APPENDIX A

FUGRO'S CONE PENETROMETERS

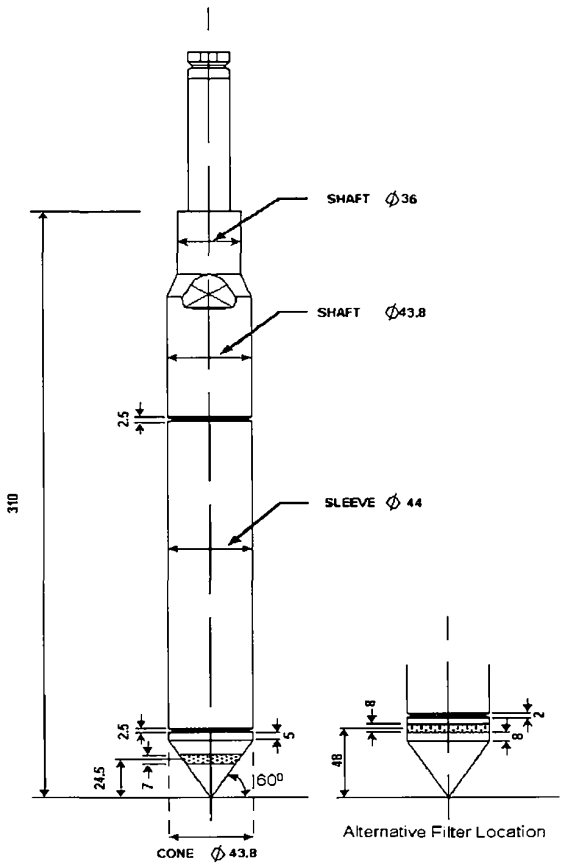
APPENDIX A

FUGRO PENETROMETER TIPS DATA - TYPES FCKE

SPECIFICATIONS LOADCELLS		F5CKE	F10CKE	F7.5CKE & F15CKE
CONE LOADCELL				
Base Area	cm^2	10	10	15
Apex Angle	DEG	60	60	60
Full Range	kN	50	100	150
Load Limit	kN	100	100	200
Effect of 10 bar water pressure	N	450	450	880
Output at zero load	mV	< ± 0.5	< ± 0.5	< ± 0.5
Full range output (FRO)	mV	10	10	10
Input resistance	ohm ca.	270	270	270
Output resistance	ohm ca.	240	240	240
Non linearity and hysteresis	%FRO	< 0.1	< 0.1	< 0.1
Calibration accuracy	%FRO	< 0.5	< 0.5	< 0.5
Rated bridge supply voltage	Volt	10	10	10
Maximum bridge supply voltage	Volt	15	15	15
Thermal zero shift	%FRO/10°C	< 0.2	< 0.2	< 0.2
Thermal Sensitivity shift	%FRO/10°C	< 0.1	< 0.1	< 0.1
Repeatability	%FRO	< 0.1	< 0.1	< 0.1
SLEEVE + CONE LOADCELL				
Sleeve Area	cm^2	150	150	200
Full Range	kN	50	100	150
Load Limit	kN	100	100	200
Effect of 10 bar water pressure	N	300	300	280
Output at zero load	mV	< ± 0.5	< ± 0.5	< ± 0.5
Full range output	mV	10	10	10
Input resistance	ohm ca.	270	270	270
Output resistance	ohm ca.	240	240	240
Non linearity and hysteresis	%FRO	< 0.1	< 0.1	< 0.1
Calibration accuracy	%FRO	< 0.5	< 0.5	< 0.5
Rated bridge supply voltage	Volt	10	10	10
Maximum bridge supply voltage	Volt	15	15	15
Thermal zero shift	%FRO/10°C	< 0.2	< 0.2	< 0.2
Thermal Sensitivity shift	%FRO/10°C	< 0.1	< 0.1	< 0.1
Repeatability	%FRO	< 0.1	< 0.1	< 0.1
GENERAL				
Friction output at full range load of cone	%FRO	< 2		
Compensated temperature range	°C	- 10 to + 40		
Maximum temperature	°C	80		
Insulation resistance	10^8 ohm	> 5		
Slope sensor built-in		on request		

NOTES: The friction sleeve is located immediately above the cone.
Standard delivery includes: cone, calibration sheet, and connector tube.
The accuracy during field use will depend on: field calibrations, treatment during testing, readout equipment, abrasion and maintenance.

TYPE F7.5CKEW/V



DIMENSIONS

CONE BASE AREA	(mm^2)	:	1,500
SLEEVE AREA	(mm^2)	:	20,000
á FACTOR		:	0.59

SPECIFICATIONS

CONE LOAD CELL

- FULL SCALE RANGE	(kN)	:	75
- OVERLOAD CAPACITY	(kN)	:	200

CONE PLUS SLEEVE LOAD CELL

- FULL SCALE RANGE	(kN)	:	75
- OVERLOAD CAPACITY	(kN)	:	200

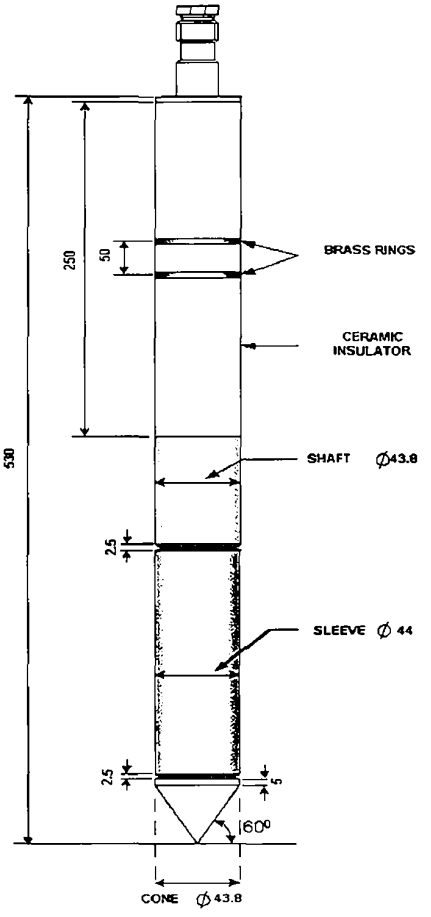
PORE PRESSURE TRANSDUCER

- FULL SCALE RANGE	(Mpa)	:	5.0
- BURST PRESSURE	(Mpa)	:	12.5

NOTES:

1. LOAD CELLS/TRANSDUCERS MAY BE CALIBRATED FOR LOWER RANGES
2. UNEQUAL SLEEVE END AREAS
3. SUBTRACTION TYPE
4. ALL DIMENSIONS IN mm
5. BUILT-IN AMPLIFIERS
6. SLOPE SENSOR INCORPORATED
7. THREADED END : INTERNAL, CONICAL

TYPE F7.5CKEG/V



DIMENSIONS

CONE BASE AREA	(mm^2)	:	1,500
SLEEVE AREA	(mm^2)	:	20,000
ά FACTOR		:	0.59

SPECIFICATIONS

CONE LOAD CELL

- FULL SCALE RANGE	(kN)	:	75
- OVERLOAD CAPACITY	(kN)	:	200

CONE PLUS SLEEVE LOAD CELL

- FULL SCALE RANGE	(kN)	:	75
- OVERLOAD CAPACITY	(kN)	:	200

PORE PRESSURE TRANSDUCER

- FULL SCALE RANGE	(Mpa)	:	5.0
- BURST PRESSURE	(Mpa)	:	12.5

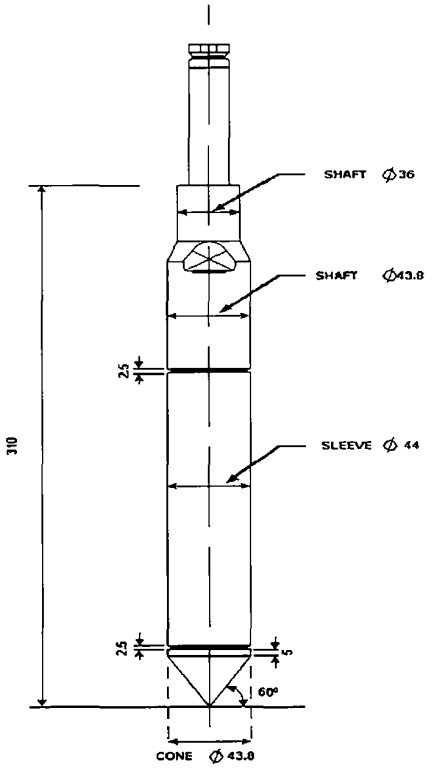
ELECTRICAL CONDUCTIVITY

- FULL SCALE RANGE	(S/m)	:	1.0
- MAXIMUM RANGE	(S/m)	:	5.0

NOTES:

1. LOAD CELLS/TRNSDUCERS MAY BE CALIBRATED FOR LOWER RANGES
2. UNEQUAL SLEEVE END AREAS
3. SUBTRACTION TYPE
4. ALL DIMENSIONS IN mm
5. BUILT-IN AMPLIFIERS
6. SLOPE SENSOR INCORPORATED
7. THREADED END : EXTERNAL. M28 x 2

TYPE F7.5CKE/V



DIMENSIONS

CONE BASE AREA	(mm^2)	: 1,500
SLEEVE AREA	(mm^2)	: 20,000
ά FACTOR		: 0.59

SPECIFICATIONS

CONE LOAD CELL

- FULL SCALE RANGE	(kN)	: 75
- OVERLOAD CAPACITY	(kN)	: 200

CONE PLUS SLEEVE LOAD CELL

- FULL SCALE RANGE	(kN)	: 75
- OVERLOAD CAPACITY	(kN)	: 200

NOTES:

1. LOAD CELLS/TRANSDUCERS MAY BE CALIBRATED FOR LOWER RANGES
2. UNEQUAL SLEEVE END AREAS
3. SUBTRACTION TYPE
4. ALL DIMENSIONS IN mm
5. BUILT-IN AMPLIFIERS
6. SLOPE SENSOR INCORPORATED
7. THREADED END : INTERNAL, CONICAL

APPENDIX B

FUGRO'S DEPLOYMENT SYSTEMS


CONE PENETROMETER SYSTEM
HOUSTON, TEXAS
LOS ANGELES, CALIFORNIA
BATON ROUGE, LOUISIANA


FUGRO


FUGRO

APPENDIX C

ZERO READINGS

CPT Zero Readings

CPT	Date	Cone Type	Cone S/N	Tip Start	Tip Stop	Sleeve Start	Sleeve Stop	Piezo Start	Piezo End	Slope Start	Slope End
C-601	15-May-2008	F7.5CKE3SW2/B	1701-0750	0.024390	0.024455	0.025562	0.025269	-0.007617	-0.007617	0.005668	0.009609
C-602A	17-May-2008	F7.5CKE3SW2/B	1701-0750	0.027478	0.026489	0.027686	0.026530	-0.007617	-0.007910	0.005520	0.005742
C-701	18-May-2008	F7.5CKE3SW2/B	1701-0750	0.027246	0.028768	0.025525	0.027995	-0.007324	-0.008203	0.005668	0.006263
C-701	19-May-2008	F7.5CKE3SW2/B	1701-0750	0.025513	0.026855	0.026746	0.028524	-0.007617	-0.007617	0.005695	0.005547
C-701	20-May-2008	F7.5CKE3SW2/B	1701-0750	0.027600	0.027832	0.028564	0.028931	-0.007617	-0.007910	0.005855	0.005703
C-702	14-May-2008	F7.5CKE3SW2/B	1701-0750	0.021692	0.022339	0.022510	0.023071	-0.007422	-0.008008	0.005773	0.006380

FUGRO CONSULTANTS, INC.

6105 Rookin Road
Houston, Texas 77074
Tel: 713-346-4000
Fax: 713-346-4002

June 30, 2008
Report Number 04.19080029

Mactec Engineering and Consulting, Inc.
3301 Atlantic Avenue
Raleigh, North Carolina 27604

Attention: Mr. Scot Auger, P.E., PMP

CALIBRATION VERIFICATION REPORT
FOR PIEZOCONE PENETRATION TESTING
TURKEY POINT COL PROJECT
FLORIDA
MACTEC PROJECT # 6468071950

Dear Mr. Auger:

Please find enclosed herewith the calibration verification results for the instruments used in the above referenced project. The data has been reviewed and has undergone the appropriate QA/QC process. Calibrations checks were performed on cones F7.5CKESW2/B 1701-1788, and F7.5CKEW2/B 1701-0750 before the project began. Post project calibration checks were performed on cone F7.5CKEW2/B 1701-0750 which was the only cone used on the project. There is no post project verification of the seismograph because no seismic data was obtained on this project.

Fugro's cone penetrometer manufacturing and calibration procedures include ISO 9001, ASTM D5778-2007 and European cone penetrometer standards. Cone penetrometers are tested and calibrated for the following:

Mechanical Calibration
- Cross Talk Check
- Dimension Check
- Seal/O-Ring Check

Electronic Calibration
- Temperature effect
- Pre and Post test voltage readings (zeros)
- Full scale output load readings
- Pore Pressure transducer calibration
- Slope indicator calibration

Calibration Verification Methodology

Manufactured and calibrated according to ISO 9001, the calibration values of the electric cone penetrometers used for this project were verified before and after fieldwork utilizing the following A2LA and/or ANSI/NCSL approved verification systems.

A member of the Fugro group of companies with offices throughout the world.

Tip and Friction

Load cell:	Geotac
Calibrated by:	Interface (A2LA approved)
Calibration date:	March 14, 2008
Load cell model:	560K
Load cell serial no:	129739
Capacity:	50,000K

Pore Pressure Transducer

Digital Pressure Indicator

Calibrated by:	GD Sensing (ANSI/NCSL approved)
Manufactured by:	Eaton
Model number:	UPS 3000CC
Serial number:	A0813
Calibration date:	September 15, 2006

Cone Penetrometer Temperature

Digital Thermometer

Calibrated by:	Houston Precision (ANSI/NCSL approved)
Manufactured by:	Cole Parmer
Model Number:	Degi-sence Type K
Serial Number:	TD-001
Calibration date:	November 16, 2007

Utilizing the above systems each was load and pressure tested as follows:

Tip:	0-20,000 lb.
Friction:	0-7,500 lb.
Pore Pressure:	0:350 PSI
Temperature effect	30 Degrees Fahrenheit – 115 Degrees Fahrenheit

Under each load/pressure increment, the cone penetrometer readings are recorded in millivolts (mV). Load/pressure (pounds/psi) load increments and corresponding cone readings in mV are input into **HGL Instrument Verificaton** software to obtain linear regression and correlation coefficient (R^2) values (See attached **HGL Instrument Verification** Forms).

Additionally, load/pressure increments and cone readings were also input into a calibration **Verification Certificate Program** to calculate each cone penetrometer's calibration value in MPa units (See attached **Calibration Verification Certificates** for each cone penetrometer). The last column in these forms represents the calibration values of tip, friction and pore pressure.

Calculation Example

Load Increment, P1	= 590 lb.
	= 0.295 tons
Tip Reading	= 35.2 mV
Tip Area, A= 15cm^2	= 0.0161 sq. ft.
Tip Pressure	= P1/A = 0.295/0.0161

	= 18.32298 tsf
Tip Pressure Per mV	= 18.32298/35.2 mV
	= 0.520539 tsf/mv
Tip Pressure Per Volt	= 0.520539 x 1,000
	= 520.539 tsf/volt
	= 49.847 MPa/Volt
Tip Calibration Valve	~ 50 Mpa/Volt

Temperature Calibration:

Cone Penetrometers are placed in a temperature-controlled enclosure and zero readings recorded in mV at intervals between 30 degrees (F) and 115 degees (F). Temperatures and zero readings (mV) are entered into the **Calibration Verification Certificate** software which calculates the deviation between the maximum and minimum zero readings (mV) for the tip friction and pore pressure channels.

Data Recording

During the cone penetration test, the calibration numbers are automatically recorded in CPT test data files along with the following information (See attached CPT test data file, 6710.DEP):

Date of CPT test
Starting time of test
Project Number
CPT test number
Operator name
Elevation, starting depth, water depth
Cone serial number
Number of cone channels (3)
- Tip calibration (50 MPa)
- Friction calibration (0.5 MPa)
- Pore Pressure Calibration (2.5 MPa)
- Slope calibration (525)

Initial baseline (zero) readings for depth, tip, friction, pore pressure and slope.

Seismograph

Seismic data was collected using an ES-3000 seismograph manufactured by Geometrics, Inc. The accuracy of the time readings of this instrument was verified before and after field work utilizing following A2LA and/or ANSI/NCSL approved verification systems.

Function Generator:	Oscilliscope with built function generator.
Manufactured by:	EZ Digital, Inc.
Model number:	OS-5020G
Serial number:	3080209
Calibrated by:	Transcat Calibration Services (ANSI/NCSL approved)
Calibration date:	February 28, 2007

Frequency Counter, 120 MHz, 1 Channel	
Manufactured by:	Insetek God Will Instruments
Model number:	GFC – 8010H
Serial number:	CF 871549
Calibrated by:	Transcat Calibration Services (A2LA/NCSL approved)
Calibration date:	February 28, 2007

Seismograph Verification Methodology

The function generator was connected to the input of the seismograph and frequency counter. Sine wave signals were generated at 10 Hz intervals from 10-100 Hz. The seismograph was manually triggered for each frequency and the data stored in standard seg2 seismic data format files, one frequency per file. Each file was opened with SeisImager software and converted to the frequency domain. The input and seismograph frequencies were entered into **Calibration Verification Certificate** software (See attached **Calibration Verification Certificate**).

Fugro appreciates the opportunity to submit our calibration verification report for your review. If you have any questions, or if we can be of further assistance, please do not hesitate to contact us.

Very truly yours,
FUGRO CONSULTANTS, INC.

Recep Yilmaz
Senior Vice President

RY/jm

CALIBRATION CERTIFICATES

TRANSCAT® CALIBRATION SERVICES

NVLAP®

NVLAP LAB CODE
200730-0

CERTIFICATE OF CALIBRATION

Customer: FUGRO CONSULTANTS INC
6100 HILLCROFT
HOUSTON. TX 77081

Customer Nbr: 1-525293-000
PO Nbr: FO200708

Cert/RA Nbr: 5-V8842-1-1
Manufacturer: Cole-Parmer
Model Nbr: 8528-40
Description: Thermometer, Type K

Serial Nbr: C95005824
ID Nbr: TD 001

Date Received: Nov 16, 2007
Date Calibrated: Nov 16, 2007
Next Calibration: Nov 16, 2008
Calibration Proc: 1-AC22434-0
Item Received: In Tolerance
Item Returned: In Tolerance

For calibration data, see Supplemental Report for RA Nbr 5-V8842-1-1

Temperature: 70°F / 21.1°C **Temp/RH Asset: temp02** **Relative Humidity: 33%**

Transcat Calibration Laboratories have been audited and found in compliance with ISO/IEC 17025:2005. Accredited calibrations performed within the Lab's Scope of Accreditation are indicated by the presence of the Accrediting Body's Logo and Certificate Number on this Certificate of Calibration. Any measurements on an accredited calibration not covered by that Lab's Scope are noted below.

Transcat calibrations, as applicable, are performed in compliance with the requirements of ISO 9001:2000, ISO TS16949, ANSI/NCSL Z540-1994, QS-9000 and ISO 10012-1992. When specified contractually, the requirements of 10CFR21, 10CFR50 App. B and NQA-1 are also covered.

Transcat will maintain and document the traceability of all its standards to the National Institute of Standards and Technology (NIST) or the National Research Council of Canada (NRC), or to other recognized national or international standard bodies (NMIs), or to measurable conditions created in our laboratory, or accepted fundamental and/or natural physical constants, ratio type of calibration, or by comparison to consensus standards. The specific path of traceability for the reported measurement results is maintained at the Transcat facility and is available there for review.

Complete records of work performed are maintained by Transcat and are available for inspection. Laboratory standards used in the performance of this calibration are shown below.

The results in this report relate only to the item calibrated or tested, and the determination of in or out of tolerance is specific to the model/serial no. referenced above based on the manufacturer's published specifications.

All calibrations have been performed using processes having a test uncertainty ratio of four or more times greater than the unit calibrated, unless otherwise noted. Uncertainties have been estimated at a 95 percent confidence level (k=2). Calibration at a 4:1 TUR provides reasonable confidence that the instrument is within the manufacturer's published specifications. Limitations on the uses of this instrument are detailed in the manufacturer's operating instructions. Any number of factors can cause a unit to drift out of tolerance at any time following its calibration.

Notes: Unit meets all manufacturers specifications. When using the K type probe with the unit, the readings were: @0.0°C/ 0.1°C @50.0°C/49.8°C @100.0°C/100.2°C

Assets	Manufacturer	Model	Description	Cal Date	Due Date	Traceability Numbers
5072	Fluke Corporation	5500A	Multi-Product Calibrator	5/7/2007	5/31/2008	5-&5072-3-8
5342	Hart Scientific	1502A	Thermometer, SPRT, -200° to 96	8/21/2007	8/31/2008	15-V54VR-1-1
5343	Hart Scientific	5626	Probe, Secondary Reference, PR	8/21/2007	8/31/2008	15-V54VR-1-1
K1TCW-11	Omega Engineering, Inc.	Type-K	Thermocouple Probe, Type-K	6/11/2007	12/31/2099	6-&K1TCW-507-11

Calibrated at:
1181 Brittmore
Houston, TX 77043
By: Thomas M. Laguna

Facility Responsible:
1181 Brittmore
Houston, TX 77043
713-465-4399

Michael A. Sublett
Lab Manager
Date 11/18/07

This certificate may not be reproduced except in full, without the written approval of Transcat. Additional information, if applicable may be included on separate report(s).

To access your calibration records, log on to www.caltrakonline.com
For all of your product, repair, and calibration needs, call Transcat at 1.800.828.1470.

TRANSCAT® CALIBRATION SERVICES

SUPPLEMENTAL REPORT FOR 5-V8842-1-1

CALIBRATION LAB DATA AS FOUND / AS LEFT

RA Nbr:	5-V8842-1-1	Mfg:	Cole-Parmer
Description:	Thermometer, Type K	Model:	8528-40
Customer:	FUGRO CONSULTANTS INC	Serial:	C95005824
Calibrated:	Nov 16, 2007	PO Nbr:	FO200708
Date Due:	Nov 16, 2008	ID Nbr:	TD 001
Service Type:	R6	Calibration Proc:	1-AC22434-0

Description	Setpoints	Accuracy	Low Limit	High Limit	As Found / As Left	OOT	Uncertainty (k=2; ±)	TUR
Temperature Measure								
Type K (ITS90)	-145.0 °C	±(0.25% Rdg + 2 °C)	-147.4	-142.6	-145.2 °C			
	0.0 °C	±(0.25% Rdg + 1 °C)	-1.0	1.0	-0.1 °C			
	450.0 °C	±(0.25% Rdg + 1 °C)	447.9	452.1	450.1 °C			
	900.0 °C	±(0.25% Rdg + 1 °C)	896.7	903.3	900.0 °C			
	1350 °C	±(0.25% Rdg + 1 °C)	1346	1354	1350 °C			
Units Conversion	2462 °F	±(0.25% Rdg + 1.8 °F)	2454	2470	2461 °F			

Remarks:

Unit meets all manufacturers specifications. When using the K type probe with the unit, the readings were: @0.0°C/ 0.1°C @50.0°C/49.8°C @100.0°C/100.2°C

When uncertainties are provided, the uncertainty only includes the measurement process and does not include uncertainty contributions of the instrument under test.

Field not applicable.

TRANSCAT® CALIBRATION SERVICES

NVLAP®

NVLAP LAB CODE
200730-0

CERTIFICATE OF CALIBRATION

Customer:	FUGRO CONSULTANTS LP 6100 HILLCROFT HOUSTON, TX 77081	Customer Nbr:	1-525293-000
Cert/RA Nbr:	5-V2023-1-1	Date Received:	Feb 28, 2007
Manufacturer:	EZ Digital, Inc	Date Calibrated:	Feb 28, 2007
Description:	OSCILLOSCOPE	Next Calibration:	Feb 28, 2008
Model Nbr:	OS-5020G	Calibration Proc:	1-AC10468-0
Serial Nbr:	3080209	Item Received:	Out Of Tolerance
ID Nbr:		Item Returned:	Limited Calibration
PO Nbr:	D111		

For calibration data, see Supplemental Report for RA Nbr 5-V2023-1-1

Temperature: 72°F / 22.2°C **Relative Humidity: 47%**

Transcat Calibration Laboratories have been audited and found in compliance with ISO/IEC 17025:2005. Accredited calibrations performed within the Lab's Scope of Accreditation are indicated by the presence of the Accrediting Body's Logo and Certificate Number on this Certificate of Calibration. Any measurements on an accredited calibration not covered by that Lab's Scope are noted below.

Transcat calibrations, as applicable, are performed in compliance with the requirements of ISO 9001:2000, ISO TS16949, ANSI/NCSL Z540-1994, QS-9000 and ISO 10012-1992. When specified contractually, the requirements of 10CFR21, 10CFR50 App. B and NQA-1 are also covered.

Transcat will maintain and document the traceability of all its standards to the National Institute of Standards and Technology (NIST) or the National Research Council of Canada (NRC), or to other recognized national or international standards bodies (NMIs), or to measurable conditions created in our laboratory, or accepted fundamental and/or natural physical constants, ratio type of calibration, or by comparison to consensus standards. The specific path of traceability for the reported measurement results is maintained at the Transcat facility and is available there for review.

Complete records of work performed are maintained by Transcat and are available for inspection. Laboratory standards used in the performance of this calibration are shown below.

The results in this report relate only to the item calibrated or tested, and the determination of in or out of tolerance is specific to the model/serial no. referenced above based on the manufacturer's published specifications.

All calibrations have been performed using processes having a test uncertainty ratio of four or more times greater than the unit calibrated, unless otherwise noted. Uncertainties have been estimated at a 95 percent confidence level (k=2). Calibration at a 4:1 TUR provides reasonable confidence that the instrument is within the manufacturer's published specifications. Limitations on the uses of this instrument are detailed in the manufacturer's operating instructions. Any number of factors can cause a unit to drift out of tolerance at any time following its calibration.

Notes: Limited Calibration: "Limitations on this calibration are: Sweep time is +/- 6%, and Frequency is +/- 10%, approved by (Brent Lawrence, 02/28/2007)." Risetime measurements are calibrated traceable, not accredited.

Assets	Manufacturer	Model	Description	Cal Date	Due Date	Traceability Numbers
5346	Fluke Corporation	5520A-SC1100	Multifunction Cal. w/ Scope Op	03/13/2006	03/31/2007	F3094007
TEMP02	Oakton Instruments	35710-10	RH/Temperature Datalogger	01/25/2007	01/31/2008	6-V10A4-1-1

Calibrated at:
1181 Brittmore
Houston, TX 77043
By: Jimmy Shipley

Facility Responsible:
1181 Brittmore
Houston, TX 77043
713-465-4399

Michael A. Sublett 2/28/07
Michael A. Sublett
Lab Manager
Date

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Certificate - Page 1 of 1

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TRANSCAT® CALIBRATION SERVICES

SUPPLEMENTAL REPORT FOR 5-V2024-2-1

CALIBRATION LAB DATA AS FOUND / AS LEFT

RA Nbr:	5-V2024-2-1	Mfg:	Instek Good Will Instruments
Description:	Frequency Counter, 120 MHz, 1 Channel	Model:	GFC-8010H
Customer:	FUGRO CONSULTANTS LP	Serial:	CF871549
Calibrated:	Feb 28, 2007	PO Nbr:	DTLL
Date Due:	Feb 28, 2008	ID Nbr:	NONE
Service Type:	S6	Calibration Proc:	1-AC17352-0

Description	Setpoints	Accuracy	Low Limit	High Limit	As Found / As Left	OOT	Uncertainty (k=2; +)	TUR
Frequency Accuracy								
Frequency Accuracy	10.000000 MHz	±(12 PPM Rdg)	9.999880	10.000120	10.000007 MHz			
Input Sensitivity								
10 Hz to 10 MHz < (15 mVrms)			P	P	P			
10 MHz to 40 MHz < (20 mVrms)			P	P	P			
40 MHz to 80 MHz < (35 mVrms)			P	P	P			
80 MHz to 120 MHz < (50 mVrms)			P	P	P			

When uncertainties are provided, the uncertainty only includes the measurement process and does not include uncertainty contributions of the instrument under test.

Field not applicable.

TRANSCAT®
CALIBRATION SERVICES • TEST & MEASUREMENT INSTRUMENTS

01V202300

PICK LIST

16:05:11 02/28/07
PL Run 852503

1181 BRITTMOORE
SUITE 600
HOUSTON TX 77043

Ship To: FUGRO CONSULTANTS LP
6100 HILLCROFT
HOUSTON TX 77081

Order 02/27/07
3/09/07
DSNYDER MSUBLETT

Co/Cust	P.O. No	Order No	Ship Via	WH
01/0000525293	D111	V2023/00	UPS GROUND	05

Item Number/Description	Ordered	Shipped	B/O	U/M	Last Cal
Contact BRENT LAWRENCE			7133695400		
Carrier: UPS GROUND					
001 - ED1801-6	1.000	1.000	0.00	EA	BELOW
Cal&Data-PZ Digital, Inc Mdl:OS-5020G OSCILLOSCOPE					
TOC: ZZ 99.99					
S/N:3080209 UNIT ID:					
1 YEAR CALIBRATION INTERVAL					
TURNAROUND TIME: 7 BUSINESS DAYS AFTER RECEIPT OF ORDER					
Thank you! Denise Snyder 800-828-1470 x 9505					
Fax: 800-395-0543 E-Mail: dsnyder@transcat.com					

* COMPLETE *

Equal Opportunity/Affirmative Action Employer, H/V

PICK

TRANSCAT® CALIBRATION SERVICES

NVLAP®

NVLAP LAB CODE
200730-0

CERTIFICATE OF CALIBRATION

Customer: FUGRO CONSULTANTS LP
6100 HILLCROFT
HOUSTON, TX 77081

Customer Nbr: 1-525293-000

Cert/RA Nbr:	5-V2024-2-1
Manufacturer:	Instek Good Will Instruments
Description:	Frequency Counter, 120 MHz, 1 Channel
Model Nbr:	GFC-8010H
Serial Nbr:	CF871549
ID Nbr:	NONE
PO Nbr:	D111

Date Received:	Feb 27, 2007
Date Calibrated:	Feb 28, 2007
Next Calibration:	Feb 28, 2008
Calibration Proc:	1-AC17352-0
Item Received:	In Tolerance
Item Returned:	In Tolerance

For calibration data, see Supplemental Report for RA Nbr 5-V2024-2-1

Temperature: 72°F / 22.2°C **Relative Humidity: 47%**

Transcat Calibration Laboratories have been audited and found in compliance with ISO/IEC 17025:2005. Accredited calibrations performed within the Lab's Scope of Accreditation are indicated by the presence of the Accrediting Body's Logo and Certificate Number on this Certificate of Calibration. Any measurements on an accredited calibration not covered by that Lab's Scope are noted below.

Transcat calibrations, as applicable, are performed in compliance with the requirements of ISO 9001:2000, ISO TS16949, ANSI/NCSL Z540-1994, QS-9000 and ISO 10012-1992. When specified contractually, the requirements of 10CFR21, 10CFR50 App. B and NQA-1 are also covered.

Transcat will maintain and document the traceability of all its standards to the National Institute of Standards and Technology (NIST) or the National Research Council of Canada (NRC), or to other recognized national or international standard bodies (NMIs), or to reasonable conditions created in our laboratory, or accepted fundamental and/or natural physical constants, ratio type of calibration, or by comparison to consensus standards. The specific path of traceability for the report of measurement results is maintained at the Transcat facility and is available there for review.

Complete records of work performed are maintained by Transcat and are available for inspection. Laboratory standards used in the performance of this calibration are shown below.

The results in this report relate only to the item calibrated or tested, and the determination of in or out of tolerance is specific to the model/serial no. referenced above based on the manufacturer's published specifications.

All calibrations have been performed using processes having a test uncertainty ratio of four or more times greater than the unit calibrated, unless otherwise noted. Uncertainties have been estimated at a 95 percent confidence level (k=2). Calibration at a 4:1 TUR provides reasonable confidence that the instrument is within the manufacturer's published specifications. Limitations on the use of this instrument are detailed in the manufacturer's operating instructions. Any number of factors can cause a unit to drift out of tolerance at any time following its calibration.

Notes:

Assets	Manufacturer	Model	Description	Cal Date	Due Date	Traceability Numbers
5219	Agilent/HP/Agilent Tech	8902A	Measuring Receiver	11/20/2006	11/30/2007	1-496265449-1
5346	Fluke Corporation	5520A-SC1100	Multifunction Cal. w/ Scope Op	03/13/2006	03/31/2007	F3094007
J568	Agilent/HP/Agilent Tech	11722A	Sensor Module, 100k-2.6GHz	03/30/2006	03/31/2007	1-270725701-1
TEMP02	Oakton Instruments	35710-10	RH/Temperature Datalogger	01/25/2007	01/31/2008	6-Y10A4-1-1

Calibrated at:
1181 Brittmore
Houston, TX 77043
By: Jimmy Shipley

Facility Responsible:
1181 Brittmore
Houston, TX 77043
713-465-4399

Michael A. Subieti — Date
Lab Manager

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Form 13R19 10/07/2006

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01V202400

35 VANTAGE POINT DR
ROCHESTER NY 14624

Ship To: FUGRO CONSULTANTS LP
6100 HILLCROFT
HOUSTON TX 77081

Order 02/27/07
3/02/07
DSNYDER MSUBLETT

Co/Cust	P.O. No	Order No	Ship Via	WH
01/0000525293	D111	V2024/00	DO NOT SHIP	01

Item Number/Description	Ordered	Shipped	B/O	U/M	Loc Seq
Contact BRENT LAWRENCE 7133695400					
Carrier: DO NOT SHIP					
001 GFC8010H	1.000	1.000	.000	EA	BELOW
FREQUENCY COUNTER 120MHZ					
LOC: I 14 05					
002 HRP016	1.000	1.000	.000	EA	BELOW
CalData-Instek Good Will Instr uments Mdl:GFC-8010H,FREQUENCY					
LOC: OS.01.01					
********* PLEASE SHIP TO HOUSTON LAB UPS RED EARLY AM					
MIKE SUBLETT WILL CALIBRATE TOMORROW 2/28/07					
1 YEAR CALIBRATION INTERVAL					

* COMPLETE *

Equal Opportunity/Affirmative Action Employer, H/V

PICK

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 200730-0

Transcat - Houston
Houston, TX

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

CALIBRATION LABORATORIES

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated 18 June 2005).

2008-01-01 through 2008-12-31
Effective dates

DEPARTMENT OF COMMERCE * UNITED STATES OF AMERICA *

Sally S. Bruce
For the National Institute of Standards and Technology

National Voluntary Laboratory Accreditation Program

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

Transcat - Houston
1181 Brittmore, Suite 600
Houston, TX 77043
Mr. Michael Sublett
Phone: 713-465-4399 Fax: 713-465-0525
E-mail: msublett@transcat.com
URL: www.transcat.com

CALIBRATION LABORATORIES **NVLAP LAB CODE 200730-0**

NVLAP Code: 20/A01 ANSI/NCSL Z540-1-1994; Part 1 Compliant

DIMENSIONAL

NVLAP Code: D05
Length and Diameter; Step Gages [note 2]

Micrometers – Outside, Inside, Depth

Range	*Best Uncertainty (±)* [note 1]	*Remarks*
(0.02 to 4) in	(12 + 14L) µin	Comparison to Gage Blocks
(4 to 8) in	(23 + 14L) µin	Comparison to Gage Blocks
(8 to 16) in	(34 + 14L) µin	Comparison to Gage Blocks
(16 to 20) in	(46 + 14L) µin	Comparison to Gage Blocks
Calipers – Outside, Inside, Depth		
to 36 in	(46 + 14L) µin	Comparison to Gage Blocks
Dial Indicators		
(0.0625 to 6) in	(23 + 14L) µin	Comparison to Gage Blocks

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ELECTROMAGNETICS – DC/LOW FREQUENCY

NVLAP Code: 20/E02
AC Current

	Best Uncertainty (±) in % note 1 *Frequency in Hz*			
Range	***10 to 20***	***20 to 40 k***	***40 to10 k***	***10 k to 30 k***
100 µA	0.02	0.01	0.009	0.014
200 µA	0.02	0.009	0.009	0.014
300 µA	0.02	0.01	0.007	0.013
1 mA	0.022	0.009	0.006	0.008
2 mA	0.02	0.009	0.005	0.007
10 mA	0.024	0.009	0.005	0.006
20 mA	0.025	0.009	0.005	0.007
50 mA	0.024	0.009	0.006	0.012
100 mA	0.024	0.009	0.005	0.008
200 mA	0.024	0.009	0.006	0.008
300 mA	0.024	0.009	0.006	0.012
1 A	0.024	0.009	0.007	0.012
2 A	0.024	0.009	0.006	0.012
3 A	0.027	0.01	0.008	0.016
5 A	0.027	0.01	0.008	0.02
10 A	0.049	0.042	0.042	0.044
20 A	0.11	0.11	0.11	0.11

AC Current *note 2*
Measuring Equipment and Measure

	Best Uncertainty (±) in % + A note 1 *Frequency in Hz*			
Range	***10 to 20***	***20 to 45***	***45 to 100***	***100 to 5 k***
(0 to 100) µA	0.46 + 30 n	0.18 + 30 n	0.08 + 30 n	0.08 + 30 n
(0.1 to 1) mA	0.46 + 200 n	0.18 + 200 n	0.07 + 200 n	0.07 + 200 n
(1 to 10) mA	0.46 + 2 µ	0.17 + 2 µ	0.07 + 2 µ	0.04 + 2 µ
(10 to 100) mA	0.46 + 20 µ	0.18 + 20 µ	0.69 + 20 µ	0.35 + 20 µ
(100 to 1000) mA	0.46 + 200 µ	0.19 + 200 µ	0.1 + 200 µ	0.12 + 200 µ

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NVLAP Code: 20/E05
DC Resistance
Measuring Equipment and Measure

Range	*Best Uncertainty (±)*[note 1]	*Remarks*
0 Ω to 0.1 mΩ	1.4 nΩ	Standard Resistors w/Low Thermal Switch
0.1 mΩ to 1 mΩ	7.1 nΩ	Standard Resistors w/Low Thermal Switch
1 mΩ to 10 mΩ	5.4 ppm	Standard Resistors w/Low Thermal Switch
10 mΩ to 100 mΩ	8.2 ppm	Standard Resistors w/Low Thermal Switch
0.1 Ω to 1 Ω	0.36 ppm	Standard Resistors w/Low Thermal Switch
1 Ω to 10 Ω	0.5 ppm	Standard Resistors w/Guildline 9975 Bridge
10 Ω to 100 Ω	0.84 ppm	Standard Resistors w/Guildline 9975 Bridge
100 Ω to 1 kΩ	0.42 ppm	Standard Resistors w/Guildline 9975 Bridge
1 kΩ to 10 kΩ	0.31 ppm	Standard Resistors w/Guildline 9975 Bridge
19 kΩ	0.78 ppm	Standard Resistors w/Fluke 8508A in transfer mode
100 kΩ	2.9 ppm	Standard Resistors w/Fluke 8508A in transfer mode
190 kΩ	2.8 ppm	Standard Resistors w/Fluke 8508A in transfer mode
1 MΩ	3.8 ppm	Standard Resistors w/Fluke 8508A in transfer mode
1.9 MΩ	5.1 ppm	Standard Resistors w/Fluke 8508A in transfer mode
10 MΩ Source	4.4 ppm	Standard Resistors w/Fluke 8508A in transfer mode
10 MΩ Measure	5.0 ppm	Standard Resistors w/Fluke 8508A in transfer mode
19 MΩ Measure	8.3 ppm	Standard Resistors w/Fluke 8508A in transfer mode
100 MΩ	13 ppm	Standard Resistors w/Fluke 8508A in transfer mode
1 GΩ Source	63 ppm	Standard Resistors w/Fluke 8508A in transfer mode
1 GΩ Measure	200 ppm	Standard Resistors w/Fluke 8508A in transfer Mode

Resistance Ratio

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1 Ω to 1 kΩ	0.33 ppm	Guildline 9975 Bridge

Measuring Equipment and Measure [note 2]

10 mΩ to 10 Ω	19 ppm + 0.05 mΩ	HP3458A w/Decade Resistor
10 Ω to 1 kΩ	15 ppm + 0.5 mΩ	HP3458A w/Decade Resistor
1 kΩ to 10 kΩ	12 ppm + 5 mΩ	HP3458A w/Decade Resistor
10 kΩ to 100 kΩ	14 ppm + 50 mΩ	HP3458A w/Decade Resistor
100 kΩ to 1 MΩ	23 ppm + 2 Ω	HP3458A w/Decade Resistor
1 MΩ to 10 MΩ	73 ppm + 50 Ω	HP3458A w/Decade Resistor
10 MΩ to 100 MΩ	630 ppm + 1 kΩ	HP3458A w/Decade Resistor
100 MΩ to 1 GΩ	0.6 % + 10 kΩ	HP3458A w/Decade Resistor

Measuring Equipment [note 2]

10 GΩ to 100 GΩ	1.16 %	Biddle Mega Dek

DC Current
Measuring Equipment and Measure

Range	*Best Uncertainty (±)* [note 1]	*Remarks*
0 A to 100 µA	4 ppm + 230 pA	Standard Shunts w/current source
100 µA to 1 mA	3.1 ppm + 1.2 nA	Standard Shunts w/current source
1 mA to 10 mA	3.2 ppm + 12 nA	Standard Shunts w/current source
10 mA to 100 mA	3.2 ppm + 115 nA	Standard Shunts w/current source
100 mA to 1 A	8.8 ppm + 1.4 µA	Standard Shunts w/current source
1 A to 10 A	8.8 ppm + 12 µA	Standard Shunts w/current source
10 A to 100 A	160 ppm + 7 mA	Standard Shunts w/current source

DC Current [note 2]
Measuring Equipment and Measure

0 µA to 100 µA	26 ppm + 0.8 nA	HP3458A w/current source
100 µA to 1 mA	26 ppm + 5 nA	HP3458A w/current source
1 mA to 10 mA	26 ppm + 50 nA	HP3458A w/current source
10 mA to 100 mA	42 ppm + 0.5 µA	HP3458A w/current source
100 mA to 1 A	0.013 % + 10 µA	HP3458A w/current source
1 A to 20 A	0.12 %	Fluke 5520A w/current shunt

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Measure Only		
1 A to 100 A	0.06 %	Valhalla 2575A
Clamp-on Ammeter Toroidal Type		
20 A to 150 A	0.3 % + 20 mA	5520A/coil w/Fluke 5220A Amplifier
150 A to 1000 A	0.3 % + 90 mA	5520A/coil w/Fluke 5220A Amplifier
Non-Toroidal Type		
20 A to 150 A	0.6 % + 140 mA	5520A/coil w/Fluke 5220A Amplifier
150 A to 1000 A	0.6 % + 540 mA	5520A/coil w/Fluke 5220A Amplifier

NVLAP Code: 20/E06
DC Voltage – Fixed Points
Measuring Equipment and Measure

Range	*Best Uncertainty (±)* [note 1]	*Remarks*
0 V	90 nV	Ratio Metric w/Zener Reference
1 mV	90 nV	Ratio Metric w/Zener Reference
10 mV	9.7 ppm	Ratio Metric w/Zener Reference
100 mV	1.5 ppm	Ratio Metric w/Zener Reference
1 V	0.39 ppm	Ratio Metric w/Zener Reference
10 V	0.2 ppm	Ratio Metric w/Zener Reference
100 V	0.4 ppm	Ratio Metric w/Zener Reference
1000 V	0.64 ppm	Ratio Metric w/Zener Reference
10 mV to 100 mV	4.5 ppm + 90 nV	Ratio Metric w/Zener Reference
100 mV to 1000 V	2.4 ppm + 90 nV	Ratio Metric w/Zener Reference
1 kV to 120 kV	91 ppm	High Voltage Divider Comparison
DC Voltage [note 2]		
Measuring Equipment and Measure		
0 V to 100 mV	7.8 ppm + 0.5 µV	3458A (002) w/5700A
100 mV to 10 V	5 ppm + 0.5 µV	3458A (002) w/5700A
10 V to 100 V	7.6 ppm + 30 µV	3458A (002) w/5700A
100 V to 500 V	11 ppm + 100 µV	3458A (002) w/5700A
500 V to 800 V	14 ppm + 100 µV	3458A (002) w/5700A

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800 V to 1000 V	21 ppm + 100 μV	3458A (002) w/5700A

NVLAP Code: 20/E09
AC Voltage

Frequency in Hz	*Best Uncertainty (±) in %* note 1			*Remarks*
		22 mV range		
	6 mV	*10 mV*	*20 mV*	
10	0.19	0.03	0.03	Fluke 792A
20	0.14	0.03	0.02	Fluke 792A
(40, 100)	0.14	0.03	0.014	Fluke 792A
(1, 10, 20) k	0.14	0.03	0.014	Fluke 792A
50 k	0.14	0.05	0.03	Fluke 792A
100 k	0.17	0.07	0.02	Fluke 792A
300 k	0.22	0.12	0.014	Fluke 792A
500 k	0.40	0.15	0.014	Fluke 792A
1 M	0.45	0.15	0.13	Fluke 792A
		220 mV Range		
	20 mV	*60 mV*	*200 mV*	
10	0.04	0.035	0.02	Fluke 792A
20	0.03	0.021	0.008	Fluke 792A
(40, 100)	0.02	0.017	0.004	Fluke 792A
(1, 10, 20) k	0.02	0.017	0.004	Fluke 792A
50 k	0.03	0.021	0.01	Fluke 792A
100 k	0.05	0.041	0.015	Fluke 792A
300 k	0.07	0.068	0.045	Fluke 792A
500 k	0.11	0.11	0.06	Fluke 792A
1 M	0.2	0.17	0.06	Fluke 792A
		700 mV Range		
	200 mV		*600 mV*	
10	0.022		0.007	Fluke 792A
20	0.008		0.007	Fluke 792A
(40, 100)	0.005		0.003	Fluke 792A
(1, 10, 20) k	0.005		0.003	Fluke 792A

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50 k	0.01		0.005	Fluke 792A
100 k	0.02		0.006	Fluke 792A
300 k	0.05		0.014	Fluke 792A
500 k	0.06		0.043	Fluke 792A
1 M	0.06		0.06	Fluke 792A

2.2 V Range

	600 mV	*1 V*	*2 V*	
10	0.02	0.02	0.02	Fluke 792A
20	0.007	0.006	0.006	Fluke 792A
40	0.003	0.003	0.003	Fluke 792A
(0.1, 1, 10, 20) k	0.003	0.004	0.0011	Fluke 792A
50 k	0.005	0.005	0.004	Fluke 792A
100 k	0.006	0.012	0.005	Fluke 792A
300 k	0.012	0.043	0.012	Fluke 792A
500 k	0.043	0.045	0.043	Fluke 792A
1 M	0.06	0.045	0.045	Fluke 792A

7 V Range

	2 V	*6 V*	
10	0.02	0.02	Fluke 792A
20	0.007	0.006	Fluke 792A
40	0.003	0.003	Fluke 792A
(0.01, 1, 10, 20) k	0.003	0.0011	Fluke 792A
50 k	0.005	0.004	Fluke 792A
100 k	0.006	0.005	Fluke 792A
300 k	0.012	0.012	Fluke 792A
500 k	0.044	0.043	Fluke 792A
1 M	0.05	0.046	Fluke 792A

22 V Range

	6 V	*10 V*	*20 V*	
10	0.02	0.02	0.02	Fluke 792A
20	0.007	0.006	0.006	Fluke 792A

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40	0.003	0.003	0.003	Fluke 792A
(0.1, 1, 10, 20) k	0.003	0.002	0.002	Fluke 792A
50 k	0.005	0.004	0.004	Fluke 792A
100 k	0.006	0.005	0.005	Fluke 792A
300 k	0.012	0.012	0.012	Fluke 792A
500 k	0.044	0.043	0.043	Fluke 792A
1 M	0.05	0.05	0.05	Fluke 792A

70 V Range

	20 V	*60 V*	
10	0.02	0.02	Fluke 792A
20	0.007	0.006	Fluke 792A
40	0.003	0.003	Fluke 792A
(0.1, 1, 10, 20) k	0.003	0.002	Fluke 792A
50 k	0.006	0.005	Fluke 792A
100 k	0.007	0.007	Fluke 792A
300 k	0.013	0.013	Fluke 792A

220 V Range

	60 V	*100 V*	*200 V*	
10	0.02	0.02	0.02	Fluke 792A
20	0.007	0.007	0.006	Fluke 792A
(0.04, 0.1, 1, 10, 20) k	0.004	0.003	0.003	Fluke 792A
50 k	0.007	0.007	0.006	Fluke 792A
100 k	0.007	0.007	0.007	Fluke 792A
200 k	0.01	0.01	0.01	Fluke 792A

1000 V Range

	200 V	*600 V*	*1000 V*	
10	0.02			Fluke 792A
20	0.009			Fluke 792A
(0.04, 0.1, 1, 10, 20) k	0.004	0.004	0.003	Fluke 792A
50 k	0.007	0.007	0.006	Fluke 792A
100 k	0.007	0.008	0.007	Fluke 792A

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(5 to 80) kV @ 60 Hz		0.054	HV Divider Comparison

AC Voltage – Measure [note 2]

Range	*Frequency in Hz*	*Best Uncertainty (±)* [note 1]	*Remarks*
(0 to 10) mV	1 to 40	0.06 % + 3 µV	3458A
	40 to 1 k	0.05 % + 1 µV	3458A
	1 k to 20 k	0.05 % + 1 µV	3458A
	20 k to 50 k	0.12 % + 1 µV	3458A
	50 k to 100 k	0.6 % + 1 µV	3458A
	100 k to 300 k	4.6 % + 2 µV	3458A
(10 to 100) mV	1 to 40	0.01 % + 4 µV	3458A
	40 to 1 k	0.01 % + 2 µV	3458A
	1 k to 20 k	0.018 % + 2 µV	3458A
	20 k to 50 k	0.036 % + 2 µV	3458A
	50 k to 100 k	0.1 % + 2 µV	3458A
	100 k to 300 k	0.35 % + 10 µV	3458A
	300 k to 1 M	1.2 % + 10 µV	3458A
(100 m to 1) V	1 to 40	0.009 % + 40 µV	3458A
	40 to 1 k	0.009 % + 20 µV	3458A
	1 k to 20 k	0.017 % + 20 µV	3458A
	20 k to 50 k	0.035 % + 20 µV	3458A
	50 k to 100 k	0.09 % + 20 µV	3458A
	100 k to 300 k	0.35 % + 100 µV	3458A
	300 k to 1 M	1.2 % + 100 µV	3458A
(1 to 10) V	1 to 40	0.009 % + 0.4 mV	3458A
	40 to 1 k	0.009 % + 0.2 mV	3458A
	1 k to 20 k	0.017 % + 0.2 mV	3458A
	20 k to 50 k	0.035 % + 0.2 mV	3458A
	50 k to 100 k	0.09 % + 0.2 mV	3458A
	100 k to 300 k	0.35 % + 1 mV	3458A
	300 k to 1 M	1.2 % + 1 mV	3458A
(10 to 100) V	1 to 40	0.025 % + 4 mV	3458A
	40 to 1 k	0.025 % + 2 mV	3458A

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	1 k to 20 k	0.025 % + 2 mV	3458A
	20 k to 50 k	0.04 % + 2 mV	3458A
	50 k to 100 k	0.14 % + 2 mV	3458A
	100 k to 300 k	0.5 % + 10 mV	3458A
	300 k to 1 M	1.8 % + 10 mV	3458A
(100 to 700) V	1 to 40	0.05 % + 40 mV	3458A
	40 to 1 k	0.05 % + 20 mV	3458A
	1 k to 20 k	0.07 % + 20 mV	3458A
	20 k to 50 k	0.14 % + 20 mV	3458A
	50 k to 100 k	0.35 % + 20 mV	3458A

AC Voltage [note 2]
Measuring Equipment

Range	*Frequency in Hz*	*Best Uncertainty (±)* [note 1]	*Remarks*
(0 to 2.2) mV	10 to 40	0.6 % + 5 μV	5700A / 5725A
	40 to 50 k	0.15 % + 5 μV	5700A / 5725A
	50 k to 100 k	0.1 % + 7 μV	5700A / 5725A
	100 k to 300 k	0.13 % + 13 μV	5700A / 5725A
	300 k to 500 k	0.2 % + 30 μV	5700A / 5725A
	500 k to 1 M	0.4 % + 30 μV	5700A / 5725A
(2.2 to 22) mV	10 to 20	0.08 % + 5 μV	5700A / 5725A
	20 to 20 k	0.05 % + 5 μV	5700A / 5725A
	20 k to 50 k	0.06 % + 5 μV	5700A / 5725A
	50 k to 100 k	0.13 % + 7 μV	5700A / 5725A
	100 k to 300 k	0.15 % + 12 μV	5700A / 5725A
	300 k to 500 k	0.13 % + 25 μV	5700A / 5725A
	500 k to 1 M	0.4 % + 25 μV	5700A / 5725A
(22 to 220) mV	10 to 20	0.07 % + 13 μV	5700A / 5725A
	20 to 40	0.03 % + 10 μV	5700A / 5725A
	40 to 20 k	0.015 % + 10 μV	5700A / 5725A
	20 k to 50 k	0.04 % + 8 μV	5700A / 5725A
	50 k to 100 k	0.1 % + 25 μV	5700A / 5725A
	100 k to 300 k	0.14 % + 25 μV	5700A / 5725A
	300 k to 500 k	0.2 % + 35 μV	5700A / 5725A

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	500 k to 1 M	0.34 % + 80 µV	5700A / 5725A
(220 m to 2.2) V	10 to 20	0.06 % + 100 µV	5700A / 5725A
	20 to 40	0.02 % + 25 µV	5700A / 5725A
	40 to 20 k	0.01 % + 6 µV	5700A / 5725A
	20 k to 50 k	0.014 % + 16 µV	5700A / 5725A
	50 k to 100 k	0.03 % + 70 µV	5700A / 5725A
	100 k to 300 k	0.06 % + 130 µV	5700A / 5725A
	300 k to 500 k	0.13 % + 350 µV	5700A / 5725A
	500 k to 1 M	0.26 % + 85 µV	5700A / 5725A
(2.2 to 22) V	10 to 20	0.06 % + 0.8 mV	5700A / 5725A
	20 to 40	0.02 % + 0.3 mV	5700A / 5725A
	40 to 20 k	0.009 % + 60 µV	5700A / 5725A
	20 k to 50 k	0.014 % + 0.2 mV	5700A / 5725A
	50 k to 100 k	0.03 % + 0.4 mV	5700A / 5725A
	100 k to 300 k	0.06 % + 1.5 mV	5700A / 5725A
	300 k to 500 k	0.15 % + 5 mV	5700A / 5725A
	500 k to 1 M	0.32 % + 9 mV	5700A / 5725A
(22 to 220) V	10 to 20	0.06 % + 8 mV	5700A / 5725A
	20 to 40	0.02 % + 3 mV	5700A / 5725A
	40 to 20 k	0.01 % + 1 mV	5700A / 5725A
	20 k to 50 k	0.03 % + 4 mV	5700A / 5725A
	50 k to 100 k	0.06 % + 8 mV	5700A / 5725A
	100 k to 300 k	0.18 % + 8 mV	5700A / 5725A
(220 to 1100) V	40 to 1 k	0.01 % + 4 mV	5700A / 5725A
	1 k to 20 k	0.02 % + 6 mV	5700A / 5725A
	20 k to 30 k	0.07 % + 11 mV	5700A / 5725A
(220 to 750) V	30 k to 50 k	0.07 % + 11 mV	5700A / 5725A
	50 k to 100 k	0.3 % + 45 mV	5700A / 5725A

NVLAP Code: 20/E10
Capacitance – Source: (100 to 10 k) Hz

Range	*Best Uncertainty (±)* [note 1]	*Remarks*

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NVLAP LAB CODE 200730-0

0.01 pF	0.02 %	Fixed Capacitors w/GR1615-A Bridge
0.1 pF	0.02 %	Fixed Capacitors w/GR1615-A Bridge
1 pF	0.02 %	Fixed Capacitors w/GR1615-A Bridge
10 pf	0.02 %	Fixed Capacitors w/GR1615-A Bridge
100 pF	0.02 %	Fixed Capacitors w/GR1615-A Bridge
500 pF	0.02 %	Fixed Capacitors w/GR1615-A Bridge
1 nF	0.002%	Fixed Capacitors w/GR1615-A Bridge
10 nF	0.02 %	Fixed Capacitors w/GR1615-A Bridge
200 nF	0.02 %	Fixed Capacitors w/GR1615-A Bridge

Capacitance – Measure: (50 to 1M) Hz

(1 a to 1.1 μ) F	0.012 % + 30 aF	GR1615-A Bridge
(1.1 μ to 10 m) F	0.06 % + 30 aF	Quadtech 7600LCR Bridge

Capacitance – Measure Equipment [note 2]

Range	*Frequency in Hz*	*Best Uncertainty (±)* [note 1]	*Remarks*
(0.19 to 1.0999) nF	10 to 10 k	0.60 % + 0.01 nF	5520A
(1.1 to 3.2999) nF	10 to 3 k	0.60 % + 0.01 nF	5520A
(3.3 to 10.9999) nF	10 to 1 k	0.30 % + 0.01 nF	5520A
(11 to 109.999) nF	10 to 1 k	0.30 % + 0.01 nF	5520A
(110 to 329.999) nF	10 to 1 k	0.30 % + 0.3 nF	5520A
(0.33 to 1.09999) μF	10 to 600	0.30 % + 1 nF	5520A
(1.1 to 3.2999) μF	10 to 300	0.30 % + 3 nF	5520A
(3.3 to 10.9999) μF	10 to 150	0.30 % + 10 nF	5520A
(11 to 32.9999) μF	10 to 120	0.48 % + 30 nF	5520A
(33 to 109.9999) μF	10 to 80	0.54 % + 100 nF	5520A
(110 to 329.999) μF	DC to 50	0.54 % + 300 nF	5520A
(0.33 to 1.09999) mF	DC to 20	0.54 % + 1 μF	5520A
(1.1 to 3.29999) mF	DC to 6	0.54 % + 3 μF	5520A
(3.3 to 10.9999) mF	DC to 2	0.54 % + 10 μF	5520A
(11 to 32.9999) mF	DC to 0.6	0.90 % + 30 μF	5520A
(33 to 110) mF	DC to 0.2	1.31 % + 100 μF	5520A

NVLAP Code: 20/E11
LF Inductance [note 2]

Source Only

Range	*Best Uncertainty (±) in %* [note 1]	*Remarks*
1 mH	0.07	Fixed Inductors w/Quadtech 7600

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CALIBRATION LABORATORIES **NVLAP LAB CODE 200730-0**

10 mH	0.07	Fixed Inductors w/Quadtech 7600
100 mH	0.07	Fixed Inductors w/Quadtech 7600
1 H	0.07	Fixed Inductors w/Quadtech 7600
Measure @ 1 kHz (10 μ to 100) H	0.07	Quadtech 7600

NVLAP Code: 20/E15
AC Phase [note 2]
Measure

Range	*Frequency in Hz*	*Best Uncertainty (±)* [note 1]	*Remarks*
0° to 360°	1 to 50 k	3 m°	Clark-Hess 5002 Bridge Set
	50 k to 200 k	11 m°	Clark-Hess 5002 Bridge Set

AC Phase – Generate [note 2]
50mV to 100V

Range	*Frequency in Hz*	*Best Uncertainty (±)* [note 1]	*Remarks*
0° to 360°	1 to 1 k	13 m°	Clark-Hess 5500-2 Phase Standard
	1 k to 6.25 k	17 m°	Clark-Hess 5500-2 Phase Standard
	6.25 k to 50 k	21 m°	Clark-Hess 5500-2 Phase Standard
	50 k to 200 k	50 m°	Clark-Hess 5500-2 Phase Standard

100V to 120V

Range	*Frequency in Hz*	*Best Uncertainty (±)* [note 1]	*Remarks*
0° to 360°	1 to 1 k	1.7 m°	Clark-Hess 5500-2 Phase Standard
	1 k to 6.25 k	26 m°	Clark-Hess 5500-2 Phase Standard
	6.25 k to 50 k	37 m°	Clark-Hess 5500-2 Phase Standard

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NVLAP LAB CODE 200730-0

50 k to 200 k	95 m°	Clark-Hess 5500-2 Phase Standard

TIME AND FREQUENCY

NVLAP Code: 20/F01
Frequency – Source and Measure

Range in Hz note 3	*Best Uncertainty (±)* note 1	*Remarks*
10 M	5.8×10^{-11}	Rubidium Frequency Standard

MECHANICAL

NVLAP Code: 20/M06
Torque note 2

Measure

Range	*Best Uncertainty (±) in %* note 1	*Remarks*
10 lbf-in to 600 lbf-ft	2.0 %	CDI

NVLAP Code: 20/M08
Mass note 2

Range	*Best Uncertainty (±)* note 1	*Remarks*
8 kg	12 mg	Echelon III
7 kg	12 mg	Echelon III
6 kg	12 mg	Echelon III
5 kg	9.3 mg	Echelon III
4 kg	8.8 mg	Echelon III
2 kg	6.9 mg	Echelon III
1 kg	3.6 mg	Echelon III
500 g	2 mg	Echelon III
200 g	0.68 mg	Echelon III
100 g	0.34 mg	Echelon III
50 g	0.17 mg	Echelon III
20 g	0.10 mg	Echelon III
10 g	68 µg	Echelon III
5 g	54 µg	Echelon III
2 g	54 µg	Echelon III

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1 g	54 µg	Echelon III
500 mg	43 µg	Echelon III
200 mg	43 µg	Echelon III
100 mg	43 µg	Echelon III
50 mg	43 µg	Echelon III
20 mg	43 µg	Echelon III
10 mg	43 µg	Echelon III
5 mg	43 µg	Echelon III
2 mg	43 µg	Echelon III
1 mg	43 µg	Echelon III

ELECTROMAGNETICS – RF/MICROWAVE

NVLAP Code: 20/R11
RF-DC Voltage/Current Converters [note 2]

Sinewave Flatness

Range in Hz	*Best Uncertainty (±) in %* [note 1]	*Remarks*
30 k to 1 M	0.014	Thermal Converters
1 M to 10 M	0.08	Thermal Converters
10 M to 30 M	0.17	Thermal Converters
30 M to 80 M	0.71	Thermal Converters
80 M to 100 M	0.84	Thermal Converters

NVLAP Code: 20/R17
RF Power [note 2]
Absolute

Range	*Frequency in Hz*	*Best Uncertainty (±)* [note 1]	*Remarks*
(+30 to -20) dBm	0.1 M to 1.3 G	0.10 dBm + M	8902A

Harmonic Distortion (50 and 600 Ω)

Range	*Best Uncertainty (±)* [note 1]	*Remarks*

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CALIBRATION LABORATORIES **NVLAP LAB CODE 200730-0**

0 dB @ (10 to 26 G) Hz	0.3 dB	8903B 71209A 8902A

THERMODYNAMIC

NVLAP Code: 20/T05
Pressure
Absolute Pressure Source – Pneumatic

Range	***Best Uncertainty (±)*** [note 1]	***Remarks***
(0.2 to 100) psia	11 ppm + 0.07 m psia	Ruska 2465
(100 to 1000) psia	12 ppm	Ruska 2465

Gage Pressure Source – Gage

Range	***Best Uncertainty (±)*** [note 1]	***Remarks***
(0 to 1.2) psi	0.013 m psi	Ruska 2465
(1.2 to 100) psi	11 ppm	Ruska 2465
(100 to 1000) psi	12 ppm	Ruska 2465
(-20 to 20) in H_2O	11 ppm + 240 µin H_2O	Differential

Gage Pressure Source – Hydraulic

Range	***Best Uncertainty (±)*** [note 1]	***Remarks***
(75 to 3000) psi	16 ppm	DHI PG7000
(725 to 30 000) psi	36 ppm	DHI PG7000

Determination of Piston Area

Range	***Best Uncertainty (±)*** [note 1]	***Remarks***
(0.2 to 100) psi	16 ppm	Ruska 2465
(100 to 1000) psi	17 ppm	Ruska 2465
(40 to 10 000) psi	35 ppm	DHI 5300

Gage Pressure Source [note 2]

Range	***Best Uncertainty (±)*** [note 1]	***Remarks***
(0.5 to 500) psi	73 ppm	Pressurements T2300

Hydraulic [note 2]

Range	***Best Uncertainty (±)*** [note 1]	***Remarks***

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CALIBRATION LABORATORIES **NVLAP LAB CODE 200730-0**

(500 to 15 000) psi	0.03 %	Ametek T-150

NVLAP Code: 20/T07
Thermodynamic

Range in °C	*Best Uncertainty (±) in C°* note 1	*Remarks*
-10 to 110	0.044	Liquid Bath w/PRT
100 to 300	0.12	Dry Block Calibrator
300 to 600	0.23	Dry Block Calibrator
Measure only note 2		
-195 to 660	0.044	PRT & Super Thermometer

NVLAP Code: 20/T08
Thermocouple

Isothermal Block Verification note 2

Range	*Best Uncertainty (±)* note 1	*Remarks*
Ambient (~23 °C)	0.04 °C	Thermocouple Half Junction

1. Represents an expanded uncertainty using a coverage factor, k = 2, at an approximate level of confidence of 95%.
2. Onsite calibrations available.
3. Uncertainty values of derivatives of 10 MHz will differ due to resolution, noise, and gating errors.

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CERTIFICATE OF CALIBRATION

Certificate Number M503691-1

Manufacturer: **Geotac**
Model No: **560K**
Customer PO No.: **L-2416**

Description: **Load Cell**
Serial No: **129739**
Customer Asset No.: **129739**

Customer:
Fugro Consultants LP
6100 Hillcroft
Houston, TX 77081

Location of Calibration:
Applied Technical Services, Inc.
1049 Triad Court
Marietta, GA 30062

Calibration Procedure: **ATS-521 Rev. 5: Calibration of Force Gages**

Date of Calibration: **November 28, 2006**
Temperature: **70° F**
Condition Received: **As Found Data Only**

*Next Calibration Due: **November 28, 2007**
Humidity: **29 %**
Condition Returned: **As Found Data Only**

This instrument has been calibrated using primary or secondary standards whose calibration is traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST). Some measurements are traceable to natural physical constants, consensus standards or ratio type measurements.

The reported expanded measurement uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a confidence level of approximately 95%. ATS maintains, wherever possible, at least a 4:1 Test Uncertainty Ratio. Statements of compliance, where applicable, are based on test results falling within specified limits with no reduction by the uncertainty of the measurement, unless otherwise allowed by procedure.

All calibrations are performed in accordance with the ATS Quality Manual QM1, Rev. 7 dated July 7, 2006. Applied Technical Services, Inc.'s Quality System complies with the applicable requirements of ANSI/NCSL Z540-1, ISO 9001-2000, 10CFR 50 Appendix B, 10CFR Part 21 and ISO/IEC 17025. ATS is an ISO/IEC 17025 Accredited Calibration Laboratory through A2LA.

The reported data is valid only at the time of the test and related only to the item calibrated. *Calibration due dates appearing on this Certificate of Calibration and calibration label are determined by the client and do not imply continued conformance to specifications.

This certificate shall not be reproduced except in full, without the permission of Applied Technical Services, Inc.

Notes: *Gage Factor = -2.1826mV/V*

Calibration Equipment Used::

Model:	Desc.:	ID No.:	Cal Due Date:
Tinius Olsen Super L	**Universal Testing Machine**	**ATS-01226**	**2/11/2007**

Calibrated by: _____ Christopher A. Gerlach
Senior Calibration Technician

APPLIED TECHNICAL SERVICES, INCORPORATED

CALIBRATION DATA SHEET

Customer: Fugro Consultants | Purchase Order No.: L-2416

Item Name: Load Cell w/o Display | Asset No.: 129739 | ATS Reference No.: M503691-1

Manufacturer: GeoTac | Model No.: 50Klbs | Proc. No.: 521 | Rev.: 5

Serial No.: 129739 | Calibration Date: 11/28/06 | Calibration Due Date: 11/28/07

Reason For Service: ☒ Initial Calibration ☐ Due For Calibration ☐ Repair and Calibration

Equipment Used:		Due:		
	ATS-01226	Due:	02/11/07	Universal Testing Machine
		Due:		
		Due:		
		Due:		
		Due:		
		Due:		

Calibrated By: [signature]

Customer Instrument Under Test

UNCERTAINTY (SEE NOTE) g	RANGE Lbs	ATS STANDARD Lbs	TOLERANCE Lbs	AS FOUND READING mV	AS CALIBRATED READING Lbs
0.03%	50000	(Comp.) 5000.000	As Found Data Only	-2.176	Same as - As Found
0.03%		10000.000	As Found Data Only	-4.358	Same as - As Found
0.03%		20000.000	As Found Data Only	-8.722	Same as - As Found
0.03%		30000.000	As Found Data Only	-13.092	Same as - As Found
0.03%		40000.000	As Found Data Only	-17.479	Same as - As Found
0.03%		50000.000	As Found Data Only	-21.826	Same as - As Found
Excitation (Before)	10.0000VDC				
Excitation (After)	10.0000VDC				
Zero (Before)	0.000				
Zero (After)	0.000				
Gage Factor	-2.1826mV/V				

* Indicates out of tolerance readings.

Remarks: Measurement Uncertainty reported at coverage factor K = 2 or 95% confidence level.

A= + Excitation B= -Excitation C= + Output D= -Output

ACCREDITED
CALIBRATION CERTIFICATE 1991.01

interface
ADVANCED FORCE MEASUREMENT

LOAD CELL CALIBRATION CERTIFICATION

CUSTOMER : FUGRO CONSULTANTS INC.
ADDRESS : Houston,TX 77081
CONDITION: AS FOUND & FINAL S.O. #: 78664 P.O. #: L-2563
MODEL: FT451-50K SERIAL: 129739 BRIDGE: A CAPACITY: 50 Klbf
PROCEDURE: C-1257

INPUT RESISTANCE: 376.3 OHM OUTPUT RESISTANCE: 354.7 OHM
ZERO BALANCE : 0.166 %RO

TEST CONDITIONS

TEMPERATURE: 74 °F HUMIDITY: 30 % EXCITATION: 10 VDC

TRACEABILITY

FORCE STANDARD : STD-14 NIST #: 822/273338-06 DUE: 15-MAR-10
STANDARD INDICATOR: BRD295 NIST #: 512727
TEST INDICATOR : BRD297 NIST #: 512727

SHUNT CALIBRATION

	Shunt (± 0.01%)	Output	Straight Line Conversion	Connections*
Tension	Kohm	.00000 mV/V	.0000 Klbf	
Compression	60 Kohm	-1.46285 mV/V	33.650 Klbf	-Out to +Exc

*For models wired with +Sense, -Sense, or -SCal leads, resistor connections are actually to these leads in place of +Exc, -Exc, or -Out respectively.

PERFORMANCE

	RATED OUTPUT	SEB OUTPUT	NONLINEARITY	HYSTERESIS		SEB
TENSION	.00000 mV/V	.00000 mV/V	.000 %FS	.000 %FS	±	.000 %FS
COMPRESSION	-2.17387 mV/V	-2.17364 mV/V	-.027 %FS	.045 %FS	±	.022 %FS

STATIC ERROR BAND (SEB) - The band of maximum deviations of the ascending and descending calibration points from a best fit straight line through zero OUTPUT. It includes the effects of NONLINEARITY, HYSTERESIS, and nonreturn to MINIMUM LOAD.

TEST LOAD APPLIED (Klbf)	RECORDED READINGS (mV/V) Tension	Compression
0		.00000
10		-.43434
20		-.86897
30		-1.30378
40		-1.73876
50		-2.17387
20		-.86994
0		-.00018

Interface, Inc. certifies that force measurements are traceable to primary standards at NIST. Calibration performed per Interface QA program and the requirements of ISO/IEC 17025, MIL-STD-45662A & ANSI/NCSL Z540-1-1994. Estimated measurement uncertainty is 0.040%, expressed as the expanded uncertainty at 95% confidence level using a coverage factor of k=2. Results relate to load cell serial 129739 only.
DO NOT REPRODUCE THIS REPORT except in full or with Interface Inc. written approval.

TECHNICIAN : Josh Smith DATE :14-MAR-08

INTERFACE INC.
7401 EAST BUTHERUS DRIVE · SCOTTSDALE, ARIZONA 85260, U.S.A.
TELEPHONE (480)948-5555 · FAX (480)948-1924

ACCREDITED
CALIBRATION CERTIFICATE 1991.01

interface
ADVANCED FORCE MEASUREMENT

LOAD CELL CALIBRATION CERTIFICATION

CUSTOMER : FUGRO CONSULTANTS INC.
ADDRESS : Houston,TX 77081
CONDITION: FINAL S.O. #: 78664 P.O. #: L-2563
MODEL: FT451-50K SERIAL: 129739 BRIDGE: A CAPACITY: 12.5 Klbf
PROCEDURE: C-1257

INPUT RESISTANCE: 374.7 OHM OUTPUT RESISTANCE: 353.0 OHM
ZERO BALANCE : -0.386 %RO

TEST CONDITIONS

TEMPERATURE: 75 °F HUMIDITY: 30 % EXCITATION: 10 VDC

TRACEABILITY

FORCE STANDARD : STD-22 NIST #: 822/275431-07 DUE: 15-SEP-11
STANDARD INDICATOR: BRD106 NIST #: 512727
TEST INDICATOR : BRD300 NIST #: 512727

SHUNT CALIBRATION

	Shunt (± 0.01%)	Output	Straight Line Conversion	Connections*
Tension	60 Kohm	1.46154 mV/V	33.590 Klbf	-Out to -Exc
Compression	Kohm	.00000 mV/V	.0000 Klbf	

*For models wired with +Sense, -Sense, or -SCal leads, resistor connections are actually to these leads in place of +Exc, -Exc, or -Out respectively.

PERFORMANCE

	RATED OUTPUT	SEB OUTPUT	NONLINEARITY	HYSTERESIS		SEB
TENSION	.54411 mV/V	.54388 mV/V	-.073 %FS	.066 %FS	±	.044 %FS
COMPRESSION	.00000 mV/V	.00000 mV/V	.000 %FS	.000 %FS	±	.000 %FS

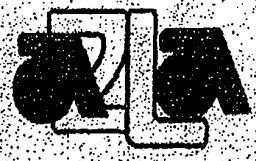
STATIC ERROR BAND (SEB) - The band of maximum deviations of the ascending and descending calibration points from a best fit straight line through zero OUTPUT. It includes the effects of NONLINEARITY, HYSTERESIS, and nonreturn to MINIMUM LOAD.

TEST LOAD APPLIED (Klbf)	RECORDED READINGS (mV/V) Tension	Compression
0.0	.00000	
2.5	.10868	
5.0	.21743	
7.5	.32609	
10.0	.43489	
12.5	.54411	
5.0	.21779	
0.0	.00026	

Interface, Inc. certifies that force measurements are traceable to primary standards at NIST. Calibration performed per Interface QA program and the requirements of ISO/IEC 17025, MIL-STD-45662A & ANSI/NCSL Z540-1-1994. Estimated measurement uncertainty is 0.040%, expressed as the expanded uncertainty at 95% confidence level using a coverage factor of k=2. Results relate to load cell serial 129739 only.
DO NOT REPRODUCE THIS REPORT except in full or with Interface Inc. written approval.

TECHNICIAN : Josh Smith DATE :14-MAR-08

INTERFACE INC.
7401 EAST BUTHERUS DRIVE · SCOTTSDALE, ARIZONA 85260, U.S.A.
TELEPHONE (480)948-5555 · FAX (480)948-1924



THE AMERICAN ASSOCIATION FOR LABORATORY ACCREDITATION

ACCREDITED LABORATORY

A2LA has accredited

INTERFACE, INC.

Scottsdale, AZ

for technical competence in the field of **Calibration**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General Requirements for the Competence of Testing and Calibration Laboratories*. This laboratory also meets the requirements of ANSI/NCSL Z540-1-1994 and any additional program requirements in the field of calibration. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated 18 June 2005*).

Presented this 18th day of October 2006.

President
For the Accreditation Council
Certificate Number 1991.01
Valid to November 30, 2008

For the calibrations to which this accreditation applies, please refer to the laboratory's Calibration Scope of Accreditation.

SCOPE OF ACCREDITATION TO ISO 17025:2005
& ANSI/NCSL Z540-1-1994

INTERFACE, INC.
7401 E. Butherus Drive
Scottsdale, AZ 85260
LaVar Clegg Phone: 480 948 5555 ext 106

CALIBRATION

Valid To: November 30, 2008 Certificate Number: 1991.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations[1]:

I. Mechanical

Parameter/Equipment	Range	Best Uncertainty[2] (±)	Comments
Force – Load Cells, Force Transducers	(200 to 240 000) lbf (100 to 1100) lbf (240 000 to 1 000 000) lbf	0.035 % reading 0.050 % reading 0.041 % reading	Load cells
	(1 to 500) lbf	0.040 % reading	Free weights
	(25 to 1100) lbf	0.030 % reading	Actuated weights
	(10 to 550) lbf	0.021 % reading	Actuated weights (stainless steel)
	(25 to 2000) gf	0.030 % reading	Free weights
Mass – Measure			Transfer method using load cells
Dead Weight	(1 to 25) lb (25 to 100) lb	0.0032 % 0.0085 %	

(A2LA Cert. No. 1991.01) 10/18/2006 Page 1 of 2

II. Electrical – DC & Low Frequency

Parameter/Equipment	Range	Best Uncertainty[2] (±)	Comments
DC Voltage – Measure	(0 to 0.14) V (0.14 to 1.4) V (1.4 to 14) V (14 to 140) V	0.0026 % + 0.2 µV 0.0024 % + 2 µV 0.0022 % + 20 µV 0.0022 % + 200 µV	Solartron 7071
DC Voltage Ratio	(0 to 0.1) V	0.0007 % rdg + 0.1 µV/V_{ref}	Kelvin-Varley divider
Resistance – Measure	(0 to 1.4) kΩ (0.14 to 1.4) kΩ (1.4 to 14) kΩ (14 to 140) kΩ (140 to 1400) kΩ	0.0026 % + 0.2 mΩ 0.0026 % + 2 mΩ 0.0026 % + 20 mΩ 0.0028 % + 0.2 Ω 0.0036 % + 2 Ω	Solartron 7071

[1] This laboratory offers commercial calibration service.

[2] "Best Uncertainty" is the smallest uncertainty of measurement that a laboratory can achieve within its scope of accreditation when performing more or less routine calibrations of nearly ideal measurement standards of nearly ideal measuring equipment. Best uncertainties represent expanded uncertainties expressed at approximately the 95 % level of confidence, usually using a coverage factor of $k = 2$. The best uncertainty of a specific calibration performed by the laboratory may be greater than the best uncertainty due to the behavior of the customer's device and to influences from the circumstances of the specific calibration.

Rosanne M. Robinson

GE Infrastructure
Sensing

Calibration Report 060915A0813

Digital Pressure Indicator

for

Fugro Consultants LP

6100 Hillcroft
Houston, TX 77081

Date of Issue: September 15, 2006

Manufacturer: Eaton
Sales Order: 216724

Model Number: UPS3000CC
Serial Number: A0813
ID Number: XPE-001

Preceding the calibration, the elastic element of this gauge was exercised and zero was adjusted. The horizontal plane of reference for pressure measurement is at the centerline of the test port.

The calibration and traceability of the transfer standards used in this calibration are maintained according to Quality Manual (QMS-001) Revision R (12/14/2005). The measurement results are traceable through an unbroken chain of comparisons to reference standards developed and maintained by the National Institute of Standards and Technology. The uncertainty reported with the data is the expanded uncertainty, and is based on the standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

This calibration was performed at the GE Infrastructure Sensing Houston facility. At the time of the calibration, the environmental conditions were 21 °C, 60%RH, and 101 kPa. The best estimate of gravitational acceleration at the site of calibration was 9.792778 m/s².

The calibration procedure CS-125 Revision D satisfies the requirements of ANSI/NCSL Z540-1-1994, ISO 9001, ISO/IEC 17025:1999 (E), NIST Handbook 150, and MIL-STD-45662A.

This report shall not be reproduced, except in full, without the written permission of the issuing laboratory.

Approved by: Sharon R. Ellis
Calibration Technician

Calibrated by: Joseph P. Balliew
Calibration Technician

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10311 Westpark Drive
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GE Infrastructure
Sensing

Calibration Report 060915A0813

Digital Pressure Indicator

for

Fugro Consultants LP

6100 Hillcroft
Houston, TX 77081

Date of Issue: September 15, 2006

Full Scale: 250 psi gauge

As Found Calibration Data

Calibration Date: September 15, 2006

Calibration Standard: PC-89, WS-12, and WS-27

Medium: nitrogen

Applied psi	Uncertainty psi	Displayed psi
0.00	0.0E+00	0.00
124.6680	1.4E-03	124.70
249.579	2.7E-03	249.65
124.6680	1.4E-03	124.65
0.00	0.0E+00	0.05

Note: The instrument was not adjusted prior to the above data being recorded. An asterisk denotes a point that is out of tolerance.

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Sensing

Calibration Report 060915A0813

Digital Pressure Indicator

for

Fugro Consultants LP

6100 Hillcroft
Houston, TX 77081

Date of Issue: September 15, 2006

Full Scale: 100 psi gauge

As Found Calibration Data

Calibration Date: September 15, 2006

Calibration Standard: PC-67, WS-12, and WS-27

Medium: nitrogen

Applied psi	Uncertainty psi	Displayed psi
0.00	0.0E+00	0.00
49.8390	5.0E-04	49.80
99.9320	1.0E-03	99.88
49.8400	5.0E-04	49.76
0.00	0.0E+00	0.00

Note: The instrument was not adjusted prior to the above data being recorded. An asterisk denotes a point that is out of tolerance.

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