

Permanent Monitoring Installation Report



Field Ticket #	RGS1704032121	TD MD	1850.0 m
Client	Tag Oil	Tubing Size	2-7/8" EUE 6.5 lb/ft
Well Name	Cheal E1	Casing Size	7" 23lb/ft
Well Location	Cheal	SHP	0 psi
Rig	Rival 101	BHP	1813 psi
Customer Rep	C. Carty	SHT	24 °C
Service Eng	J. Hollingworth	BHT	50.8 °C
Activity	Date	Time	Activity
Depart Base	02-Apr-17	17:00	Job End
Job Start	05-Apr-17	7:00	Return Base
Gauge Use	Reservoir Monitoring	Surface Card	FIC4000 - DIN Rail
Gauge Depth	1805.47m	Telemetry	FSK
Gauge Type	PCP4500T	Surface Output	Modbus
Pres Range	0-5000 psia	Cable Splice Depth	N/A
Temp Range	0-150 DegC	Tubing Hanger	1/4" NPT - 1/4" Swageok
Max Devi		WHFT	ALS WHFT
TEC Cable	0.25" x 11mm Encap	Encapsualtion	Square 11mm
Serial Number	029107G	Manufacturer	Draka
Conductor	16 AWG Solid Copper	Material	Polypropylene
Tube OD	0.25"	Pres Rating	15 kpsi
Material	316L SS	Temp Rating	150 DegC
Gauge	Digital	Pres Sensor	Gap Capacitance
Serial Number	113197	Calibration Range	0-5000 psia
Depth	1805.47 m	Temp Sensor	RTD
OD	1-9/16"	Temp Range	0-150 DegC
Vibration	N/A	Vibration Range	N/A
Gauge Carrier	Clamp		
Running OD	4.81"		
Serial Number	UE002		
Cross Coupling Protectors	2-7/8" EUE Cast CCP's, 2x11mm TEC Cable Slots		
Running OD	4.525"		
Qty Installed	187		
Bands and Clips Material	0.25" x 0.75" w-7/8" Buckle 316SS		
Qty Installed	3		
Comments:	Digital gauge cablehead installed and pressure tested to 5kpsi. 187 x cast protectors installed on all couplings. Pressure monitored while running in hole with tubing. Gauge reading prior to cutting TEC cable to feed thorugh tubing hanger 1813 psia. 8 TEC cable wraps performed on full joint or EUE tubing below hanger and strapped with SS bands. Two 1/4" NPT x 1/4" bored through Swagelok fittings used on hanger and tested to 1000 psi. Land THAF and terminate TEC cable and pressure test to 3kpsi. Complete final check on gauge, 1813 psia, 45.7 DegC.		

Permanent Monitoring Installation Report



Sequence of Events		
Date	Time	Description
2-Apr-17	16:00	Depart Roma, QLD for New Plymouth.
3-Apr-17	10:00	Arrive Kinetic, New Plymouth. Test TEC cable insulation and continuity. Function test gauge. Make up gauge to TEC cable and pressure test and chart cable head. Check and pack equipment for mobilisation to wellsite.
4-Apr-17	10:00 11:30 16:00 17:00	Load equipment and transport to wellsite. Spot cable spooler and test gauge on surface. Depart location for base. Arrive base.
5-Apr-17	4:50 6:00 6:10 7:00 7:30 7:45 8:00 14:00 14:30 16:30 17:00	Depart base for Cheal E1. Arrive Cheal E1. Safety meeting and discuss installation procedure. Start to RIH with sub assemblies. Clamp gauge 1.45m below first full joint above rod barrel. Check gauge and RIH. Connect chemical injection sub and pressure test. RIH with 2-7/8" Tubing, connecting cross coupling protector at each joint. Lower sheave from derrick and cut TEC cable, gauge reading 2246.9 PSIA, 44.38 DegC. Strap and wrap TEC cable, feed through hanger. Unable to check gauge due to surface unit. Land hanger and pressure test. Depart location for base.
6-Apr-17	6:00 7:00 7:15 7:30 8:30 10:00 10:30 13:00	Depart base for Cheal E1. Arrive Cheal E1. Safety meeting and discuss installation procedure. Rig down floor and nipple down BOP. Land THAF and pressure test. Check gauge reading 1813.1 PSIA, 45.7 DegC. Install Well Head Feedthrough. Pack equipment ready for backload to town.
7-Apr-17		Depart New Plymouth for Australia.
8-Apr-17		Arrive Roma.

C-4000 Audit Report

Product: C-4000
Gauge Serial Number: 113197
Sensor Number: 113197
Range: 5000 Psi
Date Calibrated: 03-02-2017
Date Verified: 03-02-2017
Curve Fit Model: Sercel-GRC FREQUENCY
Temp/Press Fit: 2/3
Software Revision: DACS 1.00.023
Audit report date: 03/02/2017 06:18:43

Actual Pressure PsiA	Calculated Pressure PsiA	Pressure Deviation PsiA	Actual Temperature Deg. C	Calculated Temperature Deg. C	Temperature Deviation Deg. C
15.20	17.88	2.68	60.95	60.70	-0.25
1000.00	1003.99	3.99	60.95	60.73	-0.22
2000.00	2003.67	3.67	60.95	60.74	-0.20
3000.00	3005.39	5.39	60.94	60.73	-0.21
4000.00	4007.08	7.08	60.94	60.76	-0.18
5000.00	5007.90	7.90	60.94	60.74	-0.20
14.80	14.57	-0.23	120.62	120.75	0.13
1000.00	1000.47	0.47	120.62	120.74	0.11
2000.00	1999.74	-0.26	120.62	120.76	0.14
2999.90	3000.36	0.46	120.62	120.75	0.13
4000.00	4000.94	0.94	120.63	120.75	0.13
5000.00	5000.46	0.46	120.63	120.78	0.15

Maximum negative temperature error: -0.25 °C
Maximum positive temperature error: 0.15 °C
Maximum absolute temperature error: 0.25 °C

Maximum negative pressure error: -0.26 PsiA
Maximum positive pressure error: 7.90 PsiA
Maximum absolute pressure error: 7.90 PsiA

Gauge Calibration Data

Sercel-GRC #60A320

Product: C-4000
Gauge Serial Number: 113197
Sensor Number: 24345
Range: 5000 Psi
Date Calibrated: 03-02-2017
Date Verified: 03-02-2017
Curve Fit Model: Sercel-GRC FREQUENCY

Sercel-GRCA Corp

Corporate Office

6540 E. Apache
Tulsa, Oklahoma 74115 USA

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P. O. Box 581570
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Telephone: 918-834-9600
Fax: 918-838-8846
E-Mail: sales@sercel-GRCA.com
Web Address: www.Sercel-GRCA.com

Gauge Calibration Summary Report

Product: C-4000
Gauge Serial Number: 113197
Sensor Number: 24345
Range: 5000 Psi
Date Calibrated: 03-02-2017
Date Verified: 03-02-2017
Curve Fit Model: Sercel-GRC FREQUENCY
Temp/Press Fit: 2/3
Gen. Mode (Temp/Press): 1/1
Specs Mode (Gen/Err/Hys/Rep): 0/2/2/2
Software Revision: DACS 1.00.023

Temperature Errors

	Error	Occurs At
Maximum positive error:	0.1311 °C	125.63 °C
Maximum negative error:	-0.1816 °C	50.93 °C

Sensitivity: 0.308 °C/Hz

Sensitivity: 3.249 Hz/°C

Pressure Errors

	Error	Occurs At	And At
Maximum positive error:	0.7995 Psi	23.45 °C	4000.00 Psi
Maximum negative error:	-0.8607 Psi	125.63 °C	2000.00 Psi
Hysteresis:	4.0402 Psi	100.89 °C	2000.00 Psi
Repeatability:	1.2840 Psi	100.88 °C	5000.10 Psi

Sensitivity: 2.813 Psi/Hz

Sensitivity: 0.355 Hz/ Psi

Audit Specifications

	Error	Occurs At	And At
Temp. positive error:	0.1515 °C	120.63 °C	
Temp. negative error:	-0.2490 °C	60.95 °C	
Press. positive error:	7.9028 Psi	60.94 °C	5000.00 Psi
Press. negative error:	-0.2625 Psi	120.62 °C	2000.00 Psi

Temperature Curve Fit Errors

Product: C-4000
Gauge Serial Number: 113197
Sensor Number: 24345
Range: 5000 Psi
Date Calibrated: 03-02-2017
Date Verified: 03-02-2017
Curve Fit Model: Sercel-GRC FREQUENCY
Temp/Press Fit: 2/3
Gen. Mode (Temp/Press): 1/1
Specs Mode (Gen/Err/Hys/Rep): D/D/D/D
Software Revision: DACS 1.00.023

Temperature Data Point	Temperature Frequency Hz	Temperature Deg. C	Calculated Temperature Deg. C	Temperature Error Deg. C
1	1086.83	23.45	23.56	-0.1112
2	1178.49	50.93	50.75	0.1816
3	1261.17	75.82	75.75	0.0703
4	1342.79	100.75	100.87	-0.1216
5	1422.25	125.63	125.76	-0.1311
6	1499.30	150.40	150.29	0.1120

Pressure Curve Fit Errors

Product: C-4000
Gauge Serial Number: 113197
Sensor Number: 24345
Range: 5000 Psi
Date Calibrated: 03-02-2017
Date Verified: 03-02-2017
Curve Fit Model: Sercel-GRC FREQUENCY
Temp/Press Fit: 2/3
Gen. Mode (Temp/Press): 1/1
Specs Mode (Gen/Err/Hys/Rep): D/D/D/D
Software Revision: DACS 1.00.023

Temperature (#1): 23.45 °C

Pressure Data Point	Pressure Frequency Hz	Pressure PsiA	Calculated Pressure PsiA	Pressure Error Psi	Temperature Frequency Hz	Temperature Deg. C	Calculated Temperature Deg. C
1	11026.20	15.10	14.54	-0.5616	1086.83	23.45	23.5642
2	11439.50	1000.00	1000.10	0.1006	1087.22	23.47	23.6787
3	11806.50	2000.00	1999.41	-0.5903	1087.52	23.49	23.7668
4	12131.80	3000.00	3000.19	0.1857	1087.84	23.51	23.8607
5	12423.20	4000.00	4000.80	0.7995	1088.21	23.52	23.9693
6	12687.10	5000.00	5000.70	0.6992	1088.42	23.54	24.0310
7	11807.30	2000.00	2002.49	2.4884	1088.57	23.56	24.0750

Temperature (#2): 50.93 °C

Pressure Data Point	Pressure Frequency Hz	Pressure PsiA	Calculated Pressure PsiA	Pressure Error Psi	Temperature Frequency Hz	Temperature Deg. C	Calculated Temperature Deg. C
1	11003.10	15.10	15.01	-0.0900	1178.49	50.93	50.7474
2	11416.70	1000.00	1000.37	0.3740	1178.42	50.94	50.7264
3	11783.40	2000.00	1999.53	-0.4710	1178.45	50.94	50.7354
4	12107.90	3000.00	2999.96	-0.0377	1178.50	50.95	50.7504
5	12398.30	4000.00	4000.42	0.4170	1178.49	50.95	50.7474
6	12660.90	5000.00	4999.81	-0.1948	1178.45	50.96	50.7354
7	11784.70	2000.00	2003.30	3.3003	1178.44	50.96	50.7324

Pressure Curve Fit Errors

Product: C-4000
Gauge Serial Number: 113197
Sensor Number: 24345
Range: 5000 Psi
Date Calibrated: 03-02-2017
Date Verified: 03-02-2017
Curve Fit Model: Sercel-GRC FREQUENCY
Temp/Press Fit: 2/3
Gen. Mode (Temp/Press): 1/1
Specs Mode (Gen/Err/Hys/Rep): D/D/D/D
Software Revision: DACS 1.00.023

Temperature (#3): 75.82 °C

Pressure Data Point	Pressure Frequency Hz	Pressure PsiA	Calculated Pressure PsiA	Pressure Error Psi	Temperature Frequency Hz	Temperature Deg. C	Calculated Temperature Deg. C
1	10982.90	14.60	14.45	-0.1458	1261.17	75.82	75.7467
2	11397.00	1000.00	1000.38	0.3805	1261.20	75.82	75.7559
3	11763.40	2000.00	1999.51	-0.4856	1261.29	75.83	75.7833
4	12087.30	3000.00	3000.08	0.0840	1261.31	75.84	75.7894
5	12376.80	4000.10	4000.40	0.3028	1261.24	75.84	75.7681
6	12638.40	5000.00	4999.90	-0.1015	1261.30	75.84	75.7864
7	11764.80	2000.00	2003.48	3.4758	1261.13	75.85	75.7345

Temperature (#4): 100.75 °C

Pressure Data Point	Pressure Frequency Hz	Pressure PsiA	Calculated Pressure PsiA	Pressure Error Psi	Temperature Frequency Hz	Temperature Deg. C	Calculated Temperature Deg. C
1	10962.20	14.40	14.26	-0.1368	1342.79	100.75	100.8716
2	11377.00	1000.10	1000.54	0.4359	1342.90	100.75	100.9057
3	11743.50	2000.00	1999.50	-0.4960	1342.86	100.76	100.8933
4	12067.10	3000.00	3000.00	0.0031	1342.83	100.76	100.8840
5	12356.00	4000.10	4000.49	0.3859	1342.92	100.77	100.9119
6	12616.80	5000.10	4999.92	-0.1812	1342.83	100.77	100.8840
7	11744.90	2000.00	2003.54	3.5442	1342.81	100.77	100.8778

Pressure Curve Fit Errors

Product: C-4000
Gauge Serial Number: 113197
Sensor Number: 24345
Range: 5000 Psi
Date Calibrated: 03-02-2017
Date Verified: 03-02-2017
Curve Fit Model: Sercel-GRC FREQUENCY
Temp/Press Fit: 2/3
Gen. Mode (Temp/Press): 1/1
Specs Mode (Gen/Err/Hys/Rep): D/D/D/D
Software Revision: DACS 1.00.023

Temperature (#5): 125.63 °C

Pressure Data Point	Pressure Frequency Hz	Pressure PsiA	Calculated Pressure PsiA	Pressure Error Psi	Temperature Frequency Hz	Temperature Deg. C	Calculated Temperature Deg. C
1	10940.80	15.00	14.79	-0.2091	1422.25	125.63	125.7571
2	11356.20	1000.00	1000.59	0.5890	1422.24	125.62	125.7540
3	11722.70	2000.00	1999.14	-0.8607	1422.22	125.61	125.7477
4	12046.10	3000.00	3000.18	0.1849	1422.51	125.62	125.8393
5	12334.50	4000.00	4000.63	0.6331	1422.38	125.62	125.7982
6	12594.50	5000.00	4999.76	-0.2423	1422.34	125.63	125.7856
7	11724.00	2000.00	2002.92	2.9178	1422.21	125.62	125.7445

Temperature (#6): 150.40 °C

Pressure Data Point	Pressure Frequency Hz	Pressure PsiA	Calculated Pressure PsiA	Pressure Error Psi	Temperature Frequency Hz	Temperature Deg. C	Calculated Temperature Deg. C
1	10915.00	15.10	14.88	-0.2195	1499.30	150.40	150.2890
2	11330.70	1000.00	1000.55	0.5479	1499.42	150.41	150.3275
3	11697.10	2000.00	1999.50	-0.5003	1499.48	150.41	150.3468
4	12019.90	3000.00	2999.80	-0.1975	1499.40	150.42	150.3211
5	12307.80	4000.00	4000.58	0.5758	1499.37	150.43	150.3115
6	12567.20	5000.00	4999.84	-0.1618	1499.48	150.43	150.3468
7	11698.50	2000.00	2003.48	3.4829	1499.38	150.43	150.3147

Gauge Calibration Temperature Coefficients

Product: C-4000
Gauge Serial Number: 113197
Sensor Number: 24345
Range: 5000 Psi
Date Calibrated: 03-02-2017
Date Verified: 03-02-2017
Curve Fit Model: Sercel-GRC FREQUENCY
Temp/Press Fit: 2/3
Gen. Mode (Temp/Press): 1/1
Specs Mode (Gen/Err/Hys/Rep): D/D/D/D
Software Revision: DACS 1.00.023

Temperature frequency Multiplier: 1

TEMPERATURE EQUATION:

TEMPERATURE PRESCALE (Hz): XT = TFM * FT

WHERE:

TFM = Temperature frequency multiplier
FT = Temperature frequency (Hz)

TEMPERATURE ($^{\circ}$ F) = T[0] + T[1] * XT + T[2] * XT 2

Temperature Equation Coefficients:

T[0]: -4.29080744368365340E+002

T[1]: 3.98211202436642260E-001

T[2]: 5.98615818701134270E-005

Gauge Calibration Pressure Coefficients

Product:	C-4000
Gauge Serial Number:	113197
Sensor Number:	24345
Range:	5000 Psi
Date Calibrated:	03-02-2017
Date Verified:	03-02-2017
Curve Fit Model:	Sercel-GRC FREQUENCY
Temp/Press Fit:	2/3
Gen. Mode (Temp/Press):	1/1
Specs Mode (Gen/Err/Hys/Rep):	D/D/D/D
Software Revision:	DACS 1.00.023
Pressure frequency Multiplier:	1
Pressure fit:	3

PRESSURE EQUATION:

Pressure Prescale (Hz) : $XP = PFM * FP$

WHERE:

PFM = Pressure frequency multiplier
FP = Pressure frequency (Hz)

```
P1' = A[0,T1] + A[1,T1] * XP + A[2,T1] * XP^2 + A[3,T1] * XP^3
P1 = P1' - (B[0,T1] + B[1,T1] * P1') * (TEMP - Te[T1])
P2' = A[0,T2] + A[1,T2] * XP + A[2,T2] * XP^2 + A[3,T2] * XP^3
P2 = P2' - (B[0,T2] + B[1,T2] * P2') * (TEMP - Te[T2])
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PRESSURE (PsiA) = $P1 + (TEMP - Te[T1]) * ((P2 - P1) / (Te[T2] - Te[T1]))$

WHERE TEMP = Actual temperature ($^{\circ}$ F)

T1 = Index of temperature data point less than the actual temperature
T2 = Index of temperature data point greater than the actual temperature
Te = Temperature calibration points ($^{\circ}$ F)

Gauge Calibration Pressure Coefficients

Product:	C-4000
Gauge Serial Number:	113197
Sensor Number:	24345
Range:	5000 Psi
Date Calibrated:	03-02-2017
Date Verified:	03-02-2017
Curve Fit Model:	Sercel-GRC FREQUENCY
Temp/Press Fit:	2/3
Gen. Mode (Temp/Press):	1/1
Specs Mode (Gen/Err/Hys/Rep):	D/D/D/D
Software Revision:	DACS 1.00.023
Pressure frequency Multiplier:	1
Pressure fit:	3

Temperature (#1): 23.45 °C

Temperature (#2): 50.93 °C

Pressure Equation Coefficients:

A[0,0]:	-7.49895964695995500E+004
A[1,0]:	1.98186028269039340E+001
A[2,0]:	-1.94603815899733000E-003
A[3,0]:	6.94308565189104110E-008

A[0,1]:	-7.79549016538759320E+004
A[1,1]:	2.06863075803377750E+001
A[2,1]:	-2.03020342487602710E-003
A[3,1]:	7.21774891306078600E-008

Temperature Correction Coefficients:

B[0,0]:	-9.97144529199060600E-001
B[1,0]:	-1.92250010452586370E-004

B[0,1]:	-1.00192878130454430E+000
B[1,1]:	-1.96837413428558040E-004

Temperature (#3): 75.82 °C

Temperature (#4): 100.75 °C

Pressure Equation Coefficients:

A[0,2]:	-7.96609058011043380E+004
A[1,2]:	2.12167524099349980E+001
A[2,2]:	-2.08426680364937060E-003
A[3,2]:	7.40236659191317870E-008

A[0,3]:	-8.28529154844445000E+004
A[1,3]:	2.21226300399618050E+001
A[2,3]:	-2.16970327162535960E-003
A[3,3]:	7.67368250306209900E-008

Temperature Correction Coefficients:

B[0,2]:	-1.00633473284595510E+000
B[1,2]:	-2.00773372516316170E-004

B[0,3]:	-1.01023985742435340E+000
B[1,3]:	-2.04503843655766100E-004

Temperature (#5): 125.63 °C

Temperature (#6): 150.40 °C

Pressure Equation Coefficients:

A[0,4]:	-8.42669226096039490E+004
A[1,4]:	2.25776047408580780E+001
A[2,4]:	-2.21709525067126380E-003

A[0,5]:	-8.31065758549316670E+004
A[1,5]:	2.23651221400996080E+001
A[2,5]:	-2.20721003603880590E-003

Gauge Calibration Pressure Coefficients

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Sensor Number:	24345
Range:	5000 Psi
Date Calibrated:	03-02-2017
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Curve Fit Model:	Sercel-GRC FREQUENCY
Temp/Press Fit:	2/3
Gen. Mode (Temp/Press):	1/1
Specs Mode (Gen/Err/Hys/Rep):	D/D/D/D
Software Revision:	DACS 1.00.023
Pressure frequency Multiplier:	1
Pressure fit:	3

A[3,4]: 7.83838006723769350E-008

A[3,5]: 7.84131471941940350E-008

Temperature Correction Coefficients:

B[0,4]: -1.01415008244172490E+000

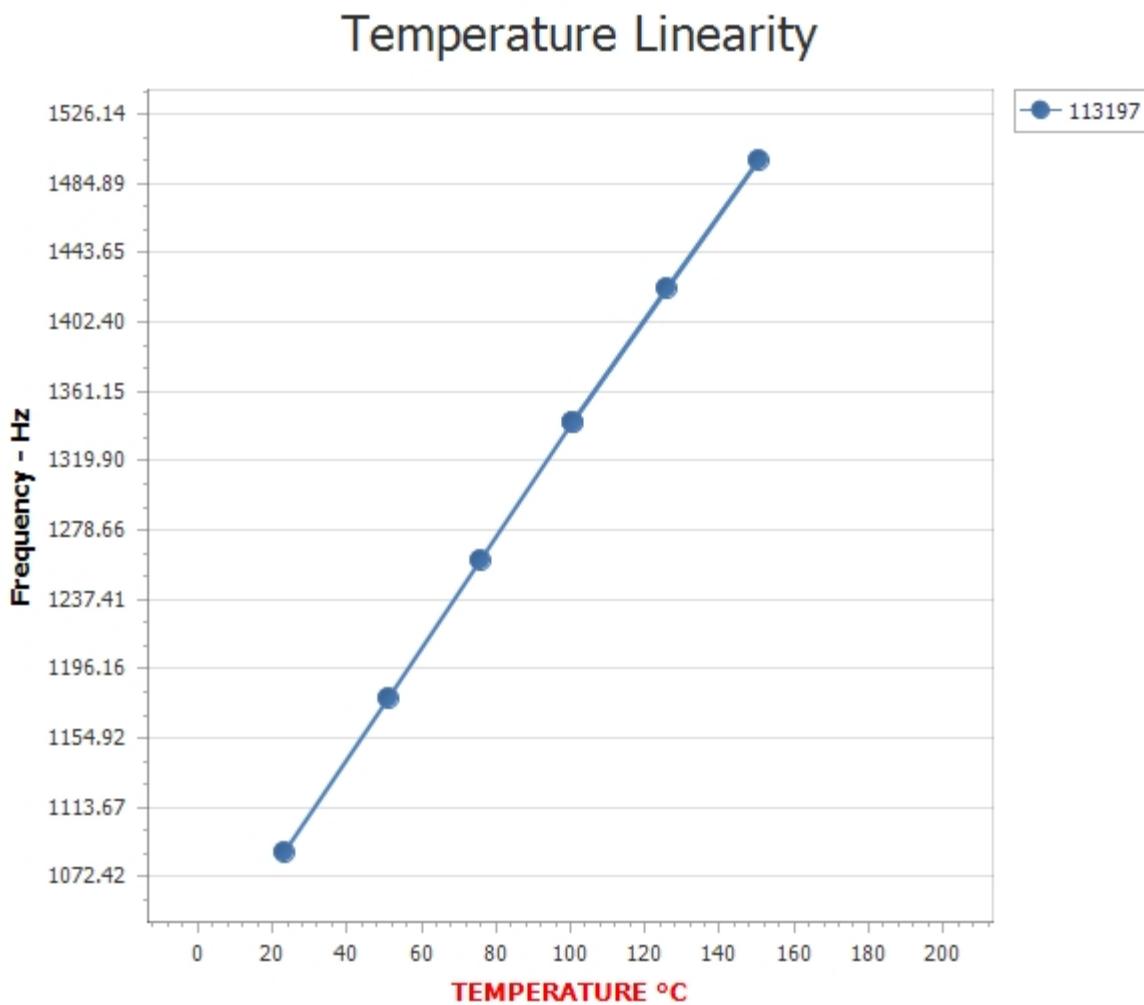
B[0,5]: -1.02145801508147470E+000

B[1,4]: -2.08338863263158250E-004

B[1,5]: -2.12171165370980110E-004

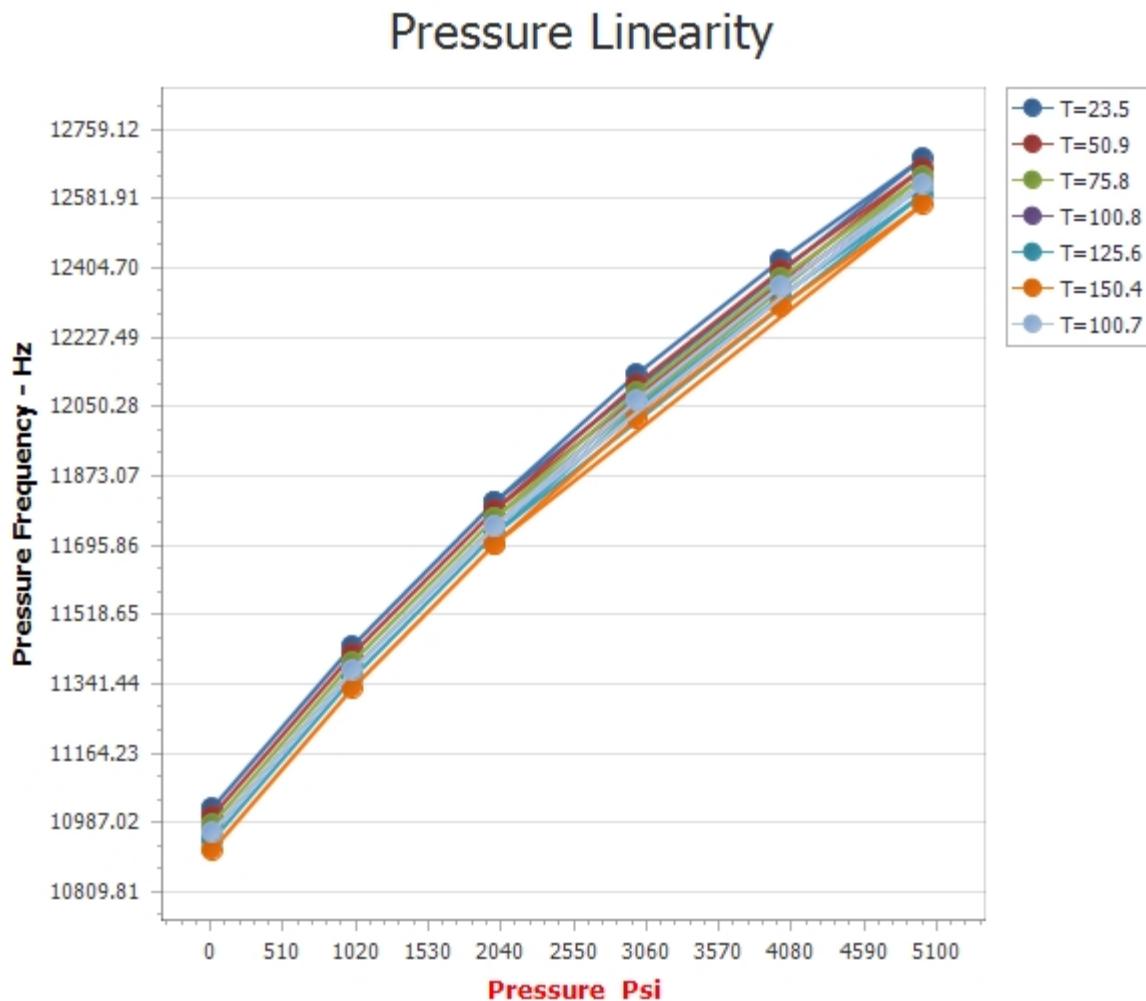
Gauge Calibration Graph

Product: C-4000
Gauge Serial Number: 113197
Sensor Number: 24345
Range: 5000 Psi
Date Calibrated: 03-02-2017
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Curve Fit Model: Sercel-GRC FREQUENCY
Temp/Press Fit: 2/3
Gen. Mode (Temp/Press): 1/1
Specs Mode (Gen/Err/Hys/Rep): D/D/D/D
Software Revision: DACS 1.00.023



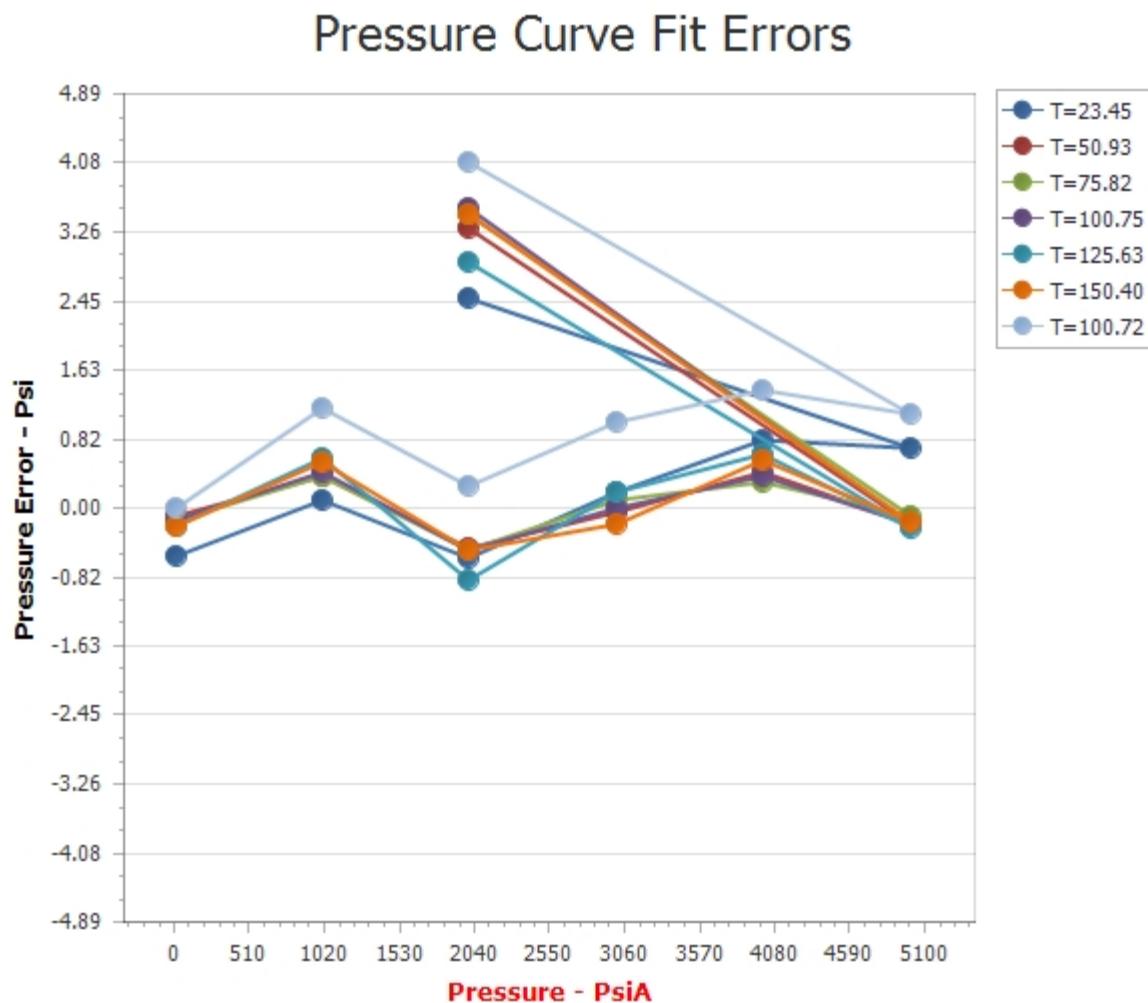
Gauge Calibration Graph

Product: C-4000
Gauge Serial Number: 113197
Sensor Number: 24345
Range: 5000 Psi
Date Calibrated: 03-02-2017
Date Verified: 03-02-2017
Curve Fit Model: Sercel-GRC FREQUENCY
Temp/Press Fit: 2/3
Gen. Mode (Temp/Press): 1/1
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Software Revision: DACS 1.00.023



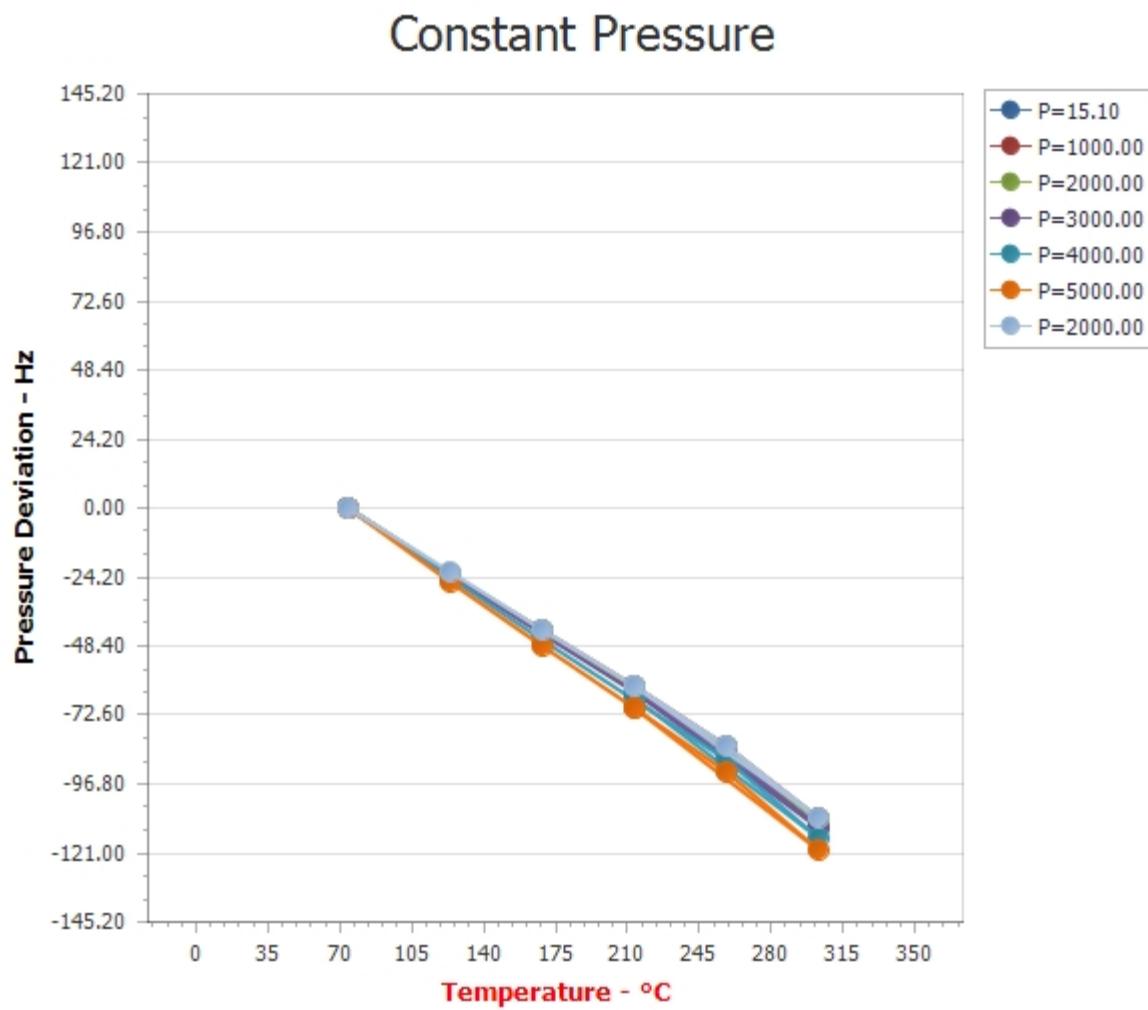
Gauge Calibration Graph

Product: C-4000
Gauge Serial Number: 113197
Sensor Number: 24345
Range: 5000 Psi
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Specs Mode (Gen/Err/Hys/Rep): D/D/D/D
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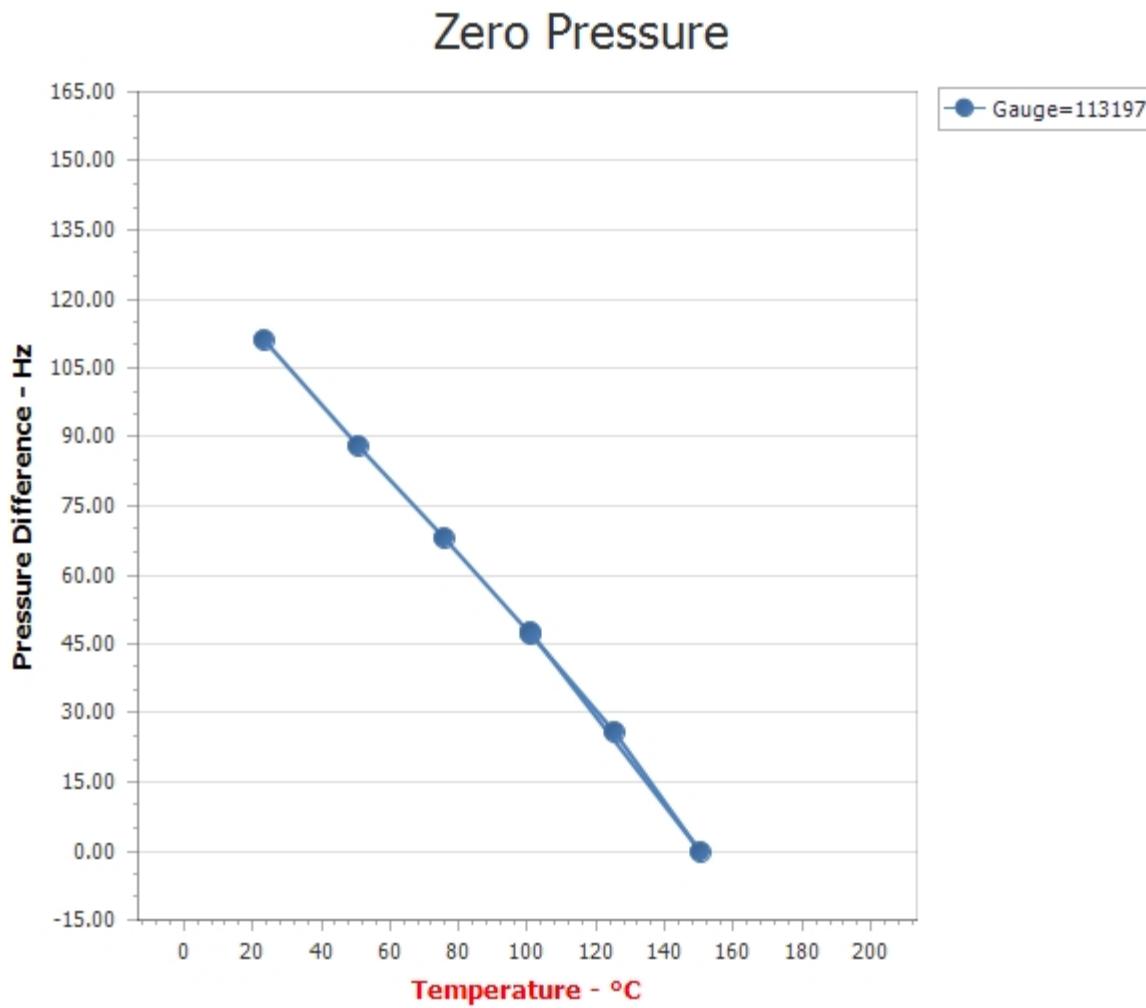
Gauge Calibration Graph

Product:	C-4000
Gauge Serial Number:	113197
Sensor Number:	24345
Range:	5000 Psi
Date Calibrated:	03-02-2017
Date Verified:	03-02-2017
Curve Fit Model:	Sercel-GRC FREQUENCY
Temp/Press Fit:	2/3
Gen. Mode (Temp/Press):	1/1
Specs Mode (Gen/Err/Hys/Rep):	D/D/D/D
Software Revision:	DACS 1.00.023

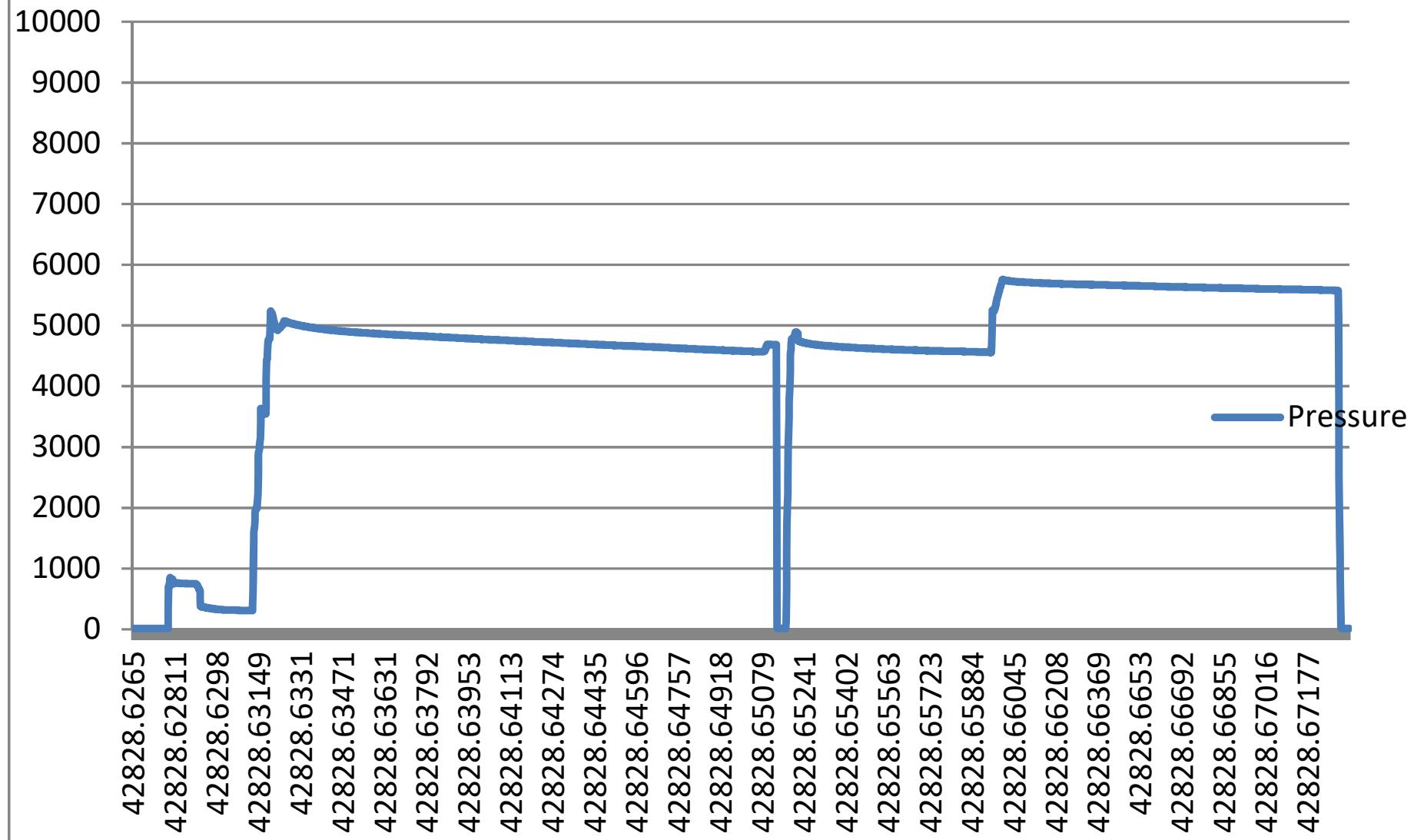


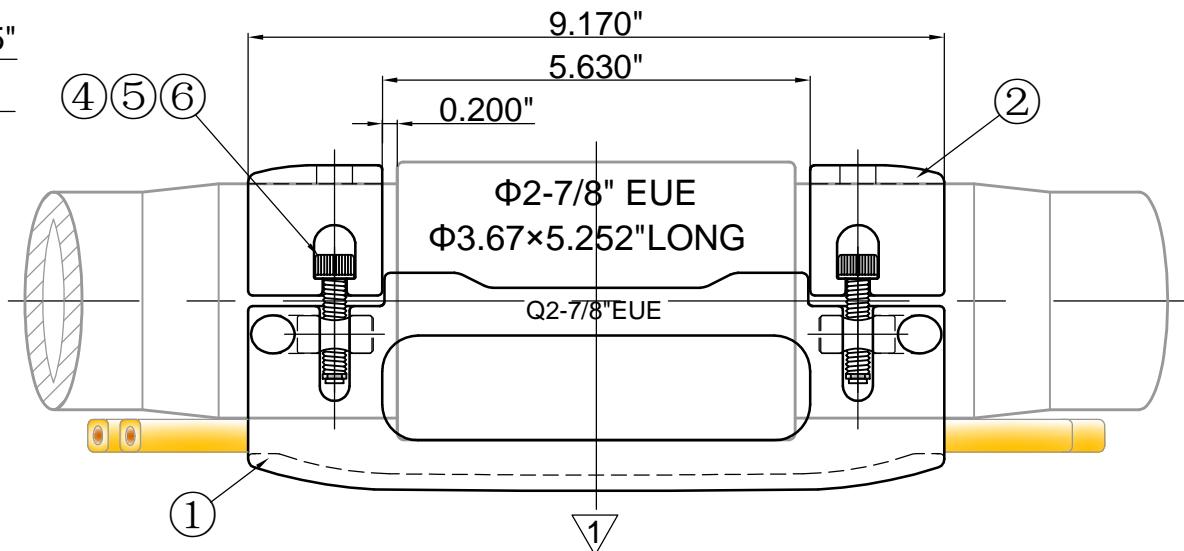
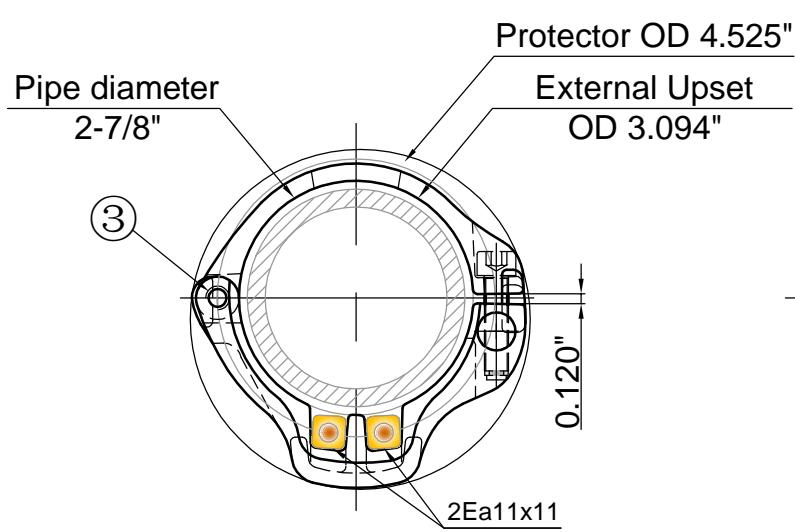
Gauge Calibration Graph

Product: C-4000
Gauge Serial Number: 113197
Sensor Number: 24345
Range: 5000 Psi
Date Calibrated: 03-02-2017
Date Verified: 03-02-2017
Curve Fit Model: Sercel-GRC FREQUENCY
Temp/Press Fit: 2/3
Gen. Mode (Temp/Press): 1/1
Specs Mode (Gen/Err/Hys/Rep): D/D/D/D
Software Revision: DACS 1.00.023



Gauge SN113197 Cablehead Pressure Test





Confirmation signed

NOTES:
1.ESTIMATED WEIGHT OF ASSEMBLY 2.4KGS
2.BOLTS TO BE TORQUED TO 30 FT-LBS

COUPLING SHOWN

2-7/8" EUE

OD 3.67"

LENGTH 5.252"

PROTECTOR OD

4.449"

CASING

CASING OD

Drift ID

DRAWING TITLE

Cast Cross Coupling Protector, 2-7/8" EUE, 2 slots,
To Support 1 or 2 off 11x11mm Lines.

Huracan Pty Ltd

151 Warooby Lane
Roma, QLD
Tel:+61-414-717907
www.huracan.com.au

HURACAN

DRAWING
MALI

DATE
2010.7.30

APPROVALED
FANLIANSHI

DATE
2014.7.14

3RD ANGLE PROJECTION



DIMENSION IN
MILLIMETERS
UNLESS STATED
OTHERWISE

DRAWING NO.
OC-205

Oileader®

天津欧立德石油装备有限公司
Tianjin Oileader Petroleum Equipment Co., Ltd

产品出厂合格证
Products Certificate

OLD-SC-066

产品名称 NAME	Cast Cable Protector	规格型号 MODEL	2-7/8" EU
产品编号 CODE	OC-215 OC-236B	合同号 CONTRACT NO.	FBFV1608162005
供货数量 QUANTITY	OC-215 : 250ea OC-236B : 50ea	出厂日期 DATE OF PRODUCTION	2016.9.5

检验内容 TEST CONTENT

检验项目 ITEM	检查标准 INSPECTION STANDARDS	检验结果 RESULTS
外观检查 APPERANCE	主体周正拉筋平直、涂层均匀光滑 Smooth shape, uniform coating and clear lettering	合格 QUALIFIED
配件检查 ACCESSORIES	配件安装正确到位 Accessories are installed to the right place	合格 QUALIFIED
材质检查 MATERIAL	符合相应国标要求(具体见《材质检测报告》) Be accordance with the relevant specifications and national standards(See the 'material test report')	合格 QUALIFIED

检验结论 CONCLUSION:

本产品经检验合格，符合技术要求，准予出厂。

Products have been tested and proved to be qualified for delivery in conformity with standards.

Tianjin Oileader
Petroleum Equipment Co., Ltd.
检验(章): Quality Department
INSPECTION SEAL
Product inspection

检验员 OQC	ZhangJiangTiang	编制 PREPARED	Mali	批准 APPROVED	WuXiDong
------------	-----------------	----------------	------	----------------	----------

材质检测报告
Material test report

OLD-SC-067

Huracan PV 14d
Cast Cable Protector

订货单位 CUSTOMER	Huracan Pty Ltd	产品名称 PRODUCT	Cast Cable Protector	合同号 CONTRACT NO.	FBFV1608162005
材质 MATERIAL	ZG270-500	标准 SPECIFICATION	GB/T 11352-2009	签发日期 DATE OF ISSUE	2016.9.5

此材質檢測報告須加蓋^印品質量檢驗專用章生效！
THE MATERIAL TEST REPORT TAKES EFFECT
WITH THE QUALITY INSPECTION SPECIAL STAMP.

备注
REMARKS

**Tianjin Oilleader
Petroleum Equipment Co., Ltd.**
Quality Management
Product inspection

檢員: 孫志 質量 INSPECTOR

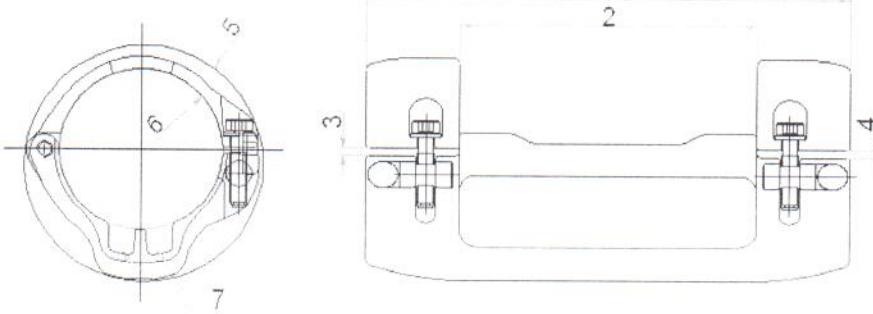
WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HEREIN HAS MANUFACTURED AND TESTED WITH SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE ABOVE MATERIAL SPECIFICATION

Sample Testing Report

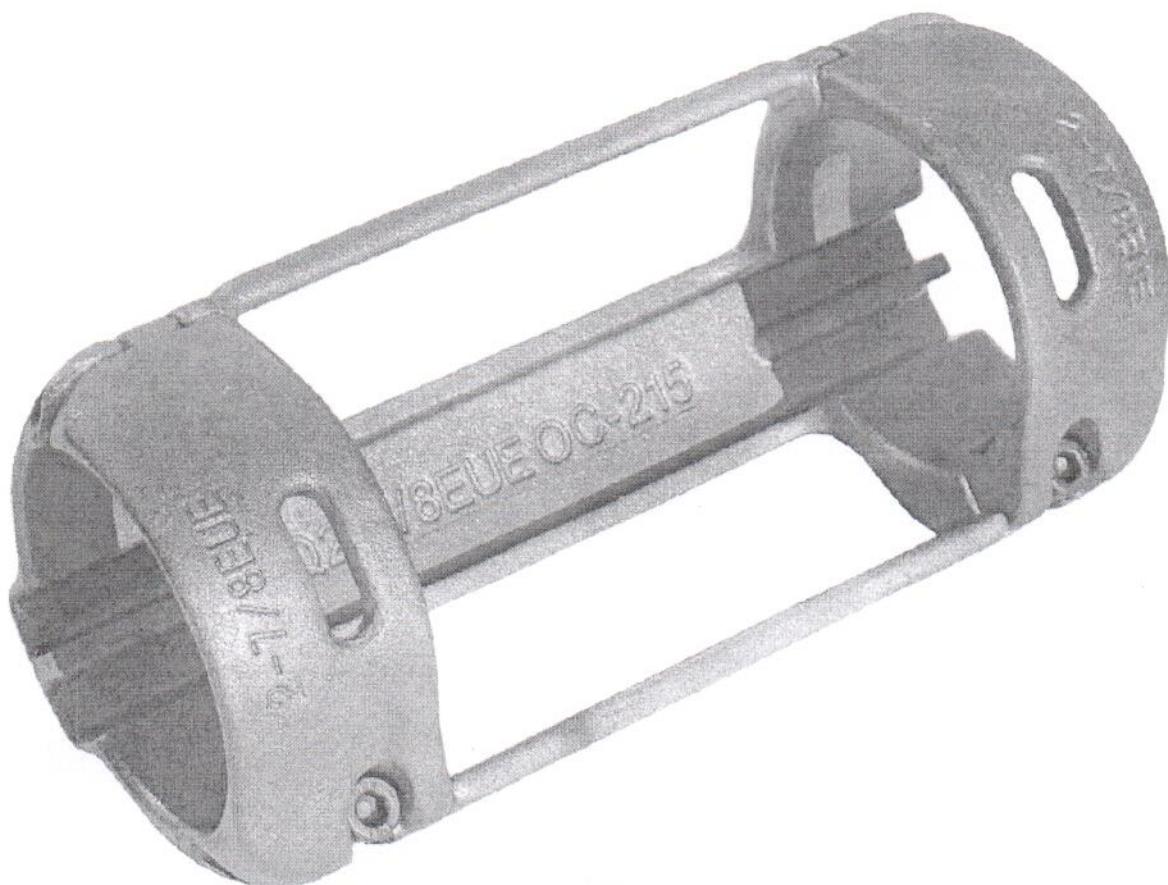
ODL-SC-069

CUSTOMER NAME	Huracan Pty Ltd	PRODUCT CODE	Q2-7/8"EUE OC-215
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INSPECTION ITEM

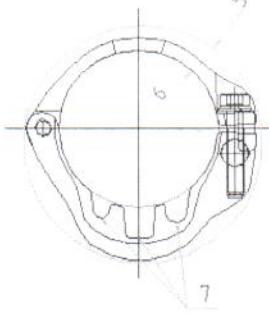
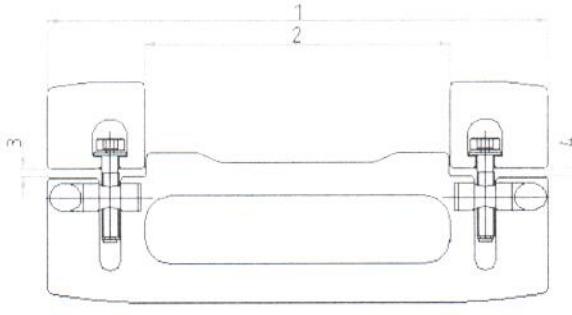
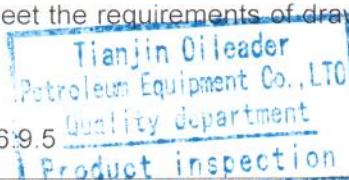
APPERANCE	The appearance of the protector is checked to be qualified without casting defects. Accessories are installed properly and completely.																																
Dimensional Inspection																																	
	<table border="1"> <thead> <tr> <th>Item</th> <th>Standard Value</th> <th>Test Value</th> <th>Determination</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>233 ± 1.4</td> <td>233.4</td> <td>Qualified</td> </tr> <tr> <td>2</td> <td>143 ± 1.2</td> <td>143.5</td> <td>Qualified</td> </tr> <tr> <td>3</td> <td>3.5 ± 1.5</td> <td>3.4</td> <td>Qualified</td> </tr> <tr> <td>4</td> <td>3.5 ± 1.5</td> <td>3.6</td> <td>Qualified</td> </tr> <tr> <td>5</td> <td>$\Phi 116 \pm 1.2$</td> <td>116.2</td> <td>Qualified</td> </tr> <tr> <td>6</td> <td>Suit for $\Phi 78.6$</td> <td>YES</td> <td>Qualified</td> </tr> <tr> <td>7</td> <td>2 slot for 11x11 line</td> <td>YES</td> <td>Qualified</td> </tr> </tbody> </table> <p>Note: 1.Casting tolerances are accordance with ISO 8062 DCTG7. 2.All dimensions are in millimeters</p>	Item	Standard Value	Test Value	Determination	1	233 ± 1.4	233.4	Qualified	2	143 ± 1.2	143.5	Qualified	3	3.5 ± 1.5	3.4	Qualified	4	3.5 ± 1.5	3.6	Qualified	5	$\Phi 116 \pm 1.2$	116.2	Qualified	6	Suit for $\Phi 78.6$	YES	Qualified	7	2 slot for 11x11 line	YES	Qualified
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CONCLUSION	<p>Product's dimensions and materials meet the requirements of drawing, and can be put into production.</p> <p>INSPECTION SEAL DATE OF TEST : 2016.9.15 by department Product inspection</p>																																
INSPECTOR	<p>Mali</p> <p>APPROVED BY</p> <p>Juni</p>																																

Product picture

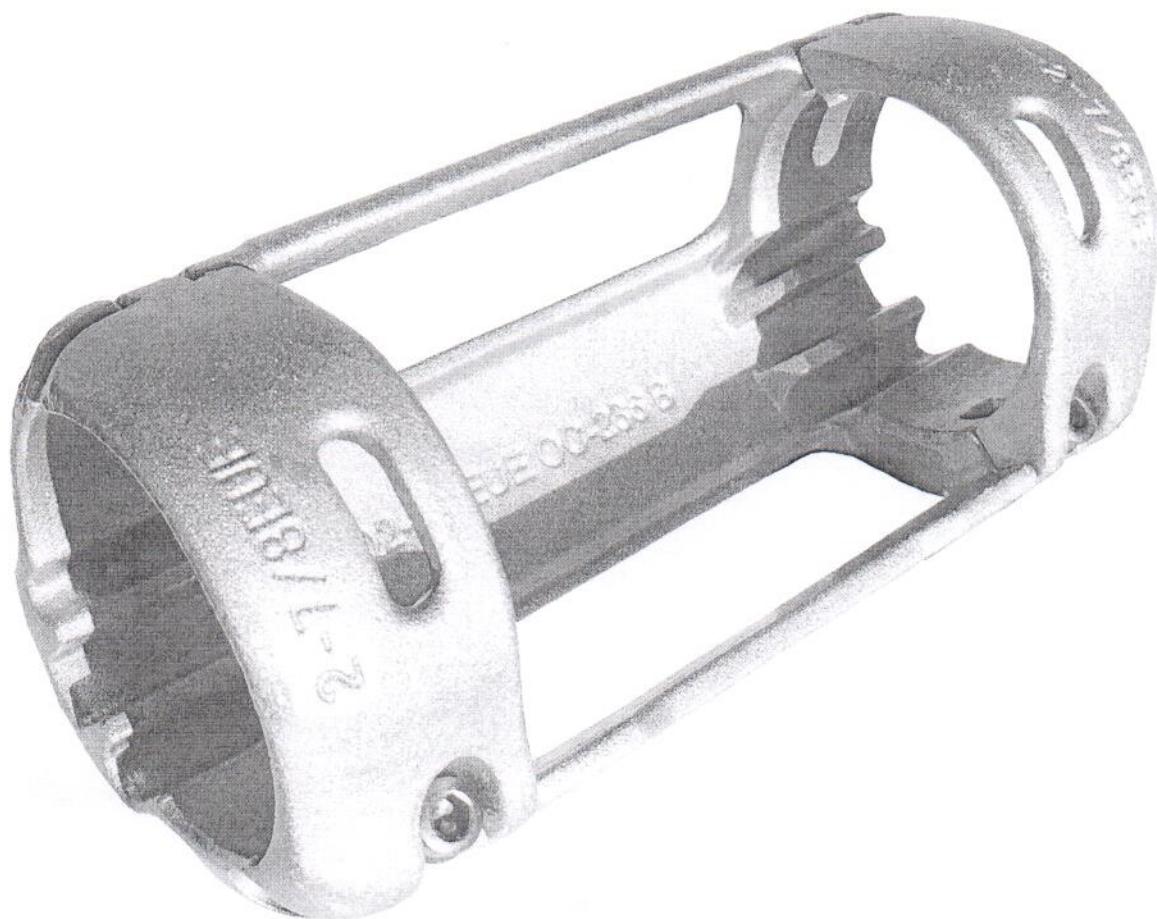


Sample Testing Report

ODL-SC-069

CUSTOMER NAME	Huracan Pty Ltd	PRODUCT CODE	Q2-7/8"EUE OC-236B																																
INSPECTION ITEM																																			
APPERANCE	The appearance of the protector is checked to be qualified without casting defects. Accessories are installed properly and completely.																																		
	 																																		
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INSPECTOR	Mai	APPROVED BY	Jani																																

Product picture



EPEE

CONFORMITY ASSESSMENT REPORT

Manufacturer: Omega Well Monitoring Ltd
Description: Wellhead "Feedthru" Cable Connector
Models: 101657 and 101657-A
Certificate: CSA Certificate: 2629502
Equivalent Marking: Ex d IIA Gb T6 IP66

*Huracan Pty Ltd
151 Warooby Lane
Roma 4455 QLD*

Project: EPEE – 16.0822
Document No: EPEE-CAD-15.0821
Revision 2.1
22 September 2016

*(The following Conformity Assessment Report has been compiled with guidance
from AS/NZS 60079.14 Section 4.3 and Annex ZD)*

CONFORMITY ASSESSMENT REPORT

Manufacturer

Omega Well Monitoring Ltd

Description, Model & Certificate No.

Wellhead "Feedthru" Cable Connector
Models 101657 and 101657-A
CSA Certificate: 2629502



Equivalent Australian Ratings

Ex d IIA Gb T6 IP66
(-10°C ≤ T_{amb} ≤ +55°C)

Suitable for use in Hazardous Areas Described by:

Zone 1 or Zone 2

Group IIA

Temperature Classifications T1 to T6

Site Location:	All Zone 1 and Zone 2 Wellhead Installations relating to Oil and Gas Production (including Coal Seam Methane)
Facility on Site:	Wellhead Installations relating to Oil and Gas Production (including Coal Seam Methane)
Requesting Entity	Huracan Pty Ltd
Document Number:	EPEE-CAD-15.0821
Revision:	2.1
Prepared By:	EPEE Consulting

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Document Version

Date	Version	Comments	Author	Reviewer	Approved
28-10-2015	1.0	Draft for review	PJS	PJS	
29-10-2015	1.1	Issued for construction	PJS	PJS	
25-08-2016	1.2	Removal of serial number	PJS	PJS	
22-09-2016	2.0	Revision of Format	PJS	JH	
22-09-2016	2.1	Redefinition of device duty	PJS	JH	

Conformity Assessment Report

Omega Well Monitoring Ltd - Wellhead "Feedthru" Cable Connector – Model: 101657 – CSA Certificate: 2629502



Relevant Definitions

Term	Definition	Source														
Ambient Temperature	Electrical equipment designed for use in a normal ambient temperature range of -20°C to $+40^{\circ}\text{C}$ does not require marking of the ambient temperature range. However, electrical equipment designed for use in other than this normal ambient temperature range is considered to be special. The marking shall then include either the symbol T_a or T_{amb} together with both the upper and lower ambient temperatures.	AS/NZS 60079.0 cl. 5.1.1														
Equipment (formerly 'Apparatus')	A general term including apparatus, fittings, devices, components, and the like used as a part of, or in connection with, an electrical installation in an explosive atmosphere.	AS/NZS 60079.0 cl. 3.25														
Certification	Acceptable certification in Australia for Group II equipment is either IECEx or ANZEx. Some legacy AUS Ex certified products may still have current certification under an earlier scheme. Other certifications such as FM, UL, CSA or ATEX are not automatically acceptable. In some cases, a conformity assessment can establish an equivalent level of safety for equipment approved or certified to other standards, on a case by case basis, but the success of a conformity assessment process for such equipment is not guaranteed.	AS/NZS 60079.14 cl. 4.3.1														
Conformity Assessment	Apart from simple apparatus used within an intrinsically safe circuit, the selection of equipment for use in a hazardous area, which has a certification that is not in accordance AS/NZS 60079.14 – clause 4.3.1, shall be restricted to circumstances where suitable equipment with certification in accordance with clause 4.3.1 is not practically obtainable. The justification for the use of such equipment along with the selection, installation, and marking, inspection, maintenance and repair and overhaul requirements shall be made by the person(s) in control of the installation using a competent body. The justification shall be included as part of the verification dossier. Justification may be demonstrated in the form of a Conformity Assessment Document . Guidance for the preparation of a Conformity Assessment Document can be found in AS/NZS 60079.14 - Annex ZD .	AS/NZS 60079.14 cl. 4.3.2 & Annex ZD														
Ex d – Flameproof Enclosure 'd' (AS/NZS 60079.1)	A type of protection in which the parts capable of igniting an explosive gas atmosphere are provided with an enclosure which can withstand the pressure developed during an internal explosion of an explosive mixture and which prevents the transmission of the explosion to the explosive gas atmosphere surrounding the enclosure.	AS/NZS 60079.14 cl. 3.3.1														
Group (formerly Apparatus Group or Gas Group)	Classification of electrical equipment related to explosive atmospheres for which it is to be used. Surface gas/vapour hazardous areas are designated Group II hazardous areas. The following subgroups exist: IIA; IIB; IIC.	AS/NZS 60079.0 cl. 4.2														
Hazardous area	An area in which an explosive gas atmosphere is or may be expected to be present, in quantities such as to require special precautions for the construction, installation and use of equipment.	AS/NZS 60079.10.1 cl. 3.3														
Non-hazardous area	An area in which an explosive gas atmosphere is not expected to be present in quantities such as to require special precautions for the construction, installation and use of equipment. Also called the "Safe Area"	AS/NZS 60079.10.1 cl. 3.4														
Temperature Class (Temperature Classification)	<p>The maximum surface temperature determined shall not exceed:</p> <ul style="list-style-type: none"> – the temperature class assigned, or – the maximum surface temperature assigned, or – if appropriate, the ignition temperature of the specific gas for which it is intended. <table border="1"> <thead> <tr> <th>Temperature Class</th> <th>Maximum Surface Temperature °C</th> </tr> </thead> <tbody> <tr> <td>T1</td> <td>450</td> </tr> <tr> <td>T2</td> <td>300</td> </tr> <tr> <td>T3</td> <td>200</td> </tr> <tr> <td>T4</td> <td>135</td> </tr> <tr> <td>T5</td> <td>100</td> </tr> <tr> <td>T6</td> <td>85</td> </tr> </tbody> </table>	Temperature Class	Maximum Surface Temperature °C	T1	450	T2	300	T3	200	T4	135	T5	100	T6	85	AS/NZS 60079.0 cl. 5.3.2.2
Temperature Class	Maximum Surface Temperature °C															
T1	450															
T2	300															
T3	200															
T4	135															
T5	100															
T6	85															
Zone 0	An area in which an explosive gas atmosphere is present continuously or for long periods or frequently	AS/NZS 60079.10.1 cl. 3.6														
Zone 1	An area in which an explosive gas atmosphere is likely to occur in normal operation occasionally.	AS/NZS 60079.10.1 cl. 3.7														
Zone 2	An area in which an explosive gas atmosphere is not likely to occur in normal operation but, if it does occur, it will exist for a short period only.	AS/NZS 60079.10.1 cl. 3.8														

Contents

1. SUMMARY OF CONFORMITY ASSESSMENT	5
2. SCOPE	6
2.1 Introduction	6
2.2 Equipment Selection	6
2.3 Certified Standards	6
2.4 Methodology	7
2.5 Equipment Protection Technique Comparison	7
3. EQUIPMENT DISPOSITION	8
3.1 Site Details	8
3.2 Site Hazardous Area Classification	8
3.3 Maximum Site Ambient Temperature	8
4. BASIS OF CONFORMITY ASSESSMENT	9
5. AUDIT OF EQUIPMENT CERTIFICATION AND MARKING	10
6. INTERPRETATION OF ORIGINAL CERTIFICATION MARKING	11
7. STATEMENT OF CONFORMITY	12
7.1 Relevant Certified Standards	12
7.2 Equivalence to Australian Standards	12
7.3 Assessments Outside of Certification	12
8. CONFORMITY ASSESSMENT AND CONCLUSIONS	13
9. CONDITIONS OF INSTALLATION AND USE	14
9.1 Manufacturer's Installation Instructions	14
9.2 Installation	14
9.3 Inspection	14
9.4 Required Competencies	14
10. REFERENCE STANDARDS	15
11. REFERENCED DOCUMENTS	16
ANNEX A – CERTIFICATIONS	17
ANNEX B – DATA SHEET	18
ANNEX C - ASSESSMENT COMPETENCY	19

1. Summary of Conformity Assessment



Figure 1: Typical Photograph of a Well Head Feedthrough

Manufacturer:

Omega Well Monitoring Ltd.
105, 1437 – 47 Ave NE
Calgary, AB. T2E-6N7

Description:

Class: 4418 05 CABLE – Hardware – For Hazardous Locations
Class I, Division I, Groups A, B, C, D T6
Model: 101657 (and –A) Wellhead Feedthru cable connector
rated 50 Vdc, 100 mA, MWP 5000 psi/35000 kPa.

Certification Details:

- | | | | |
|----------------------------|--|--|--|
| - Certificate: | 2629502 (Issued May 31, 2013) | | |
| - Certified CSA Standards: | C22.2 No. 0-10
(Reaffirmed 2015) | General Requirements - Canadian Electrical Code, Part II | |
| | C22.2 No. 30-M1986
(Reaffirmed 2007) | Explosion proof Enclosures for Use in Class I Hazardous Locations. | |
| | C22.2 No. 174-M1984
(Reaffirmed 2012) | Cables and Cable Glands for Use in Hazardous Locations | |

Equivalent Australian Ratings:

Ex d II Gb T6 IP66 (-10°C ≤ T_{amb} ≤ +55°C)

Suitable for use in Hazardous Areas described by:

- | | |
|-----------------------|-------------------|
| - Group | IIA only |
| - Temperature Classes | T1 to T6 |
| - Zones | Zone 1 and 2 only |

The equipment may **never** be used in a Zone 0 classified area.

2. Scope

2.1 Introduction

Huracan Pty Ltd (hereafter referred to as “the client”) have requested a Conformity Assessment Report which reviews **the use of CSA certified, Omega Well Monitoring Ltd, Well Head ‘Feedthru’ Cable Connector – Model 101657** for use in a Hazardous Area described as Zones 1 and 2, Group IIA and Temperature Classification T6.

CSA Certificate

The CSA Certificate, 2629502, states compliance with the following classifications:

Class: 4418 05 CABLE – Hardware – For Hazardous Locations
Class I, Division I, Groups A, B, C, D T6

Equipment Label

The Equipment Label states as follows:

WELL HEAD FEEDTHRU	CSA (symbol)
PN: 101657-A	FIELD CERTIFICATION
50 Vdc, 100 mA	
Class I, Groups A, B, C, D, T6	
MWP: 35000 kPa	

2.2 Equipment Selection

AS/NZS 60079.14 Clause 4.3.2 states “the selection of equipment for use in a hazardous area, which has a certification that is not in accordance with 4.3.1, shall be restricted to circumstances where suitable equipment with acceptable certification in accordance with 4.3.1 is not practically obtainable”.

The owner of the equipment has stated that a compatible item with certification acceptable to AS/NZS 60079.14 Clause 4.3.1 was not available and would most probably not be available for some time, as the manufacturer of this component is not considering IECEEx certification.

It is therefore assessed that the equipment complies with the requirements of AS/NZS 60079.14 Clause 4.3.2 and may be used.

2.3 Certified Standards

The equipment has been dual certified (cUL) as complying with the following North American standards:

C22.2 No. 0-10 (Reaffirmed 2015)	General Requirements - Canadian Electrical Code, Part II
C22.2 No. 30-M1986 (Reaffirmed 2007)	Explosion proof Enclosures for Use in Class I Hazardous Locations.
C22.2 No. 174-M1984 (Reaffirmed 2012)	Cables and Cable Glands for Use in Hazardous Locations

2.4 Methodology

The methodology to be employed is to compare the above CSA standards at the years published to current AS/NZS counterpart standards on a concept by concept basis:

AS/NZS 60079.0:2012 - Explosive atmospheres – Part 0: Equipment - General requirements

AS/NZS 60079.1:2015 - Explosive Atmospheres – Part 1: Equipment protection by flameproof enclosures 'd'.

This is to establish whether the requirements of the relevant concepts of the CSA standards to which equipment has been designed, constructed and certified, provide an equivalent level of safety to the requirements and concepts as described in the above AS/NZS standards, for the intended use of the equipment. Given the favourable standards intercomparison, the likelihood of success of such an assessment is "Good" as the requirements for Zone 1 and 2 equipment in all the above standards are based on similar mechanical constructional requirements and physical testing requirements, as demonstrated.

2.5 Equipment Protection Technique Comparison

The Explosion Proof technique as described within C22.2 No. 30, used the same philosophy as the Flameproof technique, marked as Ex d and as described in AS/NZS 60079.1. Refer below to a comparison of the essential aspects of each standard:

Essential Requirements for this Equipment	C22.2 No. 30	AS/NZS 60079.0 and AS/NZS 60079.1 Requirements	Comments
Thread Engagement (Tapered Threads)	Clause 4.3.3.3 Class I, Groups A and B - Threaded joints other than cover joints shall: (a) have standard tapered pipe threads with 5 fully engaged threads	AS/NZS 60079.1 - Table 5 – Taper Threaded Joints - Threads provided on each part ≥ 5	C22.2 No. 30 identical to AS/NZS 60079.1 requirements
Flamepath Lengths	Table 3: Enclosure of volume up to 100 cm ³ - Flange width 6mm for max gap of 0.15mm (Group D - Propane)	Table 2: Enclosure volume of up to 100cm ³ Flange 6mm for max gap of 0.30mm (Group IIA - Propane)	C22.2 No. 30 exceeds AS/NZS 60079.1 requirements
Impact Test Resistance	Table 11: Other enclosures of parts of enclosures (including guards and fan hoods) for other environments (not mines) - 7 joules impact energy	AS/NZS 60079.0 – Table 13 (a): Enclosures and external accessible parts of enclosures (other than light-transmitting parts) - 7 joules impact energy	C22.2 No. 30 identical to AS/NZS 60079.0 requirements
Explosion and Flame Transmission Tests	Explosion Pressure testing – Table 14 - Class 1 Group D – 5 tests – Propane 4.6% ($\pm 0.3\%$)	Explosion Pressure testing - Clause 15.2.2.2 - electrical equipment of Group IIA: three tests with (4,6 $\pm 0,3$) % propane	C22.2 No. 30 more severe than AS/NZS 60079.1 requirements
	Overpressure Testing - In the static test, the test pressure shall be raised to 2 times the reference pressure, with a minimum of 350 kPa. The pressure shall be applied for not less than 10 s and not more than 1 mm. Samples of the enclosures over 10 cm ³ not subjected to the routine test specified in Clause 6.6.2 shall be submitted to either a static test or a dynamic test in which the pressure shall be raised to 4 times the reference pressure.	Overpressure Testing – Clause 15.2.3.2 – 1.5 times the reference pressure or 4 times or 1000 kPa for volumes less than 10cm ³ – for at least 10s.	C22.2 No. 30 more severe than AS/NZS 60079.1 requirements
	Flame Transmission testing – Table 14 - Class 1 Group D – 5 tests – Hydrogen 55% ($\pm 0.5\%$)	Flame Transmission testing – Clause 15.3.2.1 - electrical equipment of Group IIA: (55 ± 0.5) % hydrogen – 5 tests	C22.2 No. 30 identical to AS/NZS 60079.0 requirements

Note: The item is encapsulated and explosion pressure testing and flame transmission testing would not have been required by either standard as the free volume is < 10cm³

It is concluded that the requirements of C22.2 No 30 meet or exceed those of AS/NZS 60079.1..

3. Equipment Disposition

3.1 Site Details

The equipment included in this assessment is limited to the **Wellhead "Feedthru" Cable Connector Model 101657** for all Zone 1 and Zone 2 wellhead Installations relating to Surface Methane (Coal Seam) Gas Production.

3.2 Site Hazardous Area Classification

The client has advised that the hazardous area classification for the site at which the equipment is installed is as follows:

Zones 1 and 2
Group IIA
Temperature Classification T6

3.3 Maximum Site Ambient Temperature

From Bureau of Meteorology data for Queensland, the site temperatures are likely to vary from as a worst case:

-10°C to +55°C

It is assessed that the equipment is capable of operating safely within this temperature range.

4. Basis of Conformity Assessment

The objective of this Conformity Assessment is to establish as follows:

*To demonstrate that the equipment (an **Omega Well Monitoring Ltd Wellhead "Feedthru" Cable Connector, Model 101657**) as described in **CSA Certificate 2629502** and as described in the **Manufacturer's Data Sheet**, demonstrates an equivalent level of safety to that required by the relevant requirements of equivalent Australian, Australian/New Zealand or IEC standards, in the configurations and locations in which the equipment is to be installed at suitable sites (see Section 3).*

*That is, it will be assessed that no further risk has been introduced by using the equipment as described above and as certified by **CSA Certificate 2629502**, at suitable sites than would be the case when employing equipment of the same design philosophy, form, fit, function and rating, certified to one of the following schemes:*

- *The current ANZEx scheme (as described in MP87-1), or*
- *The IECEx scheme, to which Australia is a signatory (note – the IECEx scheme, not to other schemes using IEC based standards).*

provided that the equipment is installed in accordance with the requirements of AS/NZS 60079 – 2009 (+A1) and the manufacturers data.

5. Audit of Equipment Certification and Marking

Datum	Certificate & Manufacturers Data	Marking Plate Data/Installed Data
Manufacturer:	Omega Well Monitoring Ltd.	Omega Well Monitoring
Certificate Holder:	Omega Well Monitoring Ltd.	---
Equipment:	Wellhead Feedthru cable connector	Wellhead Feedthru
Relevant Type:	Model: 101657	Model: 101657-A (provides traceability to certified model on certificate).
Relevant Marking:	Class I, Division I, Groups A, B, C, D, T6	Class I, Groups A, B, C, D, T6
Ambient Temperature Range:	Not marked	Not marked (assessed as suitable for a range of -10°C to +55°C).
IP Rating:	Not marked	Not marked (assessed as complying with IP66 when installed).
Certificate Number:	2629502	Not marked on the equipment

Typical Certification Marking on Equipment



Table 1 – Equipment Certification Audit

6. Interpretation of Original Certification Marking

The certified marking is as follows:

Class I Division 1 Groups A, B, C, D, T6

and should be interpreted as having the equivalent Australian designations as described below:

- **Class I Division 1:** Suitable for use in non-coal mining, gaseous hazardous area applications (surface industries) in Zone 1 and 2 hazardous areas only. The protection technique of Ex d is inferred as there is no other marking. The equipment is “Explosionproof” in terms of CSA certification. While Division 1 encompasses the local Zone 0 and Zone 1 classifications, the reverse is not assumed and Division 1 equipment is only ever assessed as being compliant to Zone 1 (or 2) requirements, and never for use in Zone 0.
- **Groups A, B, C, D:** The equipment may be installed in hazardous areas which are defined locally as Group IIC (that is, IIA, IIB or IIC). However, as this is an assessment based on work by others, only Group IIA will be allocated in this instance, to minimise the risk of accepting equipment with foreign certifications.
- **T6:** The equipment may be installed in hazardous areas with temperature classification of T1 to T6. The definitions between CSA and AS/NZS standards are identical for T6. The equipment itself is not active, but simply serves as a conductor. The original T6 marking therefore stands.

7. Statement of Conformity

7.1 Relevant Certified Standards

The equipment was originally certified to the following standards:

C22.2 No. 0-10 (Reaffirmed 2015) - General Requirements – Canadian Electrical Code, Part II.

C22.2 No. 30-M1986 (Reaffirmed 2007) - Explosion proof Enclosures for Use in Class I Hazardous Locations.

C22.2 No. 174-M1984 (Reaffirmed 2012) - Cables and Cable Glands for Use in Hazardous Locations

7.2 Equivalence to Australian Standards

The above North American standards are assessed as **aligning in principle** with the following current Australian standards:

AS/NZS 60079-0:2012 – Explosive atmospheres – Part 0: Equipment – General requirements

AS/NZS 60079-1:2015 - Explosive atmospheres – Part 1: Equipment protection by flameproof enclosures 'd'.

7.3 Assessments Outside of Certification

The following was assessed outside of certified parameters, based on the authors experience and judgement and the data provided by Huracan (the client) as background material (not referenced in this report):

- The equipment is assessed as complying with the requirements of **IP66** when installed due to the construction of the equipment
- The permissible ambient temperature range for the equipment is assessed as being:

$$-10^{\circ}\text{C} \leq T_{\text{amb}} \leq +55^{\circ}\text{C}$$

- It is assessed that the Model 101657-A equipment sample is identical in all relevant respects to the certified Model 101657 and that CSA certification 2629502 also includes this model number variation, even though the CSA certificate number does not appear to be marked on the equipment itself, and it is assumed that no compromise to safety has been made with such an assessment.

8. Conformity Assessment and Conclusions

The equipment as certified by CSA to:

- C22.2 No. 0-10 (Reaffirmed 2015)
- C22.2 No. 30-M1986 (Reaffirmed 2007)
- C22.2 No. 174-M1984 (Reaffirmed 2012)

and as described in CSA Certificate 2629502 and in the manufacturers datasheets and manuals was manufactured under an ISO 9001:2008 Quality Management System (Certificate Number: CA1993), and is considered to meet, in principle, and by comparison with the relevant requirements of the Ex d technique as described in the standards below:

- AS/NZS 60079.0:2012 &
- AS/NZS 60079.1:2015

is therefore assessed as having equivalent protection to the technique of Flameproof - Ex d.

The equipment may therefore be used as follows:

- In flammable gas/vapour hazardous areas, which are classified as:
 - Zone 1 or 2 (only),
 - Group IIA (only)
 - Temperature Classifications of T1 to T6, and
- In ambient temperatures ranging as follows: $-10^{\circ}\text{C} \leq T_{\text{amb}} \leq +55^{\circ}\text{C}$.

and may be installed as if it was certified and marked as follows:

Ex d IIA Gb T6 IP66

9. Conditions of Installation and Use

9.1 Manufacturer's Installation Instructions

The installation of the equipment shall be conducted in accordance with the manufacturer's installation instructions.

9.2 Installation

The installation of this equipment shall be conducted in accordance with the relevant requirements of AS/NZS 60079.14:2009 (+A1) - Explosive atmospheres - Electrical installations design, selection and erection (IEC 60079-14, Ed. 4.0 (2007) MOD).

9.3 Inspection

The inspection of the equipment, when installed, shall be conducted in accordance with the relevant requirements of AS/NZS 60079.17:2009 (+A1) - Explosive atmospheres - Electrical installations inspection and maintenance (IEC 60079-17, Ed.4.0(2007) MOD).

9.4 Required Competencies

Installation and maintenance staff are to possess the following competencies in accordance with AS/NZS 4761.1:2008 (and formerly AS/NZS 4761.1:2003)

- UEENEEM024A - Install explosion-protected equipment and wiring systems (formerly UTE NES 107A)
- UEENEEM028A - Maintain equipment in hazardous areas – gas (formerly UTE NES 214A)

10. Reference Standards

C22.2 No. 0 - 10 (Reaffirmed 2015) - General Requirements – Canadian Electrical Code, Part II.

C22.2 No. 30 - M1986 (Reaffirmed 2007) - Explosion proof Enclosures for Use in Class I Hazardous Locations.

C22.2 No. 174 - M1984 (Reaffirmed 2012) - Cables and Cable Glands for Use in Hazardous Locations

AS/NZS 60079-0:2012 – Explosive atmospheres – Part 0: Equipment – General requirements

AS/NZS 60079-1:2015 - Explosive atmospheres – Part 1: Equipment protection by flameproof enclosures 'd'.

AS/NZS 4761.1:2008 - Competencies for working with electrical equipment for hazardous areas (EEHA)
- Part 1: Competency Standards.

AS/NZS 60079.14:2009 (+A1) - Explosive atmospheres - Electrical installations design, selection and erection (IEC 60079-14, Ed. 4.0(2007) MOD).

AS/NZS 60079.17 (+A1) - Explosive atmospheres - Electrical installations inspection and maintenance (IEC 60079-17, Ed.4.0(2007) MOD).

AS/NZS 60079.10.1:2009 - Explosive atmospheres - Classification of areas - Explosive gas atmospheres (IEC 60079-10-1, Ed.1.0 (2008) MOD).

AS/NZS 60079.20.1:2012 - Electrical apparatus for explosive gas atmospheres - Part 20.1: Material characteristics for gas and vapour classification—Test methods and data.

11. Referenced Documents

Annex	Document Type	Document Number	Description
Annex A	A1. CSA Certificate and report	2629502	Model: 101657 Wellhead Feedthru cable connector
	A2. ISO 9001:2008 Certification	Certificate Number: CA1993	Quality Management Certificate
Annex B	B1. Data Sheet	---	DataCan – Wellhead Outlet 2
Annex C	C1. Assessment Competency	UTE NES 407 (AS/NZS 4761.1)	Provider: MOXI Certificate No: 0110-1-06 Dated: 12 June 2006

(These documents are appended to the PDF version of this report)

Table 2: Referenced Documents**Authorised by:**

(end user to sign authorisation)**Compiled by:**

Paul Spreller

Manager

EPEE Consulting

UTE NES 407 (MOXI – Certificate No: 0110-1-06 dated: 12 June 2006 - attached)

ANNEX A – Certifications

- CSA Certificate and Test Report
- ISO 9001:2008 Certification



Field Certification Certificate of Compliance

Certificate: 2629502

Date Issued: May 31, 2013

Project: 2629502

Issued to: Omega Well Monitoring Ltd.,
105, 1437 - 47 Ave NE
Calgary, AB. T2E-6N7

Attention: Gita Ram

***The products listed below are eligible to bear CSA Field Certification Labels,
bearing the CSA Mark shown***



Issued by: Dave Lancaster

Field Certification

PRODUCTS

Class: 4418 05 CABLE - Hardware - For Hazardous Locations

Class I, Division 1, Groups A, B, C, D T6

Model: 101657 Wellhead Feedthru cable connector rated 50 Vdc, 100 mA,
MWP 5000 psi/35000 Kpa

Note: The above connectors are components subject to evaluation in the final application by either CSA International or the applicable electrical authority having jurisdiction.

CSA Field Certification Label(s) issued: from serial numbers FB 517614 to FB 517629

Certificate: 2629502

Master Contract: N/A

Note: The above connectors are components subject to evaluation in the final application by either CSA International or the applicable electrical authority having jurisdiction.

APPLICABLE REQUIREMENTS

The specific products described in this report were evaluated against:

CSA Standard C22.2 No 0-2010	General Requirements - Canadian Electrical Code, Part II
C22.2 No. 30	Explosion proof Enclosures for Use in Class I Hazardous Locations.
CSA Standard C22.2 No 174	Cables and Cable Glands for Use in Hazardous Locations

MARKINGS

- Submitter's identification on product and containing package;
- Model designation or equivalent;
- Cable type and size;
- Applicable hazardous locations designation;
- Maximum Working Pressure (MWP) in psi and pascals
- Cautions, warnings and additional markings as may be required;
- Seal not required;



Descriptive and Test Report

REPORT: 2629502

PROJECT: 2629502

Edition 1: Project - 2629502
Issued by: Dave Lancaster

Contents: Certificate of Compliance - Page 1 to 2
Description and Tests – Pages 1 to 12

PRODUCTS

Class: 4418 05 CABLE - Hardware - For Hazardous Locations

Class I, Division 1, Groups A, B, C, D T6

Model: 101657 Wellhead Feedthru cable connector rated 50 Vdc, 100 mA,
MWP 5000 psi/35000 Kpa

Note: The above connectors are components subject to evaluation in the final application by either CSA International or the applicable electrical authority having jurisdiction.

CSA labels applied – Batch W/O 8887, Part # 101657 FB 517614 to FB 517629

Location of Examination

Omega Well Monitoring Ltd.,
Bay 105, 1437 – 47 Ave. NE.
Calgary, AB, T3E 6N7

Location of Installation

Oilfield Wellsites

APPLICABLE REQUIREMENTS

The specific products described in this report were evaluated against:

CSA Standard C22.2 No 0 -2010	General Requirements - Canadian Electrical Code, Part II
CSA Standard C22.2 No 174	Cables and Cable Glands for Use in Hazardous Locations
C22.2 No. 30 M1986	Explosion proof Enclosures for Use in Class I Hazardous Locations.

The test report shall not be reproduced, except in full, without the approval of CSA International.

1707-94 Street N.W., Edmonton, AB, Canada T6N 1E6

Telephone: 780.450.2111 1.800.463.6727 Fax: 780.461.5322 www.csa-international.org

MARKINGS

- Submitter's identification on product and containing package;
- Model designation or equivalent;
- Cable type and size;
- Applicable hazardous locations designation;
- Maximum Working Pressure (MWP) in psi and pascals
- Cautions, warnings and additional markings as may be required;
- Seal not required;

ALTERATIONS

1. Markings as above.

FACTORY TESTS

n/a

DESCRIPTION

The Feedthru connectors are the same as evaluated in report 1642196. The following details were extracted for this report. A copy of which is retained in File 2386531 at CSA-International Edmonton Facility.

Canada Tech's feedthru connector is to be used on a 5000 psia or less well head. The feedthru connector uses a 1/2" NPT to connect to the well. The single conductor tubewire is terminated with a crimp connection to the kemlon connector. An explosion proof junction box approved for the given gas groups is then connected to the kemlon side.

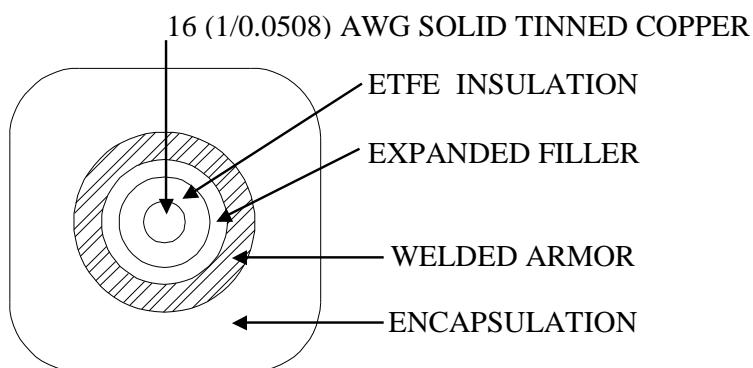
The following information is taken from file 1642196

Feed Through Assembly Bill Of Materials

Quantity	PN	Description	Manufacture
1		Feed Through Body	Canada Tech
1		Glass Seal	Canada Tech
1		Swage Seal	Canada Tech
1	16-B-01849-00	Kemlon Connector	Kemlon
1	16-B-01381-24	Kemlon Boot	Kemlon
1	SS-400 1/4" SS316	Ferrule	Swagelok
1	SS-402-1	1/4"" SS316 Nut	Swagelok
2	HF9 60-2HM9-modified	HIP Gland	HIP/ Modified by Canada Tech
2	2-116 - HSN	2-116 HSN O-Rings	AR Thompson
10 inch	5858 RD005	Red Hook up, 16 AWG Stranded, TFE	Alpha Wire
1	0368-0-33-01-13-27-10-0	PIN RECEPT .048/.064 DIA 0368	Mill-Max Manufacturing
0.25	M23053/8 3/16"	Clear Heat Shrink	SPC Technologies
2		13/16" Snap rings	

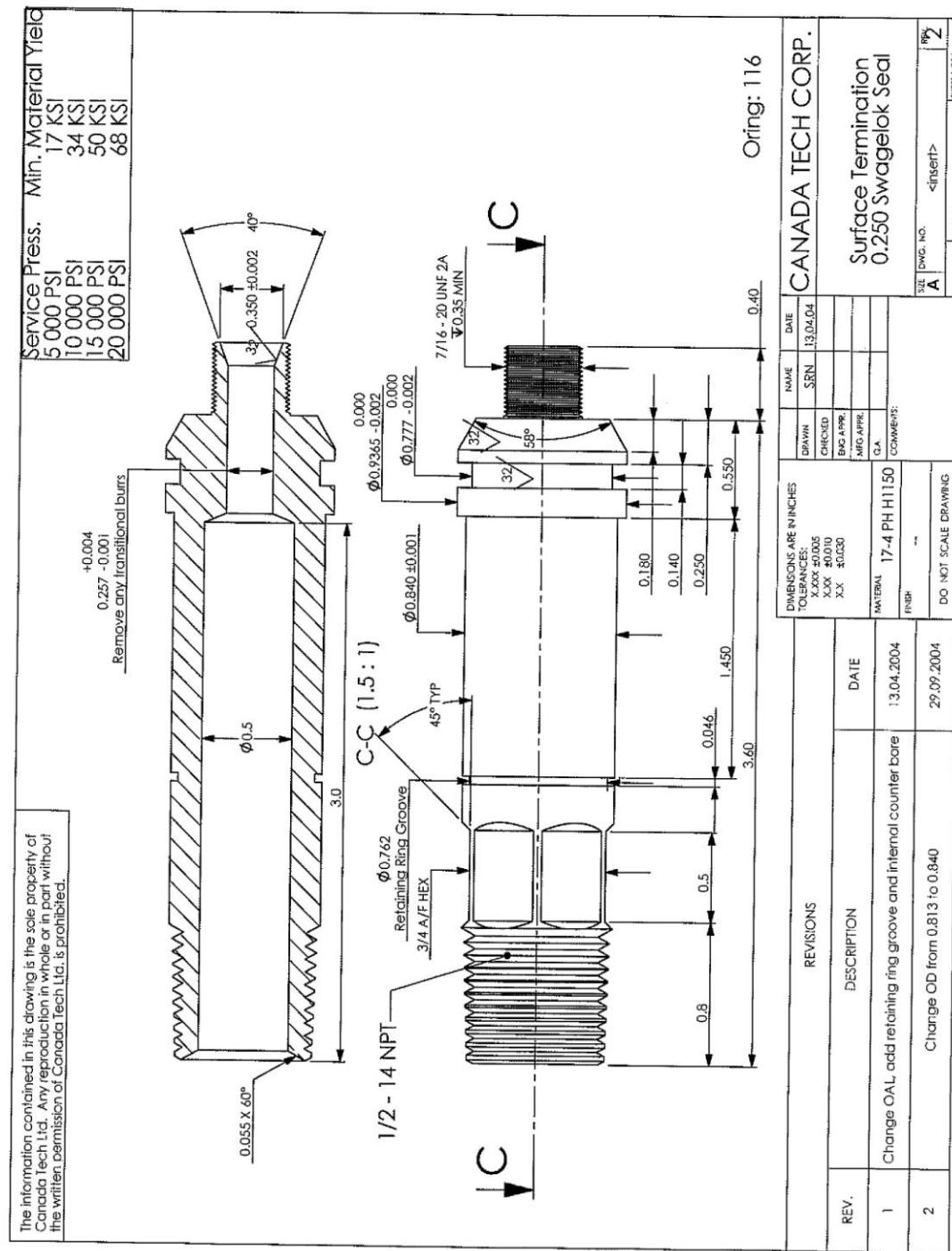
Note

The cable sealing glands are designed to be used with MC SENSOR CABLE - 150C rated - 1/C 16 AWG solid tinned copper with continuously welded 0.028" 3161 Stainless steel armor.



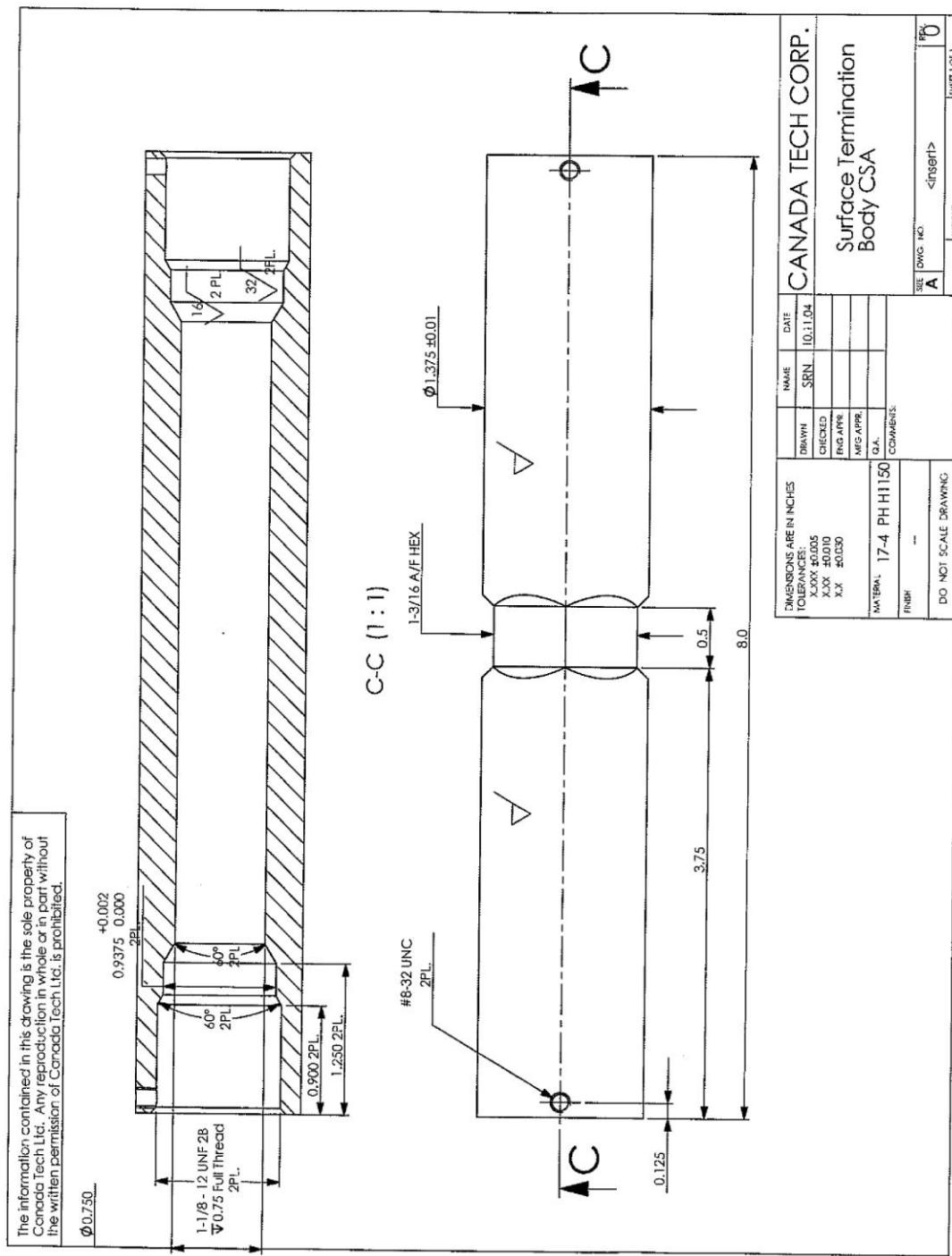
<u>CONSTRUCTION:</u>			<u>NOMINAL DIAMETER</u> <u>(mm)</u>
1.0	<u>COMPONENT I:</u>	<u>1 REQUIRED</u>	
1.1 0.051	<u>Conductor:</u>	16 AWG (1/0.0508") Solid Tinned Copper	1.29
1.2 0.101	<u>Insulation:</u>	Flame Retardant, Tefzel (ETFE), IP-1300 Target Wall Thickness 0.025" (0.635 mm)	2.57
2.0	<u>INNER JACKET:</u>	Dielectric Filler Layer of Expanded Polypropylene Nominal Dimensions.	4.93
3.0 0.250	<u>ARMOR:</u>	316L Stainless Steel Welded Cylindrical Tube Uniform Wall Thickness 0.028" (0.71 mm)	6.350
4.0 X 0.433	<u>ENCAPSULATION:</u>	Protective Layer of Colored Encapsulation, KPP-510 Nominal Dimensions	11 X 11 0.433
5.0	<u>MECHANICAL PROPERTIES:</u>		
5.1	Collapse Pressure		17,500 psi
5.2	Burst Pressure		20,000 psi
5.3	Nominal Weight (218 kg/km)		147 lb/1,000 ft
6.0	<u>ELECTRICAL PROPERTIES:</u>		
			<u>20°C</u>
	150°C		
6.1 6.57	Conductor Resistance, Ω/1,000 ft,		4.35
6.2	Insulation Resistance, M Ohm-1000 ft		15,000
6.3 20.1	Tube Resistance, Ω/1,000 ft,		17.9
6.4 29.7	Capacitance Cond. to tube, pF/ft		26.1
6.5	Voltage rating between conductor and metal tube continuous		1,000 Vdc, maximum

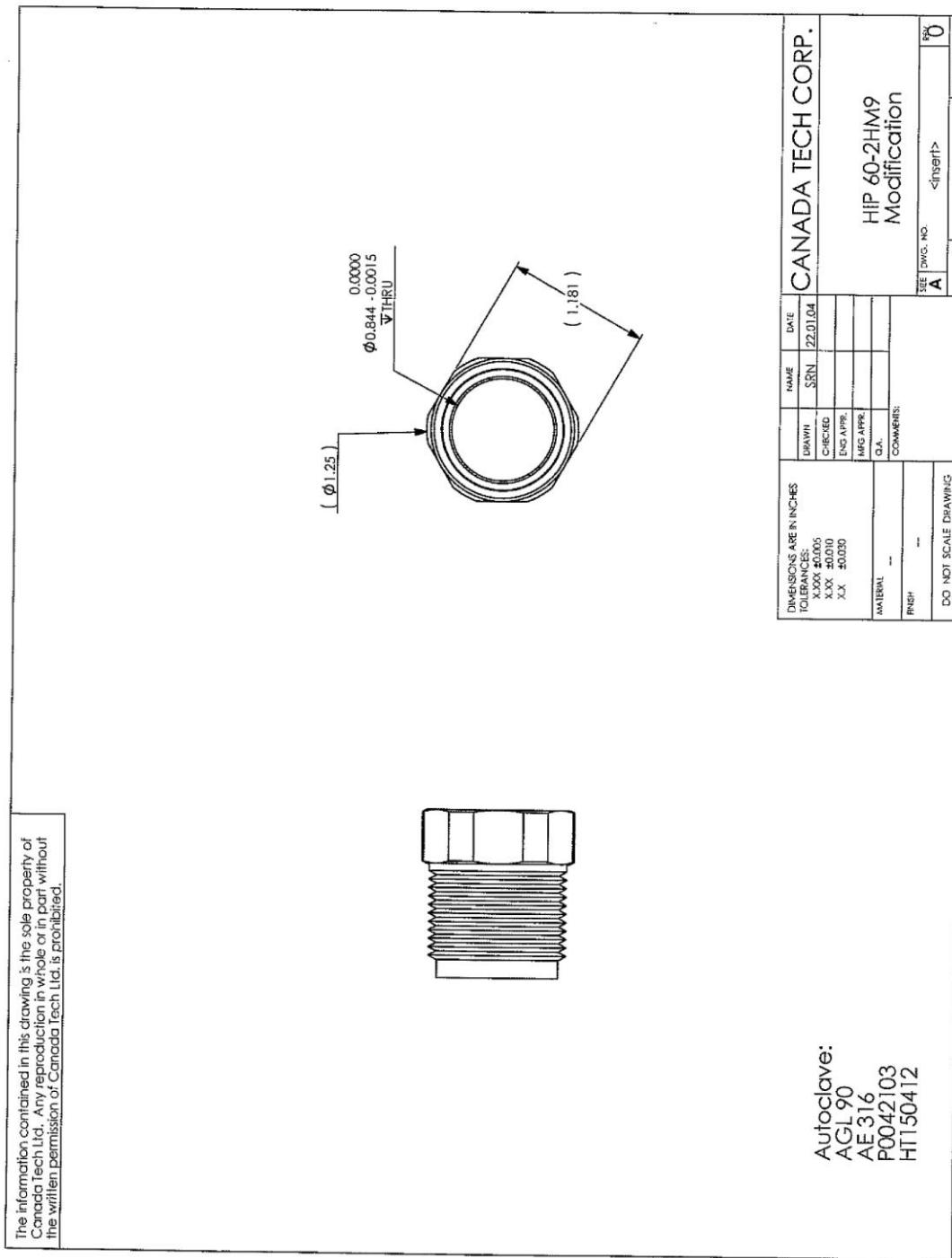
The surface feed through is shown below:



The entire inner core is of the receptacle is potted with Scotchcast™ 2130 Electrical Insulating Resin

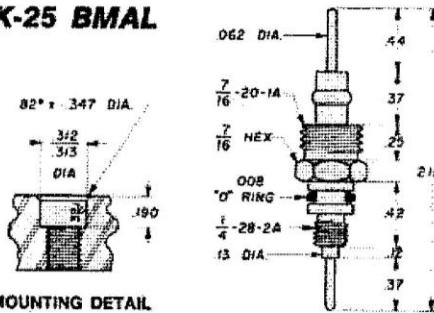
The final installation of the cable and cable glands is Subject to Inspection and Acceptance of the "Authority Having Jurisdiction" Listed below are the MC sensor cable specifications.





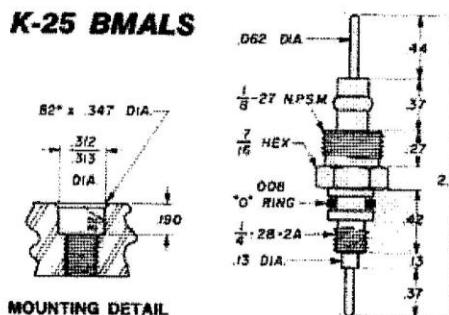
Note: The above connectors are components subject to evaluation in the final application by either CSA International or the applicable electrical authority having jurisdiction.

K-25 BMAL



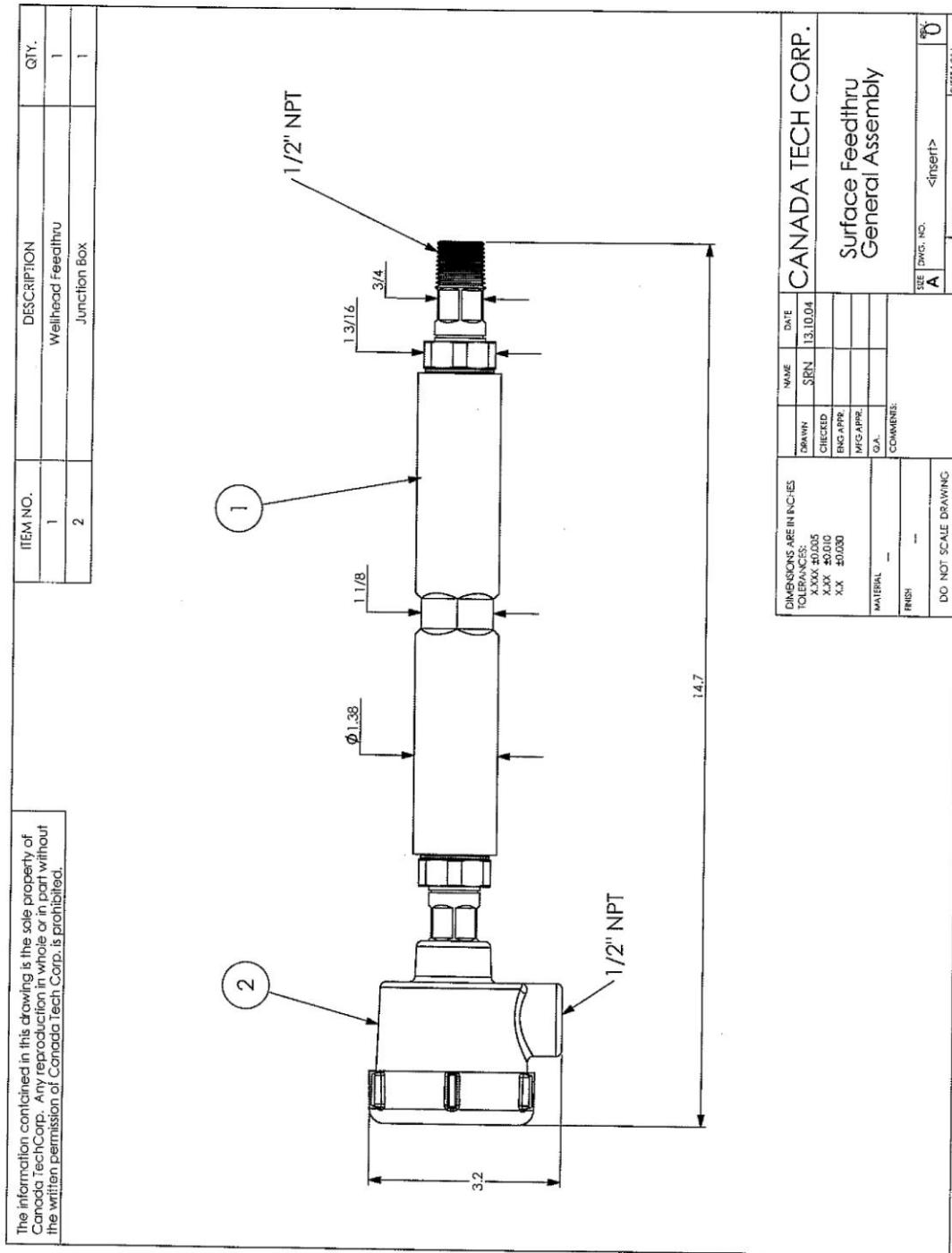
Description	Part Number	Construction	Max. Temp (F)	Max. Pressure (PSIG)	Current (A)	Max. Voltage
K-30 BMAL	16-B-1847	Polyether	450	20,000	18	3000
	16-B-1848	glass / polyether	500	25,000	7	4000
	16-B-1849	glass / ceramic	500	25,000	7	5000
	16-B-1850	ceramic	500	25,000	6	6000

K-25 BMALS (for use with retractable double ended connector)

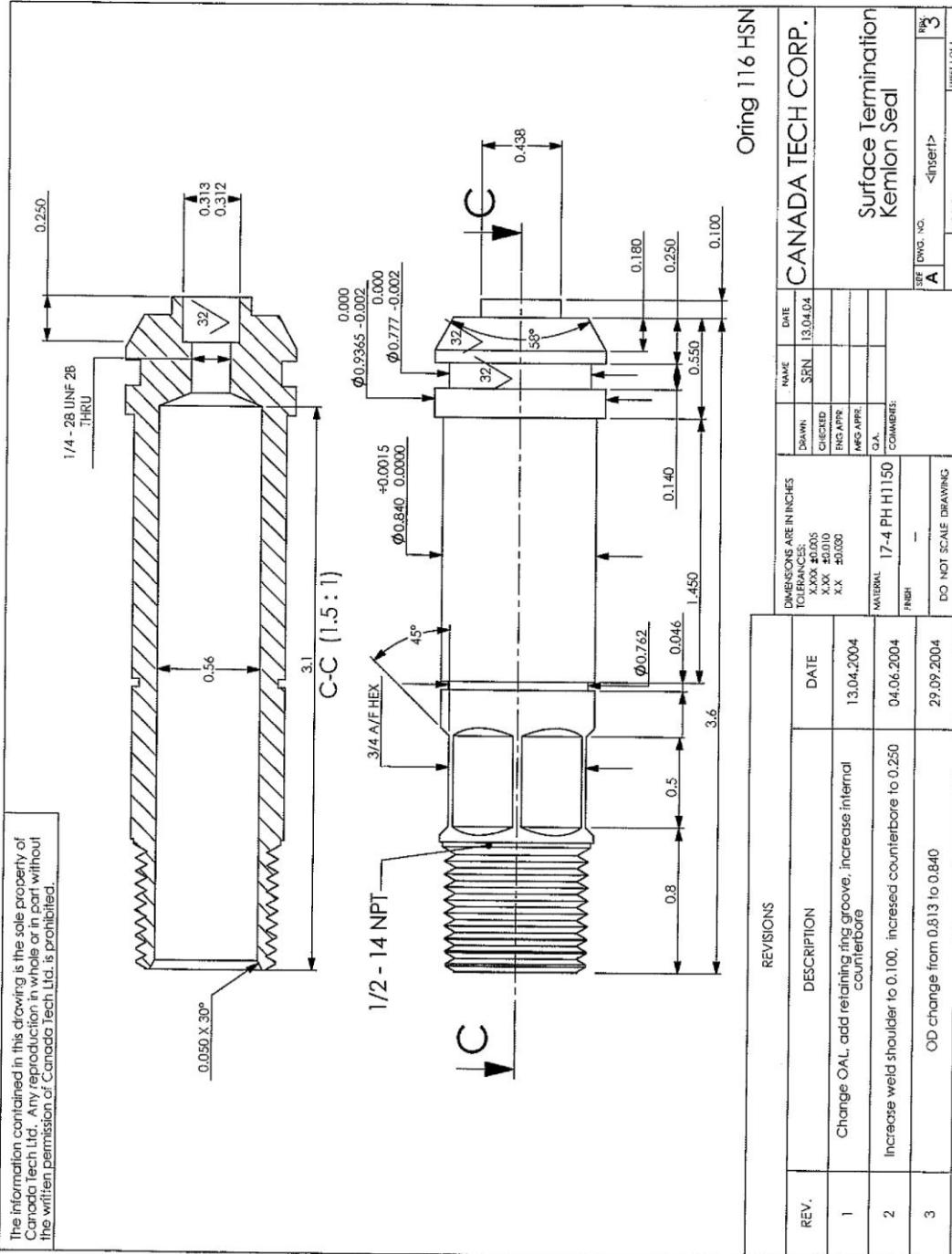


Description	Part Number	Construction	Max. Temp (F)	Max. Pressure (PSIG)	Current (A)	Max. Voltage
K-30 BMALS	16-B-1851	polyether	450	20,000	18	3000
	16-B-1852	glass / polyether	500	25,000	7	4000
	16-B-1853	glass / ceramic	500	25,000	7	5000

K-25 BMAD



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Scotchcast™ 2130
Electrical Insulating Resin
Data Sheet

Product Information for Scotchcast Insulating and Sealing Compounds

Product No	Description	Gel Time @ 73F (23C)	Maximum Operating Temperature	3M kits
Scotchcast 2130 Flame Retardant Compound	FLAME RETARDANT semi-flexible 5000 volts max, continuous Permanent urethane MSHA P-142-5	15 Minutes	194F (90C) Continuous 266 F (130 C) overload	5831, 5832, 82-F1, 82-F2, 82-BF1,M-20, -30, -40

Applications

To replace or repair the jacket on both single and multi-core power cables and particularly where flexibility is required. To insulate between the conductors of multi-core splices operating at 1000 volts or less. To seal the crotch or sheath when terminating multi-core cables.

Physical Properties

Color Black

Gel Time

@ 73°F (23°C) 15 min.

Product Description

3M™ Scotchcast 2130 Electrical Insulating Resin is a special flame retardant, two-part, polyurethane resin that is designed to replace the cable jacket when splicing or repairing mine and portable cables. Its unique formulation makes it particularly suited to withstand the rugged conditions under which mine and portable cables must operate. Scotchcast 2130 is also used as the insulating material for cable splices operating at 1000 volts or less and is rated for continuous use at 194°F (90°C) with an overload rating of 266°F (130°C). Scotchcast 2130 conforms to MSHA CFR 30 Part 18.64.

Adhesion to portable cable jacket materials:

Neoprene 45 psi (3,2 Kg/cm²)

Hypalon 45 psi (3,2 Kg/cm²)

Nitrile/PVC 40 psi (2,8 Kg/cm²)
PVC 40 psi (2,8 Kg/cm²)
EPDM 10 psi (0,7 Kg/cm²)
Urethane (itself) 45 psi (3,2 Kg/cm²)

Adhesion to metals:

Steel 35 psi (2,5 Kg/cm²)
Aluminum 35 psi (2,5 Kg/cm²)
Copper 35 psi (2,5 Kg/cm²)
3M Test Method

Electrical Properties

Dielectric Strength 450 v/mil
ASTM D-149 (17,7 Kv/mm)
Dielectric Constant (60 Hz)
ASTM D-150
73°F (23°C) 4.6
140°F (60°C) 4.9
194°F (90°C) 5.4

Note

The cable sealing glands are designed to be used with MC SENSOR CABLE - 150C rated - 1/c 16 AWG solid tinned copper with continuously welded 0.028" 316l stainless steel armor.

The final installation of the cable and cable glands is Subject to Inspection and Acceptance of the "Authority Having Jurisdiction" Listed below are the MC sensor cable specifications.

TEST REPORT – retained in Project File 1642196

C22.2 No. 30-M1986 clause 4.10.6.3 – Explosive Fluid Seals (Leakage)

The connector was subjected to a pressure of 10,000 psi for a period of one (1) minute. No sign of leakage was observed.

C22.2 No. 30-M1986 clause 4.10.6.4 – Explosive Fluid Seals (Rupture)

The connector was subjected to a pressure of 15,000 psi for a period of one (1) minute. No sign of rupture or leakage was observed.

Note: The connectors are similar to the previously approved connectors so no further tests were considered necessary.

End of Report



REGISTRATION CERTIFICATE

This document certifies that the administration systems of

ALS Omega Well Monitoring

Suite 105, 1437 - 47th Avenue NE, Calgary, Alberta T2E 6N7, Canada

***have been assessed and approved by QAS International
to the following management systems, standards and guidelines:***

ISO 9001 : 2008

The approved administration systems apply to the following:

***Omega is a global solution provider of obtaining
downhole pressure and temperature data.***

Original Approval 9th October 2013

Current Certificate 9th October 2014

Certificate Expiry 9th October 2015

Certificate Number CAN1993

Signed: Certification Officer

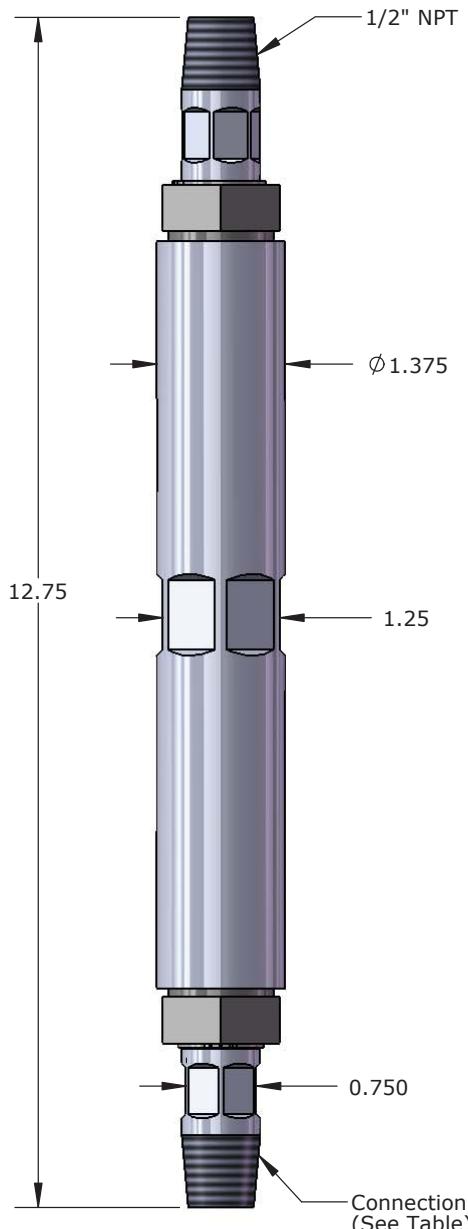
On behalf of QAS International

This certificate remains valid while the holder maintains their quality 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, 20A Oxford Street, Malmesbury, Wiltshire SN16 9AX, UK



ANNEX B – Data Sheet

Features



- CSA Approved Model Available
- Metal to Metal Seals
- Welded Glass Feedthru
- Simple Installation
- Single or Multi Conductor
- 10 000 psi
- 200°C

CSA Approved Wellhead Outlet II

Wire Size	Connection	Part No.
1/8" OD	1/2" NPT	102186
1/4" OD	1/2" NPT	102316
1/4" OD	1" Autoclave	102648
4mm OD	1/2" NPT	102651

Wellhead Outlet II

Wire Size	Connection	Part No.
1/8" OD	1/2" NPT	102631
1/4" OD	1/2" NPT	102630
4mm OD	1/2" NPT	101019

Multi Conductor Wellhead Outlet II

Wire Size	Connection	Part No.
1/8" OD	1/2" NPT	102467
1/4" OD	1/2" NPT	102451
1/4" OD	1" Autoclave	102650
4mm OD	1/2" NPT	102653

Accessory Type

Accessory Type	Part No.
Surface Wiring Package	102916

ANNEX C - Assessment Competency

**- AS/NZS 4761.1- UTE NES 407: Assess explosion-protected equipment
for conformance with standards**
(MOXI – Certificate No: 0110-1-06 dated: 12 June 2006)

This is a Statement that

Paul Spresser

has been assessed as having fulfilled the following requirements

- UTE NES 407 TA** Assess explosion-protected equipment for conformance with standards (Ex mixed)
- UTE NES 407 WA** Assess explosion-protected equipment for conformance with standards (Ex n)
- UTE NES 407 XA** Assess explosion-protected equipment for conformance with standards (Ex i)
- UTE NES 407 YA** Assess explosion-protected equipment for conformance with standards (Ex e)
- UTE NES 407 ZA** Assess explosion-protected equipment for conformance with standards (Ex d)

in partial completion of the following qualification
Certificate V in Electrotechnology (UTE 5 02 99)

Prepared by
Angie Askew
Administration Officer

Approved by
Michael Williams
Certified Trainer and Assessor

National Provider Code 51160

Date of Issue: 12 June 2006