wu District,  
Kaohsiung, Taiwan, R.O.C.  
TEL: 07-3724249; FAX: 07-3712923  
URL: www.saneng.com.tw  
e-mail: saneng@gstcs.seed.net.tw

**MILL TEST CERTIFICATE**

EN10204-3.1  
Customer: TRANS AM PIPING PRODUCTS LTD.  
Order No.: 7019616(1)-1/A

Certificate No.: SE19616A  
Date: 10/03/2019  
Page: 1 OF 1

FORGED CARBON STEEL FLANGES

ASTM A105-18/ASME SA105-2019

ASME B16.5-17  
CSA Z245.12

PRODUCT

MATERIAL SPECIFICATIONS

DIMENSIONAL SPECIFICATIONS

Item No.	CODE NO	DESCRIPTION	QUANTITY	CHEMICAL COMPOSITION (%)														
				C	Si	Mn	P	S	Cu	Cr	Ni	Mo	V	Nb	N	Al	B	CE(%)
1	B0196000	300 W/NRF STD 4" A105N	Min Max	0.350 0.201	0.100 0.250	0.600 1.050	0.035 0.013	0.040 0.007	0.400 0.010	0.300 0.067	0.400 0.044	0.120 0.005	0.080 0.005	0.020 0.005	0.003 0.006	0.033 0.034	3.000 3.000	0.405 0.407
2	B0196000	300 W/NRF STD 4" A105N	Min Max	0.215 0.290	0.280 1.050	1.050 1.050	0.013 0.014	0.008 0.008	0.010 0.010	0.029 0.044	0.044 0.044	0.005 0.005	0.009 0.005	0.005 0.005	0.006 0.006	0.034 0.034	3.000 3.000	0.407 0.407

Item No.	Heat No.	T.S.(*) (MPa)	Y.S.(*) (MPa)	EL.(*) (%)	Hardness (HB)	RA.(*) (%)	Impact Test		
							Temp:	Joule	
		Min	Max				1	2	3
1	812259	516.0	324.0	37.0	151/149	69.0	1	2	3
2	840017	514.0	331.0	35.8	151/149	68.5	1	2	3

\*1: T.S. = Tensile Strength, Y.S. = Yield Strength, E.L. = Elongation, R.A. = Reduction of Area.  
 \*2: N=Normalized, A=Annealed, Q=Quenched, T=Tempered, S.T.=Solution Treated, S.R.=Stress Relieved,  
 A.C=Air Cooled, F.C=Furnace Cooled, W.C=Water Cooled, O.C=Oil Cooled.  
 \*3: C.E Value = C + (Mn / 8) + (Cr + Mo + V) / 5 + (Ni + Cu) / 15



Material Supplier: NTMK, RUSSIA  
 HEAT TREATMENT(2)  
 REMARKS  
 880 Cx4RHS  
 CONFORMS WITH NACE MR0103/ISO17945-1:2015  
 AND NACE MR0175/ISO15156:2015 CLAUSE  
 7.2.1.4 REGION 3 AND ANNEX A.  
 CONFORMS WITH Z245.12 CATT GR248 SOUR  
 BLIND FLANGES ONLY)  
 SERVICE-17(FOR USE AS WELDING NECK AND  
 MIN TO C RATIO IS GREATER THAN 3.0"  
 FULLY KILLED IN ELECTRIC FURNACE  
 FINE GRAIN PRACTICE  
 COUNTRY OF ORIGIN: TAIWAN  
 NO WELD REPAIR WAS PERFORMED  
 TEST SPECIMEN SIZE: 12.5MM  
 BORON/10000

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

Manager of Quality Assurance Dept

NEXT Compression Corp.

This Material Meets the Requirements of  
 The A.S.M.E. Code Section II, 19 Edition

Signed: [Signature] Date: 10/06/2021



## Material Test Report

### GENERAL INFORMATION

<b>REPORT NUMBER</b>	36,131	<b>DATE</b>	June 25, 2021 11:27
<b>DESCRIPTION</b>	1-1/2" SWAGES & BULL PLUGS	<b>HEAT TREATMENT</b>	HOT ROLLED
<b>LONG DESCRIPTION</b>		<b>TEMPERATURE / TIME</b>	
<b>MATERIAL SPECIFICATION</b>	A/SA 234-WPB 20'9	<b>MATERIAL</b>	C1018
<b>DESIGN</b>	MSS SP-95 2018	<b>CRN</b>	0A7470.5CR1
<b>YEAR OF REVISION</b>		<b>COMMENT</b>	
<b>NACE</b>	NACE MR0103-15/ MR0175 ISO 15156-2-17	<b>ADDITIONAL COMMENT</b>	

### CHEMICAL ANALYSIS

<b>Heat Code</b>	<b>K4044</b>	<b>Heat Number</b>	<b>16D05446</b>											
<b>C</b>	<b>MN</b>	<b>P</b>	<b>S</b>	<b>SI</b>	<b>CU</b>	<b>NI</b>	<b>CR</b>	<b>MO</b>	<b>V</b>	<b>AL</b>	<b>TI</b>	<b>CB/NB</b>	<b>N</b>	<b>B</b>
0.1950	0.8020	0.0300	0.0110	0.3130	0.0050	0.0500	0.0500	0.0100	0.0050	0.0000	0.0000	0.0000	0.0000	0.0000

### CARBON EQUIVALENCY FORMULA USED

$C + (Mn/6) + (Cr + Mo + V) / 5 + (Ni + Cu) / 15$  CE = 0.3453

### MECHANICAL TESTS

<b>YIELD PSI</b>	46412	<b>TENSILE PSI</b>	72953
<b>ELONGATION</b>	35.2% @ 2	<b>REDUCTION OF AREA</b>	
<b>SIZE</b>	53 MM 2.09" BAR	<b>BRINELL HARDNESS (AVG. RANGE)</b>	130

### CHARPY IMPACT TEST

<b>INDIVIDUAL VALUES</b>	(V1) ft/lbs	(V2) ft/lbs	(V3) ft/lbs
--------------------------	-------------	-------------	-------------

### TEST SPECIMEN SIZE

This Material Test Report meets DIN 50 049/EN 10 204 3.1.B Standard 2004

Revisor: 1, 2021-06-25

We hereby Certify that the material described has been tested in accordance with the specifications, and the results are correct as contained in the records of the Company.

Lisa Bidtner  
 Q.A. Manager

SARNIA, ONTARIO  
 645 KeddcO St. Sarnia, ON, N7T 7H5  
 TOLL FREE 1-866-511-1381

EDMONTON, ALBERTA  
 3911 - 76th Ave. Edmonton, AB, T6B 2S8  
 TOLL FREE 1-877-465-0303

HOUSTON, TEXAS  
 12107-2 Old Huffmeister Rd. Cypress, TX, 77429  
 TOLL FREE 1-855-539-7016



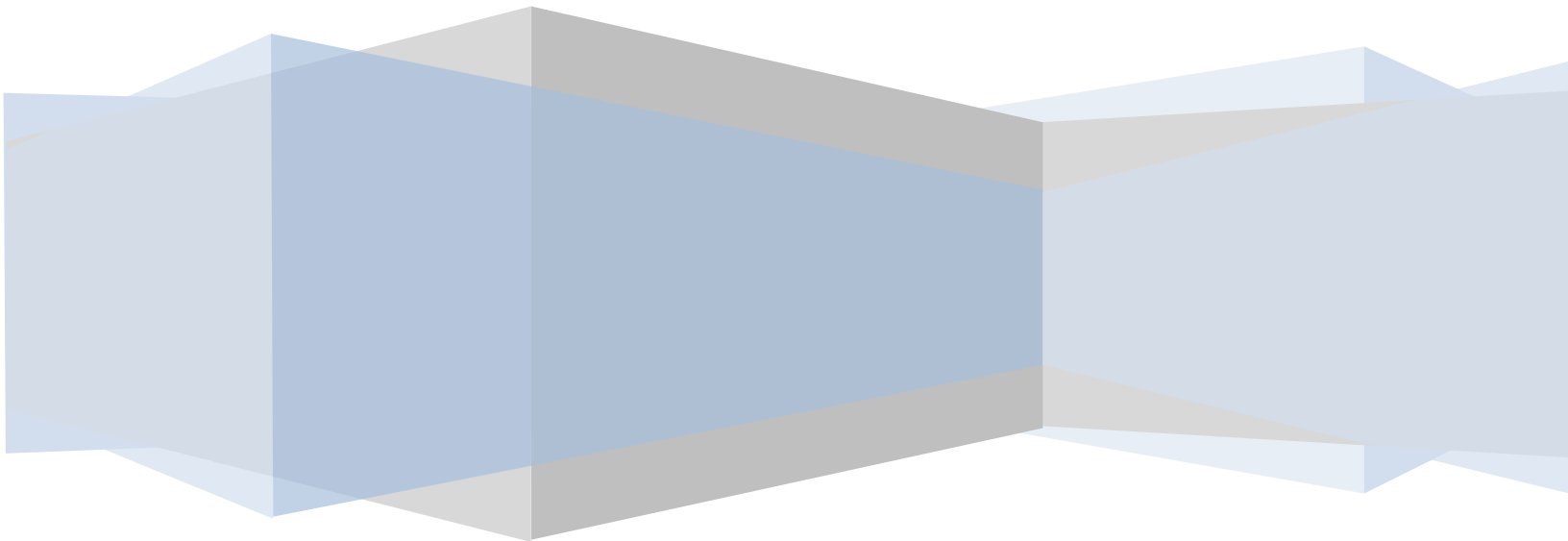
GKM FABRICATION INC.

**NEXT COMPRESSION – 100421A**

**GAS COOLER**

**PO# 53189**

**GKM JOB# 21-1954**



# **FINAL DATA BOOK INDEX**

## **SECTION 1 - CERTIFICATIONS**

**ABSA CERTIFICATE OF AUTHORIZATION**

**ISO 9001:2015 REGISTRATION CERTIFICATE**

## **SECTION 2 – DATA SHEETS**

**PRESSURE PIPING CONSTRUCTION AND TEST DATA REPORT (AB-83)**

## **SECTION 3 – AS BUILT DRAWINGS**

**EXHIBIT 20.1 PRESSURE PIPING SPECIFICATION SHEET**

## **SECTION 4 – WELDING DETAILS**

### **WELD PROCEDURES & PQR**

GKM-2 Rev. 6

GKM-22

### **WELDER PERFORMANCE QUALIFICATION TEST RECORDS**

“3” – GRAEME HILL

“O” – JEROMY MORTENSEN

## **SECTION 5 – NON-DESTRUCTIVE EXAMINATION**

### **RADIOGRAPHIC EXAMINATION REPORTS**

CGY-599029

### **NDE PERSONAL QUALIFICATIONS & EYE EXAMS**

HOOD, GREGORY

MITCHELL, DONALD

## **SECTION 6 – SHIPPING DETAILS**

**PACKING SLIP**

## **SECTION 1 - CERTIFICATIONS**

**ABSA CERTIFICATE OF AUTHORIZATION**

**ISO 9001:2015 REGISTRATION CERTIFICATE**



## Certificate of Authorization Permit

### Quality Management System

Expiry Date: **February 2, 2024**

Reg. No.: **AQP-1515**

**GKM FABRICATION INC.**  
**BAY 19, 235105 WRANGLER DRIVE S.E.**  
**CALGARY, ALBERTA**

having complied with the provisions of the SAFETY CODES ACT, is hereby authorized to perform the activities identified in the following table:

	<u>Construction</u>	<u>Repair</u>	<u>Alter</u>
<b>Pressure Vessels</b>			
ASME Section VIII-1 Pressure Vessels	Shop	Shop/Field	Shop/Field
<b>Indirect Fired Heater Coils</b>			
ASME B31.3 Indirect Fired Heater Coils	Shop/Field	Shop/Field	Shop/Field
<b>Pressure Piping</b>			
ASME B31.1 Power Piping	Shop/Field	Shop/Field	Shop/Field
ASME B31.3 Process Piping	Shop/Field	Shop/Field	Shop/Field
<b>Fittings</b>			
Category A,C,E,H	Shop	Shop	Shop



*As a condition of this permit, the holder is required to participate in interim audits by a safety codes officer to verify that the quality management system is being maintained in a manner acceptable to a safety codes officer.*

Dated at Edmonton, this 26th day of January, 2021



Chief Inspector and Administrator

**Certificate No.: 14416**



# REGISTRATION CERTIFICATE

*This document certifies that the administration systems of*

***GKM Fabrication Inc.***

*Bay 19, 235105 Wrangler Drive SE, Calgary, Alberta T1X 0K3, Canada*

*have been assessed and approved by QAS International to the following management systems, standards and guidelines:*

***ISO 9001:2015***

*The approved administration systems apply to the following:*

*GKM Fabrication Inc., located in Calgary, Alberta, provides design, construction, repair and alteration of process/power piping, pressure vessels and associated products, and general fabrication of steel products using the entire Quality Management System throughout its organization.*

Original Approval	<b>2<sup>nd</sup> November 2009</b>
Current Certificate	<b>30<sup>th</sup> January 2021</b>
Certificate Expiry	<b>30<sup>th</sup> January 2022</b>
Certificate Number	<b>CAN1660</b>

Signed: Certification Officer

**On behalf of QAS International**

This certificate remains valid while the holder maintains their administration systems in accordance with the standards and guidelines stated above, which will be audited annually by QAS International. The holder is entitled to display the above registration mark for the duration of this certificate, which should be returned to QAS International upon reasonable request.

Issuing Office: QAS International, 5 Technology Park, Colindeep Lane, London, NW9 6BX, UK



## **SECTION 2 - DATA SHEETS**

### **PRESSURE PIPING CONSTRUCTION AND TEST DATA REPORT (AB-83)**



the pressure equipment safety authority

# PRESSURE PIPING CONSTRUCTION AND TEST DATA REPORT

In accordance with the provisions of the PESR Section 31(1)

Shop Construction ; Field Construction ;  
 Final Data Report ; Partial Data Report  (from one ABSA- authorized Contractor to another  
 ABSA- authorized Contractor).

Complete both sides of this Form

1. Constructed By: GKM Fabrication Inc. Owner's Job No: 53189 100421A  
(Name of ABSA authorized primary contractor or subcontractor)  
Bay 19, 235105 Wrangler Drive SE | Calgary, Alberta | T1X 0K3

(Address)  
 Certificate of Authorization Permit No. AQP-1515 Expiry Date: February 2, 2024

2. Constructed For: NEXT COMPRESSION  
(Name of primary contractor if different from above)  
261122 WAGON WHEEL CRESCENT, ROCKY VIEW COUNTY, AB T4A 0E2

(Address)  
 Certificate of Authorization Permit No. AQP-1282 Expiry Date: Dec. 14, 2022  
(Required when the primary contractor undertakes some/all of the quality functions, e.g., NDE, PWHT, Tie-in, fabrication, hydro test, final assembly etc.)

3. Owner: CRESCENT POINT ENERGY, SUITE 2000, 585 - 8<sup>TH</sup> Avenue SW, Calgary, AB T2P 1G1  
(Name and address)  
SOUR OIL STORAGE FACILITY, SHAUNAVON LSD: 07-10-008-19 W3M

(Location of installation)  
 Certificate of Authorization Permit No. AQP- Expiry Date:   
(Required when the owner undertakes some/all of the quality functions, e.g., NDE, PWHT, Tie-in, fabrication, hydro test, final assembly etc.)

4. Piping Design Alberta Registration No.: PP-  
(Required if aggregate piping volume is over 0.5m<sup>3</sup>)

5. Design Responsibility: Owner ; Contractor

6. WP No.: WP-2635.2 ; Company: GKM Fabrication Inc. Owner's WP No. (If used): WP-  
(Alberta Registration No.) (Alberta Registration No.)  
 Spec No(s). used: GKM-2 Rev. 6, GKM-22 ; Owner's Spec No(s). (If used):

7. Code: ASME B31.1 Non Boiler External Piping ; ASME B31.1 Boiler External Piping ;  
 B31.5 ; B31.9 ; CSA Z662 Steam Pipelines ;  
 ASME B31.3  - Service Category: Normal , D , M , High Pressure ; Severe Cyclic Condition   
 High Purity

Drawing No. Rev. No. Line No.	Fluid (Air/Stm. Etc.)	Des. Press. kPa	Des. Temp.°C (Max. & Min.)	Pressure Test kPa	Test Medium	Pipe Mat'l Spec. & Grade	C.A. mm	Pipe NPS & Schedule	Flange Material & Rating	PWHT/ Preheat Temp.°C	NDE
5200270119-002	NORMAL	3103	121°C/ -29°C	N/A	N/A	SA-106-B	3.20	2.5" / STD	SA-105-N CL 300	N/A / PREHEAT @ 10°C	20% RT 100% VT

Partial Data Reports certified by sub-contractors are listed below and attached to this Data Report

No.	Line No.	Spool No.	Dwg. No. (with Rev. No.)	Sub-contractor (Name)	AQP No. (if from Alberta)	Expiry (if from Alberta)

**Remarks:** For partial data report provide information about the code work that was not completed by the subcontractor (e.g., hydrostatic test, PWHT etc.). For final data report provide information about the code work that was not completed by subcontractors and subsequently completed by the primary contractor (e.g., hydrostatic test of entire assembly, PWHT etc.)

**GKM RESPONSIBLE FOR WELDING, NDE ONLY.**

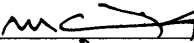
**Endorse certificate 'A' or 'B'**

**A. CERTIFICATE OF COMPLIANCE**

Signed by the subcontractor when supplying this certificate as a  
Partial Data Report

We certify that the statements in this Data Report are correct and that materials, construction and workmanship of the piping fabrication conform to the registered quality system and the applicable Piping code(s).

Date: Jul 08, 2021 GKM Fabrication Inc.  
Contractor

Mate Cvitanovic   
Print Authorized Representative's Name Signature

**This certificate is not valid unless it forms part of a Final Data Report signed by Primary Contractor**

**B. CERTIFICATE OF COMPLIANCE**

Signed by the primary contractor when supplying this certificate as a  
Final Data Report

We certify that the statements in this Data Report are correct and that piping job no. 21-1954 described in this Data Report was constructed in accordance with the Province of Alberta Safety Codes Act and Regulations, and applicable ASME Piping Code(s).

Date: \_\_\_\_\_ Contractor

\_\_\_\_\_  
Print Authorized Representative's Name Signature

**CERTIFICATE OF INSPECTION**

I, the undersigned, employed by \_\_\_\_\_ have verified that all required examination and testing has been completed, and inspected the piping described in this construction data report to the extent necessary to be satisfied that it conforms to all applicable examination requirements of the Code and of the engineering design, and state that, to the best of my knowledge and belief, the contractor has constructed this piping in accordance with the Alberta Safety Codes Act and Regulations. By signing this certificate neither the inspector nor his or her employer makes any warranty, expressed or implied, concerning the piping described in this construction data report. Furthermore, neither the inspector nor his or her employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

Date: \_\_\_\_\_ Date: \_\_\_\_\_

\_\_\_\_\_  
Owner's Inspector Name (please print) ABSA Safety Codes Officer (please print)  
(BOILER EXTERNAL PIPING ONLY)

\_\_\_\_\_  
Owner's Inspector Signature: ABSA Safety Codes Officer's Signature

Current version of this Form may be obtained from [www.absa.ca](http://www.absa.ca)

## **SECTION 3 – AS BUILT DRAWINGS**

### **EXHIBIT 20.1 PRESSURE PIPING SPECIFICATION SHEET**



EXHIBIT 20.1 PRESSURE PIPING SPECIFICATION SHEET

PRESSURE PIPING SPECIFICATION SHEET

(For Construction/Repair/Alteration of Pressure Piping Systems Less Than or Equal to 500 Litres, Aggregate Internal Volume)

Owner: NEXT COMPRESSION Contractor: NEXT COMPRESSION AQP: 1282  
 Plant Location: 261122 Wagon Wheel Cres. Job #: 100421A

Material List				Piping Sketch (Reference attached drawings if appropriate)				
Item No.	Description	Mat'l Spec. & Grade	Sch./ Rating	(use for recording RT No's. & Welder Symbols)				
1	Cooler	304SS	STD					
2	2.5" RFWN FLG	SA-105N	STD/CL300					
3	2.5" RFWN FLG	SA-105N	STD/CL300					
4	2.5" SMLS PIPE	SA-106B	STD					
5	2.5" SR ELBOW	SA-234-WPB	STD					
6	2.5" SMLS PIPE	SA-106B	STD					
7	2.5" SR ELBOW	SA-234-WPB	STD					
8	2.5" SMLS PIPE	SA-106B	STD					
Line No.	Design Pressure	Design Temp. Min. / Max.	Corr. All.	Code ASME B31.1/B31.3	Service (e.g., Normal, Cat. D, M, K)	Severe Cyclic Yes/No	Test Pressure	Test Medium
1	450 PSI	-20F/250F	0.125	B31.3	NORMAL	NO	N/A	N/A

(Note: Pneumatic tests must have prior approval from ABSA.)

Welding Procedure Specification No's: GKM-2 R6, GKM-22 (All welds are GKM-2 R6 unless otherwise noted)  
 Numbers:

Line No.	MT / PT Extent %	Radiography Extent %	Hardness Testing	Ultrasonic - Other NDE Description / Extent %	Other Requirements
1	N/A	20	N/A	N/A	N/A

NDE Contractor: Mistras Post Weld Heat Treatment Yes/N.A.: N/A

Post Weld Heat Treatment Time/Temp.: N/A PWHT Contractor: N/A

Approved by Owner: \_\_\_\_\_ Date: \_\_\_\_\_

Approved by Contractor: Mate Cvitanovic Mate Cvitanovic Date: JUN 29/2021

Comments: QTY: 5 - P1 to P1 welds, QTY: 2 P1 to P8 welds

GKM FAB INC. RESPONSIBLE FOR WELDING AND 20%RT ONLY

Cooler Serial# 5200276119 - 0002

WORK COMPLETED AND ACCEPTED (AB-83 COMPLETED)

Contractor Signature: \_\_\_\_\_ Date: \_\_\_\_\_

## **SECTION 4 – WELDING DETAILS**

### **WELD PROCEDURES & PQR**

**GKM-2 Rev. 6**

**GKM-22**

### **WELDER PERFORMANCE QUALIFICATION TEST RECORDS**

**“3” – GRAEME HILL**

**“0” – JEROMY MORTENSEN**

**Attention:** Rob Doslic  
GKM FABRICATION INC  
235105 WRANGLER DR SE BAY 19  
CALGARY, AB T1X 0K3

The welding procedure, tracking number 2020-01261, originally received on March 03, 2020 was surveyed and accepted in accordance with the requirements of ASME section IX for registration as follows:

**Reg. No. :** WP-2635.2

**Accepted on:** March 09, 2020

**Reg Type:** REVISION TO ACC. DESIGN

**Spec. No. :** GKM-2 REV 6

An invoice covering survey and registration fees will be forwarded from our Revenue Accounts.

If you have any question don't hesitate to contact me by phone at (780) 433-0281 ext 3342 or fax (780) 437-7787 or e-mail [Reinhart@absa.ca](mailto:Reinhart@absa.ca).

*Please note:*

- (1) Construction shall be completed per the requirements of the applicable construction code, and*
- (2) the acceptance of this registration does not allow the use of this welding procedure in the construction, modification, on any boiler, pressure vessel, pressure piping system or fitting in Alberta unless the contractor/manufacturer has registered a Quality Control System for such work with ABSA.*

Sincerely,



REINHART, JASON, P. Eng.  
DOP Cert. No. D00003629

WELDING PROCEDURE SPECIFICATION NO.: GKM-2 (Rev. 6)

WELDING PROCEDURE QUALIFICATION RECORD NO.(S): GKM-1-2 (Rev. 1),  
GKM-2-1 (Rev. 1),  
GKM-2-2 (Rev. 1),  
GKM-15-1,  
GKM-2-3 (Rev. 0),  
GKM-2-4 (Rev. 1),  
GKM-2-5 (Rev. 1),  
GKM-17-1 (Rev. 1)

QUALIFIED IN ACCORDANCE WITH ASME SECTION IX FOR

Base Metal (Typical): Std. Appl.: P1 to P1  
(SA 36, SA 106 Gr. B, SA 105, SA 516 Gr.70 etc.)  
Notch Appl.: 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): GMAW-S / SMAW Weld Types: GROOVE & FILLET  
Position: ALL POSITIONS Diameter: ALL DIAMETERS  
Filler Metal: Std. Appl.: ER70S-6, E7018, E7018-1  
Notch Appl.: ER70S-6, E7018-1

BASE METAL CONDITIONS & GROOVE THICKNESS RANGE QUALIFIED:  
BASE METAL THICKNESS RANGE

	Std. Appl. As Welded	Notch Appl. to -50 °F As Welded
Thinner Material	0.062 to 1.75 in.	0.118 in. to 1.75 in.
Thicker Material	0.062 to 8.00 in.	0.118 in. to 8.00 in.

COMBINED DEPOSITED WELD METAL THICKNESS

ASME B31.1 1.75 in. maximum  
ASME B31.3 1.75 in. maximum  
ASME SECTION VIII, DIVISION 1 1.50 in. maximum

**ABSA**  
SAFETY CODES ACT - PROVINCE OF ALBERTA  
WELDING PROCEDURE

Reg. No. WP 2635.2  
Spec No. GKM-2 (Rev 6)  
Weld Process GMAW/SMAW  
Matl. Gr. P No. 1Gr 1+2 to P No. 1Gr 1+2  
Elect Gr. F No. 6+4 A No. 2+1  
Th. Qual For. SEE PROCEDURE P.W.H.T. NO  
CW -46°C, #ER70S-6

Yr. 20 Mo. 3 Day 9 Signed JR  
JASON RENZI, P.ENG  
WELDING SPECIALIST

PROVINCIAL REGISTRATION

This WPS was prepared to the requirements of ASME Section IX 2019 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: Jim Cebedo  
Signed: [Signature]  
Date: February 27, 2020

Reviewed By: Timothy Colpitts, C.E.T., I.W.T.  
Signed: [Signature]  
Date: February 27, 2020

(File C20-117)

## QW-482 WELDING PROCEDURE SPECIFICATION (WPS)

Organization Name GKM Fabrication Inc.  
Welding Procedure Specification No. GKM-2 (Rev. 6) Date February 27, 2020  
Revision(s) Rev. 6 (Essential) - Deletion of PQR No.'s: GKM-2-4 (Rev. 0) & GKM-2-5 (Rev. 0).  
Addition of PQR No.'s: GKM-2-4 (Rev. 1), GKM-2-5 (Rev. 1) &  
GKM-17-1 (Rev. 1).  
(Supplementary Essential) - Addition of base metal heat treat condition  
for notch toughness applications to ASME Section VIII, Div. 1.  
(Nonessential) - Format and code update.  
Supporting PQR No.(s) GKM-1-2 (Rev. 1), GKM-2-1 (Rev. 1), GKM-2-2 (Rev. 1),  
GKM-15-1, GKM-2-3 (Rev. 0), GKM-2-4 (Rev. 1),  
GKM-2-5 (Rev. 1), GKM-17-1 (Rev. 1)  
Welding Process(es) Gas Metal Arc Welding - Short Circuiting (GMAW-S),  
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 Std. Appl.: P1 To P-Number P1  
Notch Appl.: P1 Groups 1 & 2 To P-Number P1 Groups 1 & 2  
Heat Treat Condition (1): P1 Group 1: Normalized  
P1 Group 2: Normalized  
Thickness Range: Std. Appl.: Groove Thinner Material: 0.062 to 1.75 in. inclusive  
Thicker Material: 0.062 to 8.00 in. inclusive  
Fillet All base metal thicknesses  
Notch Appl.: Groove Thinner Material: 0.118 to 1.75 in. inclusive (2)  
Thicker Material: 0.118 to 8.00 in. inclusive (2)  
Fillet 0.118 to 8.00 in. inclusive  
Pipe Diameter Ranges: Groove All diameters  
Fillet All diameters  
Deposited Weld Metal (Per Pass): Standard Applications:  
All Applications GMAW-S: 0.138 in. max. (3)  
All Applications SMAW: 0.250 in. max.  
Deposited Weld Metal (Per Pass): Notch Toughness Applications:  
ASME Section VIII, Div. 1 GMAW-S: 0.099 in. max.  
All Other Applications GMAW-S: 0.138 in. max. (3)  
All Applications SMAW: 0.250 in. max.

- (1) Condition of base metal prior to welding for notch toughness applications to  
ASME Section VIII, Div. 1.  
(2) Reference thickness limitations for tests on welds in fabrication or assembly in  
ASME B31.3 Table 323.3.1 - Impact Testing Requirements for metals.  
(3) GMAW-S deposited weld metal per pass is restricted to 0.110 in. maximum for base  
metal thickness less than 0.188 in.

<b>FILLER METALS (QW-404)</b>	<b>GMAW-S</b>	<b>SMAW</b>
Specification No. (SFA)	SFA 5.18	SFA 5.1
AWS No. (Class)	Std. Appl.: ER70S-6	E7018, E7018-1
AWS No. (Class)	Notch Appl.: ER70S-6	E7018-1
F-No.	F6	F4
A-No.	(4)	A1
Diameter	0.035 to 0.045 in. inclusive	3/32 to 1/4 in. inclusive
Filler Metal Product Form	Bare solid wire	N/A
Supplemental Filler Metal	Without	N/A
Alloy Elements	Without	N/A

Deposited Weld Metal Thickness Range: Standard Applications:

ASME Section VIII, Div. 1: Groove	0.138 in. max. (5)(6)	1.50 in. max. (5)
All Other Applications: Groove	0.138 in. max. (5)(6)	1.75 in. max. (5)
All Applications: Fillet	Single, root pass only	All fillet sizes

Deposited Weld Metal Thickness Range: Notch Toughness Applications:

ASME Section VIII, Div. 1: Groove	0.099 in. max. (5)	1.50 in. max. (5)
All Other Applications: Groove	0.138 in. max. (5)(6)	1.75 in. max. (5)
All Applications: Fillet	Single, root pass only	All fillet sizes

- (4) Chemical composition shall meet the requirements of ASME Section II, Part C, SFA 5.18 for ER70S-6.
- (5) Combined deposited weld metal thickness shall not exceed 1.75 in. for ASME B31.1 and ASME B31.3 and 1.50 in. for ASME Section VIII, Div. 1.
- (6) GMAW-S deposited weld metal thickness is restricted to 0.110 in. maximum for base metal thicknesses less than 0.188 in.

**POSITION (QW-405)**

Position of Groove	All positions	Position of Fillet	All positions
Weld Progression	GMAW-S: Vertical up or down where applicable SMAW: Vertical up where applicable		

**PREHEAT (QW-406)**

Preheat Temperature (Minimum)	See attached preheat sheet prior to welding.	
Interpass Temperature (Maximum)	Std. Appl.: 700 °F	Notch Appl.: 450 °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



WPS NO. GKM-2 (Rev. 6)

**GAS (QW-408)**

Specification No. (SFA) SFA 5.32 AWS No. (Class) SG-AC-25  
Shielding GMAW-S: 75% Argon, 25% CO<sub>2</sub>, 20 - 50 ft<sup>3</sup>/hr.  
Backing Without Trailing Without

**ELECTRICAL CHARACTERISTICS (QW-409)**

Current Direct Polarity Reverse, electrode positive  
Amps See Tables 1 & 2 Volts See Tables 1 & 2  
Mode of Metal Transfer GMAW-S: Short Circuiting (Waveform or Nonwaveform Controlled)

Maximum Heat Input for Notch Toughness Applications:

Base Metal Thickness Range	GMAW-S	SMAW
0.118 - 0.499 in.	28,395 J/in.	52,118 J/in.
0.500 in. and greater	29,204 J/in.	79,976 J/in.

**TECHNIQUE (QW-410)**

Manual or Automatic GMAW-S: Semiautomatic SMAW: Manual  
String or Weave GMAW-S: Weave SMAW: String or Weave  
Orifice, Cup, or Nozzle Size GMAW-S: 0.375 in. - 0.750 in.  
Initial & Interpass Cleaning Brushing, chipping or grinding as required  
Method of Back Gouging Air carbon arc, back-grind as required  
Oscillation GMAW-S: N/A  
Contact Tube to Work Distance GMAW-S: 0.250 in. - 0.750 in.  
Multiple or Single Pass Per Side (7) Std. Appl.: GMAW-S: Single, root pass only  
SMAW: Single or Multiple  
Notch Appl.: GMAW-S: Single, root pass only (8)  
SMAW: Multiple (8)  
Multiple or Single Electrodes GMAW-S: N/A  
Electrode Spacing GMAW-S: N/A  
Peening Not permitted  
Travel Speed See Tables 1 & 2  
Use of Thermal Process N/A

(7) Multiple layers shall be used for ASME B31.1 and ASME B31.3 when the nominal material thickness is greater than 0.188 in.

(8) Weld with both GMAW-S and SMAW combined shall contain multiple passes per side.

**TABLE 1 - WELDING PARAMETERS**

Standard Applications

Process	Filler Metal	Diameter in.	Current Type & Polarity	Amperage Range	Voltage Range	Travel Speed i.p.m.	Wire Feed Speed i.p.m
GMAW-S	ER70S-6	0.035	DCRP	70 - 130	14 - 20	2.0 - 25	100 - 290
GMAW-S	ER70S-6	0.040	DCRP	80 - 180	15 - 22	2.0 - 30	100 - 260
GMAW-S	ER70S-6	0.045	DCRP	100 - 225	16 - 23	2.5 - 35	90 - 230
SMAW	E7018, E7018-1	3/32	DCRP	60 - 110	18 - 26	1.0 - 12	N/A
SMAW	E7018, E7018-1	1/8	DCRP	90 - 170	19 - 28	1.5 - 14	N/A
SMAW	E7018, E7018-1	5/32	DCRP	110 - 220	20 - 30	1.5 - 16	N/A
SMAW	E7018, E7018-1	3/16	DCRP	160 - 320	20 - 30	2.0 - 20	N/A
SMAW	E7018, E7018-1	7/32	DCRP	240 - 340	20 - 32	3.0 - 22	N/A
SMAW	E7018, E7018-1	1/4	DCRP	275 - 360	21 - 32	4.0 - 22	N/A

Note: Size of electrode, filler metal, number of passes, voltage, amperage, and travel speed will vary with position, joint thickness, joint type etc.

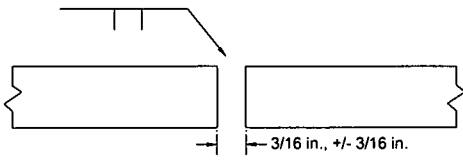
Program Settings for GMAW-S (Waveform controlled):

Miller	<u>Lincoln (select program No. corresponding to)</u>
MIG Type: RMD	Material: Steel or General
Wire Type: Carbon	Wire Size: As required
Wire Diameter: As required	Procedure: STT or STT II
Gas Type: C25	Gas: Argon CO2 (where applicable)

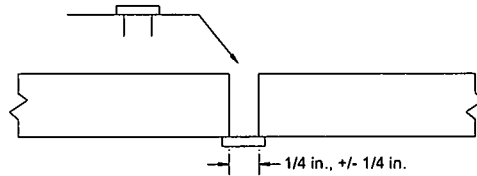
Adjust arc control & arc length (Miller) or trim & wave control (Lincoln) as required



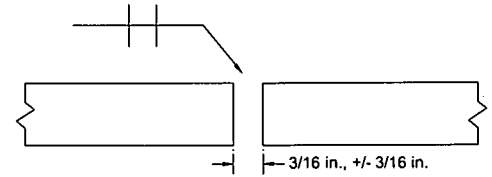
**TYPICAL JOINT DESIGNS**



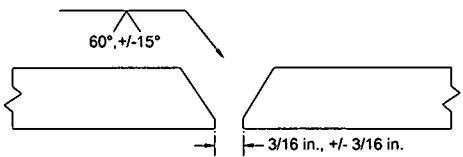
**Figure 1**  
Single Square Butt



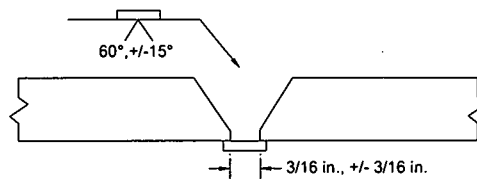
**Figure 2**  
Single Square Butt with Backing Strip



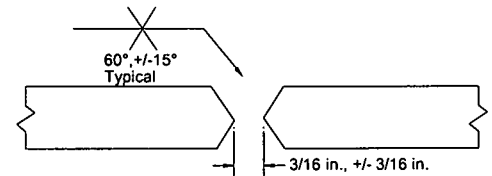
**Figure 3**  
Double Square Butt



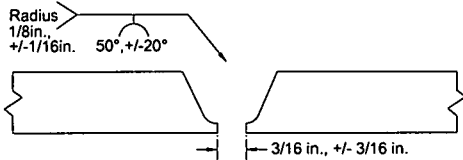
**Figure 4**  
Single Vee Butt



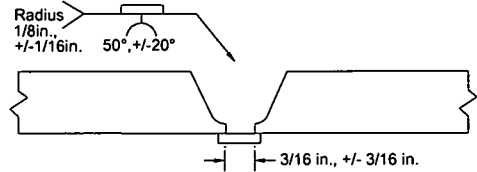
**Figure 5**  
Single Vee Butt with Backing Strip



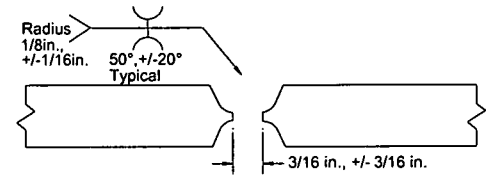
**Figure 6**  
Double Vee Butt



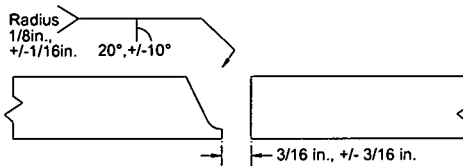
**Figure 7**  
Single U Butt



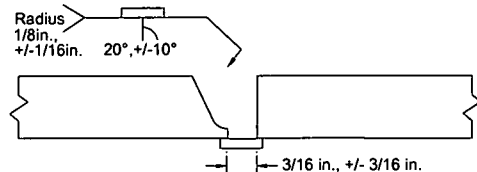
**Figure 8**  
Single U Butt with Backing Strip



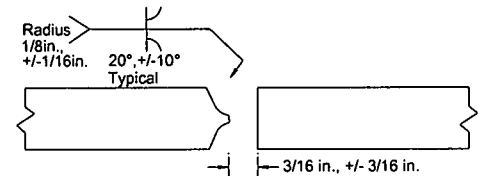
**Figure 9**  
Double U Butt



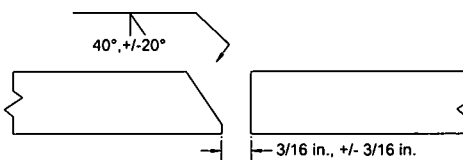
**Figure 10**  
Single J Butt



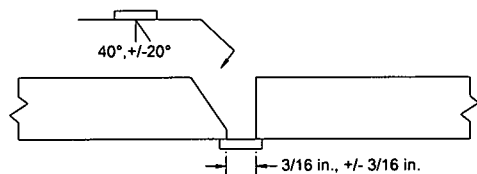
**Figure 11**  
Single J Butt with Backing Strip



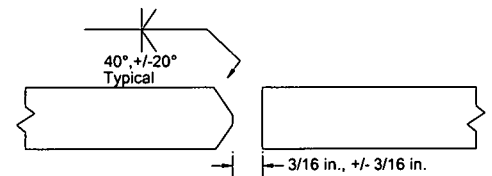
**Figure 12**  
Double J Butt



**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 (Without PWHT)**

1. Welds joining pressure parts or attachments shall be preheated to not less than the minimum preheat temperatures stated in paragraph 3. If welding is interrupted, the weld joint and adjacent areas shall be reheated to the minimum preheat temperature stated in paragraph 3 prior to the start of welding.
2. Preheat temperatures shall be checked by the welder or inspector, using temperature indicating crayons or other reputable methods.
3. Minimum preheating temperatures shall be as follows:

**POWER PIPING IN ACCORDANCE WITH ASME B31.1 - 2018**

GREATER MATERIAL THICKNESS	SPECIFIED MAXIMUM CARBON CONTENT	MINIMUM PREHEAT TEMPERATURE
Less than or equal to 1.0 in.	All	50 °F
Greater than 1.0 in.	All	200 °F

- The base metal temperature for the parts to be welded shall be at or above the specified minimum temperature in all directions from the point of welding for a distance of the larger of 3.0 in. or 1.5 times the greater nominal thickness (as defined in paragraph 132.4.3). The base metal temperature for tack welds shall be at or above the specified minimum temperature for a distance not less than 1.0 in. in all directions from the point of welding.
- Greater material thickness is the thicker of the pressure-retaining materials being joined at the weld.

**PROCESS PIPING IN ACCORDANCE WITH ASME B31.3 - 2018**

GREATER MATERIAL THICKNESS	SPECIFIED MAXIMUM CARBON CONTENT	MINIMUM PREHEAT TEMPERATURE
Less than or equal to 1.0 in.	All	50 °F
Greater than 1.0 in.	All	200 °F

- The preheat zone shall be at or above the specified minimum temperature in all directions from the point of welding for a distance of the larger of 3.0 in. or 1.5 times the greater nominal thickness (as defined in paragraph 331.1.3(c)). The base metal temperature for tack welds shall be at or above the specified minimum temperature for a distance not less than 1.0 in. in all directions from the point of welding.
- Greater material thickness is that of the nominal material thickness of the thicker of the materials being joined at the weld.

**PRESSURE VESSELS IN ACCORDANCE WITH ASME SECTION VIII, DIV. 1 - 2019**

NOMINAL THICKNESS (THICKER OF THE MATERIALS AT THE JOINT)	SPECIFIED MAXIMUM CARBON CONTENT	NOMINAL THICKNESS (PER UW-40(f))	MINIMUM PREHEAT TEMPERATURE
Less than or equal to 1.0 in.	All	Less than or equal to 1.25 in.	50 °F
Greater than 1.0 in. to 1.25 in.	Less than or equal to 0.30%	Less than or equal to 1.25 in.	50 °F
Greater than 1.0 in. to 1.25 in.	Greater than 0.30%	Less than or equal to 1.25 in.	175 °F
All	All	Greater than 1.25 in.	200 °F

- The conditions of UW-30 shall apply for base metal temperatures below 32 °F.
- The preheat zone shall extend at least 3.0 in. beyond each edge of the weld.

## QW-483 PROCEDURE QUALIFICATION RECORD (PQR)

Company Name GKM Fabrication Ltd.  
Procedure Qualification Record No. GKM-1-2 (Rev. 1)  
Date Originally Qualified October 29, 2008 Revision Date December 10, 2014  
Revisions Rev. 1 (Editorial and non-essential changes) - QW-404, Alloy Elements.  
QW-410, Use of Thermal Processes. Deletion of metric units.  
Information from historical data.  
Welding Process(es) GMAW / SMAW Type(s) Semi-automatic / Manual

### JOINTS (QW-402)

Type Butt joint, single vee groove, see next page

### BASE METALS (QW-403)

Material Spec. SA 516 Type or Grade Gr. 70N  
P-No. P1 To P-No. P1 Thickness 0.375 in.  
Diameter N/A - Plate Heat Number 297420 - 65196  
Deposited Weld Metal (Per Pass) Did not exceed 0.500 in.

### FILLER METALS (QW-404)

	<u>GMAW</u>	<u>SMAW</u>
Specification No. (SFA)	<u>SFA 5.18</u>	<u>SFA 5.1</u>
AWS No. (Class)	<u>ER70S-6</u>	<u>E7018-1</u>
Filler Metal F-No.	<u>F6</u>	<u>F4</u>
Filler Metal A-No.	<u>*</u>	<u>A1</u>
Filler Metal Product Form	<u>Solid wire</u>	<u>N/A</u>
Supplemental Filler Metal	<u>Without</u>	<u>N/A</u>
Alloying Elements	<u>Without</u>	<u>N/A</u>
Size of Electrode	<u>See attached sketch</u>	
Deposited Weld Metal Thickness	<u>0.100 in.</u>	<u>0.275 in.</u>
Other	<u>*Chemical composition meets the requirements of ASME Section II, Part C for ER70S-6</u>	

### POSITION (QW-405)

Position of Groove GMAW: Plate inclined @ 30 degrees SMAW: 1G  
Weld Progression GMAW: Vertical down SMAW: N/A

### PREHEAT (QW-406)

Preheat Temperature 50 °F Interpass Temp. (Max.) 600 °F

### POSTWELD HEAT TREATMENT (QW-407)

Temperature None Time N/A

### GAS (QW-408)

Specification No. (SFA) SFA 5.32 AWS No. (Class) SG-AC-25  
Shielding GMAW: 75% Argon, 25% CO2, 30 cfph  
Backing None Trailing Without



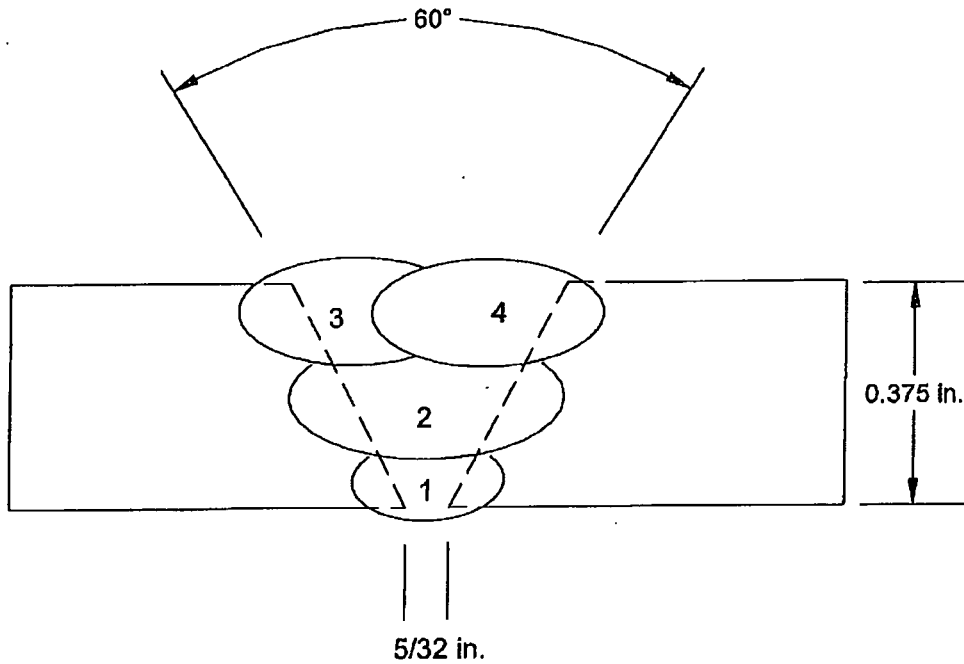
PQR NO. GKM-1-2 (Rev. 1)

**ELECTRICAL CHARACTERISTICS (QW-409)**

Current Direct Polarity Reverse, electrode positive  
 Amps See below Volts See below  
 Maximum Heat Input N/A  
 Mode of Metal Transfer GMAW; Short circuiting arc (non waveform controlled)

**TECHNIQUE (QW-410)**

String or Weave Weave Travel Speed See below  
 Orifice or Gas Cup Size GMAW: 0.500 in.  
 Initial & Interpass Cleaning Brushing, chipping or grinding to remove slag  
 Method of Back Gouging N/A Oscillation N/A  
 Tube to Work Distance GMAW: 0.500 in.  
 Multiple or Single Pass Per Side Multiple Peening None  
 Multiple or Single Electrodes Single Electrode Spacing N/A  
 Use of Thermal Process N/A



Pass	Process	Filler Metal	Diameter in.	Current & Polarity	Amperage Range	Voltage Range	Travel Speed i.p.m.
1	GMAW	ER70S-6	0.035	DCRP	90	19	3.8
2	SMAW	E7018-1	5/32	DCRP	195	25 - 26	6.6
3	SMAW	E7018-1	5/32	DCRP	195	25 - 26	8.3
4	SMAW	E7018-1	5/32	DCRP	195	25 - 26	6.5

PQR NO. GKM-1-2 (Rev. 1)

**TENSILE TEST (QW-150)**

Specimen No.	Width In.	Thickness In.	Area Sq. in.	Ultimate Load lbs.	Ultimate Stress psl	Character & Fracture Location
T1	0.752	0.343	0.258	19,800	77,000	Partial Cup & Cone Parent Metal
T2	0.748	0.362	0.271	22,800	76,700	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

**OTHER TESTS**

Vickers Hardness - see attached laboratory test report # C08-1907.1

Rockwell Hardness - see attached laboratory test report # C08-1907.1

Welders Name Graeme Hill Certificate File No. W-20456  
Tests Conducted By Ludwig Associates Ltd.  
Laboratory Test No. C08-1907.1

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 GKM Fabrication Inc.

Date 12/15/14 Signed [Signature]



# LUDWIG ASSOCIATES LTD.

Materials and Welding Consulting

## LABORATORY TEST REPORT



**CUSTOMER:** GKM Fabrication Inc.  
235105 Wrangler Dr. S.E.  
Calgary, Alberta  
T2P 2G6

**Laboratory Test No.:** C08-1907.1  
**Date:** November 3, 2008

**Attention:** Graeme Hill

**PQR Number:** GKM-1-2  
**Material:** SA 516 Gr. 70N (Heat No.: 297420 - 65196)  
**Thickness:** 9.52 mm (0.375 in.)  
**Thermal Condition:** As Welded

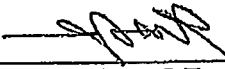
### TENSILE TEST QW-150

SAMPLE NUMBER	T1 QW-462.1(a)		T2 QW-462.1(a)	
	WIDTH mm (in)	19.1	(0.752)	19.0
THICKNESS mm (in)	8.71	(0.343)	9.19	(0.362)
AREA sq mm (sq in)	166	(0.258)	175	(0.271)
ULT. LOAD N (lbs)	88 200	(19,800)	92 300	(22,800)
UTS MPa (psi)	530	(77,000)	529	(76,700)
FRACTURE TYPE	Partial Cup & Cone		Partial Cup & Cone	
FRACTURE LOCATION	Parent Metal		Parent Metal	

### GUIDED-BEND TEST QW-160

SAMPLE WIDTH:	9.52 mm (0.375 in.)		SAMPLE THICKNESS:	9.52 mm (0.375 in.)	
	PLUNGER SIZE:	38.1 mm (1.50 in.)		YOKE SIZE:	60.3 mm (2.375 in.)
QW-462.2		Side Bend			Side Bend
SAMPLE NUMBER(S)	S1		S2	S3	
RESULTS	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, 2007 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:   
Inderjit Rai / Samuel Lu, C.Tech.



# LUDWIG ASSOCIATES LTD.

Materials and Welding Consulting

## LABORATORY TEST REPORT

LABORATORY ACCREDITATION BUREAU  
 ISO/IEC 17025 ACCREDITED  
 Certificate Number L2067 Testing

**CUSTOMER:** GKM Fabrication Inc.  
 235105 Wrangler Dr. S.E.  
 Calgary, Alberta  
 T2P 2G6

**Laboratory Test No.:** C08-1907.1  
**Date:** November 3, 2008

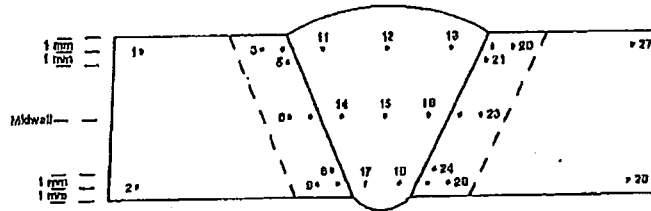
**Attention:** Graeme Hill

**PQR Number:** GKM-1-2  
**Material:** SA 516 Gr. 70N (Heat No.: 297420 - 65196)  
**Thickness:** 9.52 mm (0.375 in.)  
**Thermal Condition:** As Welded

### HARDNESS TEST

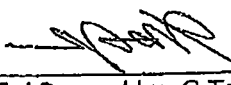
Type of Test: Vickers 1000 g (HV<sub>1000</sub>)

Instrument: Mitutoyo MacroVickers 5112



Parent Metal		HAZ		Weld Metal		HAZ		Parent Metal	
1	169	3	163	11	182	19	182	27	173
2	173	4	173	12	174	20	177	28	169
		5	175	13	195	21	178		
		6	162	14	173	22	167		
		7	158	15	167	23	148		
		8	160	16	168	24	162		
		9	165	17	168	25	160		
		10	178	18	166	26	168		

We certify the test results in this report and that the specimen(s) were prepared and tested in accordance with the requirements of ASTM E384 - 08a. 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:   
 Simon Kirkland, T.T. / Samuel Lu, C.Tech.



# LUDWIG ASSOCIATES LTD.

Materials and Welding Consulting

## LABORATORY TEST REPORT

LABORATORY ACCREDITATION BUREAU  
ISO/IEC 17025 ACCREDITED  
Certificate Number L2057 Testing

**CUSTOMER:** GKM Fabrication Inc.  
235105 Wrangler Dr. S.E.  
Calgary, Alberta  
T2P 2G6

**Laboratory Test No.:** C08-1907.1  
**Date:** November 6, 2008

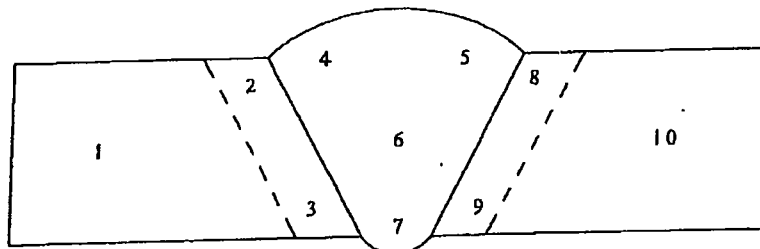
**Attention:** Graeme Hill

**PQR Number:** GKM-1-2  
**Material:** SA 516 Gr. 70N (Heat No.: 297420 - 65196)  
**Thickness:** 9.52 mm (0.375 in.)  
**Thermal Condition:** As Welded

### HARDNESS TEST


Type of Test: Rockwell Scale BW (HRBW)

Instrument: NewAge Digital Versitron



Parent Metal		Weld Metal		Weld Metal		Parent Metal	
1	79	2	84	4	86	8	85
		3	82	5	86	9	83
				6	84		
				7	82		
						10	80

We certify the test results in this report and that the specimen(s) were prepared and tested in accordance with the requirements of ASTM E18-07. 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:   
Simon Kirkland, T.T. / Samuel Lu, C.Tech.

## QW-483 PROCEDURE QUALIFICATION RECORD (PQR)

Company Name GKM Fabrication Ltd.  
Procedure Qualification Record No. GKM-2-1 (Rev. 1)  
Date Originally Qualified August 10, 2005 Revision Date December 11, 2014  
Revisions Rev. 1 (Editorial and non-essential changes) - QW-409, Mode of metal transfer added to address short circuiting (non waveform controlled). QW-404, Addition of Filler Metal Product Form, Supplemental Filler Metal and Alloy Elements. QW-403, addition of Deposited Weld Metal (Per Pass). QW-410, Use of Thermal Processes and Peening. Deleted metric units. Information from historical data.  
Welding Process(es) GMAW / SMAW Type(s) Semi-automatic / Manual

### JOINTS (QW-402)

Type Butt joint, single vee groove, see next page

### BASE METALS (QW-403)

Material Spec. SA 333 to SA 350 Type or Grade Gr. 6 to Gr. LF2  
P-No. P1 Grp. 1 To P-No. P1 Grp. 2 Thickness 0.237 in.  
Diameter 4.50 in O.D. Other 4 in. Schedule 80 m/c to 0.237 in.  
Deposited Weld Metal (Per Pass) Did not exceed 0.500 in.

### FILLER METALS (QW-404)

	GMAW	SMAW
Specification No. (SFA)	<u>SFA 5.18</u>	<u>SFA 5.1</u>
AWS No. (Class)	<u>ER70S-6</u>	<u>E7018-1</u>
Filler Metal F-No.	<u>F6</u>	<u>F4</u>
Filler Metal A-No.	<u>*</u>	<u>A1</u>
Filler Metal Product Form	<u>Solid wire</u>	<u>N/A</u>
Supplemental Filler Metal	<u>Without</u>	<u>N/A</u>
Alloying Elements	<u>Without</u>	<u>N/A</u>
Size of Electrode	<u>See attached sketch</u>	
Deposited Weld Metal Thickness	<u>0.100 in.</u>	<u>0.137 in.</u>
Other	<u>*Chemical composition meets the requirements of ASME Section II, Part C for ER70S-6</u>	

### POSITION (QW-405)

Position of Groove GMAW: Pipe rolled with nozzle tip at 45° from top SMAW: 5G  
Weld Progression GMAW: Vertical down SMAW: Vertical Up

### PREHEAT (QW-406)

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

### POSTWELD HEAT TREATMENT (QW-407)

Temperature None Time N/A

### GAS (QW-408)

Shielding GMAW: 75% Argon, 25% CO2, 27 cfph  
Backing None Trailing Without

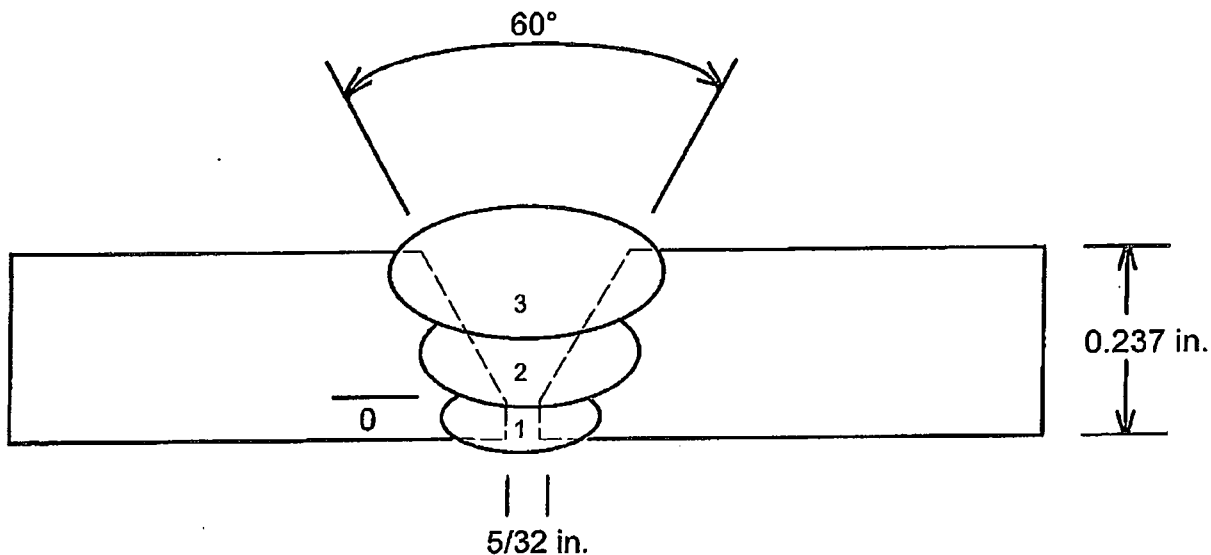


**ELECTRICAL CHARACTERISTICS (QW-409)**

Current Direct Polarity Reverse, electrode positive  
 Amps See below Volts See below  
 Maximum Heat Input GMAW: 28,395 J/in. maximum SMAW: 52,004 J/in. maximum  
 Mode of Metal Transfer GMAW: Short circuiting arc (non waveform controlled)

**TECHNIQUE (QW-410)**

String or Weave GMAW: Weave SMAW: Weave Travel Speed See below  
 Multiple or Single Pass Per Side GMAW: Single SMAW: Multiple  
 Multiple or Single Electrodes Single  
 Use of Thermal Process N/A Peening None



Pass	Process	Filler Metal	Diameter in.	Current & Polarity	Amperage Range	Voltage Range	Travel Speed i.p.m.
1	GMAW	ER70S-6	0.035	DCRP	100 - 120	16 - 17	4.0
2	SMAW	E7018-1	1/8	DCRP	90 - 100	22 - 23	4.2
3	SMAW	E7018-1	1/8	DCRP	90 - 100	21 - 22	2.4

PQR NO. GKM-2-1 (Rev. 1)

### CHARPY IMPACT TOUGHNESS

Type of Test Charpy V Notch Orientation Transverse  
Test Temperature -65 °F Specimen Size 10 X 4 mm

Specimen No.	Notch Location	Impact Values J (ft. lbs)
D2.1	Weld Metal	18.6
D2.2	within 1/16 in.	13.0
D2.3	of root	18.0
D3.1	Gr. 6 - HAZ	25.0
D3.2	Gr. 6 - HAZ	26.0
D3.3	Gr. 6 - HAZ	23.2
E3.1	Gr. LF2 - HAZ	8.6
E3.2	Gr. LF2 - HAZ	10.2
E3.3	Gr. LF2 - HAZ	5.4

### OTHER TESTS

Vickers Hardness Test - see attached laboratory test report # C05-1037.1

Welders Name Jake Krabbe Certificate File No. W-21642  
Tests Conducted By Ludwig & Associates Ltd.  
Laboratory Test No. C05-1037.1

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 GKM FABRICATION INC.

Date 12/15/14 Signed [Signature]



# LUDWIG & ASSOCIATES LTD.

Materials and Welding Engineering

## LABORATORY TEST REPORT

LABORATORY ACCREDITATION BUREAU  
ISO/IEC 17025 ACCREDITED  
Certificate Number L2057

**CUSTOMER:** GKM Fabrication Inc.  
237 West Lakeview Place  
Chestermere, Alberta  
T1X 1K4

**Laboratory Test No.:** C05-1037.1  
**Date:** August 15, 2005

**Attention:** Graeme Hill

**PQR Number:** GKM-2-1  
**Material:** SA 333 Gr. 6 to SA 350 Gr. LF2  
**Size:** 114.3 mm (4.50 in.) O.D. x 6.0 mm (0.237 in.) w.t.  
**Thermal Condition:** As Welded

### NOTCH-TOUGHNESS TEST

**TYPE OF TEST:** Charpy V-Notch  
**TEST TEMPERATURE:** -54°C (-65°F)  
**ORIENTATION:** Transverse  
**SPECIMEN SIZE:** 10 x 4 mm

Specimen Number	Notch Location	Impact Values	
		Joules	(ft.lbs)
D2.1	Weld Metal within 1/16 in. of root	25.2	(18.6)
D2.2		17.6	(13.0)
D2.3		24.4	(18.0)
D3.1	Gr. 6 – HAZ	33.9	(25.0)
D3.2		35.2	(26.0)
D3.3		31.4	(23.2)
E3.1	Gr. LF2 – HAZ	11.7	(8.6)
E3.2		13.8	(10.2)
E3.3		7.3	(5.4)

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.

Laboratory Test Conducted By:

Dan Nguyen, T.T. / Frank Langenecker, C.E.T.



# LUDWIG & ASSOCIATES LTD.

Materials and Welding Engineering

## LABORATORY TEST REPORT

LABORATORY ACCREDITATION BUREAU  
ISO/IEC 17025 ACCREDITED  
Certificate Number 12057

**CUSTOMER:** GKM Fabrication Inc.  
237 West Lakeview Place  
Chestermere, Alberta  
T1X 1K4

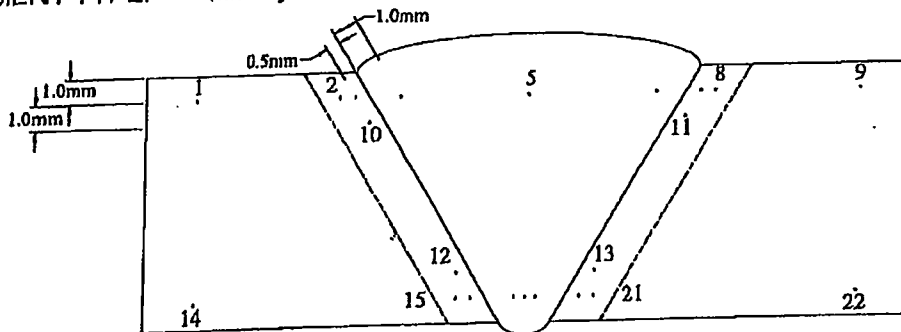
**Laboratory Test No.:** C05-1037.1  
**Date:** August 15, 2006

**Attention:** Graeme Hill

**PQR Number:** GKM-2-1  
**Material:** SA 333 Gr. 6 to SA 350 Gr. LF2  
**Size:** 114.3 mm (4.50 in.) O.D. x 6.0 mm (0.237 in.) w.t.  
**Thermal Condition:** As Welded

### HARDNESS TEST

**TYPE OF TEST:** Vickers  
**INSTRUMENT TYPE:** Mitutoyo AVIC-C1  
**LOAD:** 500 g



SA 350 Gr. LF2

SA 333 Gr. 6

1) 189 HV	6) 202 HV	11) 208 HV	16) 215 HV	21) 211 HV
2) 217 HV	7) 198 HV	12) 221 HV	17) 211 HV	22) 181 HV
3) 235 HV	8) 190 HV	13) 213 HV	18) 225 HV	
4) 216 HV	9) 169 HV	14) 209 HV	19) 215 HV	
5) 210 HV	10) 220 HV	15) 239 HV	20) 220 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 E384 - 99. The information regarding material identification (i.e. size, thickness, heat number, etc.) has been provided by the customer whose name appears on this report.

Laboratory Test Conducted By:

Mark Fung, T.T. / Frank Langenecker, C.E.T.

## QW-483 PROCEDURE QUALIFICATION RECORD (PQR)

Company Name GKM Fabrication Ltd.  
Procedure Qualification Record No. GKM-2-2 (Rev. 1)  
Date Originally Qualified August 9, 2005 Revision Date December 11, 2014  
Revisions Rev. 1 (Editorial and non-essential changes) - QW-409, Mode of metal transfer added to address short circuiting (non waveform controlled), QW-404, Addition of Filler Metal Product Form, Supplemental Filler Metal and Alloy Elements.  
QW-403, addition of Deposited Weld Metal (Per Pass), QW-410, Use of Thermal Processes and Peening. Deleted metric units. Information from historical data.  
Welding Process(es) GMAW / SMAW Type(s) Semi-automatic / Manual

### JOINTS (QW-402)

Type Butt joint, single vee groove, see next page

### BASE METALS (QW-403)

Material Spec. SA 333 to SA 350 Type or Grade Gr. 6 to Gr. LF2  
P-No. P1 Grp. 1 To P-No. P1 Grp. 2 Thickness 0.500 in.  
Diameter 8.625 in O.D. Other 8 in. Schedule 80  
Deposited Weld Metal (Per Pass) Did not exceed 0.500 in.

### FILLER METALS (QW-404)

	GMAW	SMAW
Specification No. (SFA)	<u>SFA 5.18</u>	<u>SFA 5.1</u>
AWS No. (Class)	<u>ER70S-6</u>	<u>E7018-1</u>
Filler Metal F-No.	<u>F6</u>	<u>F4</u>
Filler Metal A-No.	<u>*</u>	<u>A1</u>
Filler Metal Product Form	<u>Solid wire</u>	<u>N/A</u>
Supplemental Filler Metal	<u>Without</u>	<u>N/A</u>
Alloying Elements	<u>Without</u>	<u>N/A</u>
Size of Electrode	<u>See attached sketch</u>	
Deposited Weld Metal Thickness	<u>0.100 in.</u>	<u>0.400 in.</u>
Other	<u>*Chemical composition meets the requirements of ASME Section II, Part C for ER70S-6</u>	

### POSITION (QW-405)

Position of Groove GMAW: Pipe rolled with nozzle tip at 45° from top SMAW: 5G  
Weld Progression GMAW: Vertical down SMAW: Vertical Up

### PREHEAT (QW-406)

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

### POSTWELD HEAT TREATMENT (QW-407)

Temperature None Time N/A

### GAS (QW-408)

Shielding GMAW: 75% Argon, 25% CO2, 27 cfph  
Backing Without Trailing Without

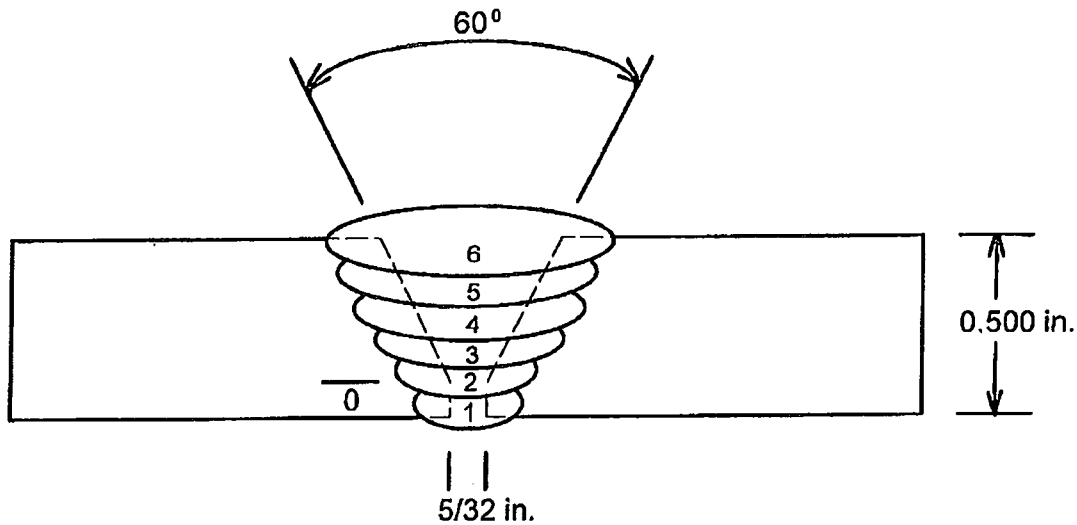
PQR NO. GKM-2-2 (Rev. 1)

**ELECTRICAL CHARACTERISTICS (QW-409)**

Current Direct Polarity Reverse, electrode positive  
 Amps See below Volts See below  
 Maximum Heat Input GMAW: 29,204 J/in. maximum SMAW: 60,893 J/in. maximum  
 Mode of Metal Transfer GMAW: Short circuiting arc (non waveform controlled)

**TECHNIQUE (QW-410)**

String or Weave GMAW: Weave SMAW: Weave Travel Speed See below  
 Multiple or Single Pass Per Side GMAW: Single SMAW: Multiple  
 Multiple or Single Electrodes Single  
 Use of Thermal Process N/A Peening None



Pass	Process	Filler Metal	Diameter in.	Current & Polarity	Amperage Range	Voltage Range	Travel Speed i.p.m.
1	GMAW	ER70S-6	0.035	DCRP	100 - 110	19 - 20	4.2
2 - 4	SMAW	E7018-1	3/32	DCRP	90 - 100	20 - 23	4.0 - 4.4
5	SMAW	E7018-1	1/8	DCRP	110 - 120	21 - 23	2.8
6	SMAW	E7018-1	1/8	DCRP	110 - 120	20 - 22	2.4



PQR NO. GKM-2-2 (Rev. 1)

### CHARPY IMPACT TOUGHNESS

Type of Test Charpy V Notch Orientation Transverse  
Test Temperature -50 °F Specimen Size 10 X 10 mm

Specimen No.	Notch Location	Impact Values J (ft. lbs)
Q2.1	Weld Metal	130
Q2.2	within 1/16 in.	58.2
Q2.3	of root	85.6
Q3.1	Gr. 6 - HAZ	>192
Q3.2	Gr. 6 - HAZ	>192
Q3.3	Gr. 6 - HAZ	>192
R3.1	Gr. LF2 - HAZ	95.0
R3.2	Gr. LF2 - HAZ	77.2
R3.3	Gr. LF2 - HAZ	77.6

### OTHER TESTS

Vickers Hardness Test - see attached laboratory test report # C05-1037.2

Welders Name Jake Krabbe Certificate File No. W-21642  
Tests Conducted By Ludwig & Associates Ltd.  
Laboratory Test No. C05-1037.2

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 GKM FABRICATION INC.

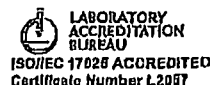
Date 12/15/14 Signed [Signature]



# LUDWIG & ASSOCIATES LTD.

Materials and Welding Engineering

## LABORATORY TEST REPORT



**CUSTOMER:** GKM Fabrication Inc.  
237 West Lakeview Place  
Chestermere, Alberta  
T1X 1K4

**Laboratory Test No.:** C05-1037.2  
**Date:** August 12, 2005

**Attention:** Graeme Hill

**PQR Number:** GKM-2-2  
**Material:** SA 333 Gr. 6 to SA 350 Gr. LF2  
**Size:** 219.1 mm (8.625 in.) O.D. x 12.7 mm (0.500 in.) w.t.  
**Thermal Condition:** As Welded

### NOTCH-TOUGHNESS TEST

**TYPE OF TEST:** Charpy V-Notch      **ORIENTATION:** Transverse  
**TEST TEMPERATURE:** -46°C (-50°F)      **SPECIMEN SIZE:** 10 x 10 mm

Specimen Number	Notch Location	Impact Values Joules (ft.lbs)	
Q2.1	Weld Metal	176	(130)
Q2.2	within 1/16 in.	78.9	(58.2)
Q2.3	of root	116	(85.6)
Q3.1	Gr. 6 - HAZ	>260	(>192)
Q3.2	Gr. 6 - HAZ	>260	(>192)
Q3.3	Gr. 6 - HAZ	>260	(>192)
R3.1	Gr. LF2 - HAZ	129	(95.0)
R3.2	Gr. LF2 - HAZ	105	(77.2)
R3.3	Gr. LF2 - HAZ	105	(77.6)

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.

Laboratory Test Conducted By: \_\_\_\_\_

Mark Fung, T.T. / Frank Langenecker, C.E.T.



# LUDWIG & ASSOCIATES LTD.

Materials and Welding Engineering



## LABORATORY TEST REPORT

**CUSTOMER:** GKM Fabrication Inc.  
237 West Lakeview Place  
Chestermere, Alberta  
T1X 1K4

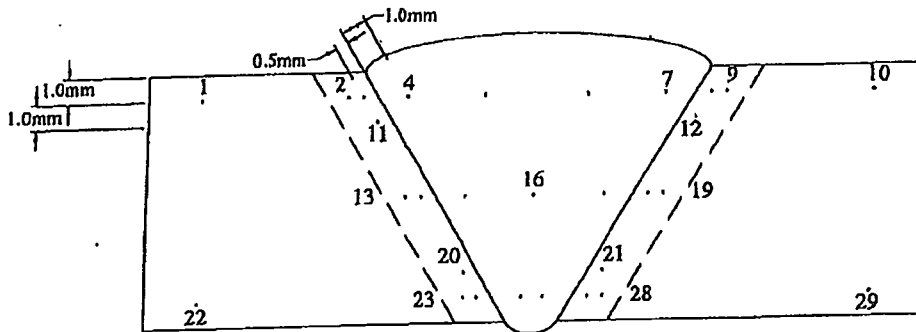
**Laboratory Test No.:** C05-1037.2  
**Date:** August 15, 2005

**Attention:** Graeme Hill

**PQR Number:** GKM-2-2  
**Material:** SA 333 Gr. 6 to SA 350 Gr. LF2  
**Size:** 219.1 mm (8.625 in.) O.D. x 12.7 mm (0.500 in.) w.t.  
**Thermal Condition:** As Welded

### HARDNESS TEST

**TYPE OF TEST:** Vickers **LOAD:** 500 g  
**INSTRUMENT TYPE:** Mitutoyo AVK-C1



SA 333 Gr. 6

SA 350 Gr. LF2

1) 164 HV	7) 191 HV	13) 166 HV	19) 202 HV	25) 197 HV
2) 159 HV	8) 200 HV	14) 168 HV	20) 180 HV	26) 205 HV
3) 166 HV	9) 201 HV	15) 204 HV	21) 192 HV	27) 196 HV
4) 193 HV	10) 154 HV	16) 193 HV	22) 175 HV	28) 198 HV
5) 195 HV	11) 159 HV	17) 197 HV	23) 187 HV	29) 174 HV
6) 199 HV	12) 217 HV	18) 202 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 E384 - 99. The information regarding material identification (i.e. size, thickness, heat number, etc.) has been provided by the customer whose name appears on this report.

Laboratory Test Conducted By: Mark Fung, T.T. / Frank Langenecker, C.E.T.

## QW-483 PROCEDURE QUALIFICATION RECORD (PQR)

GKM Fabrication Inc.

Procedure Qualification Record No. GKM-15-1 Date June 16, 2011  
Welding Procedure Specification No. GKM-15  
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. 60/70 to Gr. 60/70  
P-No. P1 Grps 1&2 To P-No. P1 Grps 1&2 Diameter N/A - Plate  
Thickness 22.2 mm (0.875 in.) to 38.1 mm (1.50 in.)  
Heat Number 347421 - 48997 to 314265 - 77802-1  
Deposited Weld Metal (Per pass) Did not exceed 12.7 mm (0.500 in.)

### FILLER METALS (QW-404)

Specification No. (SFA)	<u>SFA 5.1</u>	<u>SFA 5.1</u>
AWS No. (Class)	<u>E6010</u>	<u>E7018-1</u>
Filler Metal F-No.	<u>F3</u>	<u>F4</u>
Filler Metal A-No.	<u>A1</u>	<u>A1</u>
Size of Electrode	<u>See attached sketch</u>	
Deposited Weld Metal Thickness	<u>3.18 mm (0.125 in.)</u>	<u>19.1 mm (0.750 in.)</u>

### POSITION (QW-405)

Position of Groove 3G Weld Progression Vertical Up

### PREHEAT (QW-406)

Preheat Temperature 66°C (150°F) Interpass Temp. (Max.) 232°C (450°F)

### POSTWELD HEAT TREATMENT (QW-407)

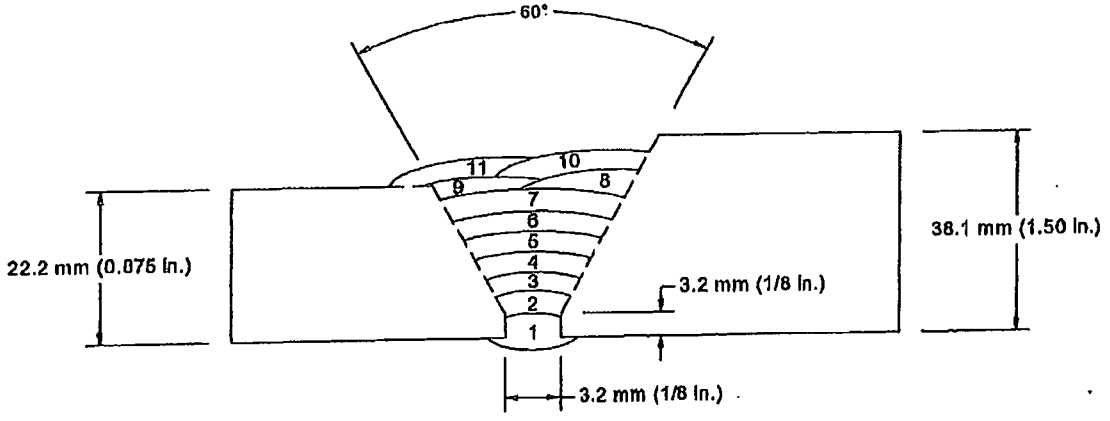
Temperature None Time N/A

### ELECTRICAL CHARACTERISTICS (QW-409)

Current	<u>Direct</u>	Polarity	<u>Reverse, electrode positive</u>
Amps	<u>See next page</u>	Volts	<u>See next page</u>
Maximum Heat Input	<u>F3: 1.48 kJ/mm (37,655 J/in.)</u>	<u>F4: 2.18 kJ/mm (55,355 J/in.)</u>	

### TECHNIQUE (QW-410)

String or Weave F3: String F4: Both Travel Speed See next page  
Initial & Interpass Cleaning Brushing, chipping & grinding to remove slag  
Method of Back Gouging Not used  
Multiple or Single Pass Per Side Multipass from groove side  
Multiple or Single Electrodes Single



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	65 - 75	25 - 27	74 (2.9)
2	SMAW	E7018-1	2.4 (3/32)	DCRP	85 - 95	21 - 23	97 (3.8)
3	SMAW	E7018-1	2.4 (3/32)	DCRP	85 - 95	21 - 23	79 (3.1)
4	SMAW	E7018-1	2.4 (3/32)	DCRP	90 - 100	21 - 23	61 (2.4)
5 - 11	SMAW	E7018-1	3.2 (1/8)	DCRP	125 - 135	21 - 23	79 - 99 (3.1 - 3.9)

PQR NO. GKM-15-1

**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 (0.748)	20.8 (0.819)	395 (0.613)	209 812 (47,200)	531 (77,000)	Partial cup & cone Parent metal (1.50 in.)
T2	19.1 (0.752)	20.8 (0.819)	397 (0.616)	211 481 (47,500)	532 (77,200)	Partial cup & cone Parent metal (1.50 in.)

**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 IMPACT TOUGHNESS**

Type of Test Charpy V-Notch Orientation Transverse  
 Test Temperature -46°C (-50°F) Specimen Size 10 X 10 mm (0.394 X 0.394 in.)

Specimen No.	Notch Location	Impact Values J (ft. lbs)
A2.1	Weld Metal	83.0 (61.2)
A2.2	within 1/16 in.	130 (96.2)
A2.3	of root	27.1 (20.0)
A3.1	7/8" Gr. 60/70 - HAZ	>140 (>103)
A3.2	7/8" Gr. 60/70 - HAZ	>140 (>103)
A3.3	7/8" Gr. 60/70 - HAZ	>140 (>103)
B3.1	1.5" Gr. 60/70 - HAZ	52.1 (38.4)
B3.2	1.5" Gr. 60/70 - HAZ	90.3 (66.6)
B3.3	1.5" Gr. 60/70 - HAZ	132 (97.2)

**OTHER TESTS**

Vickers Hardness - see attached laboratory test report # C11-1225.1

Welders Name Wayne Morcom Certificate File No. W-4853  
 Tests Conducted By Ludwig Associates Ltd.  
 Laboratory Test No. C11-1225.1

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.

Manufacturer GKM FABRICATION INC.

Date July 15/2011 Certified by MN [Signature]





# LUDWIG ASSOCIATES LTD.

Materials and Welding Consulting

## LABORATORY TEST REPORT

**CUSTOMER:** GKM Fabrication Inc. **Laboratory Test No.:** C11-1225.1  
 Bay #19, 235105 Wrangler Dr. S.E., RR#5 **Date:** June 20, 2011  
 Calgary, Alberta  
 T1X 0K3

**Attention:** Matt Cvitanovic

**PQR Number:** GKM-15-1  
**Material:** SA 516 Gr. 60/70 (Heat No.: 347421-48997 to 314265-77802-1)  
**Thickness:** 22.2 mm (0.875 in.) to 38.1 mm (1.50 in.)  
**Thermal Condition:** As Welded

### TENSILE TEST QW-160

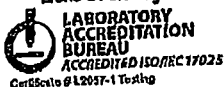
SAMPLE NUMBER	T1 QW-462.1(a)		T2 QW-462.1(a)	
	WIDTH mm (in)	19.0	(0.748)	19.1
THICKNESS mm (in)	20.8	(0.819)	20.8	(0.819)
AREA sq mm (sq in)	395	(0.613)	397	(0.616)
ULT. LOAD N (lbs)	209 812	(47,200)	211 481	(47,500)
UTS MPa (psi)	531	(77,000)	532	(77,200)
FRACTURE TYPE	Partial Cup & Cone		Partial Cup & Cone	
FRACTURE LOCATION	Parent Metal 38.1 mm (1.50 in)		Parent Metal 38.1 mm (1.50 in.)	

### GUIDED-BEND TEST QW-160

SAMPLE WIDTH:	9.52 mm (0.375 in.)		SAMPLE THICKNESS:	22.2 mm (0.875 in.)	
	PLUNGER SIZE:	38.1 mm (1.50 in.)		YOKE SIZE:	60.3 mm (2.375 in.)
QW-462.2	Side Bend	Side Bend	Side Bend	Side Bend	Side Bend
SAMPLE NUMBER(S)	S1	S2	S3	S4	
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, 2010 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: Claire Robinson, T.T. / Frank Langenecker, 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) 460-3030 FAX: (780) 468-3032  
 GKM Fabrication Inc.  
 21-1954



# LUDWIG ASSOCIATES LTD.

Materials and Welding Consulting

## LABORATORY TEST REPORT

**CUSTOMER:** GKM Fabrication Inc. **Laboratory Test No.:** C11-1225.1  
 Bay #19, 235105 Wrangler Dr. S.E., RR#5 **Date:** June 20, 2011  
 Calgary, Alberta  
 T1X 0K3

**Attention:** Matt Cvitanovic

**PQR Number:** GKM-15-1  
**Material:** SA 516 Gr. 60/70 (Heat No.: 347421-48997 to 314265-77802-1)  
**Thickness:** 22.2 mm (0.875 in.) to 38.1 mm (1.50 in.)  
**Thermal Condition:** As Welded

### CHARPY V-NOTCH IMPACT TEST

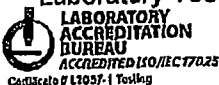
**Machine:** Satec, SI-1C SN:1363 **Specimen Size:** 10 x 10 mm (0.394 x 0.394 in.)  
**Capacity:** 325 J (240 ft-lbf) **Orientation:** Transverse  
**Verified Range:** 1.7 - 140.1 J (1.3 - 103.3 ft-lbf) **Test Temp.:** -46°C (-50°F)

Specimen Number	Notch Location	Impact Values	
		Joules	(ft-lbf)
A2.1	Weld Metal within 1/16 in. of root	83.0	(61.2)
A2.2		130	(96.2)
A2.3		27.1	(20.0)
A3.1	7/8" Gr. 60/70 - HAZ	>140	(>103)
A3.2	7/8" Gr. 60/70 - HAZ	>140	(>103)
A3.3	7/8" Gr. 60/70 - HAZ	>140	(>103)
B3.1	1.5" Gr. 60/70 - HAZ	52.1	(38.4)
B3.2	1.5" Gr. 60/70 - HAZ	90.3	(66.6)
B3.3	1.5" Gr. 60/70 - HAZ	132	(97.2)

*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 - 2010 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: \_\_\_\_\_

Claire Robinson, T.T. / Frank Langenecker, 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:** GKM Fabrication Inc. **Laboratory Test No.:** C11-1225.1  
 Bay #19, 235105 Wrangler Dr. S.E., RR#5 **Date:** June 17, 2011  
 Calgary, Alberta  
 T1X 0K3

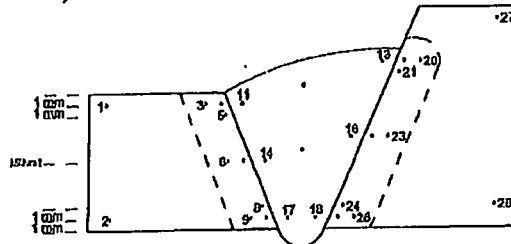
**Attention:** Matt Cvitanovic

**PQR Number:** GKM-15-1  
**Material:** SA 516 Gr. 60/70 (Heat No.: 347421-48997 to 314265-77802-1)  
**Thickness:** 22.2 mm (0.875 in.) to 38.1 mm (1.50 in.)  
**Thermal Condition:** As Welded

### HARDNESS TEST

Type of Test: Vickers 10kg (HV10)

Instrument: Mitutoyo AVK-C1

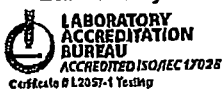


22.2 mm (0.875 in.)				Weld Metal		38.1 mm (1.50 in.)			
Parent Metal		HAZ				HAZ		Parent Metal	
1	166	3	174	11	217	19	213	27	151
2	164	4	209	12	215	20	174	28	149
		5	211	13	222	21	219		
		6	182	14	212	22	192		
		7	186	15	190	23	182		
		8	186	16	190	24	198		
		9	184	17	186	25	214		
		10	185	18	188	26	189		

We certify the test results in this report and that the specimen(s) were prepared and tested in accordance with the requirements of ASTM E384-10<sup>e2</sup>, ANSI/NACE MR0175 / ISO 15156-2:2009(E). 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: \_\_\_\_\_

Feng Cao, T.T. / Frank Langenecker, C.E.T.



## QW-483 PROCEDURE QUALIFICATION RECORD (PQR)

Company Name GKM FABRICATION INC.  
 Procedure Qualification Record No. GKM-2-3 (Rev. 0) Date December 15, 2014  
 Welding Process(es) Shielded Metal Arc Welding (SMAW),  
Flux Cored Arc Welding (FCAW)

### JOINTS (QW-402)

Type Butt joint, single vee groove, see next page

### BASE METALS (QW-403)

Material Specification No. SA 516 Type or Grade Gr. 60/70  
 P-No. P1 Grps. 1&2 To P-No. P1 Grps. 1&2 Thickness 1.50 in.  
 Heat Number 390312 - 95672-01 Carbon Equivalent (1) 0.391  
 Diameter N/A Other Plate product form  
 Backing Material Specification No. SA 36 Type or Grade N/A  
 Deposited Weld Metal (Per Pass) Did not exceed 0.125 in. for SMAW and  
0.125 in. for FCAW

(1) Per CSA Z662 Carbon Equivalent formula. See attached chemical composition heat analysis material test report

### FILLER METALS (QW-404)

	SMAW	FCAW
Specification No. (SFA)	<u>SFA 5.1</u>	<u>SFA 5.20</u>
AWS No. (Class)	<u>E7018-1 (2)</u>	<u>E71T-12M-J (3)</u>
Filler Metal F-No.	<u>F4</u>	<u>F6</u>
Filler Metal A-No.	<u>A1</u>	<u>A1 (4)</u>
Filler Metal Product Form	<u>N/A</u>	<u>Flux Cored Wire</u>
Supplemental Filler Metal	<u>N/A</u>	<u>Without</u>
Alloying Elements	<u>N/A</u>	<u>Without</u>
Size of Electrode	<u>See attached sketch</u>	
Deposited Weld Metal Thickness	<u>0.750 in.</u>	<u>0.750 in.</u>

(2) ESAB: OK 55.00

(3) Kobe Steel Ltd.: Kobelco DWA-55ESR flux cored wire

(4) See attached certificate of conformance for weld metal chemistry

### POSITION (QW-405)

Position of Groove SMAW: 3G FCAW: 1G  
 Weld Progression GMAW: Vertical up FCAW: N/A

### PREHEAT (QW-406)

Preheat Temperature 150 °F Interpass Temp. (Max.) 450 °F

### POSTWELD HEAT TREATMENT (QW-407)

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

### GAS (QW-408)

Specification No. (SFA) SFA 5.32 AWS No. (Class) SG-AC-25  
 Shielding FCAW: 75% Argon, 25% CO<sub>2</sub>, 30 ft<sup>3</sup>/hr  
 Backing Without Trailing Without

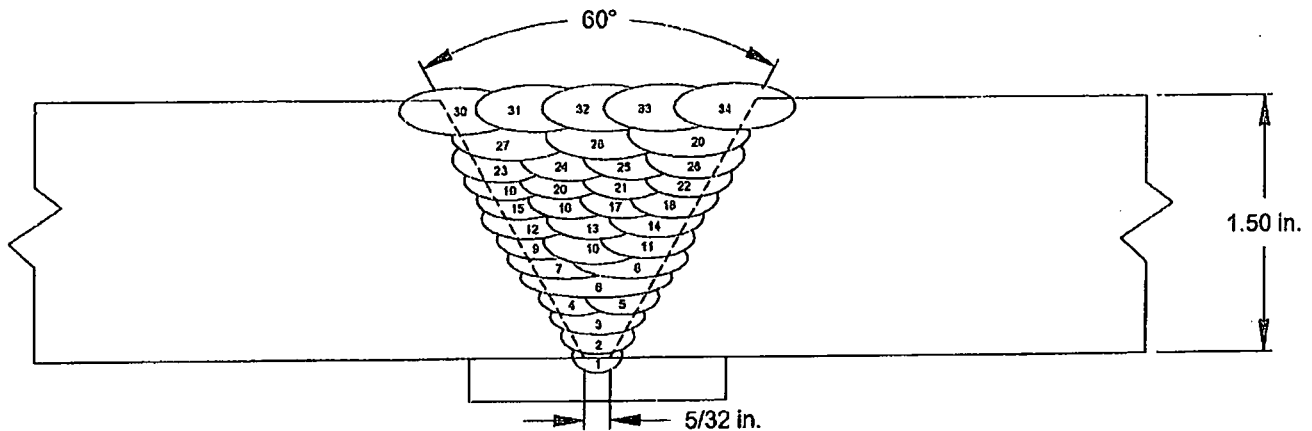
PQR NO. GKM-2-3 (Rev. 0)

**ELECTRICAL CHARACTERISTICS (QW-409)**

Current Direct Polarity Reverse, electrode positive  
 Amps See below Volts See below  
 Heat Input SMAW: 73,615 J/in. max. FCAW: 40,534 J/in. max.  
 Mode of Metal Transfer FCAW: Globular or Spray

**TECHNIQUE (QW-410)**

Manual or Automatic SMAW: Manual FCAW: Semiautomatic  
 Multiple or Single Electrodes Single  
 Multiple or Single Pass Per Side SMAW: Multiple FCAW: Multiple  
 String or Weave SMAW: String and weave FCAW: Sting & Weave  
 Tube to Work Distance SMAW: N/A FCAW: 0.500 to 0.750 in.  
 Orifice or Gas Cup Size SMAW: N/A FCAW: 0.625 in.  
 Travel Speed See below  
 Use of Thermal Process N/A  
 Peening None



Pass	Process	Filler Metal	Diameter In.	Current & Polarity	Amperage Range	Voltage Range	Travel Speed i.p.m.	Wire Feed Speed i.p.m.
1	SMAW	E7018-1	1/8	DCRP	100 - 110	21 - 23	3.0	N/A
2 - 5	SMAW	E7018-1	1/8	DCRP	115 - 125	21 - 23	2.9 - 4.0	N/A
6 - 8	SMAW	E7018-1	5/32	DCRP	140 - 150	21 - 23	2.6 - 3.9	N/A
9	FCAW	E71T-12MJ	0.045	DCRP	215 - 250	26 - 28	17.1	Not recorded
10 - 11	FCAW	E71T-12MJ	0.045	DCRP	225 - 250	27 - 28	13.1 - 15.8	Not recorded
12 - 34	FCAW	E71T-12MJ	0.045	DCRP	265 - 320	29 - 31	13.1 - 22.9	Not recorded

Note: Wire Feed Speed set on dial to setting 4.

PQR NO. GKM-2-3 (Rev. 0)

**NOTCH-TOUGHNESS TEST**

Type of Test Charpy V-Notch Orientation Transverse  
Test Temperature -50 °F Specimen Size 0.394 x 0.394 in.

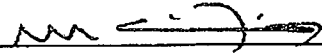
Specimen No.	Notch Location	Impact Values ft-lbf
Q2.1	Weld Metal	47
Q2.2	Within 1/16"	71
Q2.3	of root	20
R2.1	Weld Metal	90
R2.2	Within 1/16"	>107
R2.3	of cap	91
Q3.1	HAZ	>107
Q3.2	1/4 - 1/2t from	57
Q3.3	root surface	44
R3.1	HAZ	>107
R3.2	1/4 - 1/2t from	40
R3.3	cap surface	84

**OTHER TESTS**

Welders Name Keith Mitchell Certificate File No. W-23385  
Tests Conducted By SGS Ludwig Associates Ltd.  
Laboratory Test No. C14-1687.1

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.

Manufacturer GKM FABRICATION INC.

Date FEB 23 2015 Signed 





### CHARPY V-NOTCH IMPACT TEST

**Customer:** GKM Fabrication Inc.  
Bay #19, 235105 Wrangler Drive S.E., R.R. #5  
Calgary, Alberta  
T1X 0K3

**Laboratory Test No.:** C14-1687.1  
**Date:** December 24, 2014  
**P.O. No.:** 3366-01-shop

**Attention:** Matt Cvitanovic

**PQR Number:** GKM-2-3 (Rev. 0)  
**Material:** SA 516 Gr. 60/70 (Heat No.: 390312 - 95672-01)  
**Thickness:** 38.1 mm (1.50 in.)  
**Thermal Condition:** As Welded

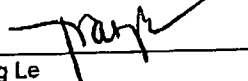
**Specimen Size:** 10 x 10 mm (0.394 x 0.394 in.)  
**Orientation:** Transverse  
**Test Temperature:** -46 °C (-50 °F)  
**Governing Spec.:** ASME Section VIII, Div. 1, UG-84 - 2013

**Machine:** Satec, SI-1C SN:1363  
**Capacity:** 325 J (240 ft-lbf)  
**Verified Range:** 1.7 - 145 J (1.3 - 107 ft-lbf)

Specimen Number	Notch Location	Impact Values	
		Joules	(ft-lbf)
Q2.1	Weld Metal within 1.5mm (1/16") of root	64	(47)
Q2.2		96	(71)
Q2.3		27	(20)
R2.1	Weld Metal within 1.5mm (1/16") of cap	122	(90)
R2.2		>145	(>107)
R2.3		123	(91)
Q3.1	HAZ 1/4-1/2t from root surface	>145	(>107)
Q3.2		77	(57)
Q3.3		60	(44)
R3.1	HAZ 1/4-1/2t from cap surface	>145	(>107)
R3.2		54	(40)
R3.3		114	(84)

*Note: Metric values calculated by direct conversion.*

**Test Conducted By:** Oksana Shevchenko, ASET Associate (Calgary)

**Certified By:**  L-A-B Accredited Certificate Number L2057-1 Testing  
Trang Le

This report (or certificate) is issued by the Company under its General Conditions for Inspection and Testing Services (copy available upon request). The issuance of this report (or certificate) does not exonerate buyers or sellers from exercising all their rights and discharging all their liabilities under the Contract of Sale. Stipulations to the contrary are not binding on the Company. The Company's responsibility under this report (or certificate) is limited to prevent negligence and will in no case be more than ten times the amount of the fees or commission. Except by special arrangement, samples, if drawn, will not be retained by the Company for more than 30 days. The information stated in this report (or certificate) is derived from the results of inspection or testing procedures carried out in accordance with the instructions of our Client, and/or our assessment of such results on the basis of any technical standards, trade custom or practice, or other circumstances which should in our professional opinion be taken into account.



### HARDNESS TEST

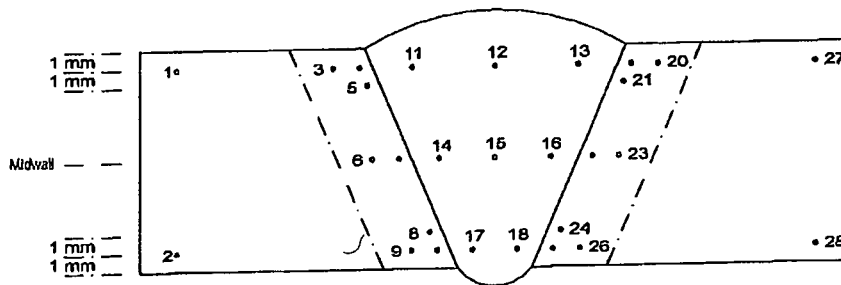
**Customer:** GKM Fabrication Inc.  
 Bay #19, 235105 Wrangler Drive S.E., R.R. #5  
 Calgary, Alberta  
 T1X 0K3

**Laboratory Test No.:** C14-1687.1  
**Date:** December 23, 2014  
**P.O. No.:** 3366-01-shop

**Attention:** Matt Cvitanovic

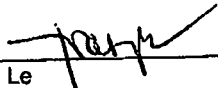
**PQR Number:** GKM-2-3 (Rev. 0)  
**Material:** SA 516 Gr. 60/70 (Heat No.: 390312 - 95672-01)  
**Thickness:** 38.1 mm (1.50 in.)  
**Thermal Condition:** As Welded

**Type of Test:** Vickers 10kg (HV10) **Instrument:** DuraScan 667  
**Governing Spec.:** ASTM E384-11<sup>e1</sup> & ANSI/NACE MR0175/ISO 15156:2009(E)



Parent Metal		HAZ		Weld Metal		HAZ		Parent Metal	
1	158	3	192	11	227	19	260	27	154
2	144	4	264	12	180	20	184	28	152
		5	234	13	230	21	251		
		6	188	14	231	22	206		
		7	214	15	207	23	172		
		8	203	16	238	24	190		
		9	190	17	200	25	193		
		10	194	18	206	26	192		

**Test Conducted By:** Xin (Vincent) Su, T.T. (Calgary)

**Certified By:**  **L-A-B Accredited Certificate Number L2057-1 Testing**  
 Trang Le

This report (or certificate) is issued by the Company under its General Conditions for Inspection and Testing Services (copy available upon request). The issuance of this report (or certificate) does not exonerate buyers or sellers from exercising all their rights and discharging all their liabilities under the Contract of Sale. Situations to the contrary are not binding on the Company. The Company's responsibility under this report (or certificate) is limited to proven negligence and will in no case be more than ten times the amount of the fees or commission. Except by special arrangement, samples, if drawn, will not be retained by the Company for more than 30 days. The information stated in this report (or certificate) is derived from the results of inspection or testing procedures carried out in accordance with the instructions of our Client, and/or our assessment of such results on the basis of any technical standards, trade custom or practice, or other circumstances which should in our professional opinion be taken into account.

## QW-483 PROCEDURE QUALIFICATION RECORD (PQR)

Organization Name GKM Fabrication Inc.  
Procedure Qualification Record No. GKM-2-4 (Rev. 1)  
Date Originally Qualified April 18, 2018 Revision Date February 26, 2020  
Revision(s) Rev. 1 (Editorial) - Addition of (QW-403) Heat Treat Condition.  
Clarification to (QW-402) Backing.  
Welding Process(es) Shielded Metal Arc Welding (SMAW)

### JOINTS (QW-402)

Joint Design Butt joint, single vee groove, welded from both sides, see next page  
Root Opening See next page  
Backing With, weld metal backing Retainers Without

### BASE METALS (QW-403)

Material Specification No. SA 516 Type or Grade Gr. 60/70  
Heat Treat Condition (1) Normalized  
P-No. P1 Groups 1/2 To P-No. P1 Groups 1/2 Thickness 0.232 in.  
Heat Number 429693 - 29256-03 Carbon Equivalent (2) 0.37  
Diameter N/A  
Other 0.375 in. thick plate machined to 0.232 in. thickness.  
Deposited Weld Metal (Per Pass) Did not exceed 0.094 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)

SMAW  
Specification No. (SFA) SFA 5.1  
AWS No. (Class) E7018-1 (3)  
F-No. F4  
A-No. A1  
Diameter See attached sketch  
Deposited Weld Metal Thickness 0.232 in.  
(3) Air Liquide Canada Inc.: Blueshield LA 18 Plus

### POSITION (QW-405)

Position of Groove 3G Weld Progression Vertical up

### PREHEAT (QW-406)

Preheat Temperature 50 °F Interpass Temp. (Max.) 350 °F  
Preheat Maintenance Weld was allowed to cool to ambient temperature in still air after welding was completed.

### POSTWELD HEAT TREATMENT (QW-407)

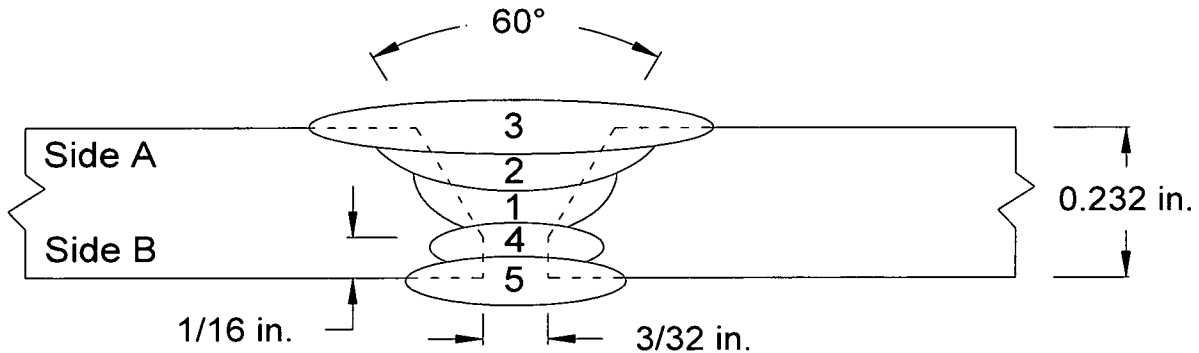
With or Without Without  
Temperature N/A Time N/A

**ELECTRICAL CHARACTERISTICS (QW-409)**

Current Direct Polarity Reverse, electrode positive  
 Amps See below Volts See below  
 Heat Input 52,118 J/in. maximum

**TECHNIQUE (QW-410)**

Manual or Automatic Manual  
 String or Weave String and Weave  
 Initial & Interpass Cleaning Brushing, chipping and grinding as required  
 Method of Back Gouging Grinding with abrasive disc from side B before depositing pass 4.  
 Multiple or Single Pass Per Side Multiple  
 Peening Not conducted  
 Travel Speed See below  
 Use of Thermal Process N/A



Pass	Process	Filler Metal	Diameter in.	Current Type & Polarity	Amperage Range	Voltage Range	Travel Speed i.p.m.
1	SMAW	E7018-1	3/32	DCRP	88 - 94	20 - 22	2.2
2	SMAW	E7018-1	3/32	DCRP	88 - 94	20 - 22	3.7
3	SMAW	E7018-1	3/32	DCRP	90 - 98	20 - 22	3.0
4	SMAW	E7018-1	3/32	DCRP	90 - 98	20 - 22	4.0
5	SMAW	E7018-1	3/32	DCRP	94 - 100	21 - 23	2.8

PQR NO. GKM-2-4 (Rev. 1)

### CHARPY V-NOTCH IMPACT TEST

Type of Test Charpy V-Notch Orientation Transverse  
Weld Thickness E7018-1 (t) = 0.232 in.

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 weld surface	0.394 x 0.158	-65	M2.1	16
				M2.2	31
				M2.3	26
	HAZ from middle 1/2t	0.394 x 0.158	-65	M3.1	20
				M3.2	27
				M3.3	6

### OTHER TESTS

Vickers Hardness - see attached Laboratory Test Report No.: C18-338.2

Welder's Name Ryan Mingo Certificate File No. W-22887  
Tests Conducted By SGS Canada Inc.  
Laboratory Test No. C18-338.2

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.

Organization GKM Fabrication Inc.

Date FEB 27, 2020 Print ROBERT DOSLIC

Signed 



CHARPY V-NOTCH IMPACT TEST

Customer: GKM Fabrication Inc.
Bay #19, 235105 Wrangler Drive S.E., R.R. #5
Calgary, Alberta
T1X 0K3

Laboratory Test No.: C18-338.2
Date: May 2, 2018
P.O. No.: 4770-01SHOP

Attention: Matt Cvitanovic

Table with 4 columns: Property, Value, Property, Value. Includes PQR No., Material, Thickness, Filler Metal, Weld Thickness, Thermal Condition, Welding Process, and Heat No.

Table with 4 columns: Property, Value, Property, Value. Includes Specimen Size, Orientation, Test Temperature, Governing Spec., Instrument, Capacity, Verified Range, and Calibration Date.

Table with 4 columns: Specimen Number, Notch Location, Joules, (ft-lbf). Lists impact values for specimens M2.1-M2.3 and M3.1-M3.3.

Note: Metric values calculated by direct conversion.

Test Conducted By: Kamaldeep Brar, T.T. (Calgary)

Certified By: Alvin Mathew, C.E.T.



This report (or certificate) is issued by the Company under its General Conditions for Inspection and Testing Services (copy available upon request). The issuance of this report (or certificate) does not exonerate buyers or sellers from exercising all their rights and discharging all their liabilities under the Contract of Sale.





**HARDNESS TEST**

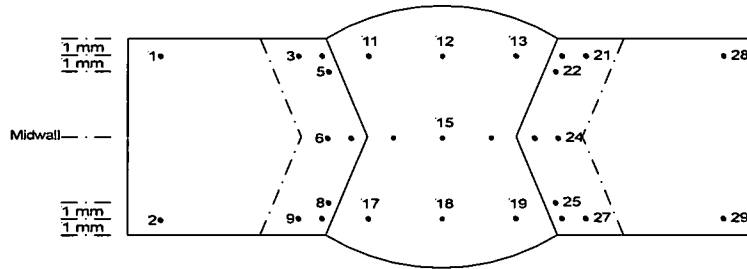
**Customer:** GKM Fabrication Inc.  
 Bay #19, 235105 Wrangler Drive S.E., R.R. #5  
 Calgary, Alberta  
 T1X 0K3

**Laboratory Test No.:** C18-338.2  
**Date:** April 26, 2018  
**P.O. No.:** 4770-01SHOP

**Attention:** Matt Cvitanovic

<b>PQR No.:</b>	GKM-2-4 (Rev. 0)	<b>Welding Process:</b>	SMAW
<b>Material:</b>	SA 516 Gr. 60/70	<b>Heat No.:</b>	429693 - 29256-03
<b>Thickness:</b>	5.9 mm (0.232 in.)		
<b>Filler Metal:</b>	E7018-1		
<b>Weld Thickness:</b>	5.9 mm (0.232 in.)		
<b>Thermal Condition:</b>	As Welded		

**Type of Test:** Vickers 10kg (HV10)      **Instrument:** DuraScan 667  
**Governing Spec.:** ASTM E92-17 & ANSI/NACE MR0175/ISO 15156:2015      **Calibration Date:** Nov. 21, 2017



Parent Metal		HAZ		Weld Metal		HAZ		Parent Metal	
1	159	3	172	11	183	20	186	28	159
2	160	4	191	12	175	21	170	29	159
		5	202	13	177	22	199		
		6	185	14	161	23	194		
		7	193	15	169	24	191		
		8	181	16	172	25	180		
		9	176	17	163	26	180		
		10	181	18	165	27	167		
				19	157				

**Test Conducted By:** Kamaldeep Brar, T.T. (Calgary)

**Certified By:**   
 Alvin Mathew, C.E.T.



This report (or certificate) is issued by the Company under its General Conditions for Inspection and Testing Services (copy available upon request). The issuance of this report (or certificate) does not exonerate buyers or sellers from exercising all their rights and discharging all their liabilities under the Contract of Sale. Stipulations to the contrary are not binding on the Company. The Company's responsibility under this report (or certificate) is limited to proven negligence and will in no case be more than ten times the amount of the fees or commission. Except by special arrangement, samples, if drawn, will not be retained by the Company for more than 30 days. The information stated in this report (or certificate) is derived from the results of inspection or testing procedures carried out in accordance with the instructions of our Client, and/or our assessment of such results on the basis of any technical standards, trade custom or practice, or other circumstances which should in our professional opinion be taken into account.



Acuren Group Inc.  
 7450 - 18th Street  
 Edmonton, AB, Canada T6P 1N8  
 Phone: (780) 440-2131  
 Fax: (780) 440-1167

NDT, Inspection and Engineering

### CVN IMPACT TEST

Client: Edmonton Exchanger & Manufacturing Ltd. Acuren Project #: 207-0088438  
 Address: 5545-89 St. Client Reference #: M1314MB-H113014  
 Edmonton, AB  
 T6E 5W9 Test Date: November 1, 2016

Attention: Tracy Kent

Sample Description: 0.375 in. Plate, ASME SA 516 Grade 70 MT, Heat #429693-29242 03, Subject to same heat cycle as forming (H01) and SPWHT (SR188) by client

Specimen Type & Preparation: 10mm x 7.5mm - Longitudinal

Test Procedure: ASTM A370; V-Notch

Governing Specification: As per client specification

**Test Result: The specimens met the governing specification requirement.**

Test Temperature: -20°F

Specimen	Test Results				Gov. Spec.	
	Energy Absorbed		Shear	Lateral Expansion	Minimum Requirements	
	(J)	(ft. lbs.)*	(%)	(mm)	(J)	(ft. lbs.)
A	256†	189†	100	Unbroken	N/S	10
B	262†	193†	100	Unbroken	N/S	10
C	264†	195†	100	Unbroken	N/S	10
Average	261†	192†	100	N/R	N/S	15

\*Denotes values obtained by conversion; N/S = Not Specified; N/R = Not Reported.

† This specimen exceeded 80% of the instrument's capacity and the value is reported as approximate.

Lateral expansion is not to be reported for specimens that did not completely fracture.

Reviewed By: Rebecca Mattis, C.E.T.

Tested By:

Meijun Zhu

Specimens will be disposed of 60 days after test date.





Acuren Group Inc.  
 7450 - 18th Street  
 Edmonton, AB, Canada T6P 1N8  
 Phone: (780) 440-2131  
 Fax: (780) 440-1167  
 NDT, Inspection and Engineering

**TENSILE TEST**

Client: Edmonton Exchanger & Manufacturing Ltd. Acuren Project #: 207-0088438  
 Address: 5545-89 St. Client Reference #: M1314MB-H113014  
 Edmonton, AB  
 T6E 5W9 Test Date: November 1, 2016

Attention: Tracy Kent

Sample Description: 0.375 in. Plate, ASME SA 516 Grade 70 MT, Heat #429693-29242 03, Subject to same heat cycle as forming (H01) and SPWHT (SR188) by client

Specimen Type & Preparation: 0.50 inch Transverse Flat Tensile - 2 inch gauge length

Test Procedure: ASTM A370

Governing Specification: ASME SA 516 Grade 70

**Test Result: The specimen met the governing specification requirement.**

Acuren Specimen ID : 6E	Test Results		Gov. Spec. Requirements	
	Imperial (ksi)	Metric (MPa)	Imperial (ksi)	Metric (MPa)
Yield Strength (0.2% Offset Method)	48.9	337	38 min.	260 min.
Ultimate Tensile Strength	72.0	497	70 - 90	485 - 620
Elongation (%)	40		21 min.	

Reviewed By: Rebecca Mattis, C.E.T.

*RMattis*

Tested By: Meijun Zhu

*Kim Holmberg*  
 EE QC Approved

Specimens will be disposed of 60 days after test date.





Acuren Group Inc.  
 7450 - 18th Street  
 Edmonton, AB, Canada T6P 1N8  
 Phone: (780) 440-2131  
 Fax: (780) 440-1167

NDT, Inspection and Engineering

### CVN IMPACT TEST

Client: Edmonton Exchanger & Manufacturing Ltd. Acuren Project #: 207-0088438  
 Address: 5545-89 St. Client Reference #: M1314MB-H113014  
 Edmonton, AB  
 T6E 5W9 Test Date: November 1, 2016

Attention: Tracy Kent

Sample Description: 0.375 in. Plate, ASME SA 516 Grade 70 MT, Heat #429693-29242 03, Subject to same heat cycle as forming (H01) and SPWHT (SR188) by client

Specimen Type & Preparation: 10mm x 7.5mm - Longitudinal

Test Procedure: ASTM A370; V-Notch

Governing Specification: As per client specification

**Test Result: The specimens met the governing specification requirement.**

Test Temperature: -20°F

Specimen	Test Results				Gov. Spec.	
	Energy Absorbed		Shear	Lateral Expansion	Minimum Requirements	
	(J)	(ft. lbs.)*	(%)	(mm)	(J)	(ft. lbs.)
A	256†	189†	100	Unbroken	N/S	10
B	262†	193†	100	Unbroken	N/S	10
C	264†	195†	100	Unbroken	N/S	10
Average	261†	192†	100	N/R	N/S	15

\*Denotes values obtained by conversion.; N/S = Not Specified; N/R = Not Reported.

† This specimen exceeded 80% of the instrument's capacity and the value is reported as approximate.

Lateral expansion is not to be reported for specimens that did not completely fracture.

*Kim Holman*  
 EE QC Approved

Reviewed By: Rebecca Mattis, C.E.T.

Tested By: Meijun Zhu

*Rebecca Mattis*

Specimens will be disposed of 60 days after test date.





Acuren Group Inc.  
 7450 - 18th Street  
 Edmonton, AB, Canada T6P 1N8  
 Phone: (780) 440-2131  
 Fax: (780) 440-1167

NDT, Inspection and Engineering

### TENSILE TEST

Client: Edmonton Exchanger & Manufacturing Ltd. Acuren Project #: 207-0088438  
 Address: 5545-89 St. Client Reference #: M1314MB-H113014  
 Edmonton, AB  
 T6E 5W9 Test Date: November 1, 2016

Attention: Tracy Kent

Sample Description: 0.375 in. Plate, ASME SA 516 Grade 70 MT, Heat #429693-29242 03, Subject to same heat cycle as forming (H01) and SPWHT (SR188) by client

Specimen Type & Preparation: 0.50 inch Transverse Flat Tensile - 2 inch gauge length

Test Procedure: ASTM A370

Governing Specification: ASME SA 516 Grade 70

**Test Result: The specimen met the governing specification requirement.**

Acuren Specimen ID : 6E	Test Results		Gov. Spec. Requirements	
	Imperial (ksi)	Metric (MPa)	Imperial (ksi)	Metric (MPa)
Yield Strength (0.2% Offset Method)	48.9	337	38 min.	260 min.
Ultimate Tensile Strength	72.0	497	70 - 90	485 - 620
Elongation (%)	40		21 min.	

Reviewed By: Rebecca Mattis, C.E.T.

*RMattis*

Tested By:

Meijun Zhu

*Kim Holmes*  
 EE QC Approved

Specimens will be  
 disposed of 60 days  
 after test date.



## QW-483 PROCEDURE QUALIFICATION RECORD (PQR)

Organization Name GKM Fabrication Inc.  
Procedure Qualification Record No. GKM-2-5 (Rev. 1)  
Date Originally Qualified Coupon A: April 18, 2018 Coupon B: May 8, 2018  
Revision Date February 26, 2020  
Revision(s) Rev. 1 (Editorial) - Addition of (QW-403) Heat Treat Condition.  
Clarification to (QW-402) Backing.  
Welding Process(es) Shielded Metal Arc Welding (SMAW)

### JOINTS (QW-402)

Joint Design Butt joint, single vee groove, welded from both sides, see next page  
Root Opening See next page  
Backing With, weld metal backing Retainers Without

### BASE METALS (QW-403)

Material Specification No. SA 516 Type or Grade Gr. 60/70  
Heat Treat Condition (1) Normalized  
P-No. P1 Groups 1/2 To P-No. P1 Groups 1/2 Thickness 0.500 in.  
Heat Number Coupon A: 444127 - 34213-02 Coupon B: 444127 - 34214-02  
Carbon Equivalent (2) 0.37 Diameter N/A  
Other Plate product form  
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)

SMAW  
Specification No. (SFA) SFA 5.1  
AWS No. (Class) E7018-1 (3)(4)  
F-No. F4  
A-No. A1  
Diameter See attached sketch  
Deposited Weld Metal Thickness 0.500 in.  
(3) Coupon A: Air Liquide Canada Inc.: Blueshield LA 18 Plus  
(4) Coupon B: ESAB: OK 55.00

### POSITION (QW-405)

Position of Groove 3G Weld Progression Vertical up

### 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)

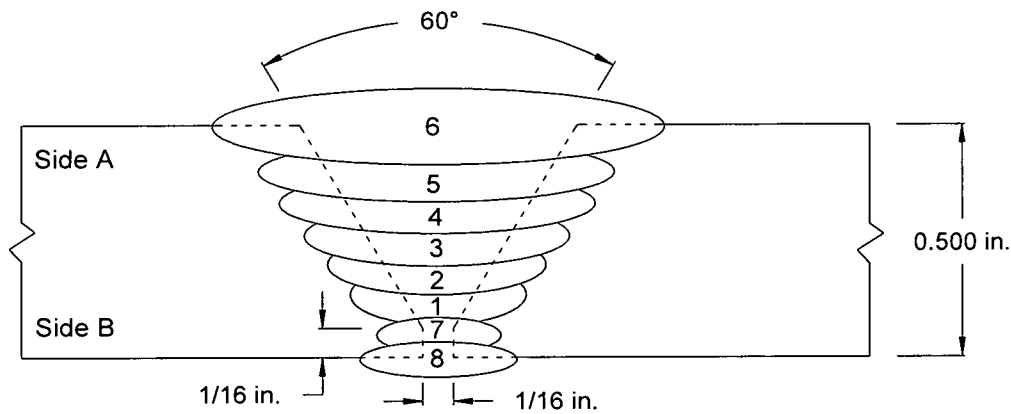
With or Without Without  
Temperature N/A Time N/A

### ELECTRICAL CHARACTERISTICS (QW-409)

Current Direct Polarity Reverse, electrode positive  
Amps See next page Volts See next page  
Heat Input Coupon A: 79,976 J/in. maximum

**TECHNIQUE (QW-410)**

Manual or Automatic	<u>Manual</u>
String or Weave	<u>String and Weave</u>
Initial & Interpass Cleaning	<u>Brushing, chipping and grinding as required</u>
Method of Back Gouging	<u>Grinding with abrasive disc from side B before depositing pass 7.</u>
Multiple or Single Pass Per Side	<u>Multiple</u>
Peening	<u>Not conducted</u>
Travel Speed	<u>See below</u>
Use of Thermal Process	<u>N/A</u>



Coupon A: Charpy V-Notch impact specimens prepared from Coupon A.

Pass	Process	Filler Metal	Diameter in.	Current Type & Polarity	Amperage Range	Voltage Range	Travel Speed i.p.m.
1	SMAW	E7018-1	3/32	DCRP	93 - 103	20 - 22	4.0
2	SMAW	E7018-1	3/32	DCRP	98 - 108	21 - 23	3.8
3	SMAW	E7018-1	3/32	DCRP	98 - 108	21 - 23	2.7
4	SMAW	E7018-1	3/32	DCRP	98 - 108	21 - 23	3.0
5	SMAW	E7018-1	3/32	DCRP	98 - 108	21 - 23	2.5
6	SMAW	E7018-1	3/32	DCRP	98 - 108	21 - 23	1.7
7	SMAW	E7018-1	3/32	DCRP	93 - 103	22 - 24	5.6
8	SMAW	E7018-1	3/32	DCRP	93 - 103	22 - 24	3.2

Coupon B: Vickers Hardness specimen prepared from Coupon B.

Pass	Process	Filler Metal	Diameter in.	Current Type & Polarity	Amperage Range	Voltage Range	Travel Speed i.p.m.
1	SMAW	E7018-1	3/32	DCRP	104 - 108	21 - 25	6.1
2	SMAW	E7018-1	3/32	DCRP	98 - 102	20 - 24	5.5
3	SMAW	E7018-1	3/32	DCRP	90 - 98	20 - 24	3.5
4	SMAW	E7018-1	3/32	DCRP	92 - 100	20 - 24	3.5
5	SMAW	E7018-1	3/32	DCRP	92 - 100	20 - 24	3.4
6	SMAW	E7018-1	3/32	DCRP	92 - 100	20 - 24	2.2
7	SMAW	E7018-1	3/32	DCRP	90 - 98	20 - 24	4.3
8	SMAW	E7018-1	3/32	DCRP	90 - 98	20 - 24	2.3



PQR NO. GKM-2-5 (Rev. 1)

### CHARPY V-NOTCH IMPACT TEST

Type of Test Charpy V-Notch Orientation Transverse  
Weld Thickness E7018-1 (t) = 0.500 in.

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 weld surface	0.394 x 0.394	-50	N2.1	24
				N2.2	81
				N2.3	100
	HAZ from middle 1/2t	0.394 x 0.394	-50	N3.1	141
				N3.2	>192
				N3.3	>192

### OTHER TESTS


Vickers Hardness - see attached Laboratory Test Report No.: C18-338.3

Welder's Name Coupon A: Ryan Mingo Certificate File No. W-22887  
Welder's Name Coupon B: Pierre Lussier Certificate File No. W-5352  
Tests Conducted By SGS Canada Inc.  
Laboratory Test No. C18-338.3

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.

Organization GKM Fabrication Inc.

Date FEB 27, 2020 Print ROB DOSLIC

Signed 



CHARPY V-NOTCH IMPACT TEST

Customer: GKM Fabrication Inc.
Bay #19, 235105 Wrangler Drive S.E., R.R. #5
Calgary, Alberta
T1X 0K3

Laboratory Test No.: C18-338.3
Date: April 27, 2018
P.O. No.: 4770-01SHOP

Attention: Matt Cvitanovic

PQR No.: GKM-2-5 (Rev. 0)
Material: SA 516 Gr. 60/70
Thickness: 12.7 mm (0.500 in.)
Filler Metal: E7018-1
Weld Thickness: 12.7 mm (0.500 in.)
Thermal Condition: As Welded
Welding Process: SMAW
Heat No.: 444127 - 34213-02

Specimen Size: 10 x 10 mm (0.394 x 0.394 in.)
Orientation: Transverse
Test Temperature: -46 °C (-50 °F)
Governing Spec.: ASME Section VIII, Div. I, UG-84 - 2017 & ASME B31.3 - 2016
Instrument: Satec, SI-1C SN:1363
Capacity: 325 J (240 ft-lbf)
Verified Range: 1.7 - 260 J (1.3 - 192 ft-lbf)
Calibration Date: June 7, 2017

Table with 4 columns: Specimen Number, Notch Location, Joules, and (ft-lbf). Rows include N2.1-2.3 (Weld Metal) and N3.1-3.3 (HAZ).

Note: Metric values calculated by direct conversion.

Test Conducted By: Kamaldeep Brar, T.T. (Calgary)

Certified By: Alvin Mathew, C.E.T.



This report (or certificate) is issued by the Company under its General Conditions for Inspection and Testing Services (copy available upon request). The issuance of this report (or certificate) does not exonerate buyers or sellers from exercising all their rights and discharging all their liabilities under the Contract of Sale.



### HARDNESS TEST

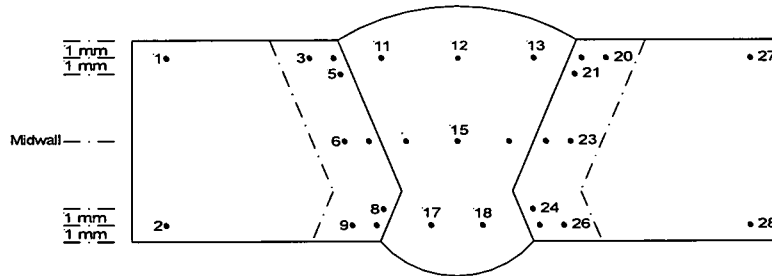
**Customer:** GKM Fabrication Inc.  
 Bay #19, 235105 Wrangler Drive S.E., R.R. #5  
 Calgary, Alberta  
 T1X 0K3

**Laboratory Test No.:** C18-338.3  
**Date:** May 10, 2018  
**P.O. No.:** 4770-01SHOP

**Attention:** Matt Cvitanovic

<b>PQR No.:</b>	GKM-2-5 (Rev. 0)	<b>Welding Process:</b>	SMAW
<b>Material:</b>	SA 516 Gr. 60/70	<b>Heat No.:</b>	444127 - 34214-02
<b>Thickness:</b>	12.7 mm (0.500 in.)		
<b>Filler Metal:</b>	E7018-1		
<b>Weld Thickness:</b>	12.7 mm (0.500 in.)		
<b>Thermal Condition:</b>	As Welded		

**Type of Test:** Vickers 10kg (HV10)      **Instrument:** DuraScan 667  
**Governing Spec.:** ASTM E92-17 & ANSI/NACE MR0175/ISO 15156:2015      **Calibration Date:** Nov. 21, 2017



Parent Metal		HAZ		Weld Metal		HAZ		Parent Metal	
1	148	3	168	11	192	19	181	27	150
2	150	4	171	12	193	20	179	28	152
		5	177	13	198	21	171		
		6	162	14	170	22	158		
		7	160	15	170	23	163		
		8	182	16	183	24	176		
		9	166	17	206	25	175		
		10	179	18	202	26	168		

**Test Conducted By:** Christian Chiovelli, T.T. (Calgary)

**Certified By:**   
 Patrick Lysz, C.E.T.



This report (or certificate) is issued by the Company under its General Conditions for Inspection and Testing Services (copy available upon request). The issuance of this report (or certificate) does not exonerate buyers or sellers from exercising all their rights and discharging all their liabilities under the Contract of Sale. Stipulations to the contrary are not binding on the Company. The Company's responsibility under this report (or certificate) is limited to proven negligence and will in no case be more than ten times the amount of the fees or commission. Except by special arrangement, samples, if drawn, will not be retained by the Company for more than 30 days. The information stated in this report (or certificate) is derived from the results of inspection or testing procedures carried out in accordance with the instructions of our Client, and/or our assessment of such results on the basis of any technical standards, trade custom or practice, or other circumstances which should in our professional opinion be taken into account.

## QW-483 PROCEDURE QUALIFICATION RECORD (PQR)

Company Name GKM Fabrication Inc.  
 Procedure Qualification Record No. GKM-17-1 (Rev. 1)  
 Date Originally Qualified July 12, 2011 Revision Date June 1, 2018  
 Revision(s) Rev. 1 (Editorial) - Addition of (QW-404) Alloy Elements, Alloy Flux,  
(QW-410) Use of Thermal Process. Clarification to (QW-407) Postweld  
Heat Treatment (Without). Removed reference to (QW-404)  
F7A6-EM14K Flux / Wire Classification. Removed Welding Procedure  
Specification No.  
 Welding Process(es) GMAW / FCAW / SAW Type(s) Semi-auto. / Machine

### 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 41.3 mm (1.625 in.)  
 Diameter N/A - Plate Heat Number 344402 - 67937  
 Deposited Weld Metal (Per pass) Did not exceed 12.7 mm (0.500 in.)

### FILLER METALS (QW-404)

	GMAW	FCAW	SAW
SFA Specification	<u>SFA 5.18</u>	<u>SFA 5.20</u>	<u>SFA 5.17</u>
AWS Classification	<u>ER70S-6</u>	<u>E71T-12MJ</u>	<u>EM14K</u>
Filler Metal F-No.	<u>F6</u>	<u>F6</u>	<u>F6</u>
Weld Metal A-No.	<u>*</u>	<u>A1</u>	<u>A1</u>
Filler Metal Product Form	<u>Solid wire</u>	<u>Flux cored wire</u>	<u>Solid wire</u>
Supplementary Fillers	<u>Without</u>	<u>Without</u>	<u>Without</u>
Electrode - Flux Classification	<u>N/A</u>	<u>N/A</u>	<u>F7A8-EM14K</u>
Flux Type	<u>N/A</u>	<u>N/A</u>	<u>Neutral</u>
Alloy Flux	<u>N/A</u>	<u>N/A</u>	<u>Without</u>
Alloy Elements	<u>Without</u>	<u>Without</u>	<u>Without</u>
Recrushed slag	<u>N/A</u>	<u>N/A</u>	<u>None</u>
Size of Electrode	<u>See attached sketch</u>		
Weld Metal Thickness mm (in.)	<u>3.2 (0.125)</u>	<u>19.1 (0.750)</u>	<u>19.1 (0.750)</u>
Trade Name (s)	<u>GMAW: Lincoln Electric, SuperArc L-56</u>		
	<u>FCAW: Kobelco, DWA-55ESR</u>		
	<u>SAW: Lincoln Electric, Lincolnweld LA-71 wire / 880M flux</u>		
Other	<u>* ER70S-6 meets the chemical composition requirements of ASME Sec.II, Part C</u>		

### POSITION (QW-405)

Position of Groove GMAW: Plate @ 30° off flat FCAW & SAW: 1G  
 Weld Progression GMAW: Vertical down FCAW & SAW: N/A

### PREHEAT (QW-406)

Preheat Temperature 66°C (150°F) Interpass Temp. 232°C (450°F) max.

### POSTWELD HEAT TREATMENT (QW-407)

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

### GAS (QW-408)

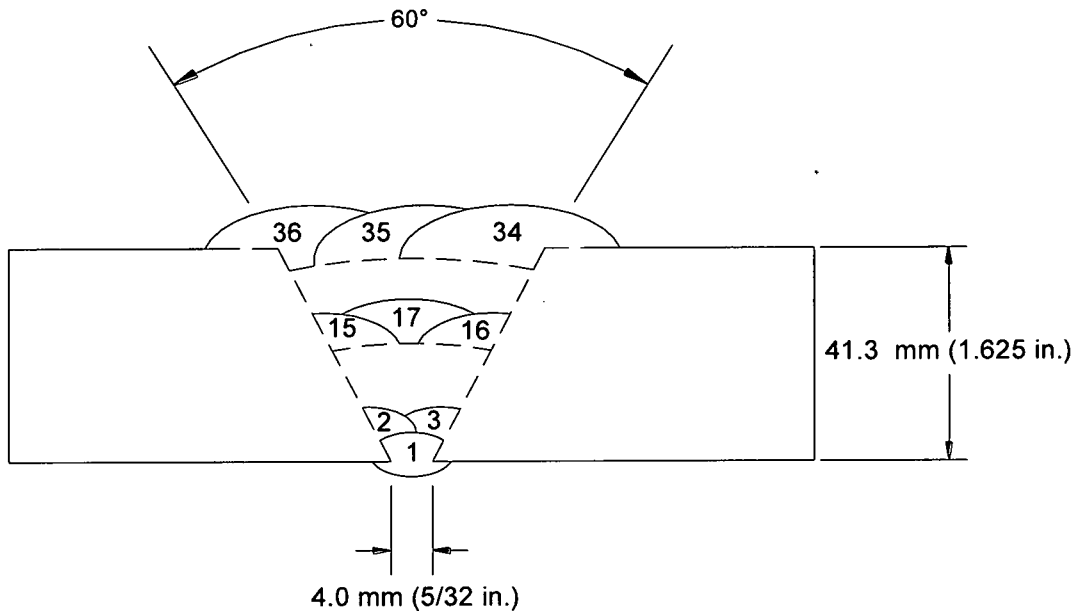
Specification No. (SFA) SFA 5.32 AWS No. SG-AC-25  
 Shielding Gas GMAW: 75% Argon, 25% CO2, 12.5 liters per minute (25 cfph)  
FCAW: 75% Argon, 25% CO2, 12.5 liters per minute (25 cfph)  
 Backing Gas None Trailing Without

**ELECTRICAL CHARACTERISTICS (QW-409)**

Current Direct Polarity Reverse, electrode positive  
 Amps See next page Volts See next page  
 Maximum Heat Input GMAW: 0.83 kJ/mm (20,982 J/in.) FCAW: 1.42 kJ/mm (36,000 J/in.)  
SAW: 2.94 kJ/mm (74,800 J/in.)  
 Mode of Metal Transfer GMAW: Short circuiting arc FCAW: Spray

**TECHNIQUE (QW-410)**

String or Weave GMAW & FCAW: Weave SAW: String Travel Speed See below  
 Orifice or Gas Cup Size 12.7 mm (0.500 in.) Peening None  
 Initial & Interpass Cleaning Brushing, chipping & grinding to remove slag  
 Method of Back Gouging Not used  
 Oscillation GMAW & FCAW: N/A SAW: Without  
 Tube to Work Distance GMAW: 12.7 mm (0.500 in.) FCAW: 25.4 mm (1.00 in.)  
SAW: 25.4 - 38.1 mm (1.00 - 1.50 in.)  
 Multiple or Single Pass Per Side Multiple  
 Multiple or Single Electrodes Single Electrode Spacing N/A  
 Use of Thermal Process N/A



Pass	Process	Filler Metal	Diameter mm (in.)	Current & Polarity	Amperage Range	Voltage Range	Travel Speed mm/min (i.p.m.)
1	GMAW	ER70S-6	0.9 (0.035)	DCRP	150 - 160	18 - 19	208 (8.2)
2 - 10	FCAW	E71T-12MJ	1.1 (0.045)	DCRP	170 - 180	24 - 25	318 - 439 (12.5 - 17.3)
11	FCAW	E71T-12MJ	1.1 (0.045)	DCRP	180 - 190	24 - 25	399 (15.7)
12 - 16	FCAW	E71T-12MJ	1.1 (0.045)	DCRP	175 - 185	23 - 25	198 - 328 (7.8 - 12.9)
17	FCAW	E71T-12MJ	1.1 (0.045)	DCRP	175 - 185	23 - 25	183 (7.2)
18 - 20	FCAW	E71T-12MJ	1.1 (0.045)	DCRP	175 - 185	23 - 25	201 - 236 (7.9 - 9.3)
21 - 33	SAW	F7A8-EM14K	2.4 (3/32)	DCRP	550	32	432 (17.0)
34 - 36	SAW	F7A8-EM14K	2.4 (3/32)	DCRP	550	34	381 (15.0)

**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	19.1 (0.752)	40.2 (1.58)	768 (1.19)	412 434 (92,700)	537 (77,900)	Partial cup & cone Parent Metal (SA 516 Gr. 60)
T2	19.1 (0.752)	40.2 (1.58)	768 (1.19)	411 951 (92,600)	537 (77,800)	Partial cup & cone Parent Metal (SA 516 Gr. 60)

**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 IMPACT TOUGHNESS**

Type of Test Charpy V-Notch Orientation Transverse  
 Test Temperature -46°C (-50°F) Specimen Size 10 X 10 mm (0.394 X 0.394 in.)

Specimen No.	Notch Location	Impact Values J (ft. lbs)
L2.1	Weld Metal	111 (82.0)
L2.2	within 1/16 in.	97.6 (72.0)
L2.3	of root	126 (93.2)
M2.1	Weld Metal	>141 (>104)
M2.2	@ ¼ T	44.5 (32.8)
M2.3	Opposite side	>141 (>104)
L3.1	Gr. 60 - HAZ	>141 (>104)
L3.2	Gr. 60 - HAZ	>141 (>104)
L3.3	Gr. 60 - HAZ	80.3 (59.2)
M3.1	Gr. 70 - HAZ	32.8 (24.2)
M3.2	Gr. 70 - HAZ	60.2 (44.4)
M3.3	Gr. 70 - HAZ	17.9 (13.2)

**OTHER TESTS**

Vickers Hardness - see attached laboratory test report # C11-1442.1

Welder's Name John Hill Certificate File No. W-9767  
 Tests Conducted By Ludwig Associates Ltd.  
 Laboratory Test No. C11-1442.1

*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 GKM Fabrication Inc.

Date July 03/2018 Certified by Matt Cvitanovic



# LUDWIG ASSOCIATES LTD.

Materials and Welding Consulting

## LABORATORY TEST REPORT

**CUSTOMER:** GKM Fabrication Inc. **Laboratory Test No.:** C11-1442.1  
 Bay #19, 235105 Wrangler Drive S.E. RR#5 **Date:** July 18, 2011  
 Calgary, Alberta  
 T1X 0K3

**Attention:** Matt Cvitanovic

**PQR Number:** GKM-17-1  
**Material:** SA 516 Gr. 60 to SA 516 Gr. 70 (Heat No.: 344402 - 67937)  
**Thickness:** 41.3 mm (1.625 in.)  
**Thermal Condition:** As Welded

### TENSILE TEST QW-150

SAMPLE NUMBER	T1 QW-462.1(a)		T2 QW-462.1(a)	
WIDTH mm (in)	19.1	(0.752)	19.1	(0.752)
THICKNESS mm (in)	40.2	(1.58)	40.2	(1.58)
AREA sq mm (sq in)	768	(1.19)	768	(1.19)
ULT. LOAD N (lbs)	412 434	(92,700)	411 951	(92,600)
UTS MPa (psi)	537	(77,900)	537	(77,800)
FRACTURE TYPE	Partial Cup & Cone		Partial Cup & Cone	
FRACTURE LOCATION	Parent Metal (SA 516 Gr. 60)		Parent Metal (SA 516 Gr. 60)	

### GUIDED-BEND TEST QW-160

SAMPLE WIDTH:	9.52 mm (0.375 in.)	SAMPLE THICKNESS:	41.3 mm (1.625 in.)
PLUNGER SIZE:	38.1 mm (1.50 in.)	YOKE SIZE:	60.3 mm (2.375 in.)
QW-462.2	Side Bend	Side Bend	Side Bend
SAMPLE NUMBER(S)	S1	S2	S3
RESULTS	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, 2010 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:

Feng Cao, T.T. / Frank Langenecker, 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

GKM Fabrication Inc.  
21-1954





# LUDWIG ASSOCIATES LTD.

Materials and Welding Consulting

## LABORATORY TEST REPORT

**CUSTOMER:** GKM Fabrication Inc. **Laboratory Test No.:** C11-1442.1  
 Bay #19, 235105 Wrangler Drive S.E. RR#5 **Date:** July 15, 2011  
 Calgary, Alberta  
 T1X 0K3

**Attention:** Matt Cvitanovic

**PQR Number:** GKM-17-1  
**Material:** SA 516 Gr. 60 to SA 516 Gr. 70 (Heat No.: 344402 - 67937)  
**Thickness:** 41.3 mm (1.625 in.)  
**Thermal Condition:** As Welded

### CHARPY V-NOTCH IMPACT TEST

**Machine:** Satec, SI-1C SN:1363 **Specimen Size:** 10 x 10 mm (0.394 x 0.394 in.)  
**Capacity:** 325 J (240 ft-lbf) **Orientation:** Transverse  
**Verified Range:** 1.7 - 141.3 J (1.3 - 104.2 ft-lbf) **Test Temp.:** -46°C (-50°F)

Specimen Number	Notch Location	Impact Values	
		Joules	(ft-lbf)
L2.1	Weld Metal within 1/16 in. of root	111	(82.0)
L2.2		97.6	(72.0)
L2.3		126	(93.2)
M2.1	Weld Metal @ 1/4T opposite side	>141	(>104)
M2.2		44.5	(32.8)
M2.3		>141	(>104)
L3.1	Gr. 60 - HAZ	>141	(>104)
L3.2		>141	(>104)
L3.3		80.3	(59.2)
M3.1	Gr. 70 - HAZ	32.8	(24.2)
M3.2		60.2	(44.4)
M3.3		17.9	(13.2)

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 - 2010 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: \_\_\_\_\_

Claire Robinson, T.T. / Frank Langenecker, 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

GKM Fabrication Inc.  
21-1954



# LUDWIG ASSOCIATES LTD.

Materials and Welding Consulting

## LABORATORY TEST REPORT

**CUSTOMER:** GKM Fabrication Inc. **Laboratory Test No.:** C11-1442.1  
 Bay #19, 235105 Wrangler Drive S.E. RR#5 **Date:** July 14, 2011  
 Calgary, Alberta  
 T1X 0K3

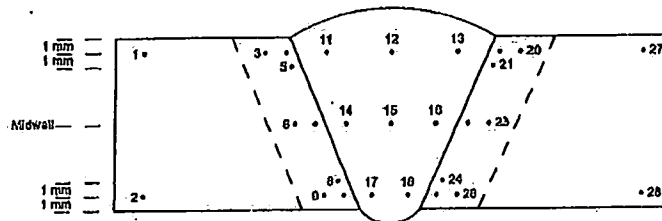
**Attention:** Matt Cvitanovic

**PQR Number:** GKM-17-1  
**Material:** SA 516 Gr. 60 to SA 516 Gr. 70 (Heat No.: 344402 - 67937)  
**Thickness:** 41.3 mm (1.625 in.)  
**Thermal Condition:** As Welded

### HARDNESS TEST

Type of Test: Vickers 10kg (HV10)

Instrument: Mitutoyo AVK-C1



SA 516 Gr. 60		Weld Metal		SA 516 Gr. 70					
Parent Metal	HAZ	Weld Metal		HAZ	Parent Metal				
1	149	3	171	11	208	19	183	27	149
2	133	4	194	12	203	20	188	28	140
		5	210	13	206	21	180		
		6	178	14	205	22	195		
		7	181	15	206	23	191		
		8	197	16	194	24	200		
		9	190	17	193	25	217		
		10	192	18	195	26	197		

We certify the test results in this report and that the specimen(s) were prepared and tested in accordance with the requirements of ASTM E384-10<sup>e2</sup> and ANSI/NACE MR0175/ISO 15156-2:2009(E). 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: \_\_\_\_\_

Bill Yao / Frank Langenecker, 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

GKM Fabrication Inc.

21-1954

November 13, 2012

Matt Cvitanovic  
GKM FABRICATION INC  
235105 WRANGLER DR SE BAY 19  
CALGARY, AB T1X 0K3

Dear Matt Cvitanovic,

The welding procedure, tracking number 2012-07486, originally received on October 31, 2012 was surveyed and accepted for registration as follows:

**Reg. No. :** WP-2635.2

**Accepted on:** November 12, 2012

**Reg Type :** New Design

**Spec. No. :** GKM-22

Design registered in the name of : GKM FABRICATION INC

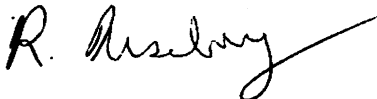
Please note the acceptance of the registration does not allow the use of this welding procedure in the construction, modification, or repair of any boiler, pressure vessel, pressure piping system or fitting in Alberta unless the contractor/manufacturer has registered a Quality Control system for such work with ABSA.

Welding procedures, which specify impact testing, have been accepted in accordance with A.S.M.E. Section IX only. Other A.S.M.E. Code Sections may have additional requirements respecting impact testing.

**An invoice covering survey and registration fees will be forwarded from our Revenue Accounts.**

Enclosed is a stamped welding procedure for your reference.

Sincerely,



ROSEBERG, BOB, P. Eng.  
Design Survey Engineer

WELDING PROCEDURE SPECIFICATION NO.: GKM-22

WELDING PROCEDURE QUALIFICATION RECORD NO.(S): GKM-22-1, GKM-22-2

QUALIFIED FOR

Base Metal: Std. Appl.: P1 to P8  
Notch Appl.: P1 Groups 1 / 2 to P8 Group 1  
Typical P1 Base Metal: Std. Appl.: SA 106 Gr. B, SA 105, SA 234 WPB, SA 516 Gr. 70, etc.  
Notch Appl.: SA 333 Gr. 6, SA 350 Gr. LF2, SA 420 WPL6, SA 516 Gr. 70, etc.  
Typical P8 Base Metal: SA 240, SA 312 Types 304, 304L, 316, 316L etc.  
Process(es): GMAW / SMAW Weld Types: GROOVE & FILLET  
Diameter: ALL DIAMETERS Position: ALL POSITIONS  
Filler Metal: GMAW: ER309(L) or ER309(L)Si  
SMAW: E309(L)-15/16/17

BASE METAL CONDITIONS & GROOVE THICKNESS RANGE QUALIFIED:

BASE METAL THICKNESS RANGE - ASME SECTION IX  
STANDARD APPLICATIONS WITH P.W.H.T.

P1 Material 1.6 to 203 mm (0.062 to 8.00 in.) inclusive  
P8 Material 1.6 to 25.4 mm (0.062 to 1.00 in.) inclusive

NOTCH TOUGHNESS APPLICATIONS TO -46°C (-50°F) WITH P.W.H.T.

P1 Material 3.2 to 203 mm (0.125 to 8.00 in.) inclusive  
P8 Material 3.2 to 25.4 mm (0.125 to 1.00 in.) inclusive

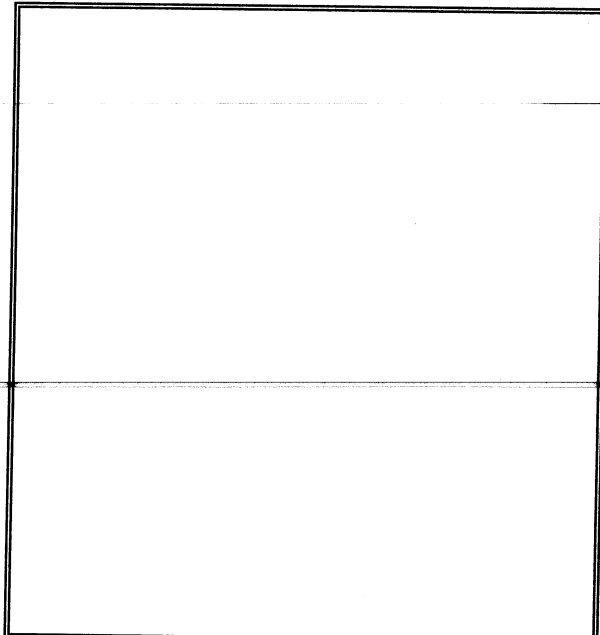
COMBINED DEPOSITED WELD METAL THICKNESS

ASME B31.1 22.6 mm (0.888 in.) maximum  
ASME B31.3 22.6 mm (0.888 in.) maximum  
ASME SECT. VIII, DIV.1 22.6 mm (0.888 in.) maximum

**WDA**  
SAFETY CODES ACT - PROVINCE OF ALBERTA  
WELDING PROCEDURE

Reg. No. WP 2635.2  
Spec. No. GKM-22  
Weld Process GMAW / SMAW  
Mtl. Gr. P No. 1 Gr. 1+2 to P No. 8 Gr. 1  
Elec. Gr. F No. 6+5 A No. 8  
Th. Qual. For P1 - 203 mm P.W.H.T. YES  
P8 - 25.4 mm  
Mtl. Th. Qual. 3.2 mm, CVN -46°C  
Yr. 12 Mo. 11 Day 12 Signed [Signature]  
R. ROSEBERG, P.ENG.  
WELDING SPECIALIST

PROVINCIAL REGISTRATION



## QW-482 WELDING PROCEDURE SPECIFICATION (WPS)

GKM Fabrication Inc.

Welding Procedure Specification No. GKM-22 Date October 18, 2012  
Supporting PQR No.(s) GKM-22-1, GKM-22-2  
Welding Process(es) GMAW / SMAW Type(s) Semi-auto. / Manual

### JOINTS (QW-402)

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

### BASE METALS (QW-403)

P-Number Std. Appl.: P1 To P-Number P8  
P-Number Notch Appl.: P1 Groups 1 & 2 To P-Number P8 Group 1  
Thickness Range: Groove See cover page for thickness qualified by governing code  
Fillet All base metal thicknesses  
Base Metal See cover page  
Pipe Diameter Ranges: Groove All diameters  
Fillet All diameters  
Deposited Weld Metal (Per Pass) GMAW: 3.51 mm (0.138 in.) maximum  
SMAW: 9.52 mm (0.375 in.) maximum

### FILLER METALS (QW-404)

	GMAW	SMAW
Specification No. (SFA)	<u>SFA 5.9</u>	<u>SFA 5.4</u>
AWS No. (Class)	<u>ER309(L) or ER309(L)Si</u>	<u>E309(L)-15/16/17</u>
F-No.	<u>F6</u>	<u>F5</u>
A-No.	<u>A8</u>	<u>A8</u>
Size	<u>See Table #1</u>	<u>See Table #1</u>
Filler Metal Product Form	<u>Solid wire</u>	<u>N/A</u>
Supplementary Filler Metal	<u>Without</u>	<u>N/A</u>
Deposited Weld Metal Thickness Range:		
Groove	<u>3.51 mm (0.138 in.) max.</u>	<u>19.1 mm (0.750 in.) max.</u>
Fillet	<u>All fillet sizes</u>	<u>All fillet sizes</u>

### POSITION (QW-405)

Position of Groove GMAW: All positions SMAW: All positions  
Position of Fillet GMAW: All positions SMAW: All positions  
Weld Progression Std. Appl.: GMAW: Vertical up or down SMAW: Vertical up  
Notch Appl.: GMAW: Vertical down SMAW: Vertical up

### PREHEAT (QW-406)

Preheat Temperature (Minimum) See attached preheat sheet  
Interpass Temperature (Maximum) 177°C (350°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.

**POST WELD HEAT TREATMENT (QW-407)**

Temperature Range See P.W.H.T. sheet Time Range See P.W.H.T. sheet  
 Other Notch Appl.: Maximum P.W.H.T. time at temperature shall not exceed 3.75 hours

**GAS (QW-408)**

Specification No. (SFA) SFA 5.32  
 AWS No. (Class) Shielding: SG-HeAC-7.5/2.5 Backing: SG-A  
 Shielding 90% Helium, 7.5% Argon, 2.5% CO<sub>2</sub>, 10 - 25 liters per minute (20 - 50 cfph)  
 Backing With or without, 100% Argon if used, 2.5 - 10 liters per minute (5 - 20 cfph)  
 Trailing Not required

**ELECTRICAL CHARACTERISTICS (QW-409)**

Current Direct Polarity Reverse, electrode positive  
 Amps See Table #1 Volts See Table #1  
 Electrode Wire Feed Speed GMAW: Amperage controlled, See Table #1  
 Maximum Heat Input For Notch Toughness Applications Only

Base Metal Thickness Range mm (in.)	GMAW kJ/mm (J/in.)	SMAW kJ/mm (J/in.)
3.2 (0.125) ≤ T < 15.9 (0.625)	1.03 (26,080)	1.59 (40,286)
15.9 (0.625) ≤ T ≤ 203 (8.00)	1.05 (26,719)	3.01 (76,500)

Mode of Metal Transfer GMAW: Short circuiting

**TECHNIQUE (QW-410)**

String or Weave Either Travel Speed See Table #1  
 Orifice or Gas Cup Size GMAW: 9.52 to 19.1 mm (0.375 to 0.750 in.) inclusive  
 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 GMAW: 6.35 to 19.1 mm (0.250 to 0.750 in.) inclusive  
 Multiple or Single Pass Per Side Std. Appl.: Either Notch Appl.: Multiple  
 Multiple or Single Electrodes Single  
 Electrode Spacing N/A  
 Peening Not permitted  
 Use of Thermal Processes N/A

**TABLE 1 - WELDING PARAMETERS**

**Standard Applications**

Process	Filler Metal	Diameter mm (in.)	Current & Polarity	Amperage Range	Voltage Range	Travel Speed mm/min (i.p.m.)
GMAW	ER309(L)	0.8 (0.030)	DCRP	70 - 130	14 - 21	43 - 250 (1.7 - 10)
GMAW	or	0.9 (0.035)	DCRP	80 - 200	15 - 22	56 - 600 (2.2 - 25)
GMAW	ER309(L)Si	1.1 (0.045)	DCRP	115 - 250	16 - 25	79 - 900 (3.1 - 35)
SMAW	E309(L)-15/16/17	2.4 (3/32)	DCRP	50 - 110	16 - 24	15 - 300 (0.6 - 12)
SMAW	E309(L)-15/16/17	3.2 (1/8)	DCRP	70 - 150	17 - 26	23 - 350 (0.9 - 14)
SMAW	E309(L)-15/16/17	4.0 (5/32)	DCRP	100 - 220	18 - 28	36 - 400 (1.4 - 16)
SMAW	E309(L)-15/16/17	5.0 (3/16)	DCRP	150 - 320	20 - 30	61 - 500 (2.4 - 20)

Note: Size of electrode, filler metal, number of passes, voltage, amperage, and travel speed will vary with position, joint thickness, joint type etc.

**Notch Toughness Applications**

Process	Filler Metal	Diameter mm (in.)	Current & Polarity	Amperage Range	Voltage Range	Travel Speed mm/min (i.p.m.)
GMAW	ER309(L)	0.8 (0.030)	DCRP	70 - 130	14 - 21	56 - 250 (2.2 - 10)
GMAW	or	0.9 (0.035)	DCRP	80 - 200	15 - 22	69 - 600 (2.7 - 25)
GMAW	ER309(L)Si	1.1 (0.045)	DCRP	115 - 250	16 - 25	104 - 900 (4.1 - 35)
SMAW	E309(L)-15/16/17	2.4 (3/32)	DCRP	50 - 110	16 - 24	15 - 300 (0.6 - 12)
SMAW	E309(L)-15/16/17	3.2 (1/8)	DCRP	70 - 150	17 - 26	23 - 350 (0.9 - 14)
SMAW	E309(L)-15/16/17	4.0 (5/32)	DCRP	100 - 220	18 - 28	36 - 400 (1.4 - 16)
SMAW	E309(L)-15/16/17	5.0 (3/16)	DCRP	150 - 320	20 - 30	61 - 500 (2.4 - 20)

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

$$\text{Heat Input (J/in.)} = \frac{\text{Amps} \times \text{Volts} \times 60}{\text{Travel Speed (ipm)}}$$



**TYPICAL JOINT DESIGNS**

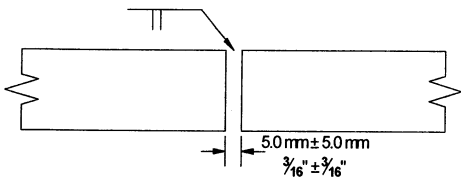


Fig. 1 Single Square Butt

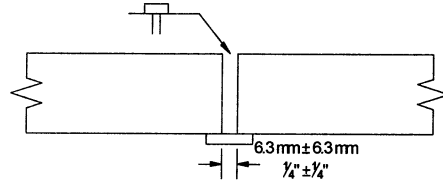


Fig. 2 Single Square Butt with Backing Strip

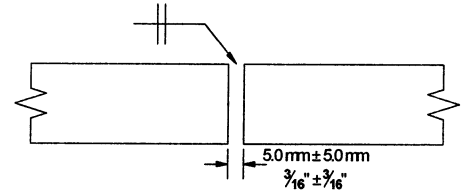


Fig. 3 Double Square Butt

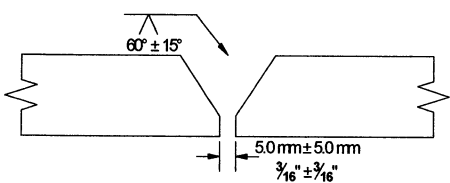


Fig. 4 Single Vee Butt

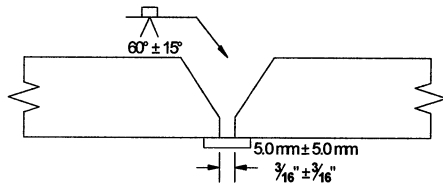


Fig. 5 Single Vee Butt with Backing Strip

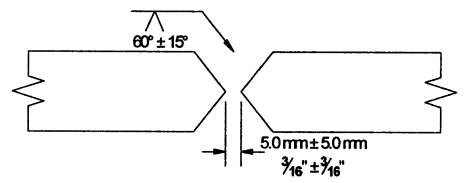


Fig. 6 Double Vee Butt

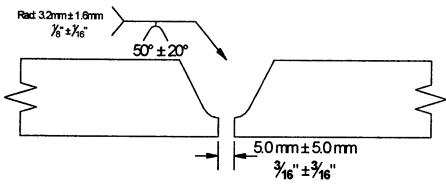


Fig. 7 Single U Butt

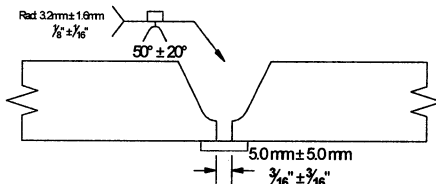


Fig. 8 Single U Butt with Backing Strip

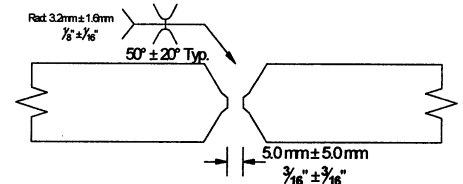


Fig. 9 Double U Butt

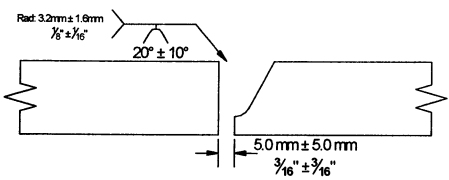


Fig. 10 Single J Butt

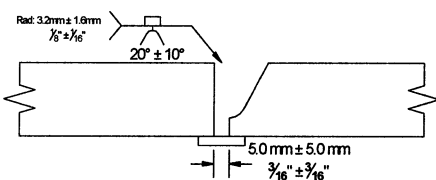


Fig. 11 Single J Butt with Backing Strip

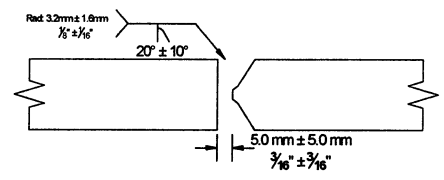


Fig. 12 Double J Butt

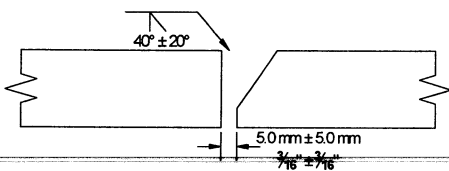


Fig. 13 Single Bevel Butt

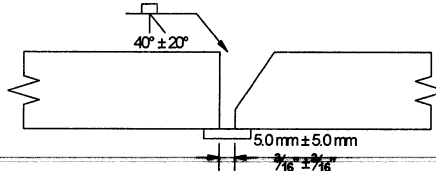


Fig. 14 Single Bevel Butt with Backing Strip

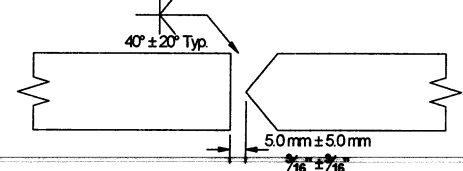


Fig. 15 Double Bevel Butt

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**

1. Welds joining pressure parts or attachments shall be preheated to not less than the minimum preheat temperatures stated in paragraph 5.
2. The preheat temperature shall be maintained during welding.
3. If welding is interrupted, the weld joint and adjacent areas shall be reheated to the minimum preheat temperature stated in paragraph 5, prior to the start of welding.
4. Preheat temperatures shall be checked by the welder or inspector, using temperature indicating crayons or other reputable methods.
5. Minimum preheating temperatures shall be as follows:

**PRESSURE VESSELS IN ACCORDANCE WITH ASME SECTION VIII, DIV. 1**

<b>NOMINAL WALL THICKNESS</b>	<b>MINIMUM PREHEAT TEMPERATURE</b>
0 to 31.8 mm (0 to 1.25 in)	10°C (50°F)
Over 31.8 mm (Over 1.25 in.)	93°C (200°F)
Over 25.4 mm (1.0 in.) & specified maximum carbon content in excess of 0.30%.	80°C (175°F)

- The conditions of UW-30 shall apply for base metal temperatures below 0°C (32°F).
- The preheat zone shall extend at least 50.8 mm (2.0 in.) beyond each edge of the weld.

**PROCESS PIPING IN ACCORDANCE WITH ASME B31.3**

<b>NOMINAL WALL THICKNESS</b>	<b>MINIMUM SPECIFIED BASE METAL TENSILE STRENGTH</b>	<b>MINIMUM PREHEAT TEMPERATURE</b>
< 25.4 mm (1.0 in.)	≤ 490 MPa (71 ksi)	10°C (50°F)
≥ 25.4 mm (1.0 in.)	All	80°C (175°F)
All	> 490 MPa (71 ksi)	80°C (175°F)

- The preheat zone shall extend at least 25.4 mm (1.0 in.) beyond each edge of the weld.
- The interruption of welding shall be subject to the requirements of paragraph 330.2.4.

**POWER PIPING IN ACCORDANCE WITH ASME B31.1**

<b>NOMINAL WALL THICKNESS</b>	<b>MINIMUM PREHEAT TEMPERATURE</b>
Over 25.4 mm (1.0 in.) & specified maximum carbon content in excess of 0.30%.	80°C (175°F)
All others	10°C (50°F)

- The preheat zone shall extend beyond each edge of the weld for at least 76.2 mm (3.0 in.) or 1.5 times the base metal thickness (as defined in paragraph 131.4.1), whichever is greater.

**POSTWELD HEAT TREATMENT****P-No. 1****PRESSURE VESSELS IN ACCORDANCE WITH ASME SECTION VIII, DIV. 1**

- All postweld heat treatment shall be in accordance with ASME Section VIII, Division I, UW-40 & UCS-56 latest edition and addenda.
- Post weld heat treatment temperatures and minimum holding times are as follows:

<b>NOMINAL WALL THICKNESS</b>	<b>HEAT TREAT TEMPERATURE</b>	<b>HOLDING TIME</b>
Up to 50.8 mm (2.0 in.)	595°C (1100°F) minimum	1 Hour / 25.4 mm (in.), 15 minutes minimum
Over 50.8 mm (2.0 in.)	595°C (1100°F) minimum	2 Hours plus 15 minutes for each additional 25.4 mm (1.0 in.) over 50.8 mm (2.0 in.)

**PROCESS PIPING IN ACCORDANCE WITH ASME B31.3**

- All postweld heat treatment shall be in accordance with Table 331.1.1 of ASME B31.3 latest edition and addenda.
- Post weld heat treatment temperatures and minimum holding times are as follows:

<b>NOMINAL WALL THICKNESS</b>	<b>MINIMUM SPECIFIED TENSILE STRENGTH</b>	<b>HEAT TREAT TEMPERATURE</b>	<b>HOLDING TIME</b>
All	All	595 - 650°C (1100 - 1200°F)	1 Hour / 25.4 mm (1.0 in.), 1 Hour minimum

**POWER PIPING IN ACCORDANCE WITH ASME B31.1**

- All postweld heat treatment shall be in accordance with Table 132 of ASME B31.1 latest edition and addenda.
- Post weld heat treatment temperatures and minimum holding times are as follows:

<b>NOMINAL WALL THICKNESS</b>	<b>HEAT TREAT TEMPERATURE</b>	<b>HOLDING TIME</b>
Up to 50.8 mm (2.0 in.)	595 - 650°C (1100 - 1200°F)	1 Hour / 25.4 mm (1.0 in.), 15 minutes minimum
Over 50.8 mm (2.0 in.)	595 - 650°C (1100 - 1200°F)	2 Hours plus 15 minutes for each additional 25.4 mm (1.0 in.) over 50.8 mm (2.0 in.)

## QW-483 PROCEDURE QUALIFICATION RECORD (PQR)

GKM Fabrication Inc.

Procedure Qualification Record No. GKM-22-1 Date September 27, 2012  
Welding Procedure Specification No. GKM-22  
Welding Process(es) GMAW / SMAW Type(s) Semi-auto. / Manual

### JOINTS (QW-402)

Type Butt joint, single vee groove, see next page

### BASE METALS (QW-403)

Material Spec. SA 516 to SA 240 Type or Grade Gr. 60/70 to Type 304L  
P-No. P1 Group 1 / 2 To P No. P8 Group 1  
Thickness 38.1 mm (1.50 in.) to 12.7 mm (0.500 in.)  
Diameter N/A - Plate  
Heat Number 347429 - 79479 to T88883 - G23792-1-01  
Deposited Weld Metal (Per pass) Did not exceed 12.7 mm (0.500 in.)

### FILLER METALS (QW-404)

	GMAW	SMAW
SFA Specification	<u>SFA 5.9</u>	<u>SFA 5.4</u>
AWS Classification	<u>ER309LSi</u>	<u>E309L-16</u>
Filler Metal F-No.	<u>F6</u>	<u>F5</u>
Weld Metal A-No.	<u>*A8</u>	<u>A8</u>
Filler Metal Product Form	<u>Solid wire</u>	<u>N/A</u>
Supplementary Fillers	<u>Without</u>	<u>N/A</u>
Size of Electrode	<u>See attached sketch</u>	<u>See attached sketch</u>
Deposited Weld Metal Thickness	<u>3.18 mm (0.125 in.)</u>	<u>9.52 mm (0.375 in.)</u>
Trade Name	<u>Prostar 309LSi</u>	<u>Sodel 309L</u>
Other	<u>*See attached weld deposit chemical analysis - Laboratory test report # C12-1470.3</u>	

### POSITION (QW-405)

Position of Groove GMAW: Plate at 45° off flat SMAW: 3G  
Weld Progression GMAW: Vertical down SMAW: Vertical up

### PREHEAT (QW-406)

Preheat Temperature 66°C (150°F) Interpass Temp. (Max.) 177°C (350°F)

### POSTWELD HEAT TREATMENT (QW-407)

Temperature Range 621°C (1150°F) Time Range 3 Hours

### GAS (QW-408)

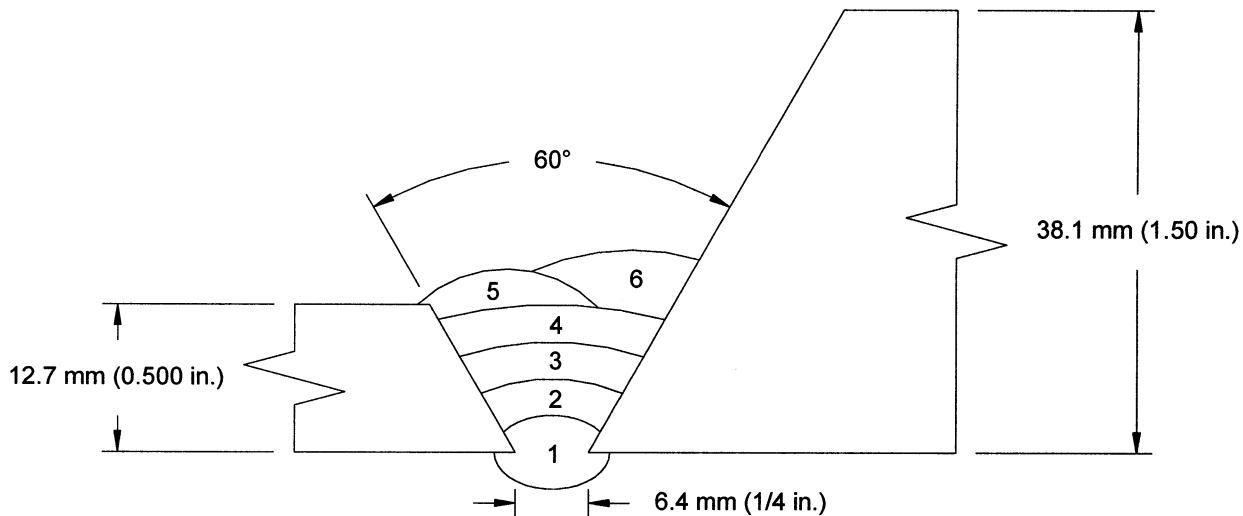
Specification No. (SFA) SFA 5.32 AWS No. SG-HeAC-7.5 / 2.5  
Shielding 90% Helium, 7.5% Argon, 2.5% CO<sub>2</sub>, 15 liters per minute (30 cfph)  
Backing None Trailing Without

### ELECTRICAL CHARACTERISTICS (QW-409)

Current Direct Polarity Reverse, electrode positive  
Amps See next page Volts See next page  
Electrode Wire Feed Speed GMAW: 560 cm/min (220 in./min)  
Maximum Heat Input GMAW: 1.05 kJ/mm (26,719 J/in.) SMAW: 3.01 kJ/mm (76,500 J/in.)  
Mode of Metal Transfer GMAW: Short circuiting arc

**TECHNIQUE (QW-410)**

String or Weave Weave Travel Speed See below  
 Orifice or Gas Cup Size GMAW: 9.52 mm (0.375 in.)  
 Initial & Interpass Cleaning Brushing, chipping & grinding to remove slag  
 Method of Back Gouging Not used Oscillation N/A  
 Tube to Work Distance GMAW: 9.52 to 12.7 mm (0.375 to 0.500 in.)  
 Multiple or Single Pass Per Side Multiple  
 Multiple or Single Electrodes Single Electrode Spacing N/A  
 Peening None  
 Use of Thermal Processes N/A



Pass	Process	Filler Metal	Diameter mm (in.)	Current & Polarity	Amperage Range	Voltage Range	Travel Speed mm/min (i.p.m.)
1	GMAW	ER309LSi	0.9 (0.035)	DCRP	90 - 100	22 - 23	122 (4.8)
2	SMAW	E309L-16	2.4 (3/32)	DCRP	65 - 75	24 - 25	56 (2.2)
3	SMAW	E309L-16	3.2 (1/8)	DCRP	80 - 90	24 - 25	43 (1.7)
4	SMAW	E309L-16	3.2 (1/8)	DCRP	85 - 95	25 - 26	46 (1.8)
5	SMAW	E309L-16	3.2 (1/8)	DCRP	80 - 90	24 - 25	61 (2.4)
6	SMAW	E309L-16	3.2 (1/8)	DCRP	80 - 90	24 - 25	43 (1.7)

**TENSILE TEST (QW-150)**

Specimen No.	Width mm (in.)	Thickness mm (in.)	Area Sq. mm (Sq. in.)	Ultimate Load N (lbf.)	Ultimate Stress MPa (psi)	Character & Fracture Location
T1	19.0 (0.748)	11.4 (0.449)	217 (0.336)	107 619 (21,200)	497 (72,100)	Partial cup & cone Parent Metal (Gr. 60 / 70)
T2	19.0 (0.748)	11.5 (0.453)	219 (0.339)	108 511 (24,400)	497 (72,000)	Partial cup & cone Parent Metal (Gr. 60 / 70)

**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 IMPACT TOUGHNESS**

Type of Test Charpy V-Notch Orientation Transverse  
 Test Temperature -46°C (-50°F) Specimen Size 10 X 10 mm (0.394 X 0.394 in.)

Specimen No.	Notch Location	Impact Values J (ft-lbf)	Lateral Expansion mm (in.)
D2.1	Weld Metal	61.0 (45.0)	1.45 (0.057)
D2.2	within 1/16 in.	54.2 (40.0)	1.35 (0.053)
D2.3	of root	65.4 (48.2)	1.50 (0.059)
D3.1	Gr. 60 / 70 - HAZ	43.1 (31.8)	---
D3.2	Gr. 60 / 70 - HAZ	49.9 (36.8)	---
D3.3	Gr. 60 / 70 - HAZ	33.9 (25.0)	---

**OTHER TESTS**

Vickers Hardness - see attached laboratory test report # C12-1470.3

Welders Name Pio Coronelia Certificate File No. W-17690  
 Tests Conducted By Ludwig Associates Ltd.  
 Laboratory Test No. C12-1470.3

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.

Manufacturer GKM FABRICATION INC.

Date OCT 30 2012 Certified by 



# LUDWIG ASSOCIATES LTD.

Materials and Welding Consulting

## LABORATORY TEST REPORT

**CUSTOMER:** GKM Fabrication Inc.  
Bay #19, 235105 Wrangler Dr. S.E., R.R. #5  
Calgary, Alberta  
T1X 0K3

**Laboratory Test No.:** C12-1470.3  
**Date:** October 2, 2012

**Attention:** Matt Cvitanovic, QCM

**PQR Number:** GKM-22-1  
**Material:** SA 516 Gr. 60/70 to SA 240 Type 304L  
**Heat Number:** 347429 - 79479 to T88883 - G23792-1-01  
**Thickness:** 38.1 mm (1.50 in.) to 12.7 mm (0.500 in.)  
**Thermal Condition:** PWHT @ 621°C (1150°F) for 180 minutes

### 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)	11.4 (0.449)	11.5 (0.453)
AREA sq mm (sq in)	217 (0.336)	219 (0.339)
ULT. LOAD N (lbf)	107 619 (21,200)	108 511 (24,400)
UTS MPa (psi)	497 (72,100)	497 (72,000)
FRACTURE TYPE	Partial Cup & Cone	Partial Cup & Cone
FRACTURE LOCATION	Parent Metal (SA 516 Gr. 60/70)	Parent Metal (SA 516 Gr. 60/70)

### GUIDED-BEND TEST QW-160

SAMPLE WIDTH:	9.52 mm (0.375 in.)	SAMPLE THICKNESS:	12.7 mm (0.500 in.)
PLUNGER SIZE:	38.1 mm (1.50 in.)	YOKE SIZE:	60.3 mm (2.375 in.)
QW-462.2	Side Bend	Side Bend	Side Bend
SAMPLE NUMBER(S)	S1	S2	S3
RESULTS	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, 2010 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: \_\_\_\_\_

Xin (Vincent) Su, T.P. / Dan Nguyen, C.E.T.







# LUDWIG ASSOCIATES LTD.

Materials and Welding Consulting

## LABORATORY TEST REPORT

**CUSTOMER:** GKM Fabrication Inc.  
Bay #19, 235105 Wrangler Dr. S.E., R.R. #5  
Calgary, Alberta  
T1X 0K3

**Laboratory Test No.:** C12-1470.3  
**Date:** October 2, 2012

**Attention:** Matt Cvitanovic, QCM

**PQR Number:** GKM-22-1  
**Material:** SA 516 Gr. 60/70 to SA 240 Type 304L  
**Heat Number:** 347429 - 79479 to T88883 - G23792-1-01  
**Thickness:** 38.1 mm (1.50 in.) to 12.7 mm (0.500 in.)  
**Thermal Condition:** PWHT @ 621°C (1150°F) for 180 minutes

### CHARPY V-NOTCH IMPACT TEST

**Machine:** Satec, SI-1C SN:1363      **Specimen Size:** 10 x 10 mm (0.394 x 0.394 in.)  
**Capacity:** 325 J (240 ft-lbf)      **Orientation:** Transverse  
**Verified Range:** 1.7 - 141.3 J (1.3 - 104.2 ft-lbf)      **Test Temp.:** -46°C (-50°F)

Specimen Number	Notch Location	Impact Values		Lateral Expansion	
		Joules	(ft-lbf)	mm	(in.)
D2.1	Weld Metal within 1/16 in. of root	61.0	(45.0)	1.45	(0.057)
D2.2		54.2	(40.0)	1.35	(0.053)
D2.3		65.4	(48.2)	1.50	(0.059)
D3.1	Gr. 60/70 - HAZ	43.1	(31.8)	---	---
D3.2	Gr. 60/70 - HAZ	49.9	(36.8)	---	---
D3.3	Gr. 60/70 - HAZ	33.9	(25.0)	---	---

*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 – 2010 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: \_\_\_\_\_

Xin (Vincent) Su, T.T. / Dan Nguyen, C.E.T.



GKM Fabrication Inc.

4027 - 14 Street, S.E., CALGARY, ALBERTA T2C 3K6 PHONE: (403) 262-7072 FAX: (403) 266-3169

7925 Davies Road, EDMONTON, ALBERTA T6E 4N1 PHONE: (780) 468-3030 FAX: (780) 468-3032

Final Data Package r.0

Jul. 8, 2011 Page 20 of 110



# LUDWIG ASSOCIATES LTD.

Materials and Welding Consulting

## LABORATORY TEST REPORT

**CUSTOMER:** GKM Fabrication Inc.  
 Bay #19, 235105 Wrangler Dr. S.E., R.R. #5  
 Calgary, Alberta  
 T1X 0K3

**Laboratory Test No.:** C12-1470.3  
**Date:** October 16, 2012

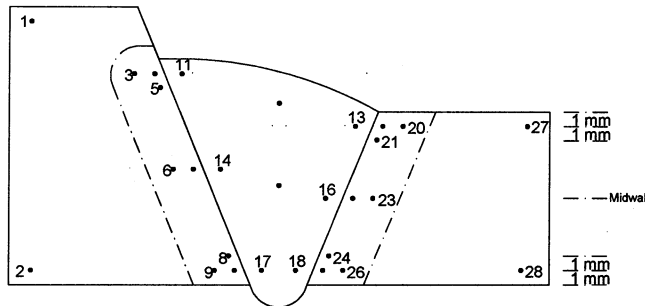
**Attention:** Matt Cvitanovic, QCM

**PQR Number:** GKM-22-1  
**Material:** SA 516 Gr. 60/70 to SA 240 Type 304L  
**Heat Number:** 347429 - 79479 to T88883 - G23792-1-01  
**Thickness:** 38.1 mm (1.50 in.) to 12.7 mm (0.500 in.)  
**Thermal Condition:** PWHT @ 621°C (1150°F) for 180 minutes

### HARDNESS TEST

Type of Test: Vickers 10 kg (HV10)

Instrument: Mitutoyo AVK-C1



SA 516 Gr. 60/70				SA 240 Type 304L					
Parent Metal		HAZ		Weld Metal		HAZ		Parent Metal	
1	142	3	157	11	178	19	179	27	166
2	134	4	170	12	170	20	180	28	165
		5	166	13	183	21	180		
		6	146	14	172	22	186		
		7	139	15	179	23	184		
		8	151	16	177	24	189		
		9	151	17	194	25	192		
		10	154	18	200	26	189		

We certify the test results in this report and that the specimen(s) were prepared and tested in accordance with the requirements of ASTM E384-11<sup>e1</sup> and ANSI/NACE MR0175/ISO 15156-2:2009(E). 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: \_\_\_\_\_

*Eric Dacyk*  
 Eric Dacyk, C.E.T. / Dan Nguyen, C.E.T.

GKM Fabrication Inc.





# LUDWIG ASSOCIATES LTD.

Materials and Welding Consulting

## LABORATORY TEST REPORT

**CUSTOMER:** GKM Fabrication Inc.  
Bay #19, 235105 Wrangler Dr. S.E., R.R. #5  
Calgary, Alberta  
T1X 0K3

**Laboratory Test No.:** C12-1470.3  
**Date:** October 9, 2012

**Attention:** Matt Cvitanovic, QCM

**PQR Number:** GKM-22-1  
**Material:** SA 516 Gr. 60/70 to SA 240 Type 304L  
**Heat Number:** 347429 - 79479 to T88883 - G23792-1-01  
**Thickness:** 38.1 mm (1.50 in.) to 12.7 mm (0.500 in.)  
**Thermal Condition:** PWHT @ 621°C (1150°F) for 180 minutes  
**Test Location:** GMAW ER309LSi deposited weld metal

### CHEMICAL ANALYSIS (% by weight)

**Instrument Type:** Shimadzu PDA-7000 Optical Emission Spectrometer

Carbon	0.034
Manganese	1.37
Sulphur	0.012
Phosphorus	0.021
Silicon	0.76
Chromium	21.5
Nickel	12.7
Molybdenum	0.20
Copper	0.14

We certify the test results in this report and that the specimen(s) were prepared and tested in accordance with the requirements of ASTM E415-08. 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: \_\_\_\_\_

*Michelle Marien, T.T. / Steve Rieberger, C.E.T.*



GKM Fabrication Inc.

4027 - 14 Street, S.E., CALGARY, ALBERTA T2G 1K6 PHONE: (403) 262-7072 FAX: (403) 266-3169  
7925 Davies Road, EDMONTON, ALBERTA T6E 4N1 PHONE: (780) 468-3030 FAX: (780) 468-3032

Final Data Package r.0

Jul. 8, 2011 Page 84 of 110

## QW-483 PROCEDURE QUALIFICATION RECORD (PQR)

GKM Fabrication Inc.

Procedure Qualification Record No. GKM-22-2 Date September 27, 2012  
Welding Procedure Specification No. GKM-21  
Welding Process(es) GMAW / SMAW Type(s) Semi-auto. / Manual

### JOINTS (QW-402)

Type Butt joint, single vee groove, see next page

### BASE METALS (QW-403)

Material Spec. SA 516 to SA 240 Type or Grade Gr. 60/70 to Type 304L  
P-No. P1 Group 1 / 2 To P No. P8 Group 1  
Diameter N/A - Plate Thickness 6.32 mm (0.249 in.)  
Heat Number 342179 - 67986 to E82351 - 728779-01  
Deposited Weld Metal (Per pass) Did not exceed 12.7 mm (0.500 in.)  
Note: SA 516 Gr. 60/70 was machine down to 6.32 mm (0.249 in.) thick

### FILLER METALS (QW-404)

	GMAW	SMAW
SFA Specification	<u>SFA 5.9</u>	<u>SFA 5.4</u>
AWS Classification	<u>ER309LSi</u>	<u>E309L-16</u>
Filler Metal F-No.	<u>F6</u>	<u>F5</u>
Weld Metal A-No.	<u>*A8</u>	<u>A8</u>
Filler Metal Product Form	<u>Solid wire</u>	<u>N/A</u>
Supplementary Fillers	<u>Without</u>	<u>N/A</u>
Size of Electrode	<u>See attached sketch</u>	<u>See attached sketch</u>
Deposited Weld Metal Thickness	<u>3.18 mm (0.125 in.)</u>	<u>3.18 mm (0.125 in.)</u>
Trade Name	<u>Prostar 309LSi</u>	<u>Sodel 309L</u>
Other	<u>*See attached weld deposit chemical analysis - Laboratory test report # C12-1470.4</u>	

### POSITION (QW-405)

Position of Groove GMAW: Plate at 45° off flat SMAW: 3G  
Weld Progression GMAW: Vertical down SMAW: Vertical up

### PREHEAT (QW-406)

Preheat Temperature 10°C (50°F) Interpass Temp. (Max.) 177°C (350°F)

### POSTWELD HEAT TREATMENT (QW-407)

Temperature Range 621°C (1150°F) Time Range 3 Hours  
Note Additional Vickers hardness test from 1 hour PWHT time

### GAS (QW-408)

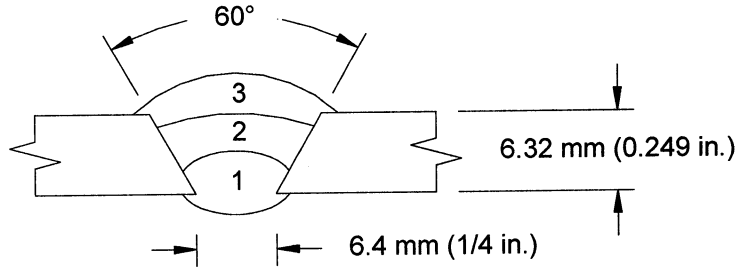
Specification No. (SFA) SFA 5.32 AWS No. SG-HeAC-7.5 / 2.5  
Shielding 90% Helium, 7.5% Argon, 2.5% CO<sub>2</sub>, 15 liters per minute (30 cfph)  
Backing None Trailing Without

### ELECTRICAL CHARACTERISTICS (QW-409)

Current Direct Polarity Reverse, electrode positive  
Amps See next page Volts See next page  
Electrode Wire Feed Speed GMAW: 535 cm/min (210 in./min)  
Maximum Heat Input GMAW: 1.03 kJ/mm (26,080 J/in.) SMAW: 1.59 kJ/mm (40,286 J/in.)  
Mode of Metal Transfer GMAW: Short circuiting arc

**TECHNIQUE (QW-410)**

String or Weave Weave Travel Speed See below  
 Orifice or Gas Cup Size GMAW: 9.52 mm (0.375 in.)  
 Initial & Interpass Cleaning Brushing, chipping & grinding to remove slag  
 Method of Back Gouging Not used Oscillation N/A  
 Tube to Work Distance GMAW: 9.52 to 12.7 mm (0.375 to 0.500 in.)  
 Multiple or Single Pass Per Side Multiple  
 Multiple or Single Electrodes Single Electrode Spacing N/A  
 Peening None  
 Use of Thermal Processes N/A



Pass	Process	Filler Metal	Diameter mm (in.)	Current & Polarity	Amperage Range	Voltage Range	Travel Speed mm/min (i.p.m.)
1	GMAW	ER309LSi	0.9 (0.035)	DCRP	80 - 90	22 - 23	112 (4.4)
2	SMAW	E309L-16	2.4 (3/32)	DCRP	55 - 65	23 - 24	56 (2.2)
3	SMAW	E309L-16	2.4 (3/32)	DCRP	55 - 65	23 - 24	53 (2.1)

**TENSILE TEST (QW-150)**

Specimen No.	Width mm (in.)	Thickness mm (in.)	Area Sq. mm (Sq. in.)	Ultimate Load N (lbf.)	Ultimate Stress MPa (psi)	Character & Fracture Location
T1	19.1 (0.752)	5.01 (0.197)	95.7 (0.148)	49 271 (11,100)	515 (74,700)	Partial cup & cone Parent Metal (Gr. 60 / 70)
T2	19.1 (0.752)	5.01 (0.197)	95.7 (0.148)	50 223 (11,300)	525 (76,100)	Partial cup & cone Parent Metal (Gr. 60 / 70)

**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 (0.394 X 0.197 in.)

Specimen No.	Notch Location	Impact Values J (ft-lbf)	Lateral Expansion mm (in.)
E2.1	Weld Metal	36.1 (26.6)	1.45 (0.057)
E2.2	within 1/16 in.	31.2 (23.0)	1.09 (0.043)
E2.3	of root	38.2 (28.2)	1.65 (0.065)
E3.1	Gr. 60 / 70 - HAZ	42.8 (31.6)	---
E3.2	Gr. 60 / 70 - HAZ	18.2 (13.4)	---
E3.3	Gr. 60 / 70 - HAZ	28.5 (21.0)	---

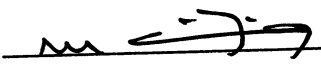
**OTHER TESTS**

Vickers Hardness (3 hour PWHT) - see attached laboratory test report # C12-1470.4  
Vickers Hardness (1 hour PWHT) - see attached laboratory test report # C12-1470.5

Welders Name Pio Coronelia Certificate File No. W-17690  
 Tests Conducted By Ludwig Associates Ltd.  
 Laboratory Test No. C12-1470.4 & C12-1470.5

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.

Manufacturer GKM FABRICATION INC.

Date OCT 30 2012 Certified by 



# LUDWIG ASSOCIATES LTD.

Materials and Welding Consulting

## LABORATORY TEST REPORT

Laboratory Test No.: C12-1470.4  
Date: October 2, 2012

CUSTOMER: **GKM Fabrication Inc.**  
Bay #19, 235105 Wrangler Dr. S.E., R.R. #5  
Calgary, Alberta  
T1X 0K3

Attention: **Matt Cvitanovic, QCM**

PQR Number: **GKM-22-2**  
Material: **SA 516 Gr. 60/70 to SA 240 Type 304L**  
Heat Number: **342179 - 67986 to E82351 - 728779-01**  
Thickness: **6.32 mm (0.249 in.)**  
Thermal Condition: **PWHT @ 621°C (1150°F) for 180 minutes**

### TENSILE TEST QW-150

SAMPLE NUMBER  
WIDTH mm (in)  
THICKNESS mm (in)  
AREA sq mm (sq in)  
ULT. LOAD N (lbf)  
UTS MPa (psi)  
FRACTURE TYPE  
FRACTURE LOCATION

Sample No.	Width (mm)	Width (in)	Thickness (mm)	Thickness (in)	Area (mm <sup>2</sup> )	Area (in <sup>2</sup> )	Ult. Load (N)	Ult. Load (lbf)	UTS (MPa)	UTS (psi)	Fracture Type	Fracture Location
T1 QW-462.1(a)	19.1	(0.752)	5.01	(0.197)	95.7	(0.148)	49 271	(11,100)	515	(74,700)	Partial Cup & Cone	Parent Metal (SA 516 Gr. 60/70)
T2 QW-462.1(a)	19.1	(0.752)	5.01	(0.197)	95.7	(0.148)	50 223	(11,300)	525	(76,100)	Partial Cup & Cone	Parent Metal (SA 516 Gr. 60/70)

### GUIDED-BEND TEST QW-160

Sample Width	Sample Thickness	Yoke Size	Face Bend	Root Bend	Pass
38.1 mm (1.50 in.)	6.32 mm (0.249 in.)	41.1 mm (1.62 in.)	Face Bend	Root Bend	Pass
25.1 mm (0.990 in.)			F2	R2	Pass
			Pass	Pass	

**RESULTS**

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, 2010 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: Xin (Vincent) Su, T.T. / Dan Nguyen, C.E.T.





# LUDWIG ASSOCIATES LTD.

Materials and Welding Consulting

## LABORATORY TEST REPORT

**CUSTOMER:** GKM Fabrication Inc.  
Bay #19, 235105 Wrangler Dr. S.E., R.R. #5  
Calgary, Alberta  
T1X 0K3

**Laboratory Test No.:** C12-1470.4  
**Date:** October 2, 2012

**Attention:** Matt Cvitanovic, QCM

**PQR Number:** GKM-22-2  
**Material:** SA 516 Gr. 60/70 to SA 240 Type 304L  
**Heat Number:** 342179 - 67986 to E82351 - 728779-01  
**Thickness:** 6.32 mm (0.249 in.)  
**Thermal Condition:** PWHT @ 621°C (1150°F) for 180 minutes

### CHARPY V-NOTCH IMPACT TEST

**Machine:** Satec, SI-1C SN:1363      **Specimen Size:** 10 x 5 mm (0.394 x 0.197 in.)  
**Capacity:** 325 J (240 ft-lbf)      **Orientation:** Transverse  
**Verified Range:** 1.7 - 141.3 J (1.3 - 104.2 ft-lbf)      **Test Temp.:** -48°C (-55°F)

Specimen Number	Notch Location	Impact Values		Lateral Expansion	
		Joules	(ft-lbf)	mm	(in.)
E2.1	Weld Metal	36.1	(26.6)	1.45	(0.057)
E2.2	within 1/16 in.	31.2	(23.0)	1.09	(0.043)
E2.3	of root	38.2	(28.2)	1.65	(0.065)
E3.1	Gr. 60/70 - HAZ	42.8	(31.6)	---	---
E3.2	Gr. 60/70 - HAZ	18.2	(13.4)	---	---
E3.3	Gr. 60/70 - HAZ	28.5	(21.0)	---	---

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 – 2010 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: \_\_\_\_\_

Xin (Vincent) Su, P.T. / Dan Nguyen, C.E.T.

GKM Fabrication Inc.





# LUDWIG ASSOCIATES LTD.

Materials and Welding Consulting

## LABORATORY TEST REPORT

**CUSTOMER:** GKM Fabrication Inc.  
Bay #19, 235105 Wrangler Dr. S.E., R.R. #5  
Calgary, Alberta  
T1X 0K3

**Laboratory Test No.:** C12-1470.4  
**Date:** October 9, 2012

**Attention:** Matt Cvitanovic, QCM

**PQR Number:** GKM-22-2  
**Material:** SA 516 Gr. 60/70 to SA 240 Type 304L  
**Heat Number:** 342179 - 67986 to E82351 - 728779-01  
**Thickness:** 6.32 mm (0.249 in.)  
**Thermal Condition:** PWHT @ 621°C (1150°F) for 180 minutes  
**Test Location:** GMAW ER309LSi deposited weld metal

### CHEMICAL ANALYSIS (% by weight)

**Instrument Type:** Shimadzu PDA-7000 Optical Emission Spectrometer

Carbon	0.029
Manganese	1.39
Sulphur	0.012
Phosphorus	0.022
Silicon	0.76
Chromium	21.9
Nickel	12.8
Molybdenum	0.21
Copper	0.18

We certify the test results in this report and that the specimen(s) were prepared and tested in accordance with the requirements of ASTM E415-08. 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: \_\_\_\_\_

*Stephen Rieberger*  
Michelle Marfen, T.T. / Steve Rieberger, C.E.T.





# LUDWIG ASSOCIATES LTD.

Materials and Welding Consulting

## LABORATORY TEST REPORT

**CUSTOMER:** GKM Fabrication Inc.  
 Bay #19, 235105 Wrangler Dr. S.E., R.R. #5  
 Calgary, Alberta  
 T1X 0K3

**Laboratory Test No.:** C12-1470.4  
**Date:** October 16, 2012

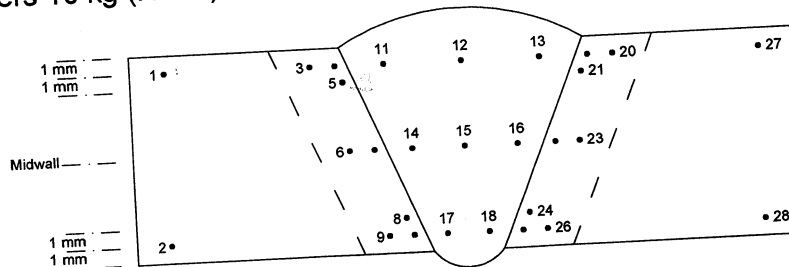
**Attention:** Matt Cvitanovic, QCM

**PQR Number:** GKM-22-2  
**Material:** SA 516 Gr. 60/70 to SA 240 Type 304L  
**Heat Number:** 342179 - 67986 to E82351 - 728779-01  
**Thickness:** 6.32 mm (0.249 in.)  
**Thermal Condition:** PWHT @ 621°C (1150°F) for 180 minutes

### HARDNESS TEST

Type of Test: Vickers 10 kg (HV10)

Instrument: Mitutoyo AVK-C1



SA 516 Gr. 60/70				Weld Metal		SA 240 Type 304L			
Parent Metal		HAZ				HAZ		Parent Metal	
1	144	3	143	11	172	19	174	27	168
2	137	4	159	12	169	20	183	28	169
		5	145	13	178	21	171		
		6	143	14	178	22	173		
		7	139	15	174	23	170		
		8	149	16	174	24	181		
		9	144	17	181	25	171		
		10	145	18	185	26	175		

We certify the test results in this report and that the specimen(s) were prepared and tested in accordance with the requirements of ASTM E384-11<sup>e1</sup> and ANSI/NACE MR0175/ISO 15156-2:2009(E). 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: \_\_\_\_\_

*Eric Dacyk*  
 Eric Dacyk, C.E.T. / Dan Nguyen, 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  
 21-1954



# LUDWIG ASSOCIATES LTD.

Materials and Welding Consulting

## LABORATORY TEST REPORT

**CUSTOMER:** GKM Fabrication Inc.  
Bay #19, 235105 Wrangler Dr. S.E., R.R. #5  
Calgary, Alberta  
T1X 0K3

**Laboratory Test No.:** C12-1470.5  
**Date:** October 16, 2012

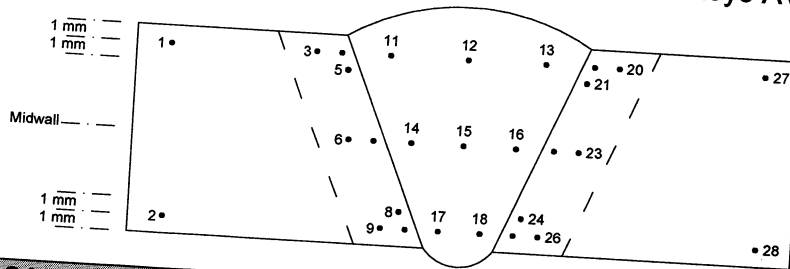
**Attention:** Matt Cvitanovic, QCM

**PQR Number:** GKM-22-2  
**Material:** SA 516 Gr. 60/70 to SA 240 Type 304L  
**Heat Number:** 342179 - 67986 to E82351 - 728779-01  
**Thickness:** 6.32 mm (0.249 in.)  
**Thermal Condition:** PWHT @ 621°C (1150°F) for 60 minutes

### HARDNESS TEST

Type of Test: Vickers 10 kg (HV10)

Instrument: Mitutoyo AVK-C1



SA 240 Type 304L									
Parent Metal		HAZ		Weld Metal		SA 516 Gr. 60/70		Parent Metal	
1	167	3	176	11	176	19	161	27	147
2	160	4	173	12	173	20	160	28	161
		5	174	13	186	21	159		
		6	171	14	177	22	153		
		7	176	15	169	23	153		
		8	175	16	182	24	146		
		9	176	17	187	25	152		
		10	179	18	175	26	161		

We certify the test results in this report and that the specimen(s) were prepared and tested in accordance with the requirements of ASTM E384-11<sup>s1</sup> and ANSI/NACE MR0175/ISO 15156-2:2009(E). 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: \_\_\_\_\_

*Eric Dacyk*  
Eric Dacyk, C.E.T. / *Dan Nguyen*  
Dan Nguyen, C.E.T.





"3"

WELDER PERFORMANCE QUALIFICATION TEST RECORD

Company GKM Fabrication Inc. Contact Mate Cvitanovic
Welder's Name Graeme Paul Hill ABSA File No. W-20456
WP Registration No. 2635.2 WPS No. GKM-22
Welding Process(es) SMAW Type Manual
Specification of Base Metal(s) SA 516 Gr. 60/70 Thickness 12.7 mm (0.500 in.)

Welding Variables (QW-350)

Backing
Base metal P-No. 1 to P-No. 1
[checked] Plate [ ] Pipe
Filler metal or electrode specification(s)
Filler metal or electrode classification(s)
Filler metal F-Number(s)
Deposit thickness: 3 layers minimum [checked] Yes [ ] No
Position qualified
Vertical progression

Actual Values

With
P1
Plate
SFA 5.4
E309L-16
F5
0.500 in.
1G
N/A

Range Qualified

With backing
P1 thru P15F
2.875 in. O.D. minimum
WPS requirements
WPS requirements
F5
Maximum to be welded
Flat
N/A

RESULTS

Visual examination of completed weld (QW-302.4) Acceptable

Bend test [checked] QW-462.2; [ ] QW-462.3(a); [ ] QW-462.5(c); [ ] QW-462.5(d)
Side bend #S1 Pass Side bend #S2 Pass

PASS

Alternative radiographic examination results (QW-191) N/A

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 Boiler and Pressure Vessel Code.

ACCREDITED ORGANIZATION SGS Canada Inc. AOQP Registration No. 7106
Test Conducted By Mark Gavino, CSA W178.2 Level 1 Insp. Date of Test June 18, 2021
Certified By Mark Gavino, T.T. Welding Examiner File No. E-00668
Test Certified by GKM Fabrication Inc. Representative Mate Cvitanovic

RECORD INFORMATION

SGS Canada Inc. testing facility [ ] Edmonton [ ] Calgary [checked] Field
Test Location 19 - 235105 Wrangler Drive SE, Rocky View AB, T1X 0K3
Date test coupon is to be retained July 18, 2021 Test Coupon I.D. No. CPL-418
Welder Performance Qualification Card No. 25716 Laboratory Test No. CW21-163.2

"3"

**SGS** Reg. No.: AOQP-7106

**WELDER PERFORMANCE QUALIFICATION CARD**

Name: **Graeme Paul Hill** ABSA File No.: **W - 20456**

This card is issued pursuant to the Alberta Safety Codes Act and the Pressure Welders Regulation. The performance qualification is in accordance with ASME Section IX of the ASME Code and subject to the limitations on the reverse side.


June 18, 2021 

Date of Test Signature of Welder or Machine Operator

**Mark Gavino**  
Welding Examiner Card No.: **25716**

**PERFORMANCE QUALIFICATION 25716**

Process(es)	<b>SMAW</b>	Materials (P.No)	<b>P1 thru P15F</b>
Filler Metal Group (F.No)	<b>F5</b>	Min. Outside Diameter	<b>2.875 in. O.D.</b>
Max. Deposited Weld Metal	<b>MAX</b>	Position(s) Qualified	<b>Flat</b>
Backing	<b>With</b>	Backing Gas	<b>N/A</b>
Progression	<b>N/A</b>		

June 18, 2023 

P.Q. Expiry Date Welding Examiner Signature Examiner File No. **E-00668**





"O"

WELDER PERFORMANCE QUALIFICATION TEST RECORD

Company GKM Fabrication Inc. Contact Mate Cvitanovic
Welder's Name Jeromy Mortenson ABSA File No. W-25671
WP Registration No. 2635.2 WPS No. GKM-2 (Rev. 6)
Welding Process(es) GMAW-S / SMAW Type Semiautomatic / Manual
Specification of Base Metal(s) A513 Gr. 1026 Thickness 15.9 mm (0.625 in.)

Welding Variables (QW-350)

Backing
Base metal P-No. 1 to P-No. 1
Plate Pipe
Filler metal or electrode specification(s)
Filler metal or electrode classification(s)
Filler metal F-Number(s)
Deposit thickness for each process
GMAW-S: 3 layers minimum Yes No
SMAW: 3 layers minimum Yes No
Position qualified
Vertical progression
Inert gas backing (GTAW, PAW, GMAW)
Transfer mode (spray/globular or pulse to short circuit-GMAW)

Actual Values

GMAW-S None
SMAW With
P1
2.50 in. O.D.
SFA 5.18 / SFA 5.1
ER70S-6 / E7018-1
F6 / F4
0.125 in.
0.500 in.
GMAW-S SP 30°
SMAW 1G Rotated
GMAW-S Downhill
SMAW N/A
None
Short circuiting

Range Qualified

With or without
With backing
P1 thru P15F, 4130
1.0 in. O.D. minimum
WPS requirements
WPS requirements
F6 / F4
0.138 in. maximum
Maximum to be welded
SP 0 - 45°, Flat
Flat
Downhill
N/A
With or without
Short circuiting

RESULTS

Visual examination of completed weld (QW-302.4) Acceptable
Bend test QW-462.2; QW-462.3(a); QW-462.5(c); QW-462.5(d)
Side bend #S1 Pass Side bend #S2 Pass
Alternative radiographic examination results (QW-191) N/A

PASS

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 Boiler and Pressure Vessel Code.

ACCREDITED ORGANIZATION SGS Canada Inc. AOQP Registration No. 7106
Test Conducted By Mark Gavino, CSA W178.2 Level 1 Insp. Date of Test June 18, 2021
Certified By Mark Gavino, T.T. Welding Examiner File No. E-00668
Test Certified by GKM Fabrication Inc. Representative Mate Cvitanovic

RECORD INFORMATION

SGS Canada Inc. testing facility Edmonton Calgary Field
Test Location 19 - 235105 Wrangler Drive SE, Rocky View AB, T1X 0K3
Date test coupon is to be retained July 18, 2021 Test Coupon I.D. No. C2-162
Welder Performance Qualification Card No. 25715 Laboratory Test No. CW21-163.1



"O"

**SGS** | Reg. No.: AOQP-7106

**WELDER PERFORMANCE QUALIFICATION CARD**

Name: **Jeromy Mortenson**      ABSA File No.: **W - 25671**


This card is issued pursuant to the Alberta Safety Codes Act and the Pressure Welders Regulation. The performance qualification is in accordance with ASME Section IX of the ASME Code and subject to the limitations on the reverse side.

June 18, 2021        
Date of Test      Signature of Welder or Machine Operator

**Mark Gavino**      Card No.: **25715**  
Welding Examiner

**PERFORMANCE QUALIFICATION**      **25715**

Process(es)	<b>GMAW-S</b>	<b>SMAW</b>	Materials (P.No)	<b>P1 thru P15F, 4130</b>
Filler Metal Group (F.No)	<b>F6</b>	<b>F4</b>	Min. Outside Diameter	<b>1.0 in. O.D.</b>
Max. Deposited Weld Metal	<b>0.138 in.</b>	<b>MAX</b>	Position(s) Qualified	<b>F6: SP 0-45°, Flat F4: Flat</b>
Backing	<b>With or Without</b>	<b>With</b>	Backing Gas	<b>With or Without</b>
Progression	<b>Downhill</b>	<b>N/A</b>		

June 18, 2023        
P.Q. Expiry Date      Welding Examiner Signature      **E-00668**  
Examiner File No.

# **SECTION 5 – NON-DESTRUCTIVE EXAMINATION**

## **RADIOGRAPHIC EXAMINATION REPORTS**

**CGY-599029**

### **NDE PERSONAL QUALIFICATIONS & EYE EXAMS**

**HOOD, GREGORY**

**MITCHELL, DONALD**



A World of NDT Solutions

3231 58th Avenue, S.E., Calgary, Alberta T2C 0B4  
Tel: 403-279-4540 Fax: 403-236-3043

GKM Fabrication  
Bay 18 & 19, 235105 Wrangler Dr. SE  
Calgary, AB T1X 0K3  
Tel: (403) 720-2039 Fax: (403) 723-9944

Job Number: 21-1954  
PO Number:

TRAVELER: #210-29013

RADIOGRAPHIC EXAMINATION REPORT #CGY-599029

Date of Exam: Tuesday, Jun 29 2021  
Job Location: Customer's Shop  
Assistants: Gregory Hood EDO #7369,

Procedure: 200-RT-001 Rev. 15  
Acc Codes: ASME B31.3 Normal (2018)  
Inspected: Pre Heat Treat  
Material: Carbon Steel  
Isotope: IR 192  
Focal Spot: 2x3 mm  
Curies: 60  
Degree: 100%  
Processing: Automatic  
Units: in

Legend:

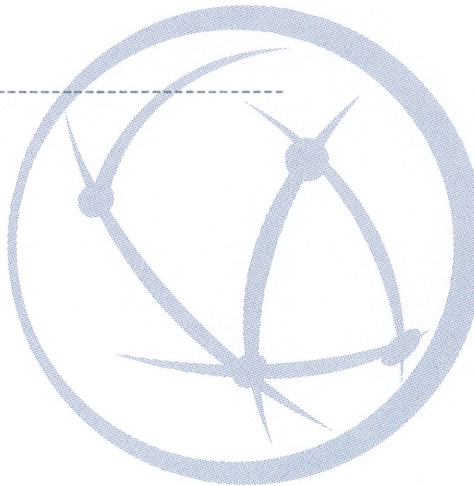
\* (Loading) S = Single  
D = Double  
T = Triple  
# (Result) ACC = Accept  
REJ = Reject  
@ (Degree) RETEST = Retest  
1 = Slight  
2 = Moderate  
3 = Reject

Note: SFD Does not include reinforcement

Test Information												Result Information				
Comp#	Test#	Tech	IQI	Wldr	Dia	Thk	Len	Sch	SFD	*	Films	Type	#	@	Discontinuity	From - To
1	1954-1-21	X1	RT-3	1A	0	2.5	0.203	STD	2.875	S	3	D4-AGFA- I	ACC			
2	1954-1-21	X2	RT-3	1A	3	2.5	0.203	STD	2.875	S	3	D4-AGFA- I	ACC			

RT-3 (Double Wall Exp, Single Wall Viewing): T.291 h) S.O.D., Nominal wall thickness + inside diam. of pipe.T.291 i) S.S.O.F.D., Wall thickness + max weld reinforcement x 2  
Screen Thickness Utilized 0.010" Front and Back:

Units:	Code
2	2.5/STD/00
1	NDE/REP



Sign Here:   
Donald Mitchell CGSB Lev. II Reg# 534, SNT Lev. II

Sign Here:   
Customer Representative: ROB DOSLIC JUN 30/21

NRCAN NATIONAL NON-DESTRUCTIVE TESTING CERTIFICATION BODY  
ORGANISME DE CERTIFICATION NATIONAL EN ESSAIS NON DESTRUCTIFS DE RNCAN



Name | Nom **G. Hood**

Reg. Number | No. matricule **7369**

Issue Date | Date d'émission **2019/01/10**

Expiry Date | Date d'expiration **2023/12/31**

This photo identification card does not identify that the stated individual is an employee or representative of Natural Resources Canada, Government of Canada.

Cette carte d'identité avec photo n'identifie pas l'individu d'être un employé ou un représentant de Ressources naturelles Canada, Gouvernement du Canada.

NEXT COMPRESSION KMI Canada, a division of Natural Resources Canada, PO# 53189

Canada

NRCAN NATIONAL NON-DESTRUCTIVE TESTING CERTIFICATION BODY  
ORGANISME DE CERTIFICATION NATIONAL EN ESSAIS NON DESTRUCTIFS DE RNCAN

Name | Nom **G. Hood**



Reg. Number | No. matricule **7369**

This photo identification card is provided and to be used solely as proof of identity in support of the Canadian Nuclear Safety Commission (CNSC) Exposure Device Operator (EDO) Certification Program. This card does not state that the individual indicated is certified, and must therefore be accompanied by a valid CNSC EDO Certification Card bearing the same registration number in order to provide proof of certification.

Cette carte d'identification avec photo est fournie seulement pour servir de preuve de l'identité pour les besoins du programme d'accréditation des opérateurs d'appareil d'exposition (OAE) de la Commission canadienne de sûreté nucléaire (CCSN). Cette carte n'indique pas que la personne qui y est nommée est certifiée. Elle doit donc être accompagnée d'une carte valide d'accréditation de l'OAE de la CCSN qui contient le même numéro de matricule pour apporter la preuve de certification.

For verification of certification status, please contact CNSC. For additional policies and definitions, please visit the Natural Resources Canada (NRCAN) National Non-Destructive Testing Certification Body (NDTCB) website.

Pour vérifier l'état d'une certification, veuillez communiquer avec la CCSN. Pour consulter d'autres politiques et définitions, veuillez visiter le site Web de l'Organisme de certification national en essais non destructifs (OCEND) de Ressources naturelles Canada (RNCAN).

This card is issued by and is the property of Natural Resources Canada and may be withdrawn or revoked in part or in total at any time. Cette carte est la propriété de Ressources naturelles Canada et peut être retirée ou révoquée en partie ou en totalité à tout moment.

NEXT COMPRESSION KING INC. Final Data Package v.0  
PO# 53189 21-1954 Jul. 8, 2021 | Page 98 of 110

Canada





Name: **Donald Mitchell** **Radiography - Film: Level II**  
 Technician SSN: \*\*\*-\*\*-\*\*\*\* Certification No: 23441  
 Mistras Division: 210 Certification Date: 12/19/2019  
 Expiration Date: 12/19/2022

---

Education\*: High School Graduate Institution: William Aberhart  
 Date: 6/1/1967 Location: Calgary, AB

**Method Training**

School	Location	Date	Hours	Course Description
Southern Alberta Institute of Te	Calgary AB	1/1/1985	960	960 hours Combined PT, MT, UT & RT II

**Experience**

From	To	Company	NDT Methods and Highest Level Attained
1/2/1983	Present	Western Inspection LTD	CGSB RT II 1988, CGSB MT II-1981, PT II 1993, UT I 1985
1/2/1980	12/31/1982	Mitchell Inspection	Qualified Operator / Trainee
1/1/1977	1/1/1980	IRIS	Qualified Operator/Trainee

**Examination**

Composite Score: 92.50%

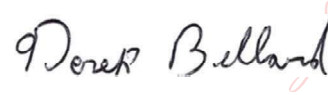
Date	Examination	Score	Comments/Technique
12/13/2019	Specific	88.00%	
12/19/2019	Practical	97.00%	
12/13/2019	General	80.00%	CGSB

Comments

\*NOTE: The education stated is the highest level attained.

**Donald Mitchell is qualified and certified Radiography - Film: Level II in accordance with Mistras Services Procedure 100-QC-005.7 Rev 8**

Certifying Level III: Derek Billard



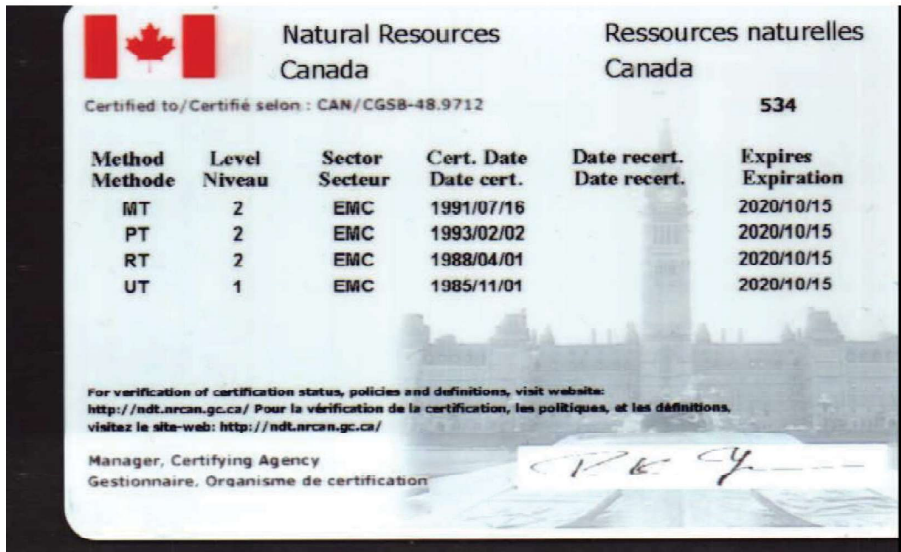
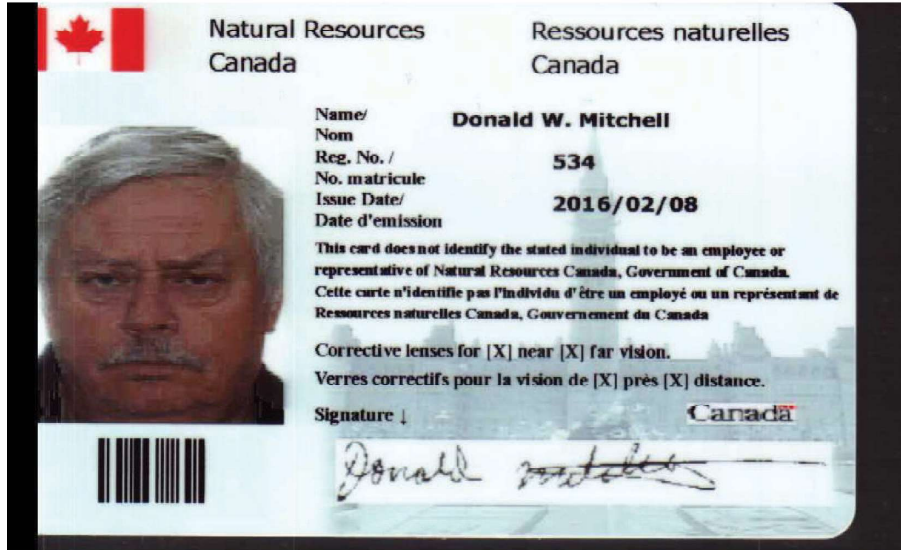
Digitally signed by Derek Billard  
 CGSB Level 3 UT (Signing for Report Review Only)

(Sign)





## CAN/CGSB Standard 48.9712 Qualification for Donald Mitchell



Examination Date: June 25, 2020      Expiration Date: June 25, 2021  
 Technician Name: Donald Mitchell      Employee No: 240328

Performed by: Jason Brunet      Signature: *Jason Brunet*

The individual named above was examined on the above date for visual acuity. This examination fulfills the requirement defined in the Mistras Written Practice and procedure 100-QC-005.6 and verified in the following qualifications:

1. Near Vision acuity in at least one eye to read the Jaeger Number 1 on a standard Jaeger test
2. Far Vision acuity of 20/30 or better in at least one eye on a standard Snellen test chart or equivalent
3. Capability to distinguish color and differentiate contrast between colors used in NDE. The Ishihara or similar test should be used and if failed, Mistras will conduct an alternate color discrimination test.
4. Shades of Gray and/or Brightness Discrimination for certified radiographers.

**Examination Results**

**1.0 Visual Acuity**

1.1 Individual meets the **near vision** requirements:     Without Correction     With Correction     Does not Meet Requirements  
 Eye Chart Serial No: WIL-001

1.2 Individual meets the **far vision** requirements:     Without Correction     With Correction     Does not Meet Requirements

**3.0 Color Perception**

- Individual meets above color requirements (3)
- Individual does not meet Ishihara color perception or the equivalent but has demonstrated the ability to differentiate among the colors used in the method(s) in which they are certified
- Individual does not meet color perception requirements and may not evaluate color attributes.

**4.0 Brightness Discrimination (as required)**

- Individual meets the requirements for brightness discrimination.
- Individual does not meet the requirements for brightness discrimination.
- The brightness discrimination test does not apply to this individual.

**5.0 Shades of Gray Distinction (Radiographers)**

- Individual meets the requirements for shades of gray distinction.
- Individual does not meet the requirements shades of gray distinction.
- The shades of gray distinction exam does not apply to this individual.

**Figure 1: Shades of Gray Chart**

Use as a hardcopy or on the Computer screen at 12-20 inches under normal desktop working light conditions.

Minimum of 20 correct readings required to pass exam. Number Correct: 23

2	7	8	2	1
23	6	4	32	5
5	3	65	65	46
1	64	32	542	64
46	35	46	46	63

developed by Dr. Kölbl of FMTÜBV, Langemarckstr. 20, 45141 Essen, Germany



# Directory of Certified Personnel

---

## **⚠️ NRCan NDTCB response to COVID-19 situation**

With the ongoing COVID-19 situation, the NRCan NDTCB is working to ensure the health and safety of the public and our team members in accordance with all public safety guidelines. We are closely monitoring the situation and will adjust our business practices and client services rapidly as required. We remain at the ready to assist you as best as we can throughout this situation. We will keep you updated on any developments.

**At this time, certification processing and services are likely to be disrupted, delayed, and/or postponed.**

Temporary accommodations and extensions relating to initial certifications and renewals/recertifications will be provided for select candidates. Currently, the accommodations are:

- ○ A 12-month extension for **MT, PT, UT and ET** **NDT renewal** and **recertification** candidates who have certifications that expire from **April 15, 2020 to March 15, 2021**. This 12-month extension is applied to the current expiry date listed on your certification ID card, and the [Directory of Certified Personnel](#) (PDF, 9.42 MB).
- A 24-month extension for **RT NDT renewal** and **recertification** candidates who have certifications that expire from **April 15, 2020 to March 15, 2021**. This 24-month extension is applied to the current expiry date listed on your certification ID card, and the [Directory of Certified Personnel](#) (PDF, 9.2 MB).

- A 12-month extension for **MT, PT, UT and ET NDT initial certification candidates** who have examinations in process that **expire(d) after March 15, 2020**. This 12-month extension is applied to the current expiry date(s) listed on your most recent examination results letter.
- A 24 month extension for **RT NDT initial certification candidates** who have examinations in process that **expire(d) after March 15, 2020**. This 24-month extension is applied to the current expiry date(s) listed on your most recent examination results letter.
- A 12-month extension for **NDT certificate holders** who are due to complete their annual vision test requirement from **March 16, 2020 to March 15, 2021**.
- A 12-month extension for **XRF renewal and recertification** candidates who have certifications that expire from **March 16, 2020 to March 15, 2021**. This 12-month extension is applied to the current expiry date listed on your certification ID card, and the [Directory of Certified Personnel](#) (PDF, 9.2 MB).
- A 12-month extension for **EDO photo ID cards** that expire from **March 16, 2020 to March 15, 2021**. This 12-month extension is applied to the current expiry date listed on your EDO

**Please note that it is important for all clients to review all the policies and conditions with regards to COVID related accommodations and extensions.**

- Certification requirements and processing that can be completed via form-filling and document submission (with mail or electronic communication) or remote access should be pursued and supported by all candidates, employers, and the NDTCB network.
- Affected candidates/certificate holders shall maintain continuity and competence in the method(s) for which they are certified and must

recertify and/or renew by the end of their (extended) period of validity.

- Affected candidates/certificate holders shall perform certification/renewal/recertification requirements and examinations as soon as possible, even if they are still temporarily covered by the extension period.
- **The original certification expiry and validity time cycle period will be unaffected by the extension accommodation policy, the NDTCB is only providing a temporary extension for those affected.**

While at this time, the initial certification process extension has a current end date of To-Be-Decided (TBD), and most candidates in process may be included in this general accommodation, we are encouraging everyone to complete their examinations and certification requirements as soon as possible.

**Of note, for clients (recerts) outside of the covered periods or those that may further request additional accommodation(s) or review of their eligibility, it is paramount that they keep all records and/or documentation related to their efforts, attempts and actions to fulfill such requirements on time. The NDTCB may request this supporting documentation for review and justification of individuals' submission.**

For full details and supplementary verification of certification status, please download and read the [NRCAN NDTCB COVID-19 Temporary Extension Policy Notice](#) (PDF, 167 kb). The appropriate extension accommodations will be applied automatically (no need for candidate to submit a request) without re-issuance of the corresponding paperwork or documents. As conditions evolve, we will adjust services accordingly—temporary accommodations and extensions may be amended or applied as required. Please check our website regularly for further updates on this rapidly evolving situation. For more details, please contact our office.

**Contacting and communicating with the NDTCB:**

At this time, we strongly advise that clients and certificate holders **refrain** from mailing, shipping or faxing certification-related documents and communications; we will be maintaining communication services via **email** and **telephone**. We will also not be providing in-person client services at our local office at this time. We encourage clients to provide the NRCan NDTCB with your most up-to-date **personal** email address and telephone number to avoid interruptions in communication.

For all **telephone inquiries**, please call our main telephone line: **1-866-858-0473**

(Note: other NDTCB telephone lines may not be monitored at this time.)

For **email inquiries**, send your emails to our main inboxes listed below:

NRCan NDTCB main inbox: [ndt@nrcan.gc.ca](mailto:ndt@nrcan.gc.ca)

NRCan renewal and recertification: [nrcan.ndtre-cert@canada.ca](mailto:nrcan.ndtre-cert@canada.ca)

EDO written examination: [nrcan.cedo-oaea.nrcan@canada.ca](mailto:nrcan.cedo-oaea.nrcan@canada.ca)

(Note: other NDTCB email inboxes may not be monitored at this time.)

The health and safety for the public is a priority for the NDTCB—we appreciate your understanding and support.

**i** This list of NDT personnel, currently certified by NRCan, was produced at NRCan and was accurate on the date shown. Certifications are valid until the listed expiration date. Due to COVID-19, select certificate holders have been granted temporary expiry date extensions. Please read the above notice for details.

The Natural Resources Canada (NRCan) National Non-Destructive Testing Certification Body's (NDTCB's) [Directory of Certified Personnel](#) (PDF, 9.2 MB) lists personnel who hold the following certifications:

- Those who are X-ray fluorescence (XRF) certified analyzer operators based on ISO standard 20807 and Health Canada Safety Code 32
- Those who are certified in Non-Destructive Testing (NDT) according to the Canadian General Standards Board Standard CAN/CGSB-48.9712-2014 (ISO

## 9712:2012, IDT)

During the transition period for the implementation of CAN/CGSB 48.9712-2014, once clients who require recertification are renewed, their certifications are valid until their next NDT certification renewal date.

However, these renewals are issued conditionally, pending the successful completion of the recertification examination process. Candidates who do not complete their recertification examination by the end of their period of validity will not have their certifications renewed.

### Also note:

- This list of NDT personnel, currently certified by NRCan, was produced at NRCan and was accurate on the date shown.
- Certifications are valid until the listed expiration date.
- All candidates who are due for recertification must successfully complete their recertification examination before their next NDT certification renewal date.

To verify the certification status of NDT certified personnel, contact the [NRCan National NDT Certification Body](#).

## Understanding the directory

Certification to the above CGSB standard is offered at three levels of certification in the following test areas (abbreviations used in the directory are shown in parentheses):

- Eddy Current Testing (ET)
- Magnetic Testing (MT)
- Penetrant Testing (PT)
- Radiographic Testing (RT)
- Ultrasonic Testing (UT)



For all testing methods except radiographic, certifications are in the Engineering, Materials and Components Sector. For Industrial Radiography:

- E = Engineering, Materials and Components Sector
- AS = Aerospace Sector
- A = Light Alloy Castings and Forgings
- W = Welds and Weldments
- C = Heavy Metal Castings and Forgings

## Our certification responsibilities

We make every reasonable effort to ensure candidate applications, examination requests, and certification submissions are completed in accordance with our service standard targets. Despite these efforts, there can sometimes be errors, omissions, or delays the NRCAN NDTCB is not responsible for any direct and indirect costs, expenses, or delays that may arise.

Find out more

- [Read the basics about the NRCAN NDT Certification Body](#)
- [Quick downloads: forms and guides](#)
- [NDT Certification](#)
- [Certification for XRF analyzer operators](#)
- [Our role in EDO certification](#)

### Date modified:

2020-11-09

**SECTION 6 – SHIPPING DETAILS**

**PACKING SLIP**





Process Systems

# **DATA MANUAL**

**JOB # 15630/ 100421**

**Customer:**

**Concept Compression**

**Description:**

**185 hp Compressor Skid**

**Piping**

**Contents**

**AB-83 Data Report for Piping**

**NDE Reports**

**PSV Reports**

5120 – 6th Street N.E. Calgary, Alberta, Canada T2K 4W5  
main: 403.274.6106 fax: 403.274-6149 toll free: 800.256.1598

[www.ngc-ltd.com](http://www.ngc-ltd.com)





# CONSTRUCTION DATA REPORT FOR PIPING SYSTEMS

In accordance with the provisions of the Safety Codes Act

Shop Construction ; Field Construction ; Final Data Report   
 Partial Data Report  (from one ABSA-authorized Contractor to another  
 ABSA- authorized Contractor).

**Complete both sides of this Form**

1. Constructed By: NGC Process Systems Ltd. Owner's Job No: 15630  
(Name of ABSA authorized primary contractor or subcontractor)  
5110 - 6<sup>th</sup> Street NE, Calgary, AB T2K 4W5  
(Address)  
 Alberta Quality Program No. AQP-1282(s) Expiry Date: December 15, 2007

2. Constructed For: Concept Compression, #2 3530 11A Street NE, Calgary, Alberta  
(Name of primary contractor if different from above)  
(Address)  
 Alberta Quality Program No. AQP- Expiry Date: \_\_\_\_\_  
(Required when the primary contractor undertakes some/all of the quality functions, e.g., Mat'l supply, NDE, PWHT, Tie-in, fabrication, hydro test, final assembly etc.)

3. Owner: \_\_\_\_\_  
(Name and address)  
 \_\_\_\_\_  
(Location of installation)  
 Alberta Quality Program No. AQP- Expiry Date: \_\_\_\_\_  
(Required when the owner undertakes some/all of the quality functions, e.g., Mat'l supply, NDE, PWHT, Tie-in, fabrication, hydro test, final assembly etc.)

4. Piping Design Alberta Registration No.: PP-  
(Required if aggregate piping volume is over 0.5m<sup>3</sup>)  
 5. WP No.: WP-1801.2 ; Company: NGC Process Systems Ltd. ; Owner's WP No. (If used): WP-  
(Alberta Registration No.) (Alberta Registration No.)  
 WPS No(s). used: E&D 1, E&D 2 ; Owner's WPS No(s). (If used): \_\_\_\_\_

6. Code: ASME B31.1 Non Boiler External Piping ; ASME B31.1 Boiler External Piping   
 ASME B31.3  - Service category: Normal ; D ; M ; High Pressure ; B31.5 ; B31.9

Drawing No. Rev. No Line No.	Fluid (Air/Strm. Etc.)	Des. Press. kPa	Des. Temp. °C	Test Press. kPa	Test Medium	Pipe Mat'l Spec. & Grade	C.A. mm	Pipe NPS & Schedule	Flange Material & Rating	PWHT/ Preheat Temp. °C	R.I. %	Other NDE
100421-101	HC	1689	121	2534	H2O	SA-105N SA-106B	0.125	6" STD	300# 150#	NO	10	Visual
100421-101	HC	1689	121	2534	H2O	SA-105N SA-106B	0.125	8" STD	150#	NO	10	Visual
100421-101	HC	3102	121	4654	H2O	SA-105N SA-106B	0.125	3" XH	300#	NO	10	Visual
100421-101	HC	3102	121	4654	H2O	SA-105N SA-106B	0.125	3" STD	300#	NO	10	Visual
100421-101	HC	3102	121	4654	H2O	SA-105N SA-106B	0.125	4" STD	300#	NO	10	Visual

Partial Data Reports, properly identified and certified by ABSA-authorized contractors, as listed below are attached to and form part of this Data Report

No.	Line No.	Spool No.	Drg. No. (with Rev. No.)	Contractor (Name)	AQP No.	Expiry date

**Remarks:** Provide additional comments including noting any code work that was not performed by the ABSA-authorized contractor(s) supplying this document as a Partial Data Report but which must be completed by another ABSA-authorized contractor who assumes overall responsibility for conformance with the Safety Codes Act & Regulations and applicable ASME Codes, and who assures that all required code work is completed prior

to putting the piping system into service.

**Endorse certificate 'A' or 'B'**

**A. CERTIFICATE OF COMPLIANCE**

Signed by the subcontractor when supplying this certificate as a  
Partial Data Report

We certify that the statements in this Data Report are correct and that materials, construction and workmanship of the piping fabrication conform to the registered quality system and the applicable Piping code(s).

Date: \_\_\_\_\_  
Subcontractor: \_\_\_\_\_

Print Authorized Representative's Name \_\_\_\_\_ Signature \_\_\_\_\_

**This certificate is not valid unless it forms part of a Final Data Report signed by Primary Contractor**

**B. CERTIFICATE OF COMPLIANCE**

Signed by the primary contractor when supplying this certificate as a  
Final Data Report

We certify that the statements in this Data Report are correct and that piping job no. 15630 described in this Data Report was constructed in accordance with the Province of Alberta Safety Codes Act and Regulations, and applicable ASME Piping Code(s).

Date: Sept 29/05 NGC Process Systems Ltd.  
Primary Contractor

Terra Delbridge  
Print Authorized Representative's Name \_\_\_\_\_ Signature \_\_\_\_\_

**CERTIFICATE OF INSPECTION**

I, the undersigned, employed by \_\_\_\_\_ have inspected the piping job no. \_\_\_\_\_ described in this Construction Data Report and state that, to the best of my knowledge and belief, the Contractor has constructed this piping in accordance with the applicable Sections of the ASME Piping Codes and Province of Alberta Safety Codes Act and Regulations.

Date: \_\_\_\_\_  
Print Owner's Inspector's Name \_\_\_\_\_ Owner's Inspector's Signature \_\_\_\_\_

Date: \_\_\_\_\_  
Name: \_\_\_\_\_ Sign.: \_\_\_\_\_  
ABSA Safety Codes Officer  
(BOILER EXTERNAL PIPING ONLY)

Current version of this Form may be obtained from [www.absa.ca](http://www.absa.ca)



JOB # 15638

LINE SIZE	LINE #	SPOOL #	REQUIRED HYDRO PRESSURE	ACTUAL HYDRO PRESSURE (PSI)	GAUGE #	DATE	HYDRO EMPLOYEE SIGNATURE	FOREMAN SIGNATURE
		Inlet 150# X	428 psi	430	308/PI 310	5/12/2015	SH111	
		Inlet 300# X	1080 psi					
		300#						
		Inlet 500# X	2160 psi		308/PI 310			
		600#						
		Suction spool	428 psi	430		5/12/2015	SH111	
		Suction Spool	428 psi	428	309/PI 190	5/12/2015	SH111	
		Suction Spool Elbow	1080 psi					
		Compressor Discharge spool	1080 psi	1085	PI 197/198	5/12/2015	SH111	
		Outlet spool	1080 psi	1085	PI 308/PI 310	5/12/2015	SH111	
		11	1080	1085	PI 212/213	5/12/2015	SH111	
		11	1080	1100	PI 308/PI 310	5/12/2015	SH111	



Exposure Device #: 16691 Source #: A639  
 Cobar: 60  IR 192  X-Ray  EFSS: .13  
 Film Brand: Agfa #Film/cassette: 1  
 Code: ASME B31.3 (N)

Job / P.O. #: 15630 IRISNDT #: 215463 Date: June 20/05  
 Client: NGC #1  
 Location: Calgary  
 Item: Piping Material: C.S.

Film #	Size, Location, Thickness	Welder ID	IRISNDT Proc.	SOD Inches	OFD Inches	# of Exp.	Work Location	Film Type	Type and Location of Discontinuities (Circle rejectable discontinuities)	Accept	Reject
X1	2 1/2 STD	R	RT3	2.6	.263	3	1		100% 5/8	/	
X2	↓	DD		↓	↓	↓	↓			/	
X3	3" STD	G		3.3	.216	↓	↓			/	
X4	4" STD	R		4.3	.237	↓	↓			/	
X5	↓	R		↓	↓	↓	↓			/	

2-2 1/2 STD  
 1-3" STD  
 2-4" STD

Number of Radiation Barrier Warning Signs Erected \_\_\_\_\_ Number of Radiation Barrier Warning Signs Returned \_\_\_\_\_

Work Location Legend (insert number): [1] Inside Fab. Shop [2] Yard/Lay-down Area [3] Piping/Modular Fab. Area [4] N/A (Other)

IRIS Procedure:  
 Single Wall Exposure: RT 1, 2, 2A, 6, 7  
 Double Wall Exposure: RT 3, 3A, 4, 5, 8

S.O.D. = Minimum Source-to-object distance  
 O.F.D. = Distance source side of Object to film at min. S.O.D.

AB - Arc Burns  
 BT - Burn Through  
 CK - Crack  
 EP - Excessive Penetration  
 P - Porosity

EUC - External Undercut  
 IUC - Internal Undercut  
 HB - Hollow Bead  
 IP - Incomplete Penetration  
 S - Slag

IG - Internal Concavity  
 LF - Lack of Fusion  
 LC - Low Cover  
 MA - Misalignment

Unit # 267 Kilometres: \_\_\_\_\_  
 In 2300 Out 2345 Hrs. .75  
 In \_\_\_\_\_ Out \_\_\_\_\_ Hrs. \_\_\_\_\_  
 Incl: CF  
NC

Film Quantity:  
9-2 3/4 x 5 1/2 D4  
6-2 3/4 x 8 1/2 D5

Interpretation by: Craig Forget (Print)  
[Signature] (Signature)  
 SNT-TC-1A II  
 C.G.S.B. II (Level)  
 C.G.S.B. # 2049  
 I am in full agreement with report contents.  
 Client Representative: [Signature]

Edmonton (780) 437-4747	Fort McMurray (780) 713-1536	Cold Lake (780) 694-1114	Mailing Address
Calgary (403) 279-6121	Grande Prairie (780) 532-2283	Red Deer (403) 347-1742	5908 - 98 Street
Nisku (780) 965-7616	High Level (780) 841-0470	Tulsa, OK (918) 446-8778	Edmonton, Alberta
Barrhead (780) 674-8018	Lloydminster (780) 875-6455	Houston, TX (713) 461-4010	T6E 3G3

# TEGA SUPPLY INC.

P.R.V. INSPECTION AND TEST REPORT

P.R.V

CALGARY

BRANCH/LOCATION:

DATE	MAY 30 05	W.O.#:		LDJ#:	14481 - 1
CUSTOMER:	NGL PROCESS	LOCATION:		PO#:	15630-17
	HYDROSEAL	TYPE/MODEL:	14E3MOV00	SN#:	1880-6
CONNECTION TYPE:	NPT	INLET SIZE:	1"	TAG/PSV:	
SET PRESSURE:	200 PSF	BACK PRESS:		CAPACITY:	830 SCFM
CO. DIFF. SET PRESS:		TEMP:		NEW VALVE Spring in Range	
CAP. ASSEMBLY:	CLOSED	CODE SYMBOL:	NB, UV		
RESET REQ. <input checked="" type="checkbox"/>	YES	NEW CAPACITY <input checked="" type="checkbox"/>	752 SCFM	SCALE: 100% PARTIAL BY READ VALUE	
NEW SET PRESSURE <input checked="" type="checkbox"/>	180 PSF	INSIGNIA:	HUS		
SEAL CONDITION:	INTACT	DATA PLATE CONDITION:	GOOD		
DATE OF LAST SERVICE:					

PRE-TEST:  POP PRESSURE:  RESULTS:

COMPONENT INSPECTION	CHECK	AS FOUND CONDITION	REPAIR ACTIONS
DISC	MM	DIM	AC
NOZZLE	MM	DIM	AC
DISC HOLDER	MM	DIM	AC
GUIDE	MM	DIM	AC
SPINDLE STEM		VIS	
SPRING BUTTONS		VIS	
LOWER RING		VIS	
BELLOWS		PER	
GASKETS/O-RINGS		VIS	
OTHER		VIS	
OTHER		VIS	
OTHER		VIS	
OTHER		VIS	
DISC		VIS	
DISC		DIM	
DISC		DIM	
DISC		DIM	

DISASSEMBLY:  INSPECTION:  REASSEMBLY:   
 MEDIUM:  SET PRESS:  COI D SET:

FINAL TEST:

S.A.M.E.R.:  SET POINT:  182

BACK PRESS. TEST:  LEAKAGE:  0

BLOWDOWN RING SETTINGS: UPPER  LOWER  N/A

TEST GAUGE ID: BCC#  11

TEL. NO.

PARTS REQ. NEXT:

COMMENTS:

FINAL INSPECTION:  CUSTOMER/INSPECTOR:




**TEST CERTIFICATE FOR SAFETY / RELIEF VALVES**

4/12/2005

CUSTOMER:  
Tega Supply  
5308-4th St SE  
Calgary AB Canada  
  
PO#T-1193-DB

This document certifies that the safety-relief valves identified below and ordered by the above purchase order were manufactured, assembled and tested to meet the requirements of the ASME Boiler and Pressure Vessel Code, Section VIII. Hydroseal Valve Company, Inc. is authorized by the ASME to apply the 'UV' symbol for valves of this series when used for gas service. The performance data recorded below is provided for your records.

VALVE TYPE	SERIAL NO	SET PRESSURE psig	OPENING PRESSURE psig	RESEAT PRESSURE psig	BODY HEAT NO	BONNET HEAT NO
6HCF00/D5	2256-1	245	245	159		
6HCF00/D5	2256-2	245	246	180		
6HCF00/D5	2256-3	245	248	157		
6HCF00/D5	2256-4	245	248	183		

  
Hydroseal Technical Representative



**(4)**

**COMPONENTS**

**Toll Free Number**

**1-866-747-9720**

**Webpage**

**www.mercervalve.net**



1138444 B.C. LTD A Subsidiary Of  
**MERCER VALVE CO., INC.®**  
**"AUTO SEAT TECHNOLOGY"®**

**Direct Number**

**403-225-3219**

**Email**

**canada@mercervalve.net**

**Sour Service**

**Customer Name:** Next Compression

**Customer PO Number:** 53048

**Item Description: Qty** (1) 91-16D51V07EN2

1" FNPT X 1" FNPT D ORIFICE FKM SEAT FKM SEALS  
SOUR GAS SERVICE

Series 9100

Serial Number(s) RVC00010204

Set @ 125 PSI

Temperature: 60 F

Capacity 278 SCFM

Tag:PSV-100

CDTP 123

**Repair Kit No:** 1D1V2EN1

CRN.0G8841.5CR1

**Mercer Valve Sales Order Number:** 5288

**Mercer Valve Job Order Number:** 81434

**Valve Setting Instructions:**

**Set Pressure Tolerance:** 3%

**Test Medium:** Air

This certifies that the valves purchased on the above sales order number were built per section VIII, Division 1 of ASME boiler and pressure vessel code.

Note: \_\_\_\_\_

*DBB*

6/15/2021

Certified Individual  
Quality Control

**Toll Free Number**

**1-866-747-9720**

**Webpage**

**www.mercervolve.net**



7139444 BC LTD A Subsidiary Of  
**MERCER VALVE CO., INC.®**  
**"AUTO SEAT TECHNOLOGY"®**

**Direct Number**

**403-225-3219**

**Email**

**canada@mercervolve.net**

**Sour Service**

**Customer Name:** Next Compression

**Customer PO Number:** 53048

**Item Description: Qty** (1) 81-17151V10N11

1" MNPT X 1" FNPT 1/2" (E) ORIFICE FKM SEAT  
FKM/BUNA SEALS SOUR GAS SERVICE

Series 8100

Serial Number(s) RVC00010203

Set @ 245 PSI

Temperature: 90 F

Capacity 881 SCFM

Tag:PSV-101

CDTP

**Repair Kit No:** 11V1N11

CRN.0G8841.5CR1

**Mercer Valve Sales Order Number:** 5288

**Mercer Valve Job Order Number:** 81433

**Valve Setting Instructions:**

**Set Pressure Tolerance:** 3%

**Test Medium:** Air

This certifies that the valves purchased on the above sales order number were built per section VIII, Division 1 of ASME boiler and pressure vessel code.

Note: \_\_\_\_\_

*DUB*

6/15/2021

Certified Individual  
Quality Control



GIR 42221-1004214

### Packing Slip

**Canalta Controls Ltd**  
6759-65th Avenue , Red Deer, AB T4P 1X5  
Tel.:+1 (403) 342-4494 Fax No.:+1 (403) 346 7110  
www.canaltaflow.com

Shipment Number:SS039875  
Shipment Date:6/25/2021  
Our Order No.:SO031792  
Customer Order No.:53111  
SalesPerson:Gord Gentner  
Page: 1

Bill To:  
Next Compression  
Joe Herauf  
261122 Wagon Wheel Crescent  
Rocky View , T4A 0E2  
AB  
Canada  
  
Ship Via Collect

Ship To:  
Next Compression  
Joe Herauf  
261122 Wagon Wheel Crescent  
Rocky View , T4A 0E2  
AB  
Canada

No.	Item No.	Unit	Shipped	Ordered	Back Ordered
1	260RFDC80SAW00WFTT_ABA9-FF-CB-N-0 DUAL CHAMBER W/ RUN, 2" 600, SCH80, 3PC Serial No. :D0203131 CS (NACE) Internals, Grease Seat, 600 WxF Teletaps AGA 2016 Ed., A216WCB (NACE) LEFT HAND O-PLT 2"x1/8" 1.000" 316SS K-Style 316 SS, HNBR, 85D Pipe: Cold Drawn, A106B / A105N, OAL:57" AGA 2016 Upstream: 600RF, Downstream: 600RF Contour Flow Cond.: RF, 0.75 Beta Outlets: 1"TOL, 0.75"TOL Includes Hydro Test, MTR's, Canalta Inspection Canalta Standard Paint	Each	1	1	

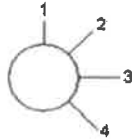
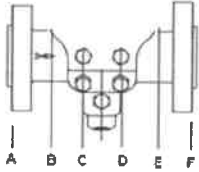
RECEIVED  
JUN 29 2021

Packed By:	Checked By:



Serial No: D0203131 Tag Number: \_\_\_\_\_ Date: 11-Mar-2019 Edition: 00  
 Body Heat Number: 8BJG Top Housing Heat Number: 8415 Overall Length: 10.625 "  
 Line Size: 2 Schedule: 80 ANSI Class: 600 Configuration: W x RF Material: A216WCB/A352LCC

**ORIFICE FITTING INTERNAL DIAMETER (inches)**



From Flow Direction

**PLEASE NOTE:**

This drawing may not accurately represent the model ordered, it is intended as a reference of the spots checked for bore diameter only. Not all points may be applicable to all models.

Plane	Upstream Points					Downstream Points		
	A	B	C			D	E	F
			0.5D	0.25D	0D			
1	1.944	1.943	1.944			1.944	1.944	1.944
2	1.944	1.943	1.944			1.944	1.944	1.944
3	1.944	1.943	1.944			1.944	1.944	1.944
4	1.944	1.943	1.944			1.944	1.944	1.944
Temp (°F)	72	72	72			72	72	72
Roughness (µin)	70	70	70			70	70	70
Average of Column C (D <sub>m</sub> ): <b>1.944</b>						Average of Downstream Columns: <b>1.944</b>		
"D <sub>r</sub> " at 68°F: 1.944								

\*\*\* Inspected to AGA Report 3 \*\*\*

**Upstream 0D - 2D**

	Measured	Allowed (± 0.25%)	
Max:	1.944	1.949	<b>PASS</b>
Min:	1.943	1.939	<b>PASS</b>

**Downstream 0D - 2D**

	Measured	Allowed (± 0.5%)	
Max:	1.944	1.954	<b>PASS</b>
Min:	1.944	1.934	<b>PASS</b>

**Roughness**

Min	Max	Measured (Avg. A-D)	
34.0	250.0	70.0	<b>PASS</b>

Inspector: WALTER

**PRESSURE TAP TESTS (inches)**

Tap Size:  0.125  0.250  0.375  0.500 Instrument Type:  Depth Gauge  Caliper

	Top				Bottom			
	U/S RIGHT	U/S LEFT	D/S RIGHT	D/S LEFT	U/S RIGHT	U/S LEFT	D/S RIGHT	D/S LEFT
Tap Size	0.369	0.370	0.369	0.369	0.369	0.370	0.369	0.369
Tap Location	0.996	0.997	0.997	0.995	0.998	0.998	0.997	0.996
Pressure Test	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

Tap Size is ± 0.016 (0.359 to 0.391): **PASS**

Tap Location within ±0.016: **PASS**

Inspector: RG TA

**ECCENTRICITY (inches)**

	RIGHT	LEFT		TOP	BOTTOM
HORIZONTAL	0.002	0.003	VERTICAL	0.003	0.003
HORIZONTAL TOLERANCE	0.006		VERTICAL TOLERANCE	0.023	
HORIZONTAL ECCENTRICITY	0.001		VERTICAL ECCENTRICITY	0.000	

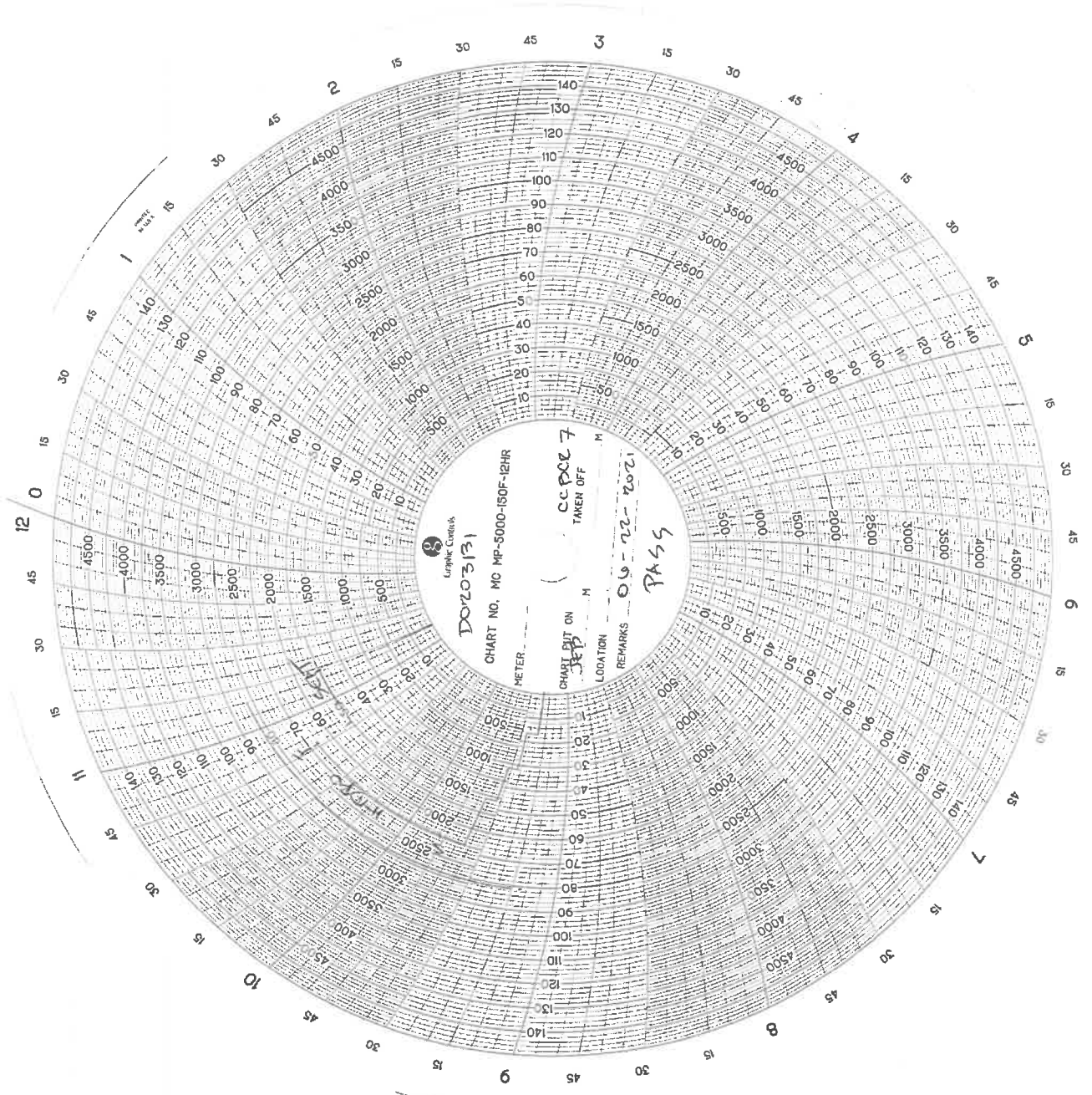
Inspector: JS

**PLATE SEAL GAP (Inches)**

Target Seal Gap:  0.562  0.688  0.700  0.813  0.875

	Top	Bottom	Right	Left
Seal Gap Width	0.563	0.563	0.564	0.564

Inspector: TA



Logline Controls

D0203131

CHART NO. MC MP-5000-150F-12HR

METER

CHART PUT ON  
11:30

LOCATION  
M

REMARKS  
09-22-2021  
PASS

COPIES 7  
TAKEN OFF

WIND VELOCITY

WIND DIRECTION

Serial           D0203131           Top Serial No.:           T0201903            
 Chart Recorder #:           CC-BCR7           Gauge Serial #:           3006536          

**HYDROSTATIC SHELL INTEGRITY TEST REPORT**

TEST PRESSURE (PSI):	<u>          2225          </u>	AMBIENT TEMPERATURE (°F):	<u>          81          </u>
DURATION (MINUTES):	<u>          60          </u>		
TECHNICIAN:	<u>          JEB          </u>		
WITNESS:	<u>          AQ          </u>	<b>Result:</b>	
DATE:	<u>          22-Jun-2021          </u>	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL

**VALVE SEAT TEST REPORT**

GREASE SEAT     SOFT SEAT

TEST PRESSURE (PSI):	<u>          1650          </u>	<input checked="" type="checkbox"/> EQUALIZER VALVE OPERATIONAL
DURATION (MINUTES):	<u>          15          </u>	<input checked="" type="checkbox"/> GREASE GUN OPERATIONAL
TECHNICIAN:	<u>          JEB          </u>	
WITNESS:	<u>          AQ          </u>	<b>Result:</b>
DATE:	<u>          22-Jun-2021          </u>	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL

**BLANK PLATE REPORT**

PRESSURE APPLIED:	<u>          15PSI          </u>	<input type="checkbox"/> VACUUM APPLIED TO D/S
SEAL MATERIAL:	<u>          HNBR          </u>	<input checked="" type="checkbox"/> PRESSURE APPLIED TO D/S
FLOW CONDITIONER HEAT #:	<u>          N/A          </u>	
TECHNICIAN:	<u>          JEB          </u>	
WITNESS:	<u>          AQ          </u>	<b>Result:</b>
DATE:	<u>          22-Jun-2021          </u>	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL

Standard Test Parameters:  
 SC FITTINGS: 30 MINUTE HYDRO AND BLANK PLATE TEST  
 DC & DEB FITTINGS: 60 MINUTE HYDRO, SEAT TEST WITH WATER AND BLANK PLATE TEST  
 PRESSURE PIPING: 10 MINUTE HYDRO

Test Medium:  
 HYDRO & VALVE SEAT : WATER w/RUST INHIBITOR  
 BLANK PLATE : AIR

REVIEW DATASHEET FOR ALTERNATE CUSTOMER SPECIFICATIONS



# Dual Chamber Orifice Fitting Datasheet

6759 - 65th Avenue, Red Deer, Alberta T4P 1X5  
 Ph:(403)342-4494 Fax:(403)346-7110  
 Email: canalta@canaltaflow.com

General	1	Tag No.	
	2	Line No.	
	3	Line Size/Schedule	2" SCH80 (XS)
	4	Inside Diameter	1.939 "
	5	Measurement Standard	AGA 2016 Ed.
	6	Quantity	1
	7	Paint	Canalta Standard Ship Coat
Orifice Plate	1	Orifice Plates	Qty Provided (per): 1 <input checked="" type="checkbox"/> Installed
	2	Material	316 SS
	3	Thickness(Inches)	0.125
	4	Beta(b) = d/D (installed)	0.52
	5	Bore Diameter (d) (Inches)	1.000
	6	Max Allowable Beta (b) = d/D	0.75
	7	Max Allow. Orifice Bore Diam. (d) (Inches)	1.375
	8	Vent / Drain	
	9	Seal Assembly	K-Style 316SS, HNBR, 85D
	10	Plate Holder	Standard, CF8M Stainless
Orifice Fitting	1	Body Material	A216WCB (NACE)
	2	Body Size / Rating	2" 600
	3	Body Connections	Up:Weld Down:RF Dwl Pin: <input type="checkbox"/>
	4	Seal Gap	.56200
	5	Trim Material	NACE MR-01-75 (CS)
	6	Seat Style	Grease
	7	Tap Hole Diameter	0.375
	8	Body Stud Bolt/Nut Special Coating	S: A193 B7M N: A194 2HM Special Coating: None
	9	Engineering Design Standard	ASME B16.34-2017
	10	Tap Location	1.000" from plate face
	11	Tap Connection Style	1/2" NPT
	12	Sets of Taps	4
	13	Shaft Orientation	Left
	14	Valve Lockout Mechanism	None
Meter Tube	1	Tube Material	A106B
	2	Pipe Grade	Cold Drawn
	3	Pipe (Outer) Connection Types	Up:RF Down:RF
	4	Pipe Connection Size / Rating	2" 600
	5	Flange Material	A105N
	6	Stud Bolt / Nut Material	S: A193 B7M N: A194 2HM Special Coating: None
	7	Gasket	316 Spiral Wound Flex CG
	8	Pipe Measurement Standard	AGA 2016 Catch All
	9	Engineering Design Standard	ASME B31.3-2018
Flow Conditioner	1	Flow Conditioner Type	Contour
	2	Material	ANSI 316SS
	3	Spacer	Included: <input type="checkbox"/>
	4	Connection Style	RF Dwl Pin: <input type="checkbox"/>

Customer:	Next Compression
Customer PO#:	
Reff#:	
Sales Quote:	SQ039277 Line: 610000
Sales Order:	Line:
Sales Contact:	Gord Gentner

Drawing Name:  
 Dimensions (Inches)  
 OAL: 57 N1: 12  
 UL1: 15 N2: 8  
 UL2: 16 N3:  
 N4:  
 DL: 26 N5:  
 FC1: N6:  
 N7:  
 N8:  
 Overall Length Tolerance +/- 1/4"  
 Weld Bevels: 37.5° +/- 15°

### Non-Destructive Testing

- Fitting Radiography Testing (Critical Locations)
- Fitting Radiography Testing (Weldneck Only)
- Weld Radiography Testing: 10% byshop rate  
ASME B31.3 - Normal
- MPI
- Liquid Penetrant
- Hardness 10%
- PWHT
- Ultrasonic
- Ferrite

Seat Test:	1650 PSIG
Hydro Test:	1 Hour(s) @ 2225 PSIG
Corr. Allow.:	1/16
CWP:	1480 PSIG @ -20°F to 100°F

### Weld Procedures

- GMAW, FCAW, or SAW  
(CCL5 may also be used on outlets of large runs)
- CCL-1N Rev 1(RT/LT-FCAW)
- CCL8 (STAINLESS-GMAW(RMD)/FCAW)
- CCL5 (RT/LT-SMAW)
- CCL-10N/11N (RT/LT-MCAW)
- CCL-14N (GTAW-PED)
- Subcontractor (refer to attachment)

### Branch Connection Details

	N1	N2	N3	N4	N5	N6	N7	N8
Style	TOL	TOL	--	--	--	--	--	--
Size (Inches)	1	3/4	--	--	--	--	--	--
Schedules	--	--	--	--	--	--	--	--
Rating	3000	3000	--	--	--	--	--	--
Orientation	0	0	--	--	--	--	--	--
Material	A105N	A105N	--	--	--	--	--	--

### Other Applicable Customer Specifications

Rev	Description	By	Date
0	Issued for quotation	GG	06/14/2021
1	CL 600 option added	GG	06/14/2021

### Customer Approval

Signature

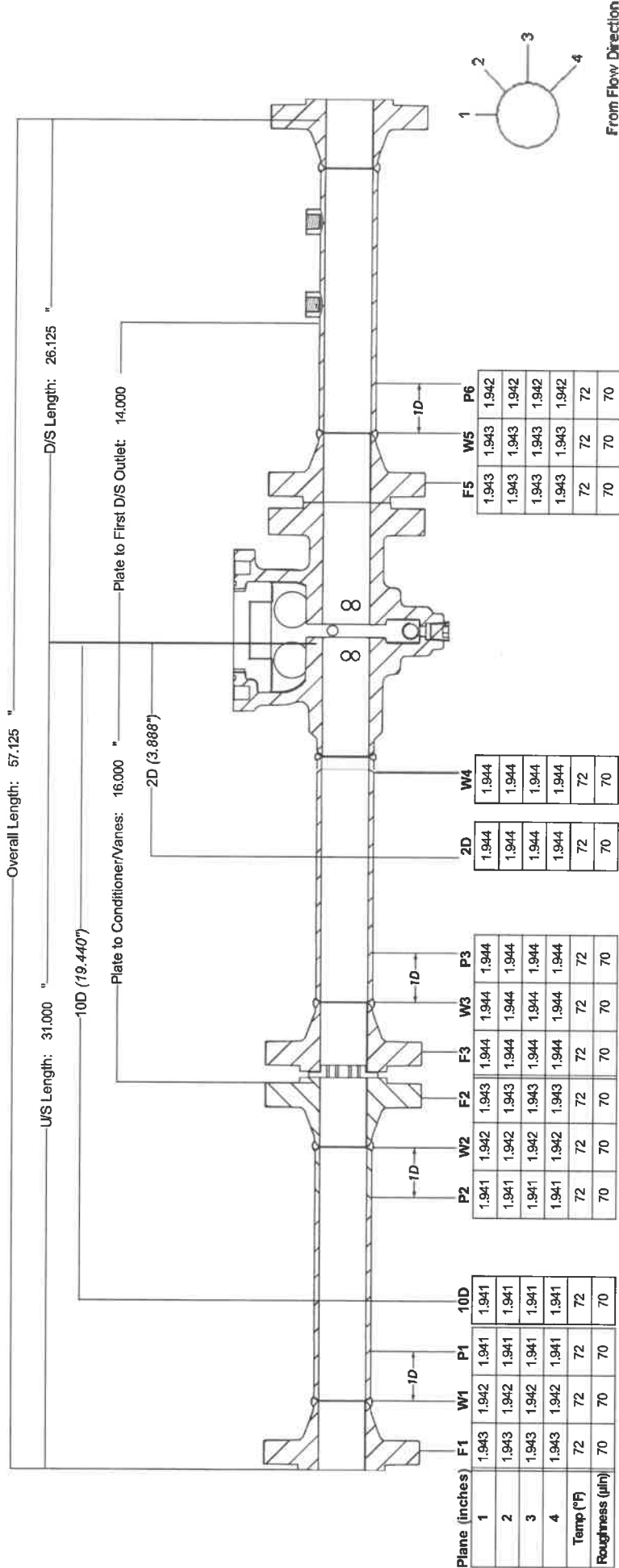
**Hoan San**

Printed Name:

Digitally signed by Hoan San  
 DN: cn=Hoan San, o=NEXT  
 Compression, ou=Projects,  
 email=kim.san@nextcomp.ca,  
 c=CA  
 Date: 2021.06.21 15:32:50 -06'00'

Serial D0203131

**PLEASE NOTE:** This drawing may not accurately represent the model ordered; it is intended as a reference of the spots checked for bore diameters only. Not all points may be applicable



**ROUNDNESS CHECKS (inches)**

From Fitting Inspection Sheet:				Upstream				Downstream			
Tolerance		Measured		Tolerance		Measured		Tolerance		Measured	
%	Value	%	Value	%	Value	%	Value	%	Value	%	Value
0.5	0.010	0.154	0.003	0.250	1.939	-0.051	1.943	-0.500	1.934	-0.103	1.942
Max Diff between Values		PASS		Minimum		PASS		Maximum		PASS	
Largest Value 0D - 1D Upstream: 1.944		Smallest Value 0D - 1D Upstream: 1.943		Largest Value 0D - 1D Downstream: 1.944		Smallest Value 0D - 1D Downstream: 1.943		Maximum		1.954	
Minimum		1.949		0.000		1.944		0.500		-0.051	
Maximum		1.949		0.000		1.944		0.500		-0.051	

Pin Type Flow Conditioner Clearance Checked:  Yes  N/A  
 Inspector: WALTER Date: 13-Dec-2019





Serial No:           T0201903           Heat No:           8415          

- EQ AND GREASE PORT DRILLED
- EQ PORT: BALL SEAT AND PORT HOLE ARE CENTERED
- TAG HOLES DRILLED CORRECTLY
- SEAL BAR SURFACE PASSES (ROUGHNESS AND NO POROSITIES)
- TOP AND BOTTOM PLATE CARRIER SLOTS ARE BEVELED ON INTERIOR AND EXTERIOR
- SQUARE FLANGE SURFACE IS FLAT
- BOLT UP FLANGE PASSES (ROUGHNESS AND NO POROSITIES)
- ALL THREAD SIZES AND FINISH PASSES
- CLEARANCE ON TOP OF FLANGE FOR NUTS
- PINION SEAL SURFACES PASS (ROUGHNESS AND NO POROSITIES)
- FITTING DEGREASED AND NO SHAVING INSIDE
- WALL THICKNESS PASSES, NO FLAWS ON INTERIOR OR EXTERIOR





T-SLOT WIDTH:           1.792          

FLANGE THICKNESS:           0.656          


Inspector:           DNW           Date:           17-May-2019

		<b>MATERIAL TEST REPORT IN ACCORDANCE WITH EN 10204 - 3.1</b>				<b>DATE</b> 2018. 06.04							
<b>COMPANY NAME &amp; ADDRESS:</b> CCI Global - S. Korea 161 Bodeum-Ro, 16bl-18lot, Geomdan Industrial Park, Oryu, Sugu, Incheon, South Korea Telephone +82-70-4848-4205		<b>SPECIFICATION REFERENCE:</b> 1. STANDARD: ASTM A216 & A352 GRADE: WCB / LCC YEAR: 2008 2. NACE MR 0175				<b>PURCHASE ORDER NO.</b>  <b>CERTIFICATE NO.</b> 3ZMQ18042603 <b>DATE OF POURING</b> 2018.04.26 <b>VENDOR MARK</b> C3Z							
<b>SERIAL NO. (If applicable)</b>	<b>DESCRIPTION</b>	<b>DRAWING REV. NO.</b>	<b>PART NO.</b>			<b>QUANTITY</b>							
	2" TOP HOUSING		260DC14R			100							
<b>CHEMICAL COMPOSITION %</b>													
<b>ELEMENT</b>	<b>C</b>	<b>Si</b>	<b>S</b>	<b>P</b>	<b>Mn</b>	<b>Ni</b>	<b>Cr</b>	<b>Mo</b>	<b>V</b>	<b>Cu</b>	<b>*RE</b>	<b>*CE</b>	
<b>Minimum</b>											0.000	0.000	
<b>Maximum</b>	0.25	0.60	0.045	0.040	1.20	0.50	0.50	0.20	0.03	0.30	1.530	0.649	
<b>HEAT NUMBER</b>	<b>QTY</b>	<b>ACHIEVED</b>											
83W8	20	0.17	0.36	0.01	0.02	1.15	0.23	0.02	0.01	0.00	0.00	0.260	0.383
8404	20	0.17	0.32	0.01	0.02	1.10	0.23	0.02	0.02	0.00	0.00	0.270	0.377
8415	20	0.19	0.36	0.01	0.02	1.15	0.21	0.02	0.01	0.00	0.00	0.240	0.402
8416	20	0.20	0.35	0.01	0.02	0.99	0.19	0.02	0.01	0.00	0.00	0.220	0.384
8417	20	0.18	0.35	0.01	0.02	1.09	0.21	0.04	0.02	0.00	0.00	0.270	0.388
												0.000	0.000
												0.000	0.000
<b>HEAT TREATMENT:</b>													
QUENCHING Temperature raised to 900°C, soaked for 5.6 hours and then water cooled.    TEMPERING Temperature raised to 620°C, soaked for 6.2 hours and then air cooled.													
<b>MECHANICAL PROPERTIES</b>													
<b>SPECIFICATION</b>	<b>Y.S.</b> ( MPa )	<b>UTS</b> ( MPa )	<b>% ELONGATION IN 50mm (4d)</b>	<b>% REDUCTION IN AREA</b>	<b>NOTCH TOUGHNESS J (at -46.0 °C)</b>		<b>BEND TEST</b>		<b>HARDNESS</b> ( HB )		<b>PROOF LOAD</b> (            )		
<b>Minimum</b>	275	485	22	35	16	20							
<b>Maximum</b>		655								237			
<b>HEAT NUMBER</b>	<b>QTY</b>	<b>ACHIEVED</b>											
83W8	20	352	539	35	59	47.56.6	55					162	
8404	20	342	531	31	57	42.54.6	53					164	
8415	20	340	533	33	58	44.51.73	56					160	
8416	20	335	524	31	55	36.40.52	43					151	
8417	20	346	531	33	57	48.54.71	58					162	
<b>REMARKS :</b>				<b>OTHER COMMENTS:</b>									
1. *RE = Ni + Cr + Mo + V + Cu 2. *CE = C + [Mn/6] + [(Cr + Mo + V)/5] + [(Ni + Cu)/15]													
<b>CERTIFIED THAT:</b>													
1. THE ABOVE GIVEN DETAILS ARE CORRECT 2. THE MATERIAL CONFORMS TO ABOVE SPECIFICATION 3. THE MATERIAL IS FREE OF CONTAMINATION FROM RADIOACTIVE ELEMENT OR RADIATION THE PARTS WERE MANUFACTURED AND TESTED IN ACCORDANCE WITH THE ABOVE SPECIFICATION AND CERTIFIED IN ACCORDANCE WITH EN 10204-3.1													
<b>PREPARED BY:</b>				<b>CHECKED BY:</b>									
								<b>AUTHORISED WORK INSPECTOR: QUALITY CONTROL MANAGER / MANUFACTURER'S AUTHORIZED INSPECTOR</b>					



 <b>CCI</b> <small>GLOBAL SUPPLY CHAIN SOLUTIONS A Canada Controls Company</small>		<b>MATERIAL TEST REPORT IN ACCORDANCE WITH EN 10204 - 3.1</b>				DATE 2019.03.20							
<b>COMPANY NAME &amp; ADDRESS:</b> CCI Global - S. Korea 161 Bodeum-Ro, 16bl-18lot, Geomdan Industrial Park, Oryu, Sugu, Incheon, South Korea Telephone +82-32-562-0161		<b>SPECIFICATION REFERENCE:</b> 1. STANDARD: ASTM A216 & A352 GRADE: WCB / LCC YEAR: 2008 2. NACE MR 0175				<b>PURCHASE ORDER NO.</b>  <b>CERTIFICATE NO.</b> 3ZMQ18122801 <b>DATE OF POURING</b> 2018.12.28 <b>VENDOR MARK</b> C3Z							
SERIAL NO. (If applicable)	DESCRIPTION	DRAWING REV. NO.	PART NO.			QUANTITY							
	2" DUAL CHAMBER		260RFDC04			125							
<b>CHEMICAL COMPOSITION %</b>													
<b>ELEMENT</b>	<b>C</b>	<b>Si</b>	<b>S</b>	<b>P</b>	<b>Mn</b>	<b>Ni</b>	<b>Cr</b>	<b>Mo</b>	<b>V</b>	<b>Cu</b>	<b>*RE</b>	<b>*CE</b>	
<b>Minimum</b>											0.000	0.000	
<b>Maximum</b>	0.25	0.60	0.045	0.040	1.20	0.50	0.50	0.20	0.03	0.30	1.530	0.649	
<b>HEAT NUMBER</b>	<b>QTY</b>	<b>ACHIEVED</b>											
8BFF	25	0.18	0.33	0.01	0.01	1.12	0.22	0.002	0.007	0.001	0.001	0.231	0.383
8BFG	25	0.19	0.34	0.01	0.01	1.11	0.20	0.001	0.009	0.001	0.001	0.212	0.391
8BFK	25	0.17	0.31	0.01	0.01	1.09	0.20	0.006	0.008	0.001	0.001	0.216	0.368
8BJF	25	0.17	0.31	0.01	0.01	1.12	0.21	0.027	0.010	0.001	0.001	0.249	0.378
8BJG	25	0.17	0.33	0.01	0.01	1.14	0.20	0.020	0.009	0.001	0.001	0.231	0.379
												0.000	0.000
												0.000	0.000
<b>HEAT TREATMENT:</b>													
QUENCHING Temperature raised to 900°C, soaked for 5.0 hours and then water cooled.    TEMPERING Temperature raised to 620°C, soaked for 8.1 hours and then air cooled.													
<b>MECHANICAL PROPERTIES</b>													
<b>SPECIFICATION</b>	<b>Y.S.</b>	<b>UTS</b>	<b>% ELONGATION IN 50mm (4d)</b>	<b>% REDUCTION IN AREA</b>	<b>NOTCH TOUGHNESS J (at -46.0 °C)</b>		<b>BEND TEST</b>		<b>HARDNESS</b>	<b>PROOF LOAD</b>			
	( MPa )	( MPa )			VALUES	AVERAGE	ANGLE	D	( HIB )	(      )			
<b>Minimum</b>	275	485	22	35	16	20			237				
<b>Maximum</b>		655											
<b>HEAT NUMBER</b>	<b>QTY</b>	<b>ACHIEVED</b>											
8BFF	25	332	538	33	58	44.55.64	54			165			
8BFG	25	336	536	33	59	49.56.67	57			164			
8BFK	25	335	543	34	59	44.57.69	57			159			
8BJF	25	332	539	34	60	46.59.70	58			165			
8BJG	25	331	539	34	60	47.54.72	58			159			
<b>REMARKS :</b>				<b>OTHER COMMENTS:</b>									
1. *RE = Ni + Cr + Mo + V + Cu													
2. *CE = C + [Mn/6] + [(Cr + Mo + V)/5] + [(Ni + Cu)/15]													
<b>CERTIFIED THAT:</b>													
1. THE ABOVE GIVEN DETAILS ARE CORRECT.													
2. THE MATERIAL CONFORMS TO ABOVE SPECIFICATION													
3. THE MATERIAL IS FREE OF CONTAMINATION FROM RADIOACTIVE ELEMENT OR RADIATION													
THE PARTS WERE MANUFACTURED AND TESTED IN ACCORDANCE WITH THE ABOVE SPECIFICATION AND CERTIFIED IN ACCORDANCE WITH EN 10204-3.1													
<b>PREPARED BY:</b>				<b>CHECKED BY:</b>				<b>AUTHORISED WORK INSPECTOR: QUALITY CONTROL MANAGER / MANUFACTURER'S AUTHORIZED INSPECTOR</b>					
													



<b>QINGDAO PIPELINE CO., LTD.</b> ROOM 1303B, UNIT 1, NO.2 MINIANG ROAD, QINGDAO, CHINA TEL:0086 532 85064444/85061468/85065950, FAX:0086 532 85062336 www.lolopipeline.com, E-mail: kqx@plumbingchina.com	<b>MATERIAL TEST REPORT</b>		Date: :MAY 08,2019
	IN ACCORDANCE WITH EN 10204-3.1		PURCHASE ORDER NO.:028163
	SPECIFICATION REFERENCE:		
	1.Standard:	ASTM A105/SA105M-14	CERTIFICATE NO.: MTRZH19324
	Year:	2017	
	Grade:		VENDOR MARK: 
2.NACE MR 0175		DATE OF POURING: 2019-05-08	

SERIAL NO. (If applicable)	DESCRIPTION	HEAT NUMBER	DRAWING NO./PART NO.	QTY
1	FLANGE 2" 150LBS RF SCH40 WN A105	190372		30
2	FLANGE 2" 600LBS RF SCH40 WN A105	190372		150
3	FLANGE 2" 600LBS RF BLIND A105	190372		24
4	FLANGE 3" 600LBS RF BLIND A105	190372		24
5	FLANGE 4" 600LBS RF BLIND A105	190372		24
6	FLANGE 10" 1500LBS RTJ BLIND A105	1900115		2

CHEMICAL COMPOSITION%													
ELEMENT	C	Si	S	P	Mn	Ni	Cr	Mo	V	Cu	Al	*RE	*CE
MIN		0.100			0.600								
MAX	0.350	0.350	0.040	0.035	1.050	0.400	0.300	0.120	0.080	0.400			


HEAT NUMBER	QTY	ACHIEVED											
190372	252	0.180	0.240	0.007	0.015	0.960	0.011	0.023	0.008	0.002	0.016		
1900115	2	0.180	0.240	0.006	0.013	0.950	0.019	0.021	0.007	0.004	0.027		

HEAT TREATMENT: NORMALIZED AT 900°C FOR 2 HOURS, COOLED IN STILL AIR

MECHANICAL PROPERTIES										
SPECIFICATION	Y.S. (MPa)	UTS (Mpa)	%ELONG .in 50mm (4d)	%RED. IN AREA	Notch Toughness(at -46°C)J		BEND TEST		HARDNESS (HB)	PROOF LOAD
					Values	Avg.	ANGLE	D		
MIN	250	485	22	30						
MAX									187	

HEAT NUMBER	QTY	ACHIEVED									
190372	252	308	544	31.5	73						158/161/164
1900115	2	311	541	32.5	74						160/162/163

REMARKS:  
 1.\*RE=Ni+Cr+Mo+V+Cu  
 2.\*CE=C+【Mn/6】+【(Cr+Mo+V)/5】+【(Ni+Cu)/15】  
 OTHER COMMENTS:

CERTIFIED THAT:	Manager-Quality Control Manufacturer's Authorized Inspector  
1.THE ABOVE GIVEN DETAILS ARE CORRECT	
2.THE MATERIAL CONFORMS TO ABOVE SPECIFICATION	
3.THE MATERIAL IS FREE OF CONTAMINATION FROM RADIOACTIVE ELEMENT OR RADIATION	
THE PARTS WERE MANUFACTURED AND TESTED IN ACCORDANCE WITH THE ABOVE SPECIFICATION AND CERTIFIED IN ACCORDANCE WITH EN 10204-3.1	
Prepared by:	Checked by:
GU	JIANGWEIZENG



# MILL TEST CERTIFICATE

ACCORDING TO : EN-10204-3.1

MANUFACTURER: SHANDONG FLYING CASTING AND FORGING CO.LTD

PRODUCT: PIPE FITTINGS

DATE: DEC.03,2012


INVOICE NO.		MATERIAL GRADE		Technical Requirements															
ZH2012843		ASTM A105/A105M-05		ANSI B16.11-1996 PED 97/23/EC Annex I Sec.4.3															
ITEM	HEAT NO.	DESCRIPTION				QTY (PCS)	INSPECTION RESULT												
		C%	Si%	Mn%	P%		Visual inspection:	Dimensional inspection:											
1	10034	Threadolet specifically for 2" pipe, 3000# A105				2500	Acceptable	Acceptable											
2	10001	1"				2500	Acceptable	Acceptable											
MECHANICAL PROPERTIES																			
ITEM	HEAT NO.	CHEMICAL COMPOSITION %				Mo%	Ni%	Cr%	S%	P%	Mn%	Si%	C%	TENSILE STRENGTH MPA	BRINELL HARDNESS SS	Cu%	YIELD STRENGTH 0.2% offset MPA	ELONGATION in 2 inch. %	REDUCTI ON OF AREA, MIN%
		V%	Mo%	Ni%	Cr%														
1	10034	0,24	0,18	0,78	0,022	0,005	0,004	0,300	0,040	0,035	1,05	0,35	0,35	485	-	0,4	250	22	30
2	10001	0,19	0,22	0,74	0,021	0,004	-	-	-	0,021	0,74	0,19	499	-	-	268	28	-	
APPROVED Chief of Inspection Section: LIL THE MATERIAL IS COMPLIANT WITH NACE MR0175-2009. NORMALIZED AT 900°C FOR 3 HOURS, COOLED IN STILL AIR																			

For and on behalf of  
 SHANDONG FLYING CASTING & FORGING COMPANY LIMITED



Authorized Signatory(S)

HEAT: 50608

 The Best Value -  
Price, Quality, Service  
All The Time.

LOG NO. F0000000129715 Page 1 of 1

BONNEY FORGE CORPORATION  
P.O. BOX 330 • 14496 CROGHAN PIKE • MOUNT UNION, PA 17066-0330  
(814) 542-2545 • (800) 345-7546 • FAX (814) 542-4906  
www.bonneyforge.com

CUSTOMER.

DATE 11/11/2019

CUSTOMER  
ORDER NO.:

BONNEY ORDER NO. B000266410

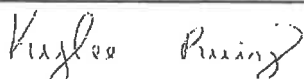
SHIP TO:

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

ITEM	QUANTITY	LOT NO.	GRADE OR SPECIFICATION NO.	CHEMICAL ANALYSIS, PHYSICAL PROPERTIES, REMARKS:
7550987	3	2	50608	5 - 4 X 1 XS A105N WELD B SA/A105N
			↑	C 0.190 Cb 0.004 Co 0.000 Cr 0.130 Cu 0.270 Mn 1.010 Mo 0.020 Ni 0.080 P 0.007 S 0.021 Si 0.230 V 0.025 CE(Long Formula) = 0.42 T/S(PSI) 76,000 Y/S(PSI) 51,000 EL(%) 34.00 RA(%) 64.00 Brinell Hardness 149 BHN 152 BHN

1. THE FITTINGS SUPPLIED ARE IN ACCORDANCE WITH PURCHASE ORDER SPECIFICATIONS.
2. THE MATERIAL SUPPLIED IDENTIFIED AS A105N WAS NORMALIZED IN ACCORDANCE WITH ASTM A105 HEAT TREATING REQUIREMENTS.
3. THE MATERIAL SUPPLIED AS A105N MEETS THE REQUIREMENTS OF BOTH NACE MR0103/ISO 17945 - 2015 & NACE MR0175/ISO 15156-2 - 2015 EDITION.
4. CERTIFYING ASTM A105-18 / ASME SA105-17 EDITION.
5. THE PRODUCT SUPPLIED WAS INSPECTED IN ACCORDANCE WITH EN 10204:2004 EDITION TYPE 3.1 INSPECTION DOCUMENT. (EUROPEAN STANDARD)
6. THE UNIT OF MEASURE FOR TENSILE AND YIELD (0.2%) STRENGTH ARE REPORTED IN PSI.
7. ELONGATION TEST RESULTS ARE OBTAINED USING STANDARD ROUND SPECIMEN, 2 INCH OR 50 MM GAGE LENGTH.

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


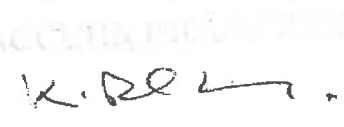


by   
Kylee Ruiz  
QUALITY PROCESS MANAGER

CMTR: REV2





**REVIEWED**  
By Daniel Fielder at 2:16 pm, Oct 07, 2019

		<b>MATERIAL TEST REPORT IN ACCORDANCE WITH EN 10204 - 3.1</b>				DATE: 17-06-2019							
		COMPANY NAME & ADDRESS: M/S ACCURA INDUSTRIES 15 C1,10TH STREET GANAPATHYPUDUR,COIMBATORE-641006 TAMILNANU,INDIA				SPECIFICATION REFERENCE: 1. STANDARD: ASTM A240 GRADE: SS316 YEAR: 2013 2. NACE MR 0175				PURCHASE ORDER NO. PO026155 CERTIFICATE NO.: AI/TC/864 DATE OF POURING VENDOR MARK : A			
SERIAL NO. (If applicable)	DESCRIPTION					DRAWING R	PART NO.				QUANTITY		
	O-PLT 2"X1/8" Various Bores, 316SS				3	260DC13-316-XXXX-125				210			
	O-PLT 3"X1/8" Various Bores, 316SS				3	360DC13-316-XXXX-125				200			
	O-PLT 4"X1/8" Various Bores, 316SS				3	460DC13-316-XXXX-125				247			
	O-PLT 6"X1/8" Various Bores, 316SS				3	660DC13-316-XXXX-125				10			
<b>CHEMICAL COMPOSITION %</b>													
ELEMENT	C	Si	S	P	Mn	Ni	Cr	Mo	V	Cu	*RE	*CE	
Minimum						10.00	16.00	2.00			28.00	4.27	
Maximum	0.08	1.00	0.03	0.045	2.00	14.00	18.00	3.00			35.00	5.55	
HEAT NUMBER	QTY	ACHIEVED											
21800126	210	0.02	0.23	0.004	0.037	1.22	10.03	16.45	2.05			28.53	4.59
21800126	200	0.02	0.23	0.004	0.037	1.22	10.03	16.45	2.05			28.53	4.59
21800126	247	0.02	0.23	0.004	0.037	1.22	10.03	16.45	2.05			28.53	4.59
21800126	10	0.02	0.23	0.004	0.037	1.22	10.03	16.45	2.05			28.53	4.59
											0.00	0.00	
											0.00	0.00	
											0.00	0.00	
HEAT TREATMENT: SOLUTION ANNEALED													
<b>MECHANICAL PROPERTIES</b>													
SPECIFICATION	Y.S. (MPa)	UTS (MPa)	% ELONGATION IN 50mm (4d)	% REDUCTION IN AREA	NOTCH TOUGHNESS J (at °C)		BEND TEST		HARDNESS		PROOF LOAD		
					VALUES	AVERAGE	ANGLE	D	(BHN)	( )			
Minimum	205	515	40	50					215				
Maximum													
HEAT NUMBER	QTY	ACHIEVED											
21800126	210	336	601	55						147-150			
21800126	200	336	601	55						147-150			
21800126	247	336	601	55						147-150			
21800126	10	336	601	55						147-150			
REMARKS :				OTHER COMMENTS:									
1. *RE = Ni + Cr + Mo + V + Cu 2. *CE = C + [Mn/6] + [(Cr + Mo + V)/5] + [(Ni + Cu)/15]													
CERTIFIED THAT: 1. THE ABOVE GIVEN DETAILS ARE CORRECT. 2. THE MATERIAL CONFORMS TO ABOVE SPECIFICATION. 3. THE MATERIAL IS FREE OF CONTAMINATION FROM RADIOACTIVE ELEMENT OR RADIATION THE PARTS WERE MANUFACTURED AND TESTED IN ACCORDANCE WITH THE ABOVE SPECIFICATION AND CERTIFIED IN ACCORDANCE WITH EN 10204-3.1													
PREPARED BY:				CHECKED BY:				AUTHORISED WORK INSPECTOR: QUALITY CONTROL MANAGER / MANUFACTURER'S AUTHORISED INSPECTOR					
													



# 泰州市恒达新型复合材料有限公司

JIANGSU STEEL GROUP CO., LIMITED

编号: JSSG201903017007D

## 质量证明书 (TEST REPORT)

订货单位 CUSTOMER		APS Machining		产品名称 PRODUCT		STAINLESS STEEL ROUND BAR		交货状态 DELIVER STATE		POLISHED											
收货单位 PURCHASER		APS Machining		代号 CUSTOMER'S NO.		HD100289															
技术标准 SPECIFICATION		ASTM A276-06		客户订单编号 CUSTOMER ORDER NO		HD5328															
序号 NO.	钢号 TYPE	炉号 HEAT NO.	规格及重量 MATERIAL DESCRIPTION	化学成分 CHEMICAL COMPOSITION % (熔炼分析 HEAT ANALYSIS)											拉伸试验 TENSILE TEST (G.L=L3)		BEN D TES T	*02 HARD NESS	试样热处理		
				C	Si	Mn	P	S	Ni	Cr	Mo	Ti	N	Cu	屈服 Y.S.	抗拉 T.S.				EL %	F.M. (Kg/m)
3	316L	S257	1"	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	208	521	35		
4	316L	S258	2"	0.024	0.75	1.69	0.027	0.001	10.03	16.52	2.01	100%	100%	100%	100%	211	535	35			
5	316L	S259	2.75"	0.026	0.65	1.81	0.023	0.001	10.17	16.21	2.03	100%	100%	100%	100%	212	537	35			
6	316L	S260	4.75"	0.025	0.65	1.82	0.024	0.001	10.11	16.17	2.05	100%	100%	100%	100%	212	537	35			
7	316L	S261	5.0"	0.027	0.67	1.74	0.027	0.001	10.01	16.23	2.05	100%	100%	100%	100%	213	535	35			
8	316L	S262	6.25"	0.028	0.66	1.75	0.027	0.001	10.07	16.27	2.07	100%	100%	100%	100%	218	545	35			
9	316L	S263	8.5"	0.028	0.65	1.72	0.025	0.001	10.12	16.57	2.04	100%	100%	100%	100%	218	545	35			
10	316L	S264	10.75"	0.029	0.54	1.65	0.021	0.001	10.02	16.78	2.11	100%	100%	100%	100%	218	545	35			
判定员:				0.022		0.68	1.77	0.026	0.001	10.12	16.58	2.01	100%	100%	100%	100%	218	545	35		

合格  
Qualified

本产品已按上述要求进行制造和检验,其结果符合要求,特此证明。  
This product has been manufactured and tested accordingly, I hereby certify

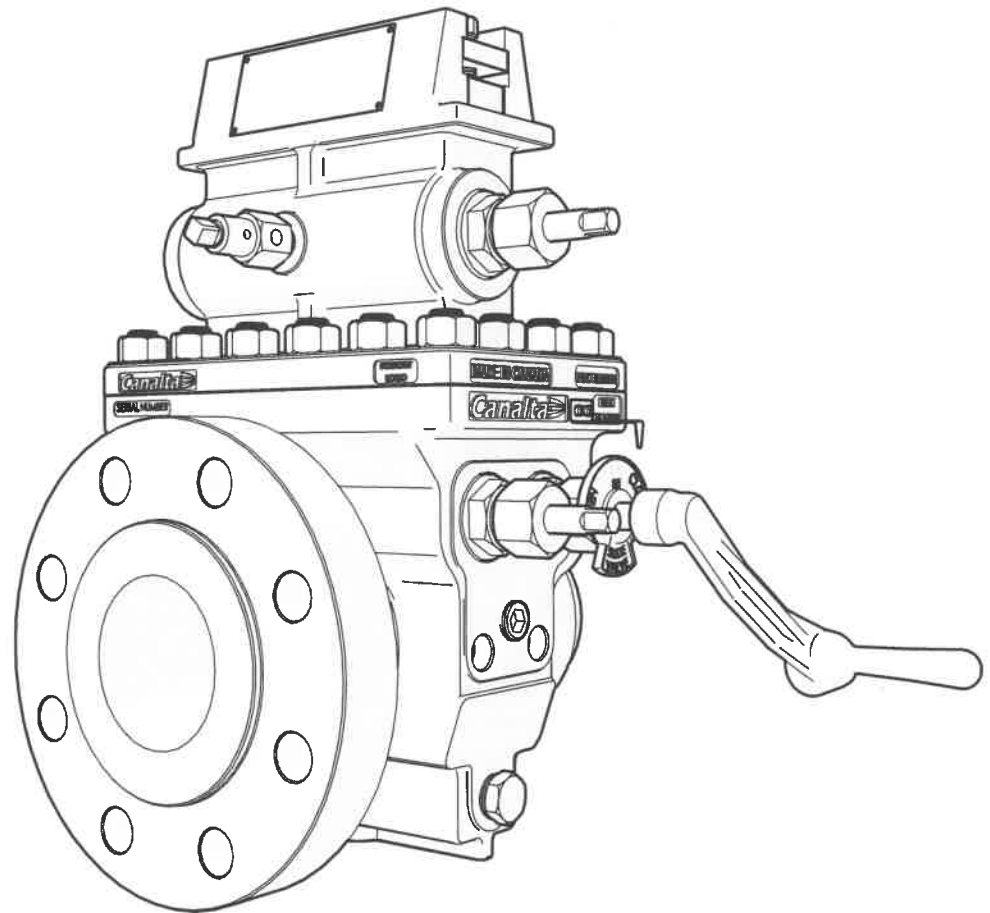


SURVEYOR TO: 刘鑫  
质检部长: 刘鑫  
QC MANAGER: 刘鑫

# **Canalta**

**Flow Measurement**

---



## **OPERATIONS AND MAINTENANCE GUIDE**

**FOR DUAL CHAMBER ORIFICE FITTINGS**

**Call Us Toll Free: 1-855-CANALTA**  
An ISO 9001:2015 registered company

Phone: (+1) 403.342.4494  
Email: [sales@canaltaflow.com](mailto:sales@canaltaflow.com)  
[www.canaltaflow.com](http://www.canaltaflow.com)

## CONTENTS

Normal Operation .....	4
Key Operating Parts .....	5
Removing the Orifice Plate .....	6
Orifice Plate Inspection .....	13
Replacing the Orifice Plate .....	14
Greasing Procedure .....	21
Installation Preservation & Storage Requirements .....	22
Model Numbering System .....	23
Orifice Fitting Quick Inspection & Assessment .....	24
Scheduled Teardown Maintenance .....	25
Lifting and Handling .....	26

## WARNINGS



**WARNING: PRESSURIZED UNIT.**

Ensure all operating staff are trained in the safe operation of this and all other pressurized equipment. **SAFETY FIRST.**



Orifice fittings and their components can present both heavy lifting and tip over hazards. Workers should wear suitable PPE at all times and have strategies in place for safely lifting, moving and storing orifice fittings and their components.



The soft seat valve seal design *does not* require lubrication through the grease port. Attempting to lubricate a Canalta DC Orifice fitting equipped with a soft seat slide valve will cause the inner O-ring seal to be ejected from the dovetail groove *resulting in valve failure.*

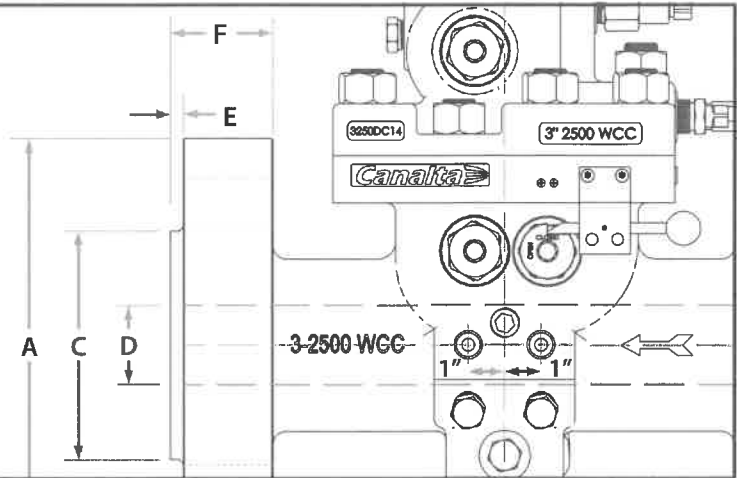
## CHANGE OF OWNERSHIP

By purchasing meters/meter runs from Canalta, a client would have entered into a binding contract. At the point of delivery/receiving of goods, the ownership of the purchased goods is then transferred to the client.

It is the responsibility of the client to ensure that any practices carried out after transfer of ownership are to be in compliance with manufacturing codes, standards and governing statutory legislation. Moreover, any activities need to be approved by the relevant Notified Bodies where applicable.

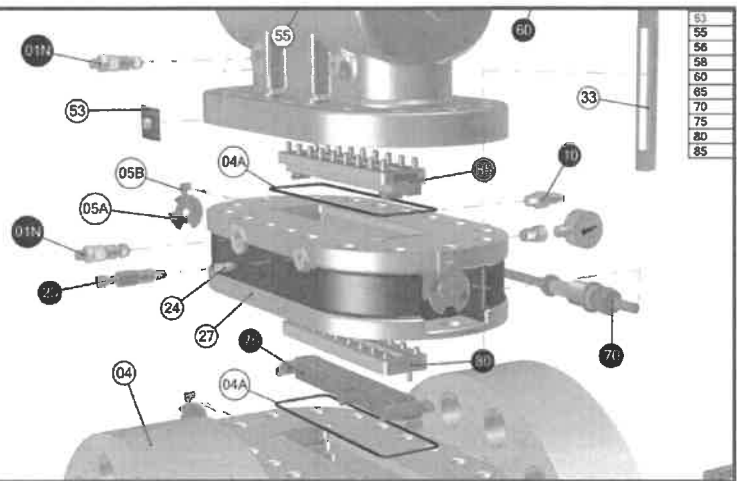
*Complete dimensions tables for all of our orifice fitting models are available by contacting your nearest Canalta Flow Measurement sales representative.*

*Find a list of our offices and global distribution partners at [www.canaltaflow.com/global](http://www.canaltaflow.com/global)*



*Looking for general assembly diagrams? Contact your nearest Canalta Flow Measurement sales representative to get all of the technical documents you need.*

*Find a list of our offices and global distribution partners at [www.canaltaflow.com/global](http://www.canaltaflow.com/global)*



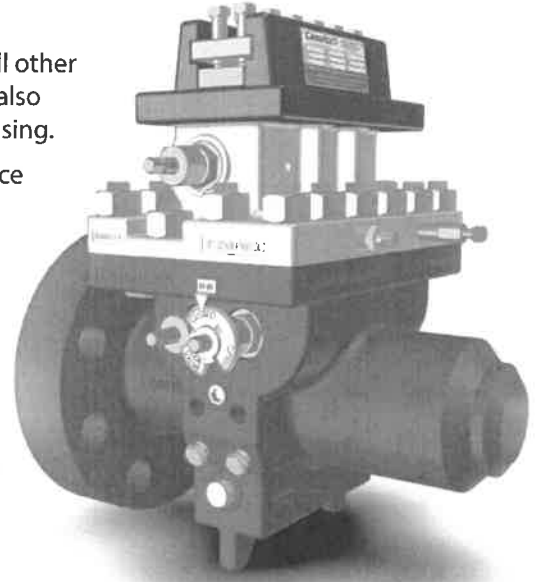
*Canalta supplies a complete lineup of quality orifice fitting replacement parts and accessories - many of them compatible with other industry leading brands.*

*Find a list of our offices and global distribution partners at [www.canaltaflow.com/global](http://www.canaltaflow.com/global)*



## GENERAL OPERATING NOTES

- It is the responsibility of the end user to ensure all operating staff are competent and properly trained in the operation of this and all other pressurized equipment. The following operating instructions are also given on the operating plate attached to each flow meter top housing.
- It is the responsibility of the end user to assess the expected surface temperature of the unit while in service, and to take the necessary precautions to avoid operator injury.
- It is the responsibility of the end user to account for all vented process fluids, and to develop the necessary procedures to avoid operator injury and environmental damage.



*During normal operation, only the lower chamber is pressurized. Atmospheric pressure in the upper chamber is necessary for proper functioning of the inner slide valve.*

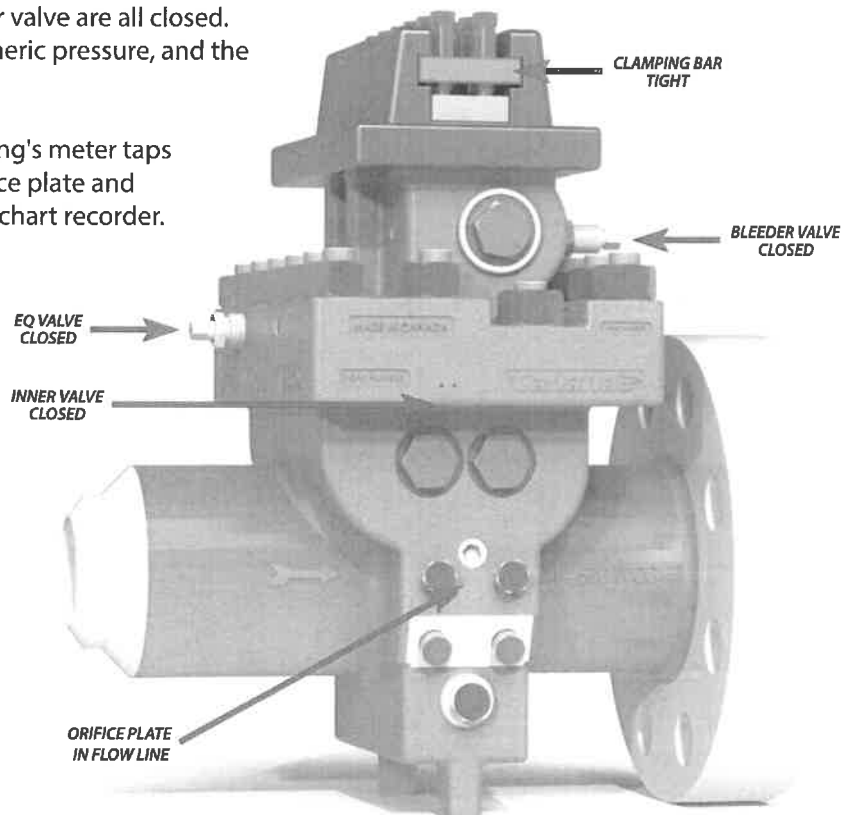
## NORMAL OPERATION

The Canalta Dual Chamber Orifice Fitting allows for accurate placement of an orifice plate in the flow line, along with easy removal and replacement, without interrupting the flow or dismantling the pipeline. Flow of the gas or liquid through the orifice plate creates the differential pressure which is measured and used for the calculation of the flow rate through the pipeline.

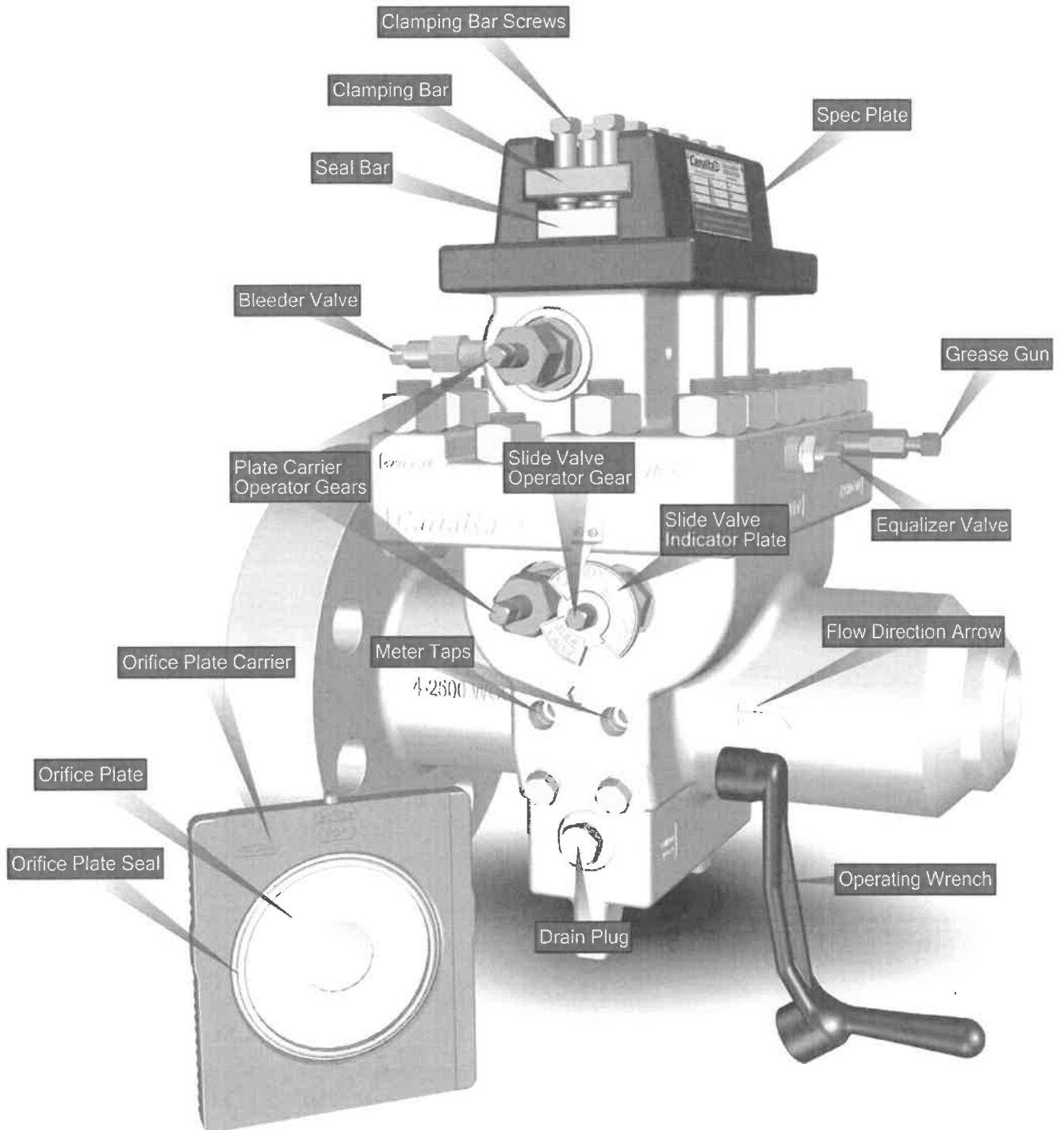
The unit is in normal metering status when the plate carrier and orifice plate are in the lower chamber, concentric to the flow line, and the inner slide valve, equalizer valve and bleeder valve are all closed. The upper chamber of the unit is at atmospheric pressure, and the clamping bar at the top of the unit is tight.

Pressure sensors installed in the lower housing's meter taps read the differential pressure across the orifice plate and transmit the readings to a flow computer or chart recorder.

Orifice plate condition is critical to accurate metering. The orifice plate must be removed and inspected for damage, general wear and particulate build-up regularly. Prior to beginning the orifice plate removal procedure, the operator must confirm that the clamping bar is tight and that the bleeder valve is fully closed.

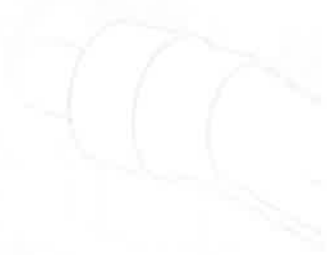
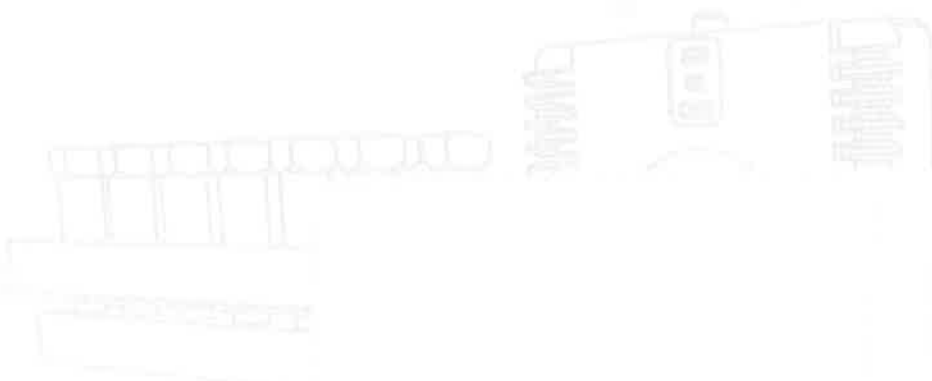


## KEY OPERATING PARTS AT A GLANCE



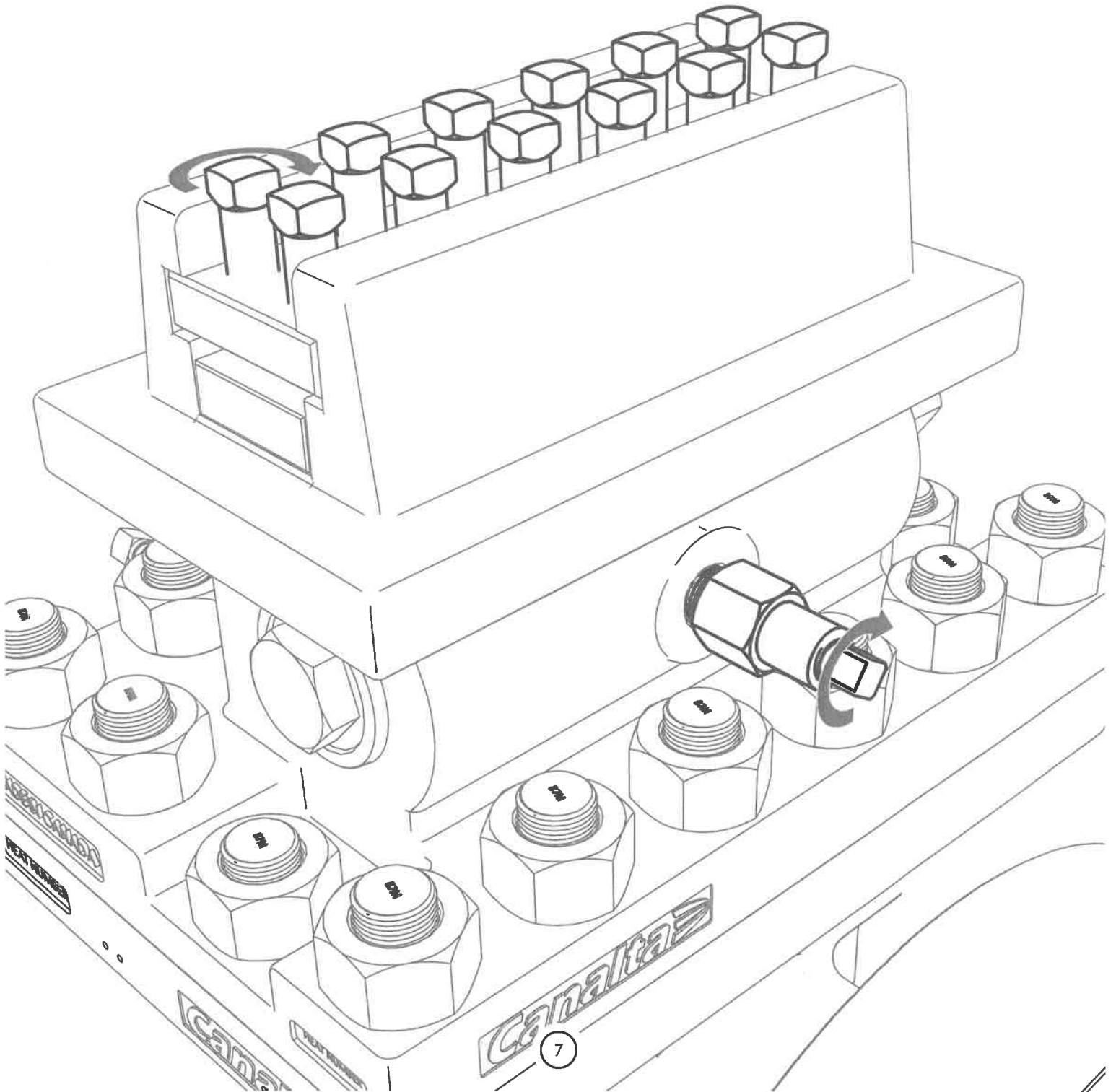


**REMOVING THE  
ORIFICE PLATE**



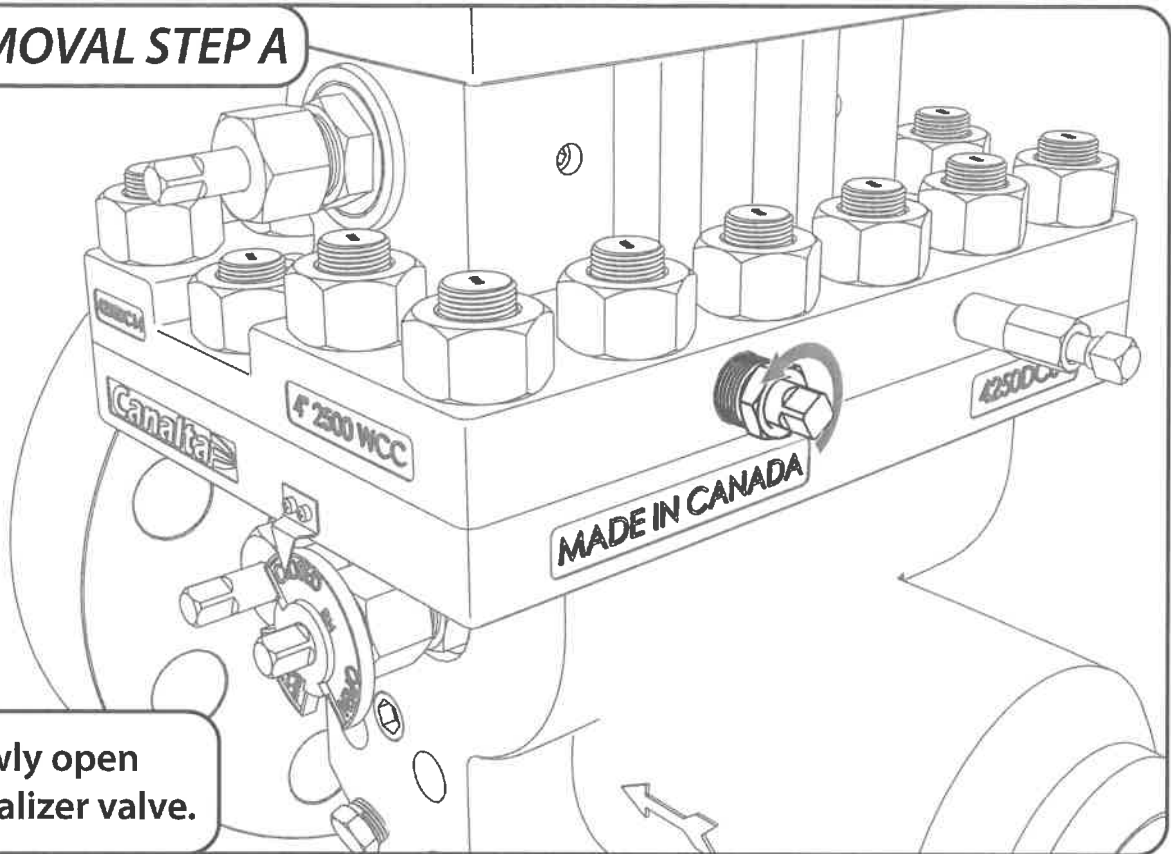


Ensure the bleeder valve is closed and clamping bar tight before beginning.



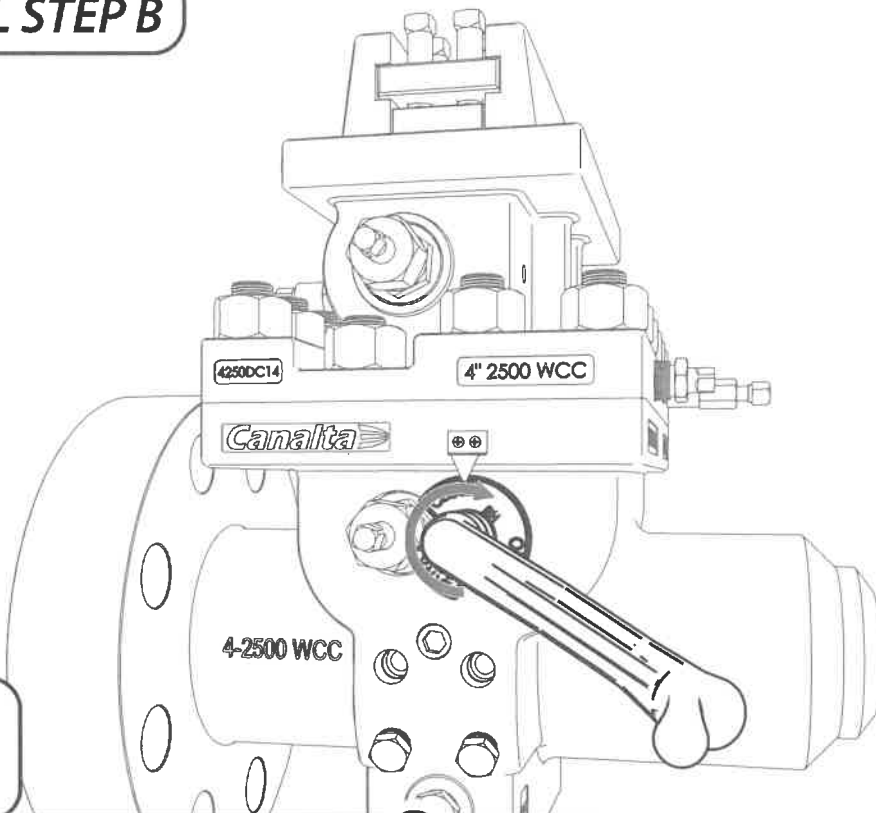
## REMOVAL STEP A

Slowly open  
equalizer valve.

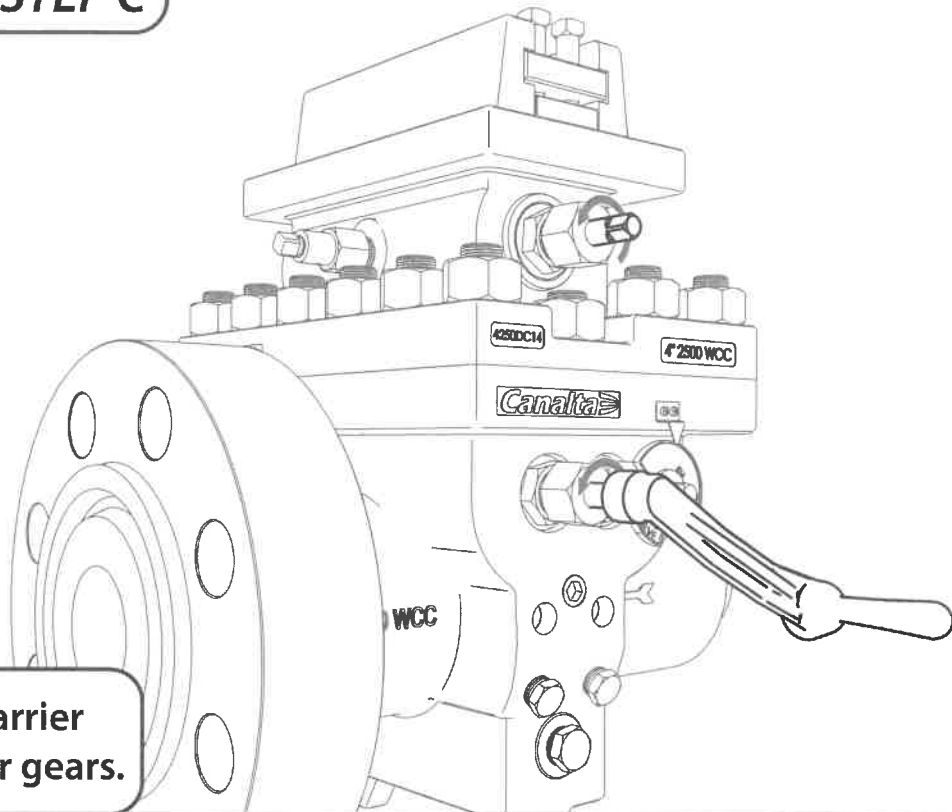


## REMOVAL STEP B

Open inner  
slide valve.

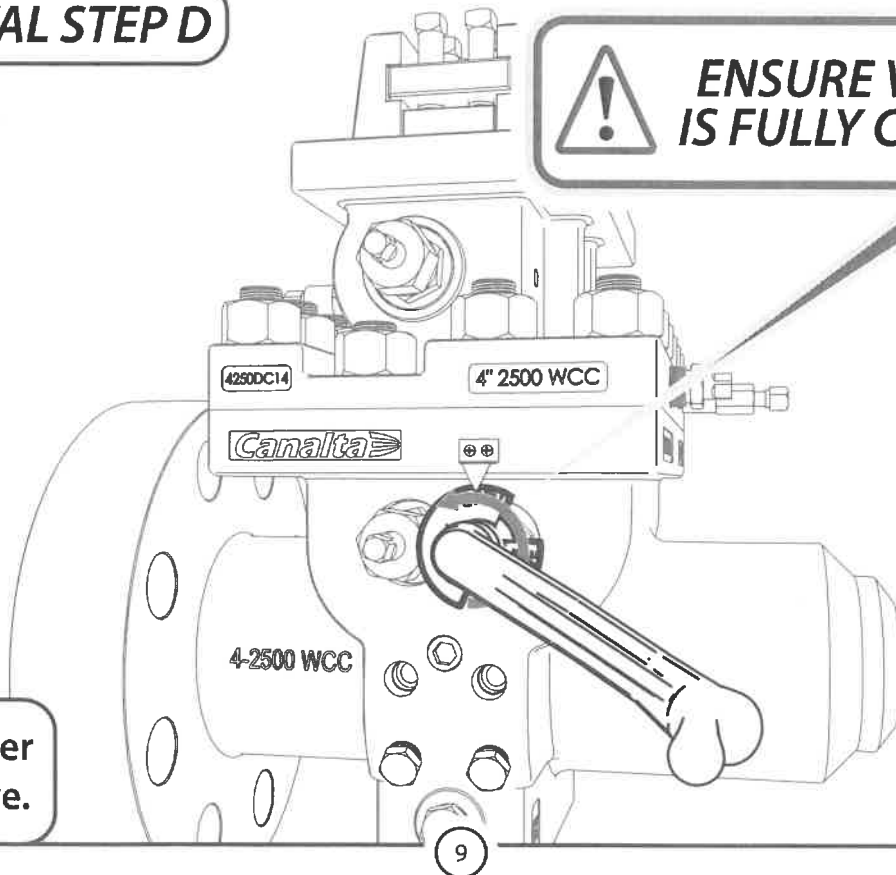


## REMOVAL STEP C



Raise plate carrier  
with operator gears.

## REMOVAL STEP D



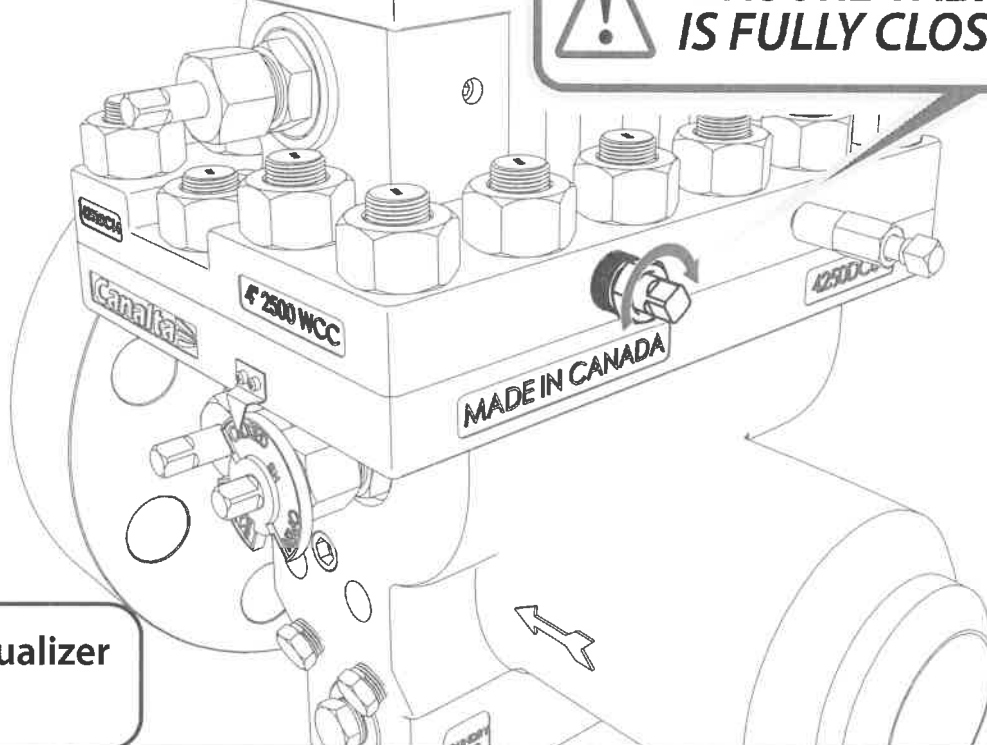
**ENSURE VALVE  
IS FULLY CLOSED**

Close inner  
slide valve.

### REMOVAL STEP E



**ENSURE VALVE  
IS FULLY CLOSED**



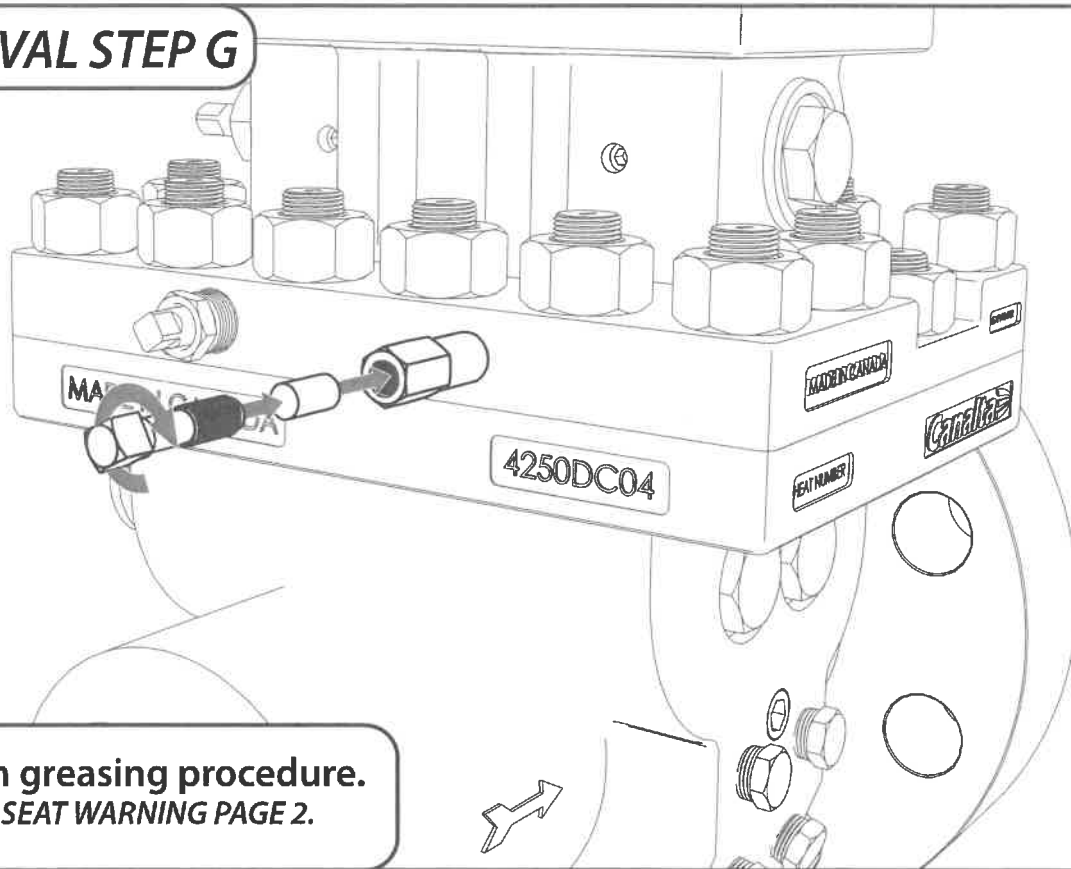
**Close equalizer  
valve.**

### REMOVAL STEP F



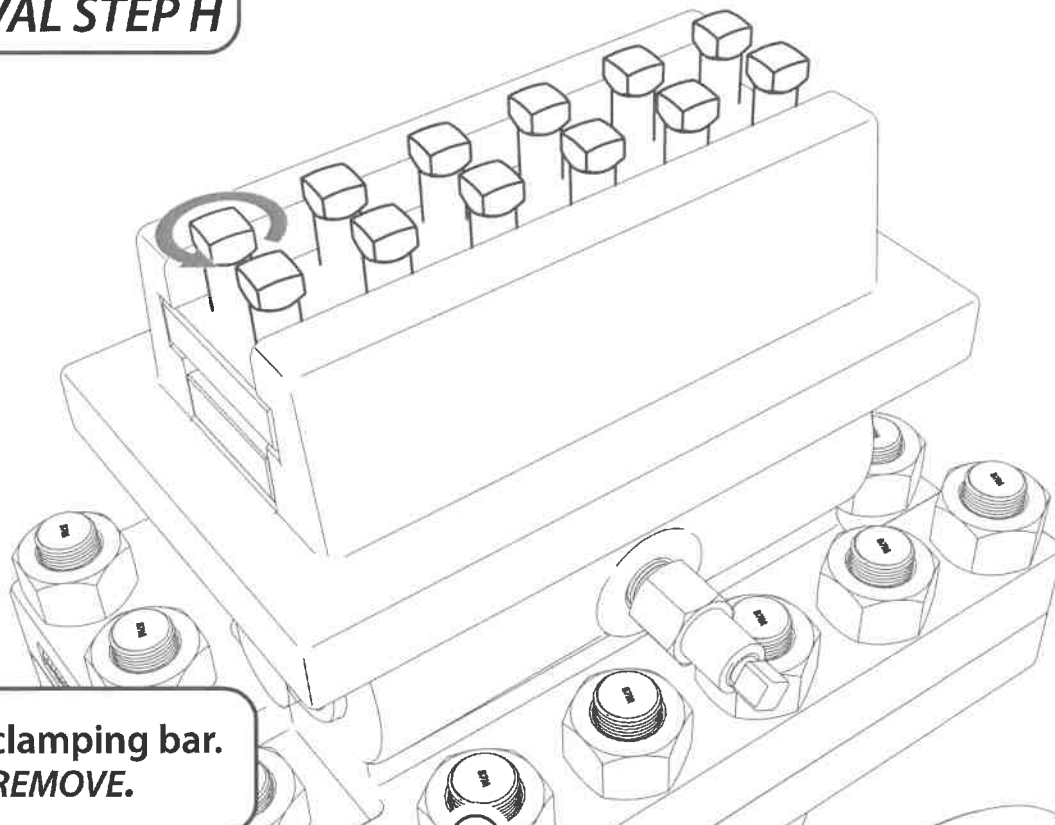
**Open bleeder  
valve.**

### REMOVAL STEP G



Perform greasing procedure.  
SEE SOFT SEAT WARNING PAGE 2.

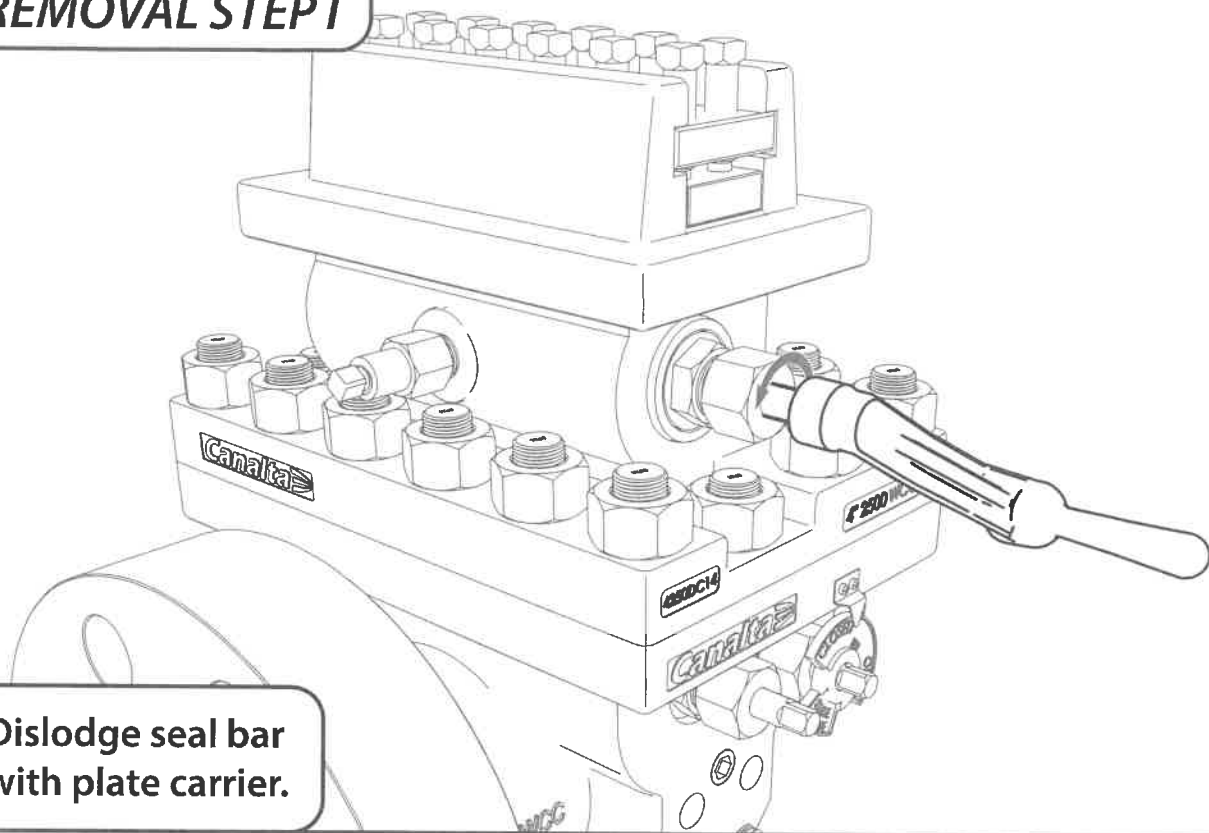
### REMOVAL STEP H



Loosen clamping bar.  
DO NOT REMOVE.

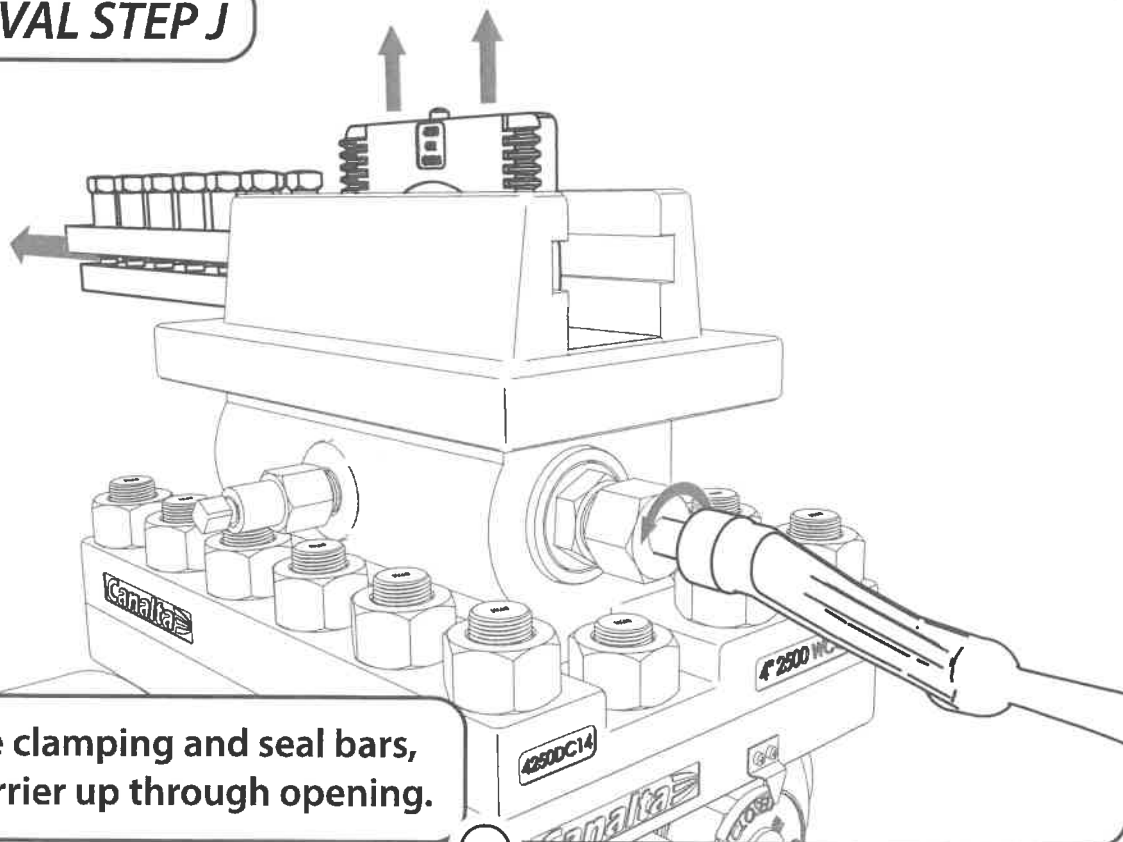
### REMOVAL STEP I

Dislodge seal bar with plate carrier.



### REMOVAL STEP J

Remove clamping and seal bars, raise carrier up through opening.



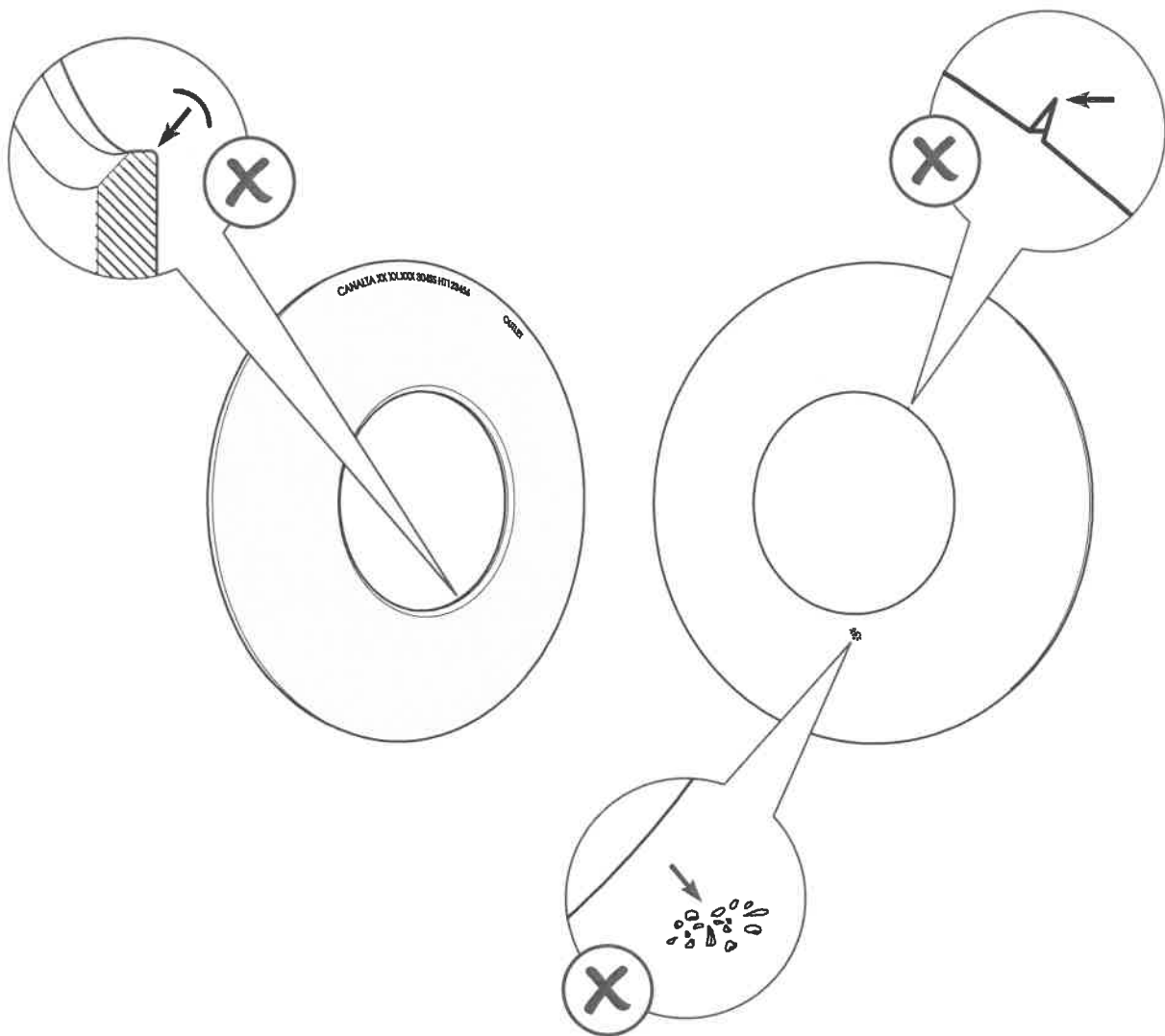


## ORIFICE PLATE INSPECTION

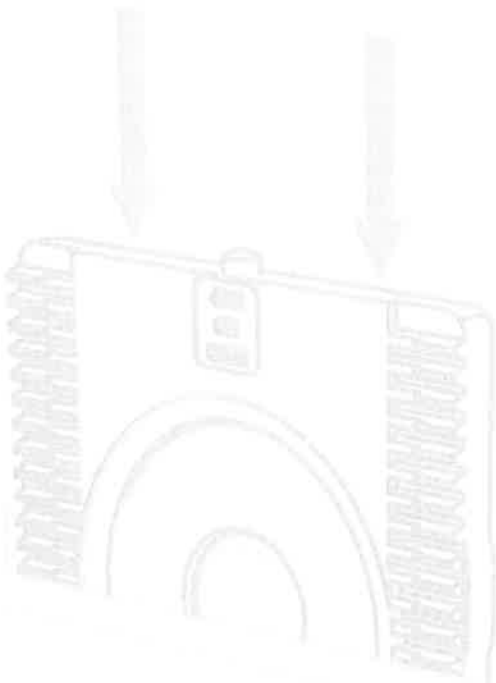
Regular orifice plate inspections are crucial to measurement accuracy. Canalta recommends that the orifice plate be removed from the flow line and inspected at least monthly. AGA-3 / API 14.3 sections 2.4.1 and 2.4.2 outline orifice plate parameters that can be affected by service conditions. Damage, excessive wear and build-up can lead to a reduction in flow meter accuracy.

Pay particular attention to dirt, grease or ice accumulation, pitting due to corrosion, nicks, dings and other impact damage, as well as general wear and erosion of the normally sharp bore edges. Replace the orifice plate as necessary.

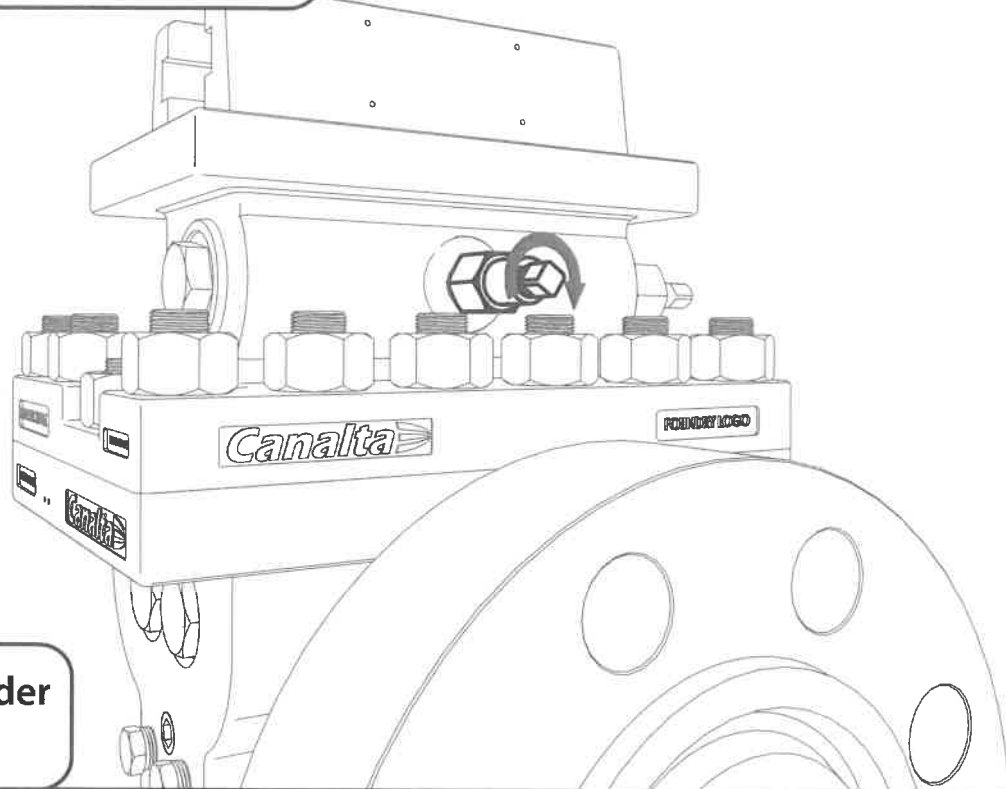
Orifice plate seals should also be inspected to reduce the possibility of bypass. Pay attention to dirt or grease accumulation, cracks, tears or cuts and swelling. Replace seals as necessary.



**REPLACING THE  
ORIFICE PLATE**

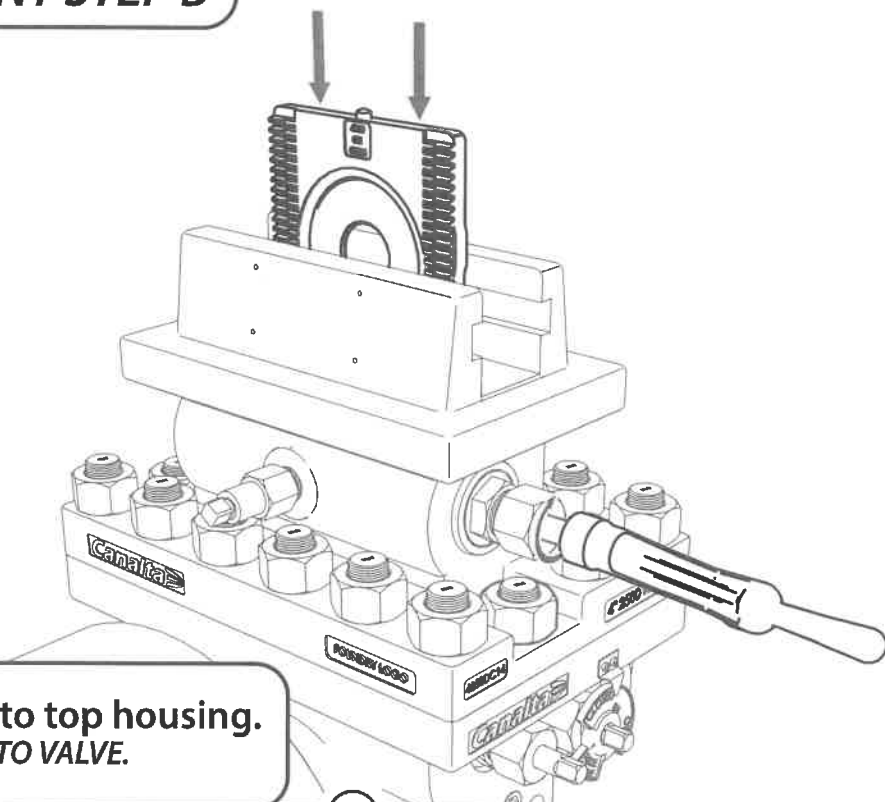


## REPLACEMENT STEP A



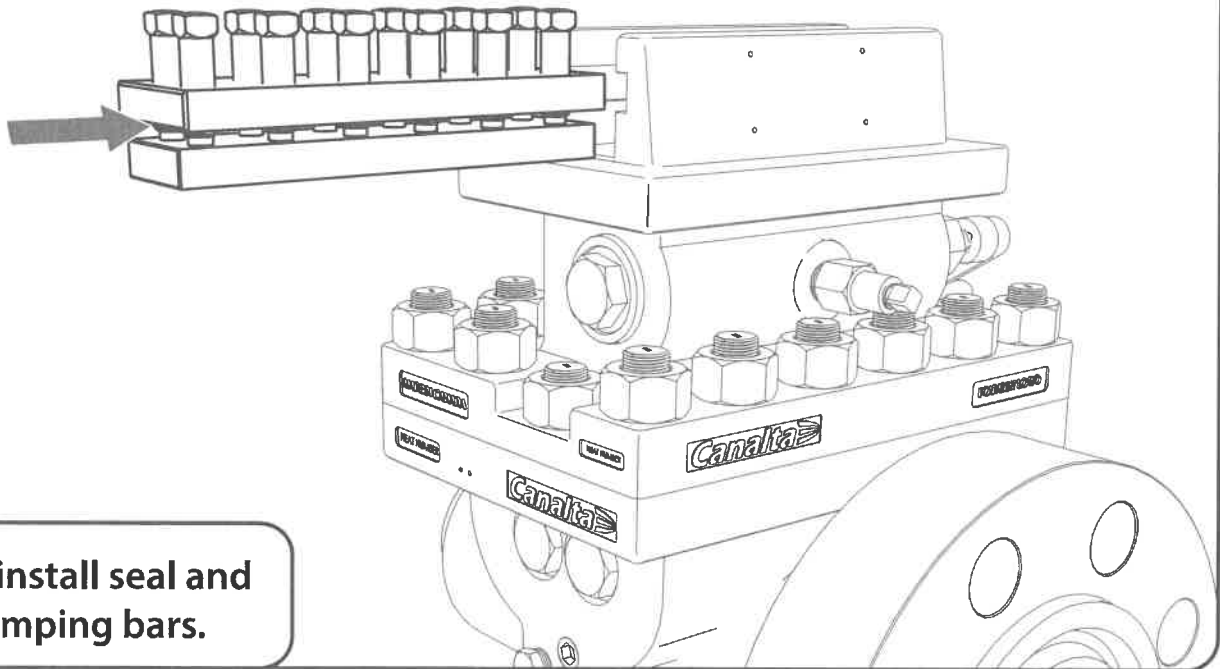
Close bleeder valve.

## REPLACEMENT STEP B



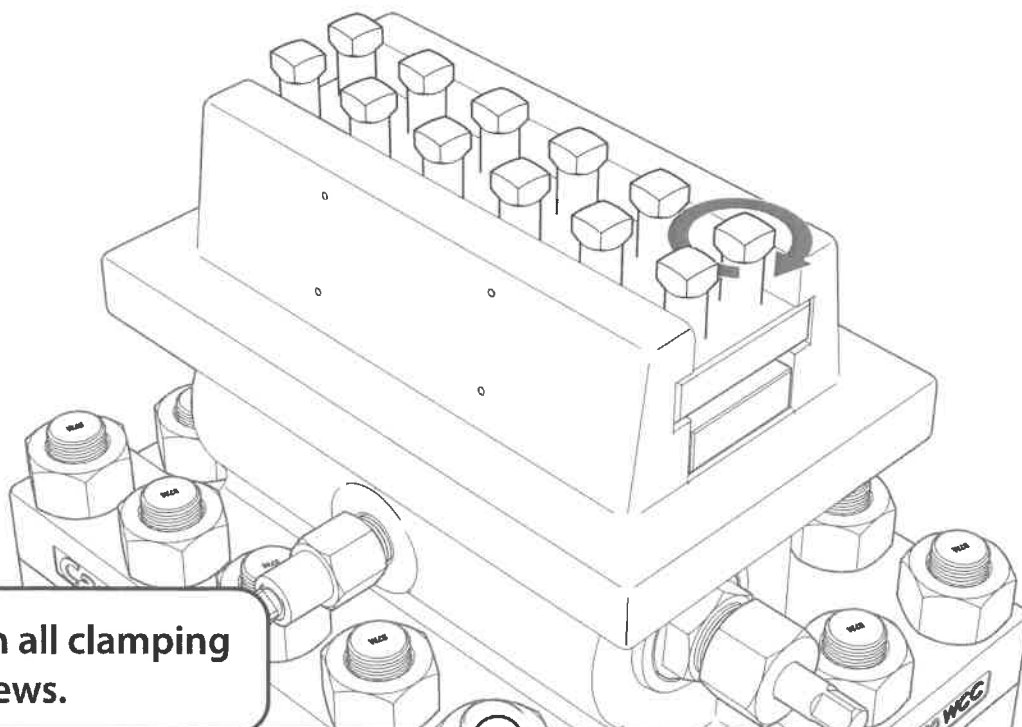
Lower carrier into top housing.  
DO NOT LOWER ONTO VALVE.

## REPLACEMENT STEP C



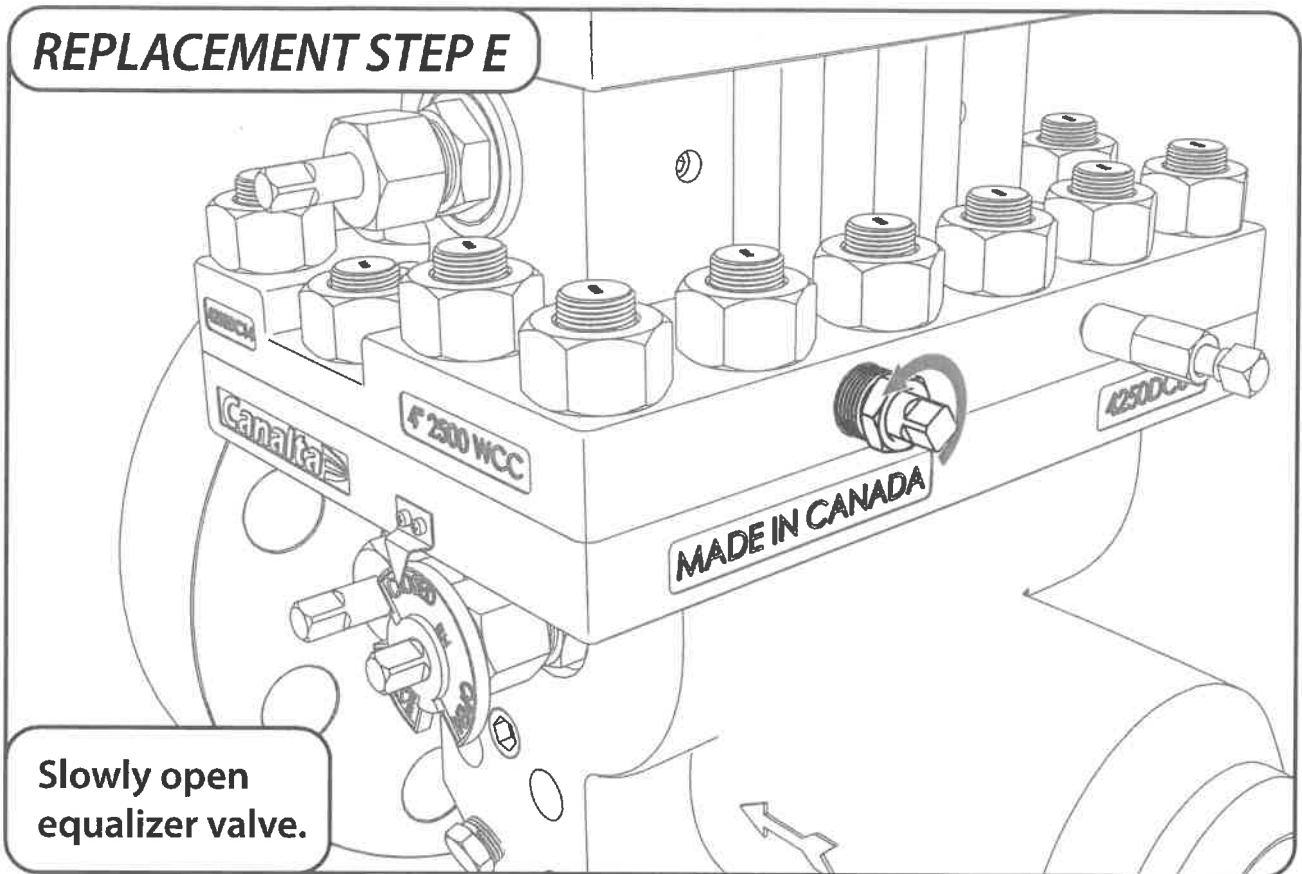
Reinstall seal and clamping bars.

## REPLACEMENT STEP D

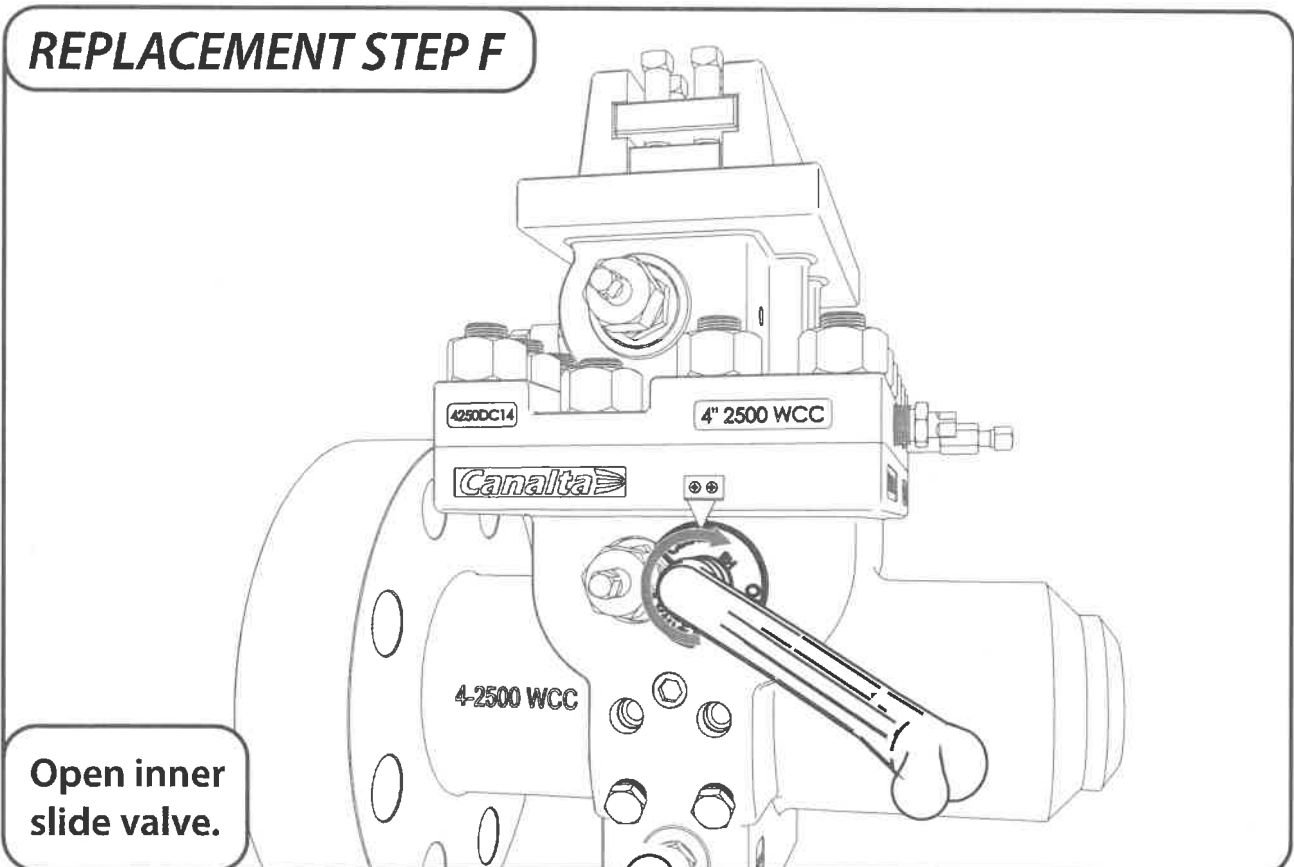


Tighten all clamping bar screws.

## REPLACEMENT STEP E

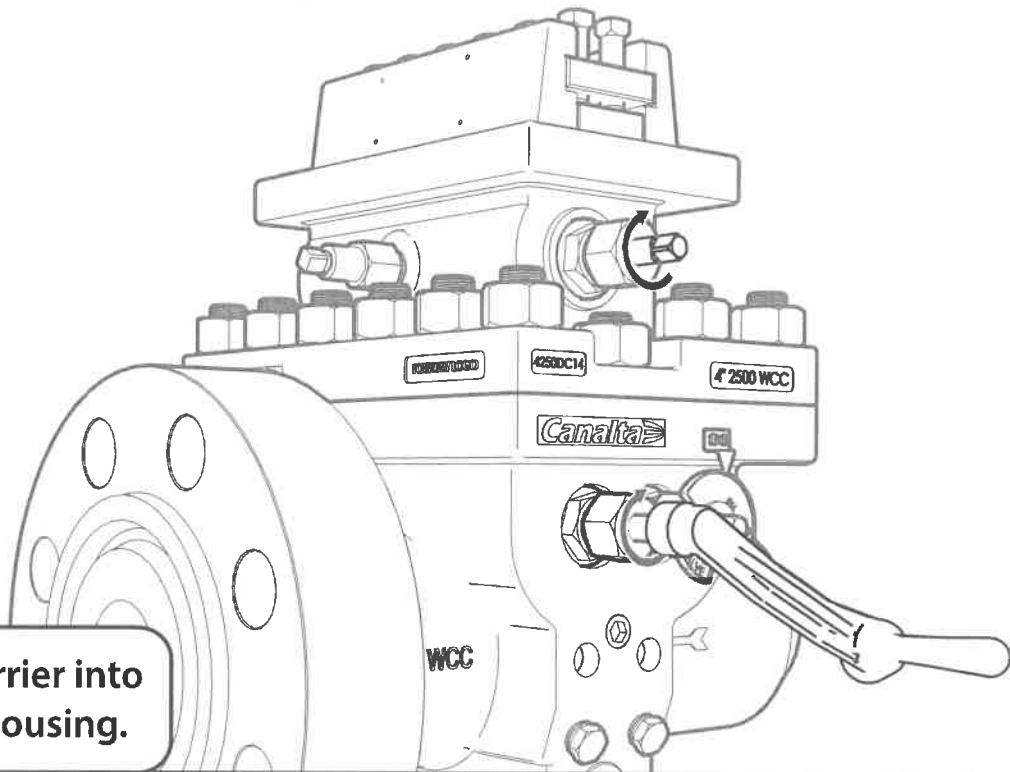


## REPLACEMENT STEP F



## REPLACEMENT STEP G

Lower carrier into bottom housing.

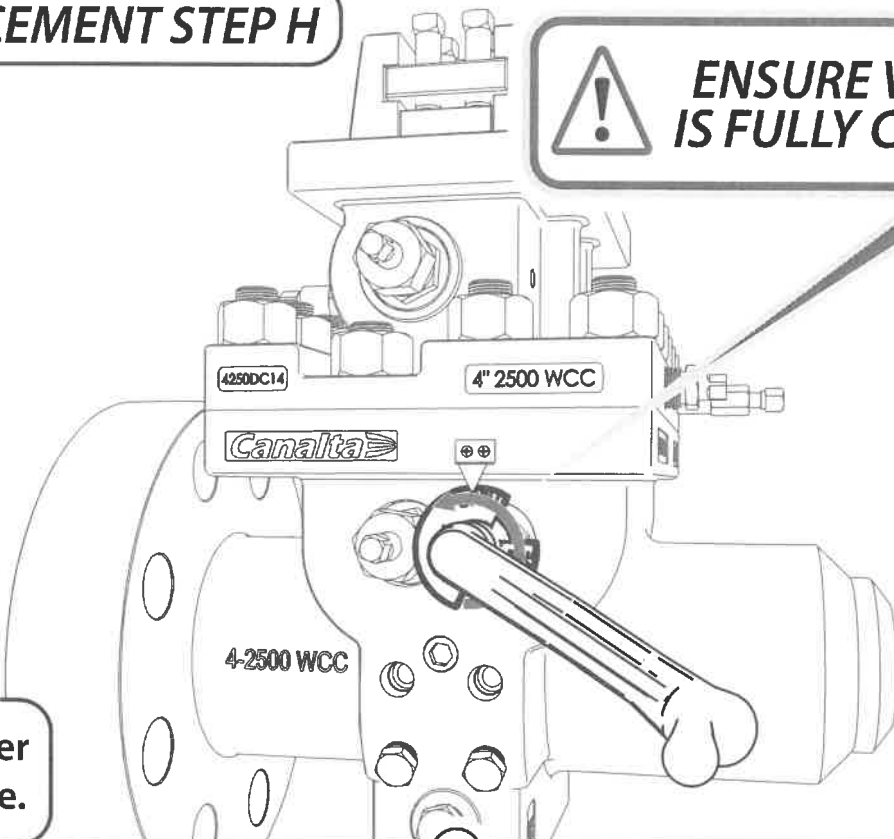


## REPLACEMENT STEP H



**ENSURE VALVE IS FULLY CLOSED**

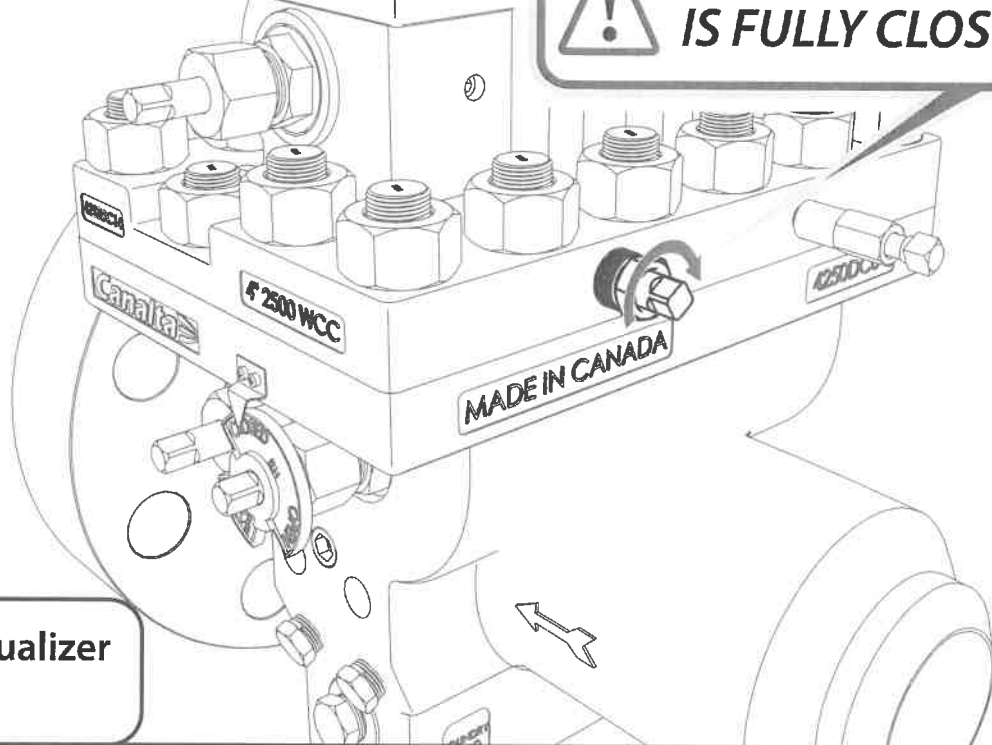
Close inner slide valve.



## REPLACEMENT STEP I



**ENSURE VALVE  
IS FULLY CLOSED**



**Close equalizer  
valve.**

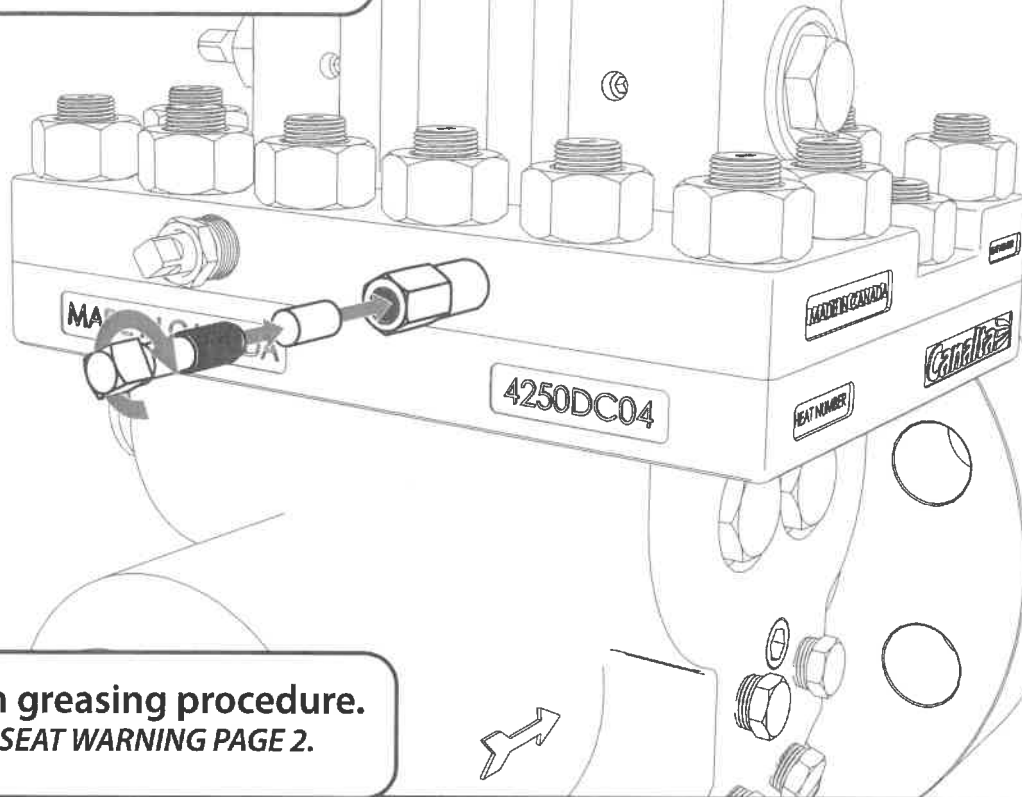
## REPLACEMENT STEP J



**Open bleeder  
valve.**



## REPLACEMENT STEP K



Perform greasing procedure.  
SEE SOFT SEAT WARNING PAGE 2.

## REPLACEMENT STEP L



Close bleeder  
valve.

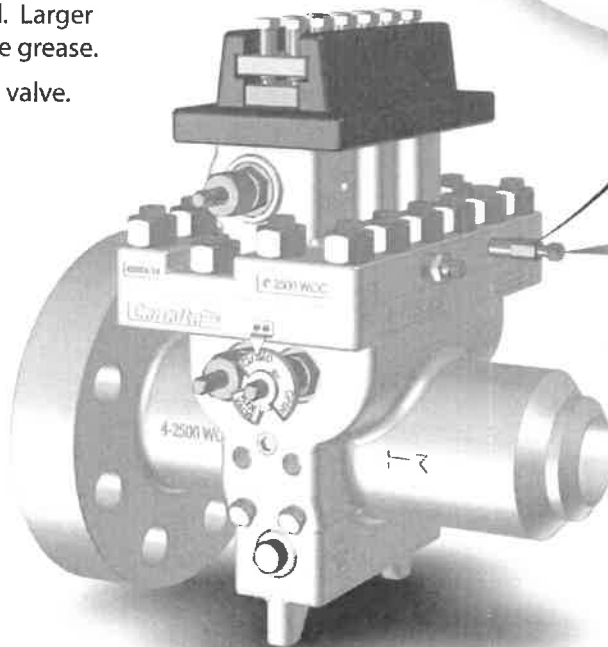
## GREASING PROCEDURE

The metal-to-metal grease seal design requires lubrication on a regular basis. For the procedure to be successful, a pressure differential across the slide valve being serviced is required, with the chamber immediately below the valve having a higher pressure and forcing the valve strip up against the seat. The double ball grease check valve prevents process pressure from coming through the grease port. For best results, use only valve seal grease supplied by Canalta and recommended for the applicable service.

1. Ensure that the inner slide valve and equalizer valve are fully closed, and that the upper chamber is de-pressurized.
2. Open the bleeder valve and allow the top chamber to de-pressurize. A pressure differential now exists between the lower and upper chambers, and the slide valve is ready to be greased.
3. Remove the threaded stem from the grease gun assembly. Insert one stick of grease.
4. Replace the grease gun stem and turn in slowly so as not to rupture the grease channel seal.
5. Repeat steps 3 and 4 if additional grease is required. Larger units require more grease.
6. Close the bleeder valve.



Grease Gun Assembly



Grease Gun

**NOTE:** use only Canalta supplied grease guns to apply grease to the slide valve.

**NOTE:** DO NOT perform greasing procedure on units equipped with soft seat slide valves. See warning page 2.

## ***INSTALLATION RECOMMENDATIONS***

The DC Dual Chamber Orifice Fitting is typically installed in conjunction with upstream and downstream meter run sections (tubes). This is essential to meet the recommendations of both AGA Report 3 and ISO 5167. To obtain the best measurement results, follow the recommended piping configurations and installation requirements of either of these two standards, as well as the recommendations below.

1. Always ensure that operating staff are competent and properly trained to operate this and all other pressurized equipment.
2. When installing the fitting or meter run, ensure that the flow arrow on the outer surface of the fitting corresponds to the direction of flow in the line.
3. Attention to clearances is essential. Users should refer to the appropriate Weights and Dimensions brochure and any order specific General Arrangement drawings for details. Ensure there is operating clearance above the top of the fitting for removal of the plate carrier. For 8" - 30" DC Dual Chamber Orifice Fitting models, additional clearance at the sides of the fitting is necessary for pinion gear rotation and operating wrench removal.
4. When used to measure wet gas, the vertical mount is recommended to prevent dam formation against the orifice plate.
5. Instrument tap lines should be installed sloping upwards to the differential pressure measurement instrument. Where this cannot be accomplished, use seal pots to chemically seal the sensing lines eliminate hydrostatic head errors.
6. To avoid damage to the orifice plate, ensure that the orifice plate and plate carrier are removed from the fitting prior to pressure testing the system.
7. Before inserting the orifice plate and plate carrier into the fitting, always ensure that the lower cavity of the fitting is free of debris. If debris has accumulated, remove the lower drain plugs and rod-clean the lower section.

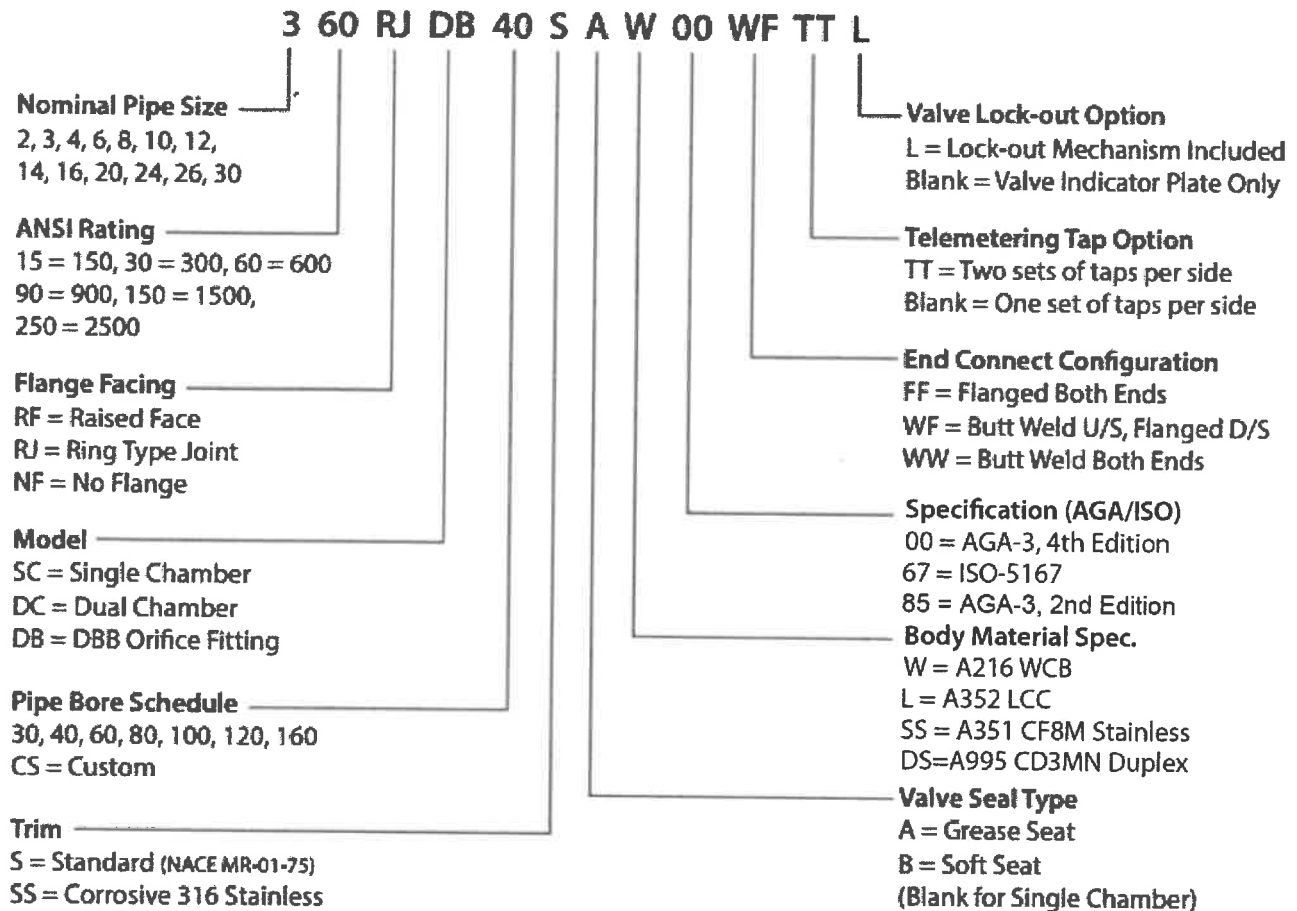
## ***PRESERVATION & STORAGE***

The following measures should be taken to preserve and store all orifice fittings and meter runs that are not currently in service:

- Hydrostatic testing is required before entering service if stored for more than 1 year;
- Apply rust inhibitor every 3-6 months inside the bore to prevent rust and corrosion;
- Store in dry conditions, preferably indoors to prevent rust and corrosion;
- The end caps shipped with the meter run or fitting should be left in place during storage.

## MODEL NUMBERING SYSTEM

Each individual Canalta Orifice Fitting is assigned a model number which can be found on the unit's sales and quality control documentation. These model numbers facilitate quick identification of specific features of an orifice fitting, such as pipe schedule, body material and applicable standard. To understand the model number on your Canalta Orifice Fitting, use the legend below.



**Note:** the orifice fitting model number may deviate slightly from this legend in cases where exotic materials or other custom features are included. Please contact us directly for any questions or concerns regarding your Canalta Orifice Fitting.

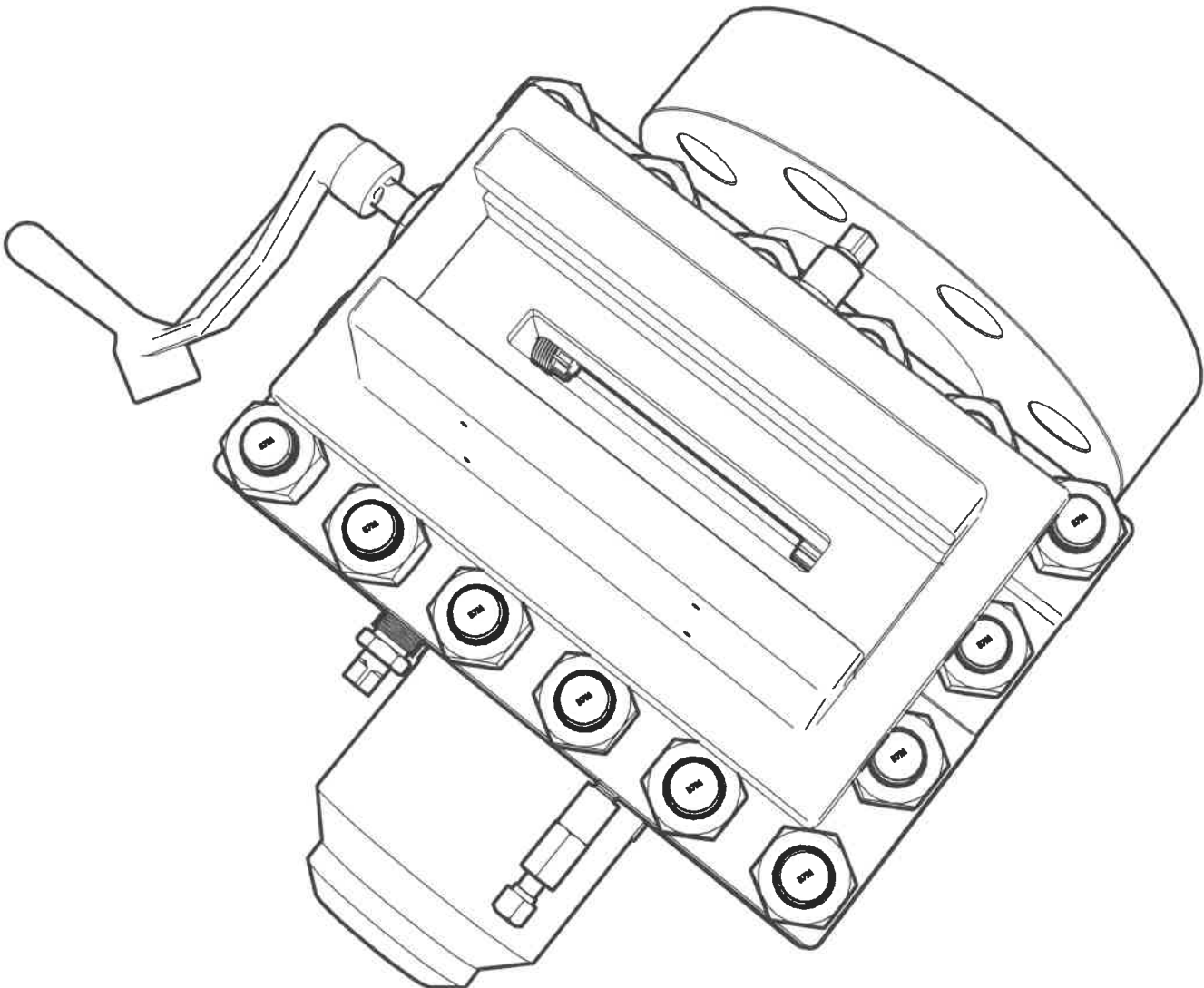
## ORIFICE FITTING QUICK INSPECTION & ASSESSMENT

While the seal and clamping bars are off of the orifice fitting and the top housing is open, visually inspect the interior of the unit.



**DO NOT OPEN SLIDE VALVE TO INSPECT LOWER HOUSING WHILE TOP HOUSING IS OPEN AND UNIT IS UNDER PROCESS PRESSURE.**

Pay attention to the condition of the interior surfaces of the orifice fitting, the pinion gear, seal bar face and O-ring. Excessive corrosion, fluid build-up or other visible damage may indicate the need for more extensive maintenance and replacement of parts. Similarly, excessive resistance when turning gear shafts during operation may indicate the need for the replacement of parts.



## SCHEDULED TEARDOWN MAINTENANCE

Both measurement accuracy and orifice fitting performance in general can benefit from periodic teardown maintenance. Canalta recommends teardown maintenance be performed every two years or earlier if deemed necessary. The appropriate Disassembly/Assembly can be requested from Canalta if required.

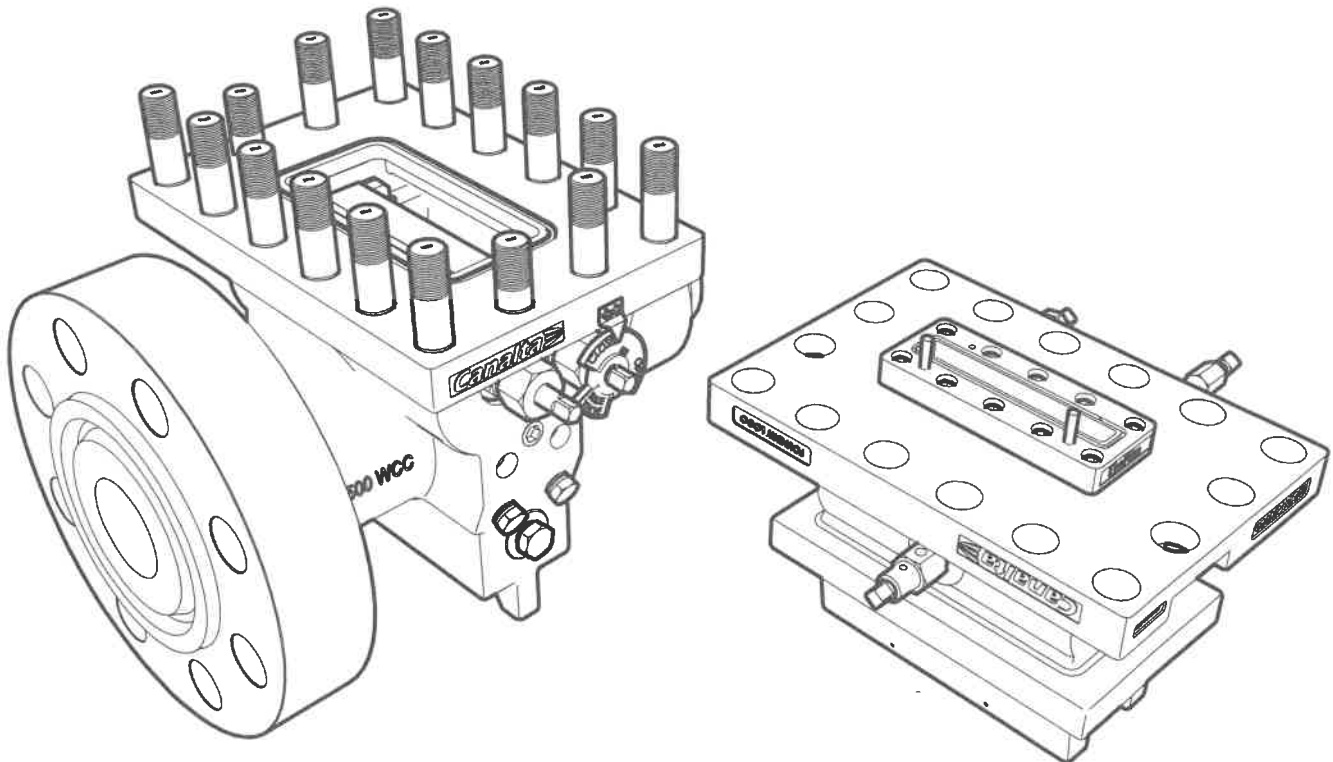


**ENSURE FLOW LINE IS DE-PRESSURIZED BEFORE REMOVING TOP HOUSING FROM ORIFICE FITTING BODY. FAILURE TO DE-PRESSURIZE COULD RESULT IN SERIOUS INJURY OR DEATH.**

After de-pressurizing the line and removing the top housing, perform the following inspections and parts replacements:

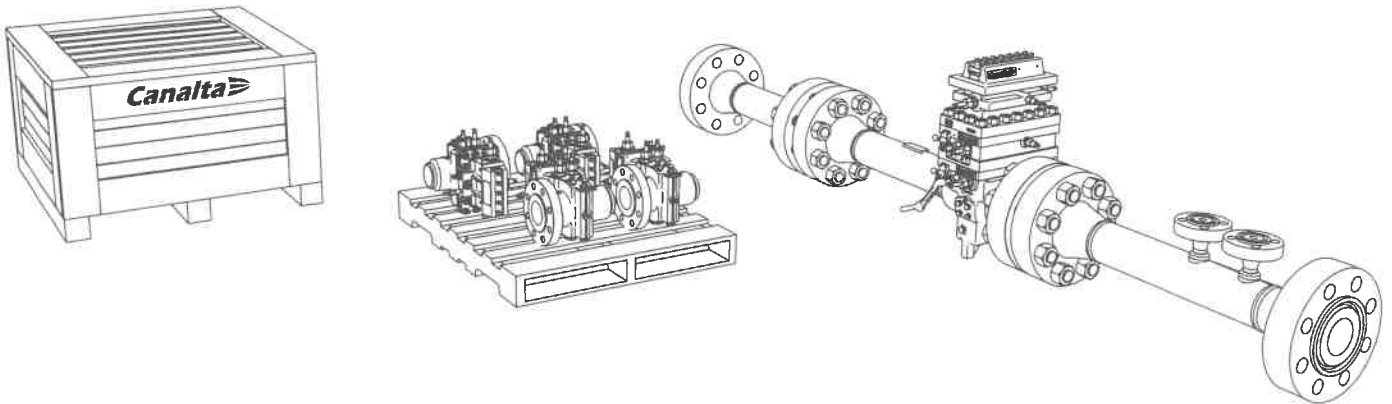
- Visually inspect all interior surfaces of the orifice fitting body for excessive build-up or corrosion;
- Inspect gear shafts for broken or bent teeth. Replace as necessary.
- Inspect valve seat surfaces for abrasion or corrosion. Replace as necessary.
- Manually change out valve seat grease in the grease track (for grease-type units only).
- Replace the valve strip and all accessible O-rings (including valve seat O-rings on soft seat units).
- Remove the drain plugs and rod-clean the lower section of all accumulated debris.
- Inspect all differential pressure tap holes for build-up. Clean out as necessary.

When returning the line to service, ensure that the orifice plate is in the top housing during re-pressurization, the slide valve is in the closed position, the EQ and bleeder valves are closed, and the seal and clamping bars are in place and tightened down.



## LIFTING AND HANDLING

Canalta Flow Measurement products generally require mechanical lifting devices and techniques. All safety activities associated with lifting techniques and equipment shall be in accordance with local laws and the receiving company's HSE policies and procedures, and shall be followed without exception. Extreme care shall be exercised throughout the operation to prevent both injury to personnel and damage to the meter. Proper rigging and lifting techniques should be followed. Do not stand under suspended load. Improper handling may cause injury and/or damage. SAFETY FIRST.



Most Canalta products arrive at their destination in a wooden crate or strapped to a wooden pallet, and are therefore easily moved using a standard forklift. There are scenarios, however, where a meter run or fitting only unit must be moved without the aid of a frame. In either case, care must be taken to assess the weight of the package and ensure that the machinery and lifting aids are appropriate to the items being handled. Crate, pallet and/or meter run weights are documented on the commercial invoice or packing slip accompanying the shipment.

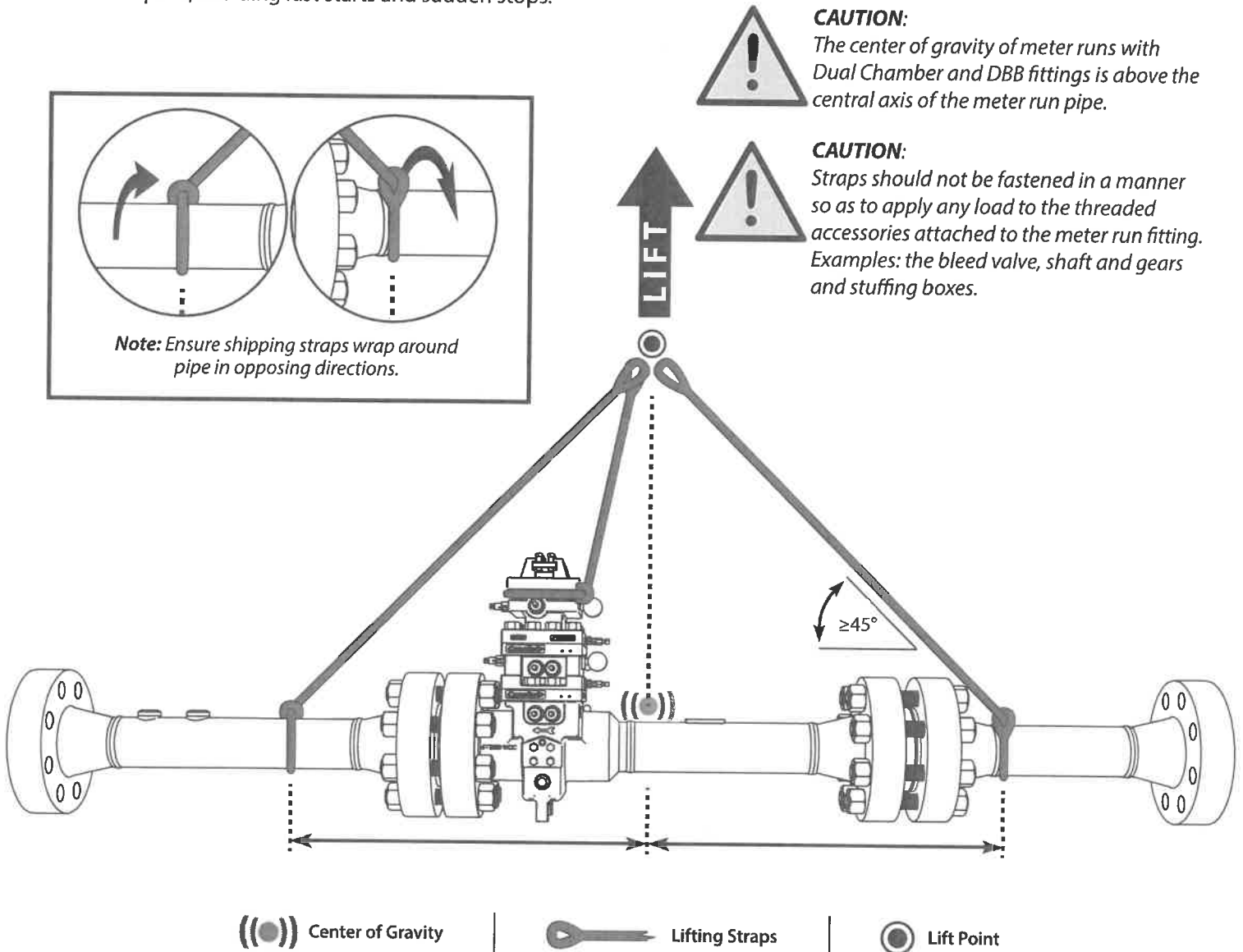
### MOVING UNITS IN CRATES AND ON PALLETS

- Select an appropriate forklift based on the weight of the package being handled. Use fork extensions if necessary.
- Center the forks so the load is evenly distributed. Ensure the load is balanced and secure prior to lifting. Use extra strapping to secure any unstable loads.
- Drive the forks into the load as far as possible. Avoid contact with any parts of the load that may extend past the edge of the pallet. Tilt the load back slightly, then lift.
- Keep the load as low as possible while traveling, keeping an even pace, avoiding fast starts and sudden stops.



## MOVING METER RUNS

- Select an appropriate forklift and lifting straps based on the weight of the meter run being handled. Position the forks as narrowly as possible to create a single lifting point.
- Determine the meter's fulcrum and position the straps so the unit is balanced when lifted. Ensure the straps are wrapped in opposing directions to prevent the unit from rotating and swinging.
- Ensure the rigging set up is adequate to maintain control through all stages of hoisting, maneuvering and lowering the meter run.
- For meter runs containing a Dual Chamber fitting, a strap should be attached to the fitting top chamber in order to prevent the meter run from "rolling". Refer to diagram and instructions on page 28 for meter strap positioning.
- Slide the ends of the straps over the forks, positioning the straps as close to the forklift body as possible without having the meter run make contact with the forklift.
- Tilt the load back slightly then lift. Keep the fork as low as possible while travelling, keeping an even pace, avoiding fast starts and sudden stops.



**Note:** Lifting diagrams may not reflect all configurations. Centers of gravity not exactly as shown.

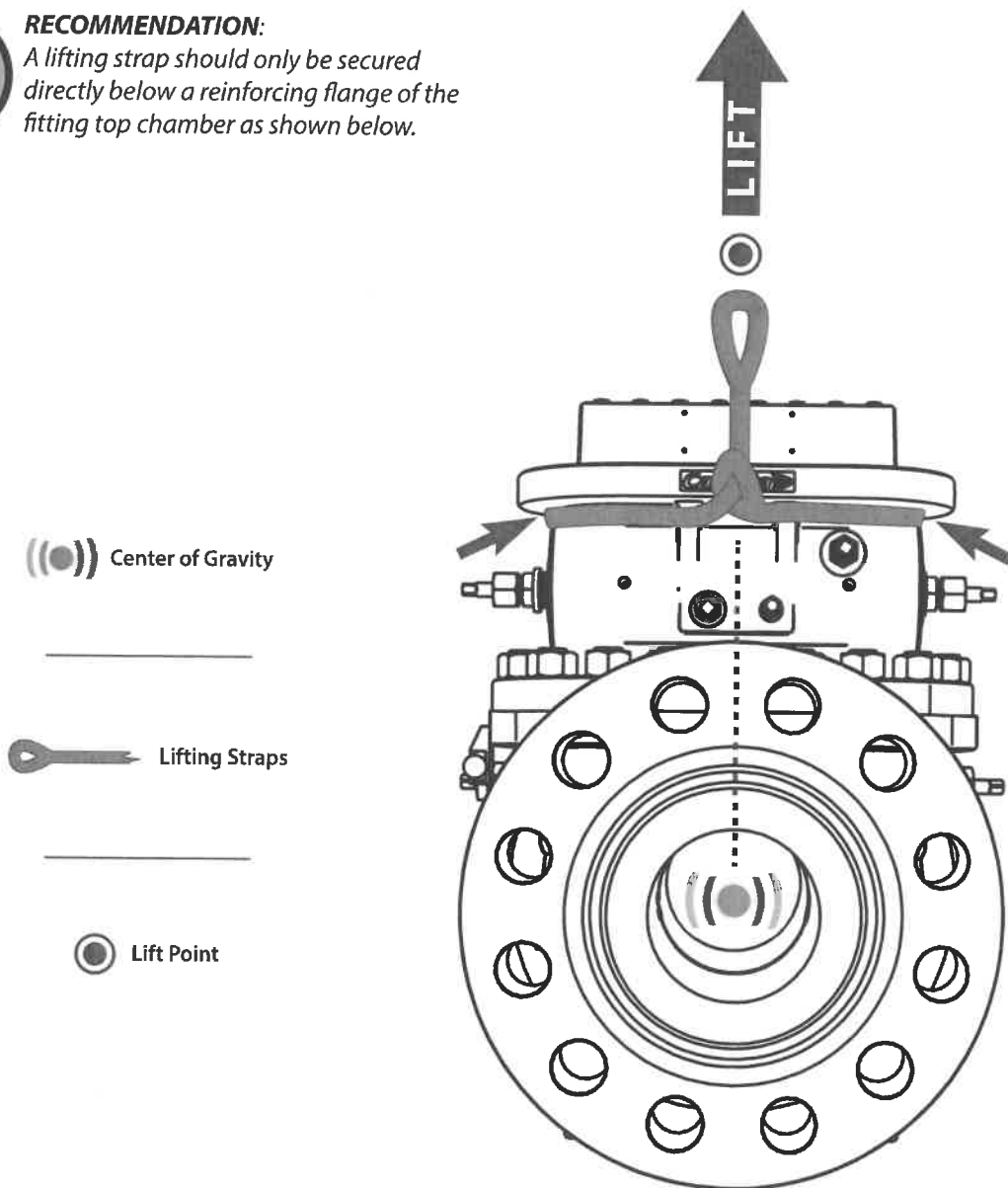
## MOVING DUAL CHAMBER FITTING ONLY UNITS

- Select an appropriate forklift and lifting straps based on the weight of the meter being handled. Position the forks as narrowly as possible to create a single lifting point.
- Wrap the lifting strap around the fitting, under the shoulder of the top housing. *Do not position the lifting strap under the plate carrier operator gears or under any threaded components - lifting from this position may result in significant damage and inoperability.*
- Slide the end of the lifting strap over the forks, positioning the strap as close to the forklift body as possible without having the unit make contact with the forklift. Adjust as necessary.
- Tilt the load back slightly, then lift. Keep the forks as low as possible while traveling, keeping an even pace, avoiding fast starts and sudden stops.



### RECOMMENDATION:

A lifting strap should only be secured directly below a reinforcing flange of the fitting top chamber as shown below.



**Note:** Lifting diagrams may not reflect all configurations. Centers of gravity not exactly as shown.

## NOTES

# Canalta

**Flow Measurement**



<b>Corporate Head Office / Canada</b>	<b>(+1) 403 342 4494</b>
United States	(+1) 940 898 0800
Argentina	(+54) 9 11 3272 2377
United Kingdom	(+44) 0 1842 768350
India	(+91) 96004 5368
Singapore	(+65) 06316 4965

Find a list of our global distribution partners at [www.canaltaflow.com/global](http://www.canaltaflow.com/global)

The "Canalta Flow Measurement," "Contour" and "Canalta Controls" names and logos are trademarks of Canalta Controls Ltd. All other trademarks are the property of their respective companies.

All information presented here is for information purposes only. Though every effort has been made to ensure their accuracy, the contents of this publication shall not be construed as warranties or guarantees, expressed or implied, regarding the products or services described herein, or their use or applicability. Due to Canalta's commitment to quality and innovation, all product designs, specifications and information material, including the contents of this publication, are subject to change without notice. Responsibility for the proper selection, maintenance and use of any product remains with the customer. SAFETY FIRST.

Copyright, trademark and other forms of proprietary rights protect the contents of this publication.

© 2014 Canalta Controls Ltd. All rights reserved. Unauthorized reproduction in whole or in part is prohibited.




Valves & Measurement  
Cameron Canada Corporation  
2125 - 64 Avenue  
Edmonton Alberta Canada T6P 1Z4  
Tel 780 468 2732  
Fax 780 450 1359

## LETTER OF NOTICE

Models: C1  
H1

The Model C1 (Investment Cast Ball Valve, Reduced Bore) and the Model H1 (1-pc. Hex Ball Valve, Reduced Bore) valves satisfy the material requirements of NACE MR0175-2002.

Approved by:

  
Greg Ogarko, P. Eng.  
Engineering Manager