



Dec 19/2014  
1000068185

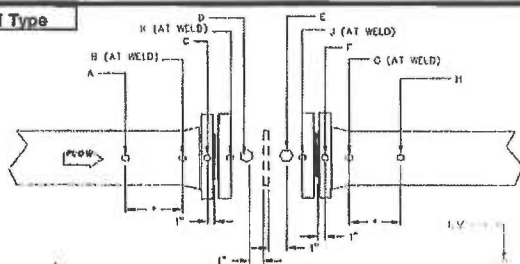
MEASUREMENT SYSTEMS

### Meter Tube Calibration Record

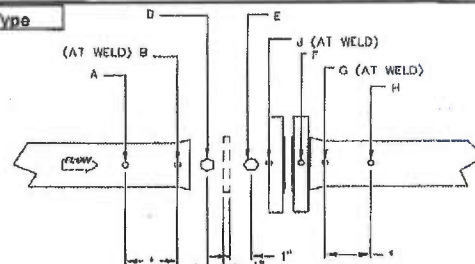
#### General Specifications

|                         |                                       |                     |                                                                 |
|-------------------------|---------------------------------------|---------------------|-----------------------------------------------------------------|
| Customer:               | RJV Gas Field Services                | Date:               | January 7, 2014                                                 |
| Location:               | Husky Oil Operations                  | P.O. Number:        | 130524                                                          |
| Serial No.              | 12016646509                           | Work Order No.      | 120166465                                                       |
| Assembly Part No.       | 9A-MR_53_0128C                        | Part No.            | 40553-33221                                                     |
| Orifice Fitting:        | 3" 600# Sch 80 Dual Chamber Meter Run | Meter Tube Type No. | 2                                                               |
| Str. Vane / Flow Cond.: |                                       | Yes                 | <input checked="" type="checkbox"/> No <input type="checkbox"/> |

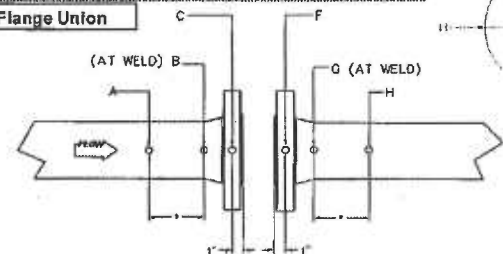
#### Type 1 Flanged Type



#### Type 2 Flangeweld Type



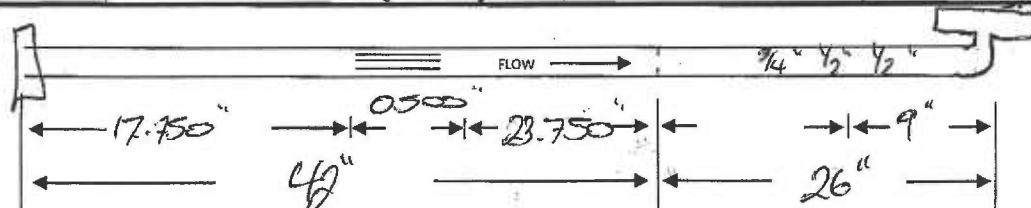
#### Type 3 Orifice Flange Union



**Type 4 weldneck Type Valve or Door**  
Check Location Point A-B-D on Upstream Tube,  
Point E-G-H on Downstream Tube

\*Cross section 'A' and 'H' shall be one pipe diameter  
except if such Cross Section falls within the lifting or weld  
it shall be made 1' inside the pipe

| Location                                        | Upstream Meter Tube |       |   |       |   | Downstream Meter Tube                             |       |       |       |       |
|-------------------------------------------------|---------------------|-------|---|-------|---|---------------------------------------------------|-------|-------|-------|-------|
|                                                 | A                   | B     | C | D     | K | E                                                 | F     | G     | H     | J     |
| V                                               | 2.900               | 2.914 |   | 2.902 |   | 2.901                                             | 2.890 | 2.900 | 2.895 | 2.903 |
| LV                                              | 2.902               | 2.915 |   | 2.901 |   | 2.900                                             | 2.889 | 2.895 | 2.898 | 2.902 |
| RV                                              | 2.898               | 2.908 |   | 2.902 |   | 2.902                                             | 2.890 | 2.895 | 2.902 | 2.898 |
| H                                               | 2.902               | 2.912 |   | 2.901 |   | 2.901                                             | 2.890 | 2.901 | 2.900 | 2.899 |
| Average                                         | 2.901               | 2.910 |   | 2.902 |   | 2.901                                             | 2.890 | 2.898 | 2.899 | 2.901 |
| Upstream Mean Average<br>to Stamp on I.D. Plate | 2.902               |       |   |       |   | Downstream Mean Average<br>to Stamp on I.D. Plate | 2.901 |       |       |       |



|                            |      |                               |     |            |
|----------------------------|------|-------------------------------|-----|------------|
| AGA/API Figure<br>3 (2000) | Q.70 | Meter Tap Location            |     |            |
| Remarks:<br>68*            |      | Upstream                      | N/A | Downstream |
|                            |      |                               |     | N/A        |
|                            |      | Inspector:<br>Chris Robertson |     |            |



www.c-a-m.com  
Tel.: 403-291-4818  
Calgary, AB  
NQS-01 Rev.6  
01/07/2014

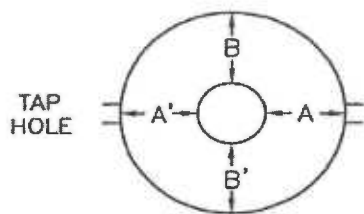


**Cameron Measurement Systems**  
3707 - 97th Street  
Edmonton, Alberta, Canada T6E 6J2

**QUALITY CONTROL  
INSPECTION REPORT**

Customer: RJV Gas Field Svcs. Date: January 31, 2014  
Location: Husky Oil Operations Purchase Order No.: 130524  
Serial No.: 12016646509 Orifice Fitting: 3" 600# Sch 80 Dual Chamber Meter Run  
Assembly No.: 9A-MR\_53\_0128C Hydrostatic Test Pressure: 2225  
Meter Tube Design Standard API 14.3 Duration: 15 Minutes

**ECCENTRICITY**



Horizontal  $(A - A')/2$ .....

Vertical  $(B - B')/2$ .....

|        |        |
|--------|--------|
| 0.003" | 0.004" |
| 0.003" | 0.003" |

Measurement Instrument: Mitutoyo Dial Indicator

**PRESSURE TAP HOLE VARIATION**

Distance from Plate & Hole Diameter

| Upstream | Hole   | Downstream | Hole   |
|----------|--------|------------|--------|
| 1.005"   | 0.375" | 0.999"     | 0.375" |

Measurement Instrument: PAV Electronic Depth Gauge

**SURFACE ROUGHNESS**

Roughness Measurement Location

Upstream Tube, One Pipe Diameter from Weld  
Upstream at Pressure Tap Hole  
Downstream at Pressure Tap Hole  
Downstream 1" from End of Flange

Microinches

|     |
|-----|
| 48  |
| 40  |
| 100 |
| 100 |

Measurement Instrument: Mitutoyo 212 Surftester

**DIFFERENTIAL TEST**

Water Hydrostatic Method at 50 psi  
Duration 5 Minutes Minimum Visual: No Leaks

Measurement Instrument: McDaniels Gauge 0 -100 psi

Work Order #: 120166465

Lorne Dagg / Fiona O'Neill



the pressure equipment safety authority

## Certificate of Authorization Permit

### Quality Management System

Expiry Date: **December 9, 2016**

Reg. No.: **AQP-5046**

### CAMERON MEASUREMENT SYSTEMS DIVISION

7944 - 10 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:

|                 | <u>Construction</u> | <u>Repair</u> | <u>Alter</u> |
|-----------------|---------------------|---------------|--------------|
| <b>Fittings</b> |                     |               |              |
| Category F      | 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 6th day of December, 2013

Chief Inspector and Administrator

**Certificate No.: 9601**

**NUFLO™ DUAL CHAMBER  
ORIFICE FITTING**

PART NO. 40553-33221  
SERIAL NO. 12016646509  
SIZE 3.0 BORE 2.900  
SWP 1480 FLG 600  
TRIM SWEET

CRN (ASME CODE) 0F01120 2C

 **CAMERON**  
EDMONTON, ALBERTA, CANADA

**TO REMOVE PLATE FROM CHAMBER**

1. CLOSE ORIFICE CHAMBER (INDEX ORIFICE OUT OF OPERATION).
2. OPEN BLEED VALVE.
3. OPEN CHAMBER LID (REMOVE TWO TOP NUTS ONLY).
4. REMOVE ORIFICE PLATE (PRY ON HOLES IN RETAINER HANDLE).

**TO PLACE ORIFICE PLATE IN OPERATION**

1. REPLACE ORIFICE WITH OUTLET ON PLATE AND SEAL ON RETAINER FACING UPWARD.
2. CLOSE LID.
3. CLOSE BLEED VALVE.
4. OPEN EQUALIZING VALVE.
5. OPEN ORIFICE CHAMBER (INDEX ORIFICE INTO OPERATION).
6. CLOSE EQUALIZING VALVE.

**NUFLO™ METER RUN**

ASSY  
NO.

9A-MR\_53\_0128C

SERIAL NO. 12016646509

U/S  
DIA. 2.902

D/S  
DIA. 2.901

PIPE SIZE 3.0

SCH 80

RATING 600

AGA / API 3 (2000)

MAT'L. WCB

DATE 01/14

W.O. NO. 120166465

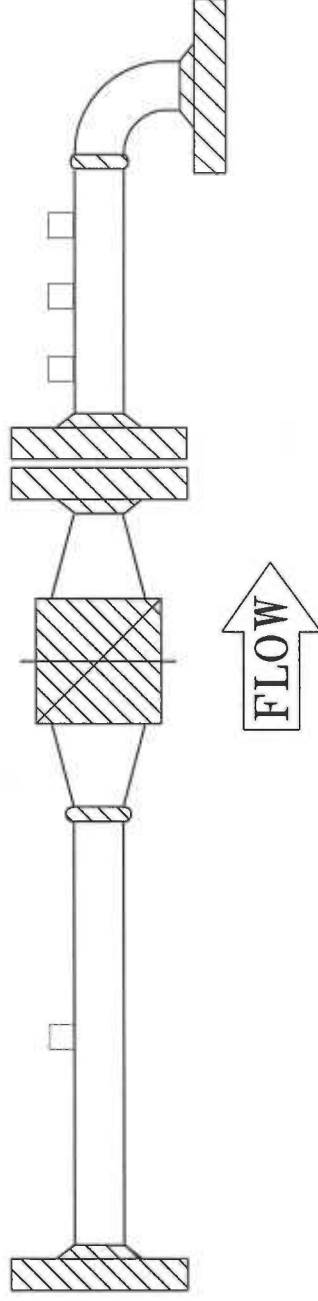
CALIBRATION  
CERT'D BY

CAMERON

CRN (ASME CODE) 0F01120.2C

 **CAMERON**  
EDMONTON, ALBERTA, CANADA

# WELD AND RADIOGRAPHY IDENTIFICATION MAP



**CAMERON**  
CAMERON MEASUREMENT SYSTEMS  
7944 - 10th STREET N.E.  
CALGARY, AB. T2E 8W1

DESCRIPTION: 3" 600# Sch 80 Dual Chamber Meter Run

SERIAL No.: 12016646509

CUSTOMER: RJV Gas Field Services

P/O No.: 130524 TAG No.: N/A

W/O No.: 120166465 END USER: Husky Oil Operations

RADIOGRAPHY UNIT: N/A

WELDER: Jeff Harrington FILE No.: W-23651

DATE: January 2014 Lorne Dagg

SYMBOL: "T" QUALITY ASSURANCE INSPECTOR