

ANEXO 6



INFORME DE ENSAYO N° M-ME-0260-002-17
MONITOREO DE CALIDAD DE AIRE AMBIENTE
DRAGADO DE MUELLES 1,2,3,4,5,6 ZONA DE MANIOBRA Y CANAL DE ACCESO
DE PUERTO BOLÍVAR

IDENTIFICACIÓN DEL CLIENTE

DRAGADO DE MUELLES 1,2,3,4,5,6 ZONA DE MANIOBRA Y CANAL DE ACCESO DE PUERTO BOLÍVAR
Prov. El Oro; Machala, Av. Bolívar Madero Vargas S/N - Puerto Bolívar
Ing. Harry Veintimilla
0992909970

Guayaquil, 20 de abril de 2017

PRESENTACIÓN DEL MONITOREO

Coordenadas geográficas: 0610951 - 9639819
Orden de trabajo: OT-0260-17
Norma técnica: Acuerdo Ministerial 097-A
Procedimiento de muestreo: PEE.EL.019

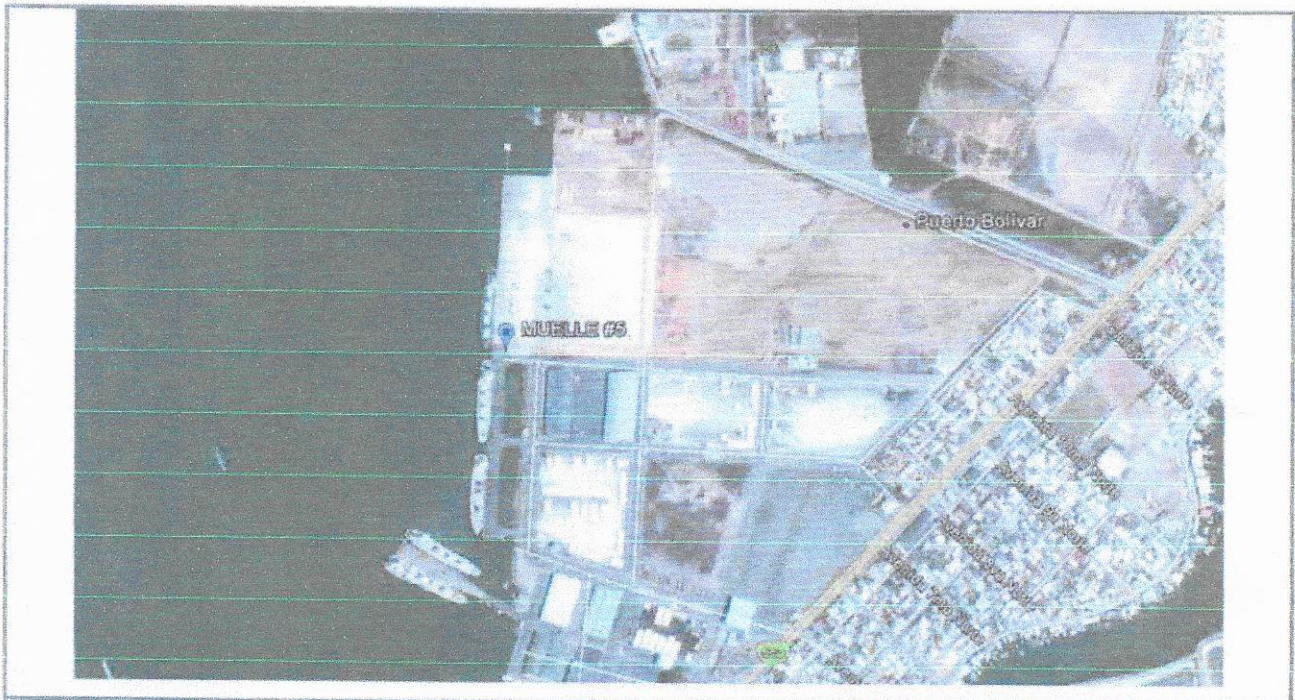
Coord. Técnico:
Técnico:
Fecha inicial:
Fecha final:


Ing. José Marcial
Gabriel Sellán
20 de Abril de 2017
20 de Abril de 2017

EQUIPOS UTILIZADOS

CÓDIGO	NOMBRE	MARCA	MODELO	SERIE	FECHA CAL.	CERTIFICADOS
ELEA.071	BOMBA SUPELCO	MICRO AIR SAMPLER	NO ESPECÍFICA	NO ESPECÍFICA	09-05-16	http://www.elicrom.com/trazabilidad/
EL.PT.211	TERMOHIGRÓMETRO	ATM	HT9214	NO ESPECÍFICA	07-01-17	
EL.PT.567	ANEMÓMETRO	CONTROL COMPANY	3655	160252813	04-03-16	
EL.PT.547	BARÓMETRO	CONTROL COMPANY	1081	160253706	01-03-16	

CROQUIS DE PUNTOS:



	INFORME DE ENSAYO N° M-ME-0260-002-17 MONITOREO DE CALIDAD DE AIRE AMBIENTE DRAGADO DE MUELLES 1,2,3,4,5,6 ZONA DE MANIOBRA Y CANAL DE ACCESO DE PUERTO BOLÍVAR
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DESCRIPCIÓN DE LA FUENTE EVALUADA

NOMBRE:	DRAGADO DE MUELLES 1,2,3,4,5,6 ZONA DE MANIOBRA Y CANAL DE ACCESO DE PUERTO BOLÍVAR
ACTIVIDAD:	ALMACENAMIENTO, CARGA Y DESCARGA DE CONTENEDORES
RÉGIMEN DE FUNCIONAMIENTO:	TURNOS: 3 (8 HORAS CADA TURNO) DÍAS POR MES: 30 DÍAS HORAS POR MES: 720 HORAS

CONDICIONES AMBIENTALES

Las condiciones ambientales del sitio de monitoreo fueron:

Puntos	Lugar de Medición	Temperatura Media (°C)	Humedad Relativa (%HR)	Velocidad del Viento (m/s)	Presión Atmosférica (mmHg)
1	MUELLE # 5	31,6	69,3	1,5	753,6

RESULTADOS

MUELLE # 5 20 DE ABRIL DE 2017				
Parámetro	Concentración Observada µg/m³	Concentración Corregida µg/m³	Máximo Permitido*	Evaluación
Monóxido de carbono	2024,22	2086,62	10000	CUMPLE
Dióxido de nitrógeno	10,96	11,29	200	CUMPLE
Dióxido de azufre	8,64	8,90	125	CUMPLE
Ozono	22,86	23,56	100	CUMPLE

*Norma de calidad del aire o nivel de inmisión, Acuerdo Ministerial N°097-A.

Este informe no podrá reproducirse excepto en su totalidad sin la aprobación escrita del laboratorio ELICROM MEDIO AMBIENTE. El presente informe se refiere solamente al sitio descrito en este informe en las condiciones ambientales descritas al momento del ensayo.

"SUPLEMENTO DEL INFORME / CERTIFICADO NÚMERO ME-0260-002-17"

AUTORIZADO POR:


 ING. SHIRLEY SAENZ
 COORDINADORA TÉCNICA M.A.

ANEXO:

1. CROMATOGRAFÍAS
2. FOTOGRAFÍA
3. CERTIFICADO DE CALIBRACIÓN



**DRAGADO DE MUELLES 1,2,3,4,5,6 ZONA DE MANIOBRA Y CANAL DE ACCESO DE
PUERTO BOLÍVAR
MONITOREO DE CALIDAD DE AIRE AMBIENTE
ABRIL DE 2017**

UBICACIÓN: MUELLE # 5

Fecha de monitoreo: 20 de abril de 2017

Equipo utilizado: Bomba Supelco



Realizado por:

Ing. José Marcial

Abril de 2017

Dirección: Cdla. Guayaquil Calle 1era Solar 10; Pbx: 2282007; Cel: 099337519, 097448710;
jmarcial@elicrom.com
GUAYAQUIL - ECUADOR



Clarity - Chromatography SW

ANALISIS DE CALIDAD DE AIRE

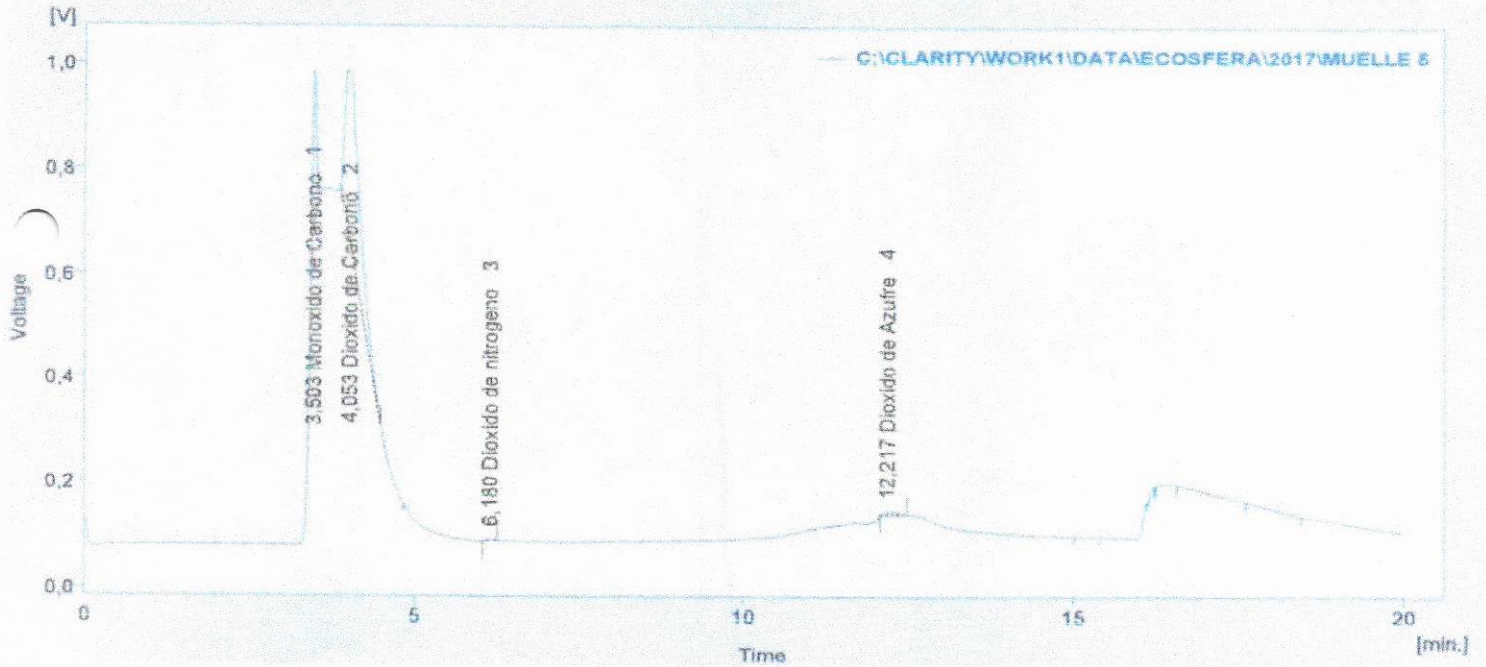
PERSONA DE CONTACTO: ING. HARRY VEINTIMILLA

Printed Version Info:

Printed Version	: Modified	Printed Date	: 24/04/2017 8:37:40
Report Style	: Chromatogram	By	: None
Calibration File	: GASES AMBIENTE		

Sample Info:

Sample ID	: ECOSFERA CIA. LTDA.	Amount [µg/m3]	: 1
Sample	: MUELLE 5	ISTD Amount	: 0
Inj. Volume [ml]	: 1	Dilution	: 1



Result Table (ESTD - C:\CLARITY\WORK1\DATA\ECOSFERA\2017\MUELLE 5)

	Reten. Time [min]	Response	RB	Amount [µg/m3]	Amount [%]	Peak Type	Compound Name
1	3,503	1039,102	A	2024,224	202422,4	Ordnr	Monóxido de Carbono
2	4,053	4825,756	A	N/A	N/A	Error	Dióxido de Carbono
3	6,180	22,183	A	10,968	1096,8	Ordnr	Dióxido de nitrógeno
4	12,217	91,246	A	8,644	864,4	Ordnr	Dióxido de Azufre
	Total			1,000	204383,7		



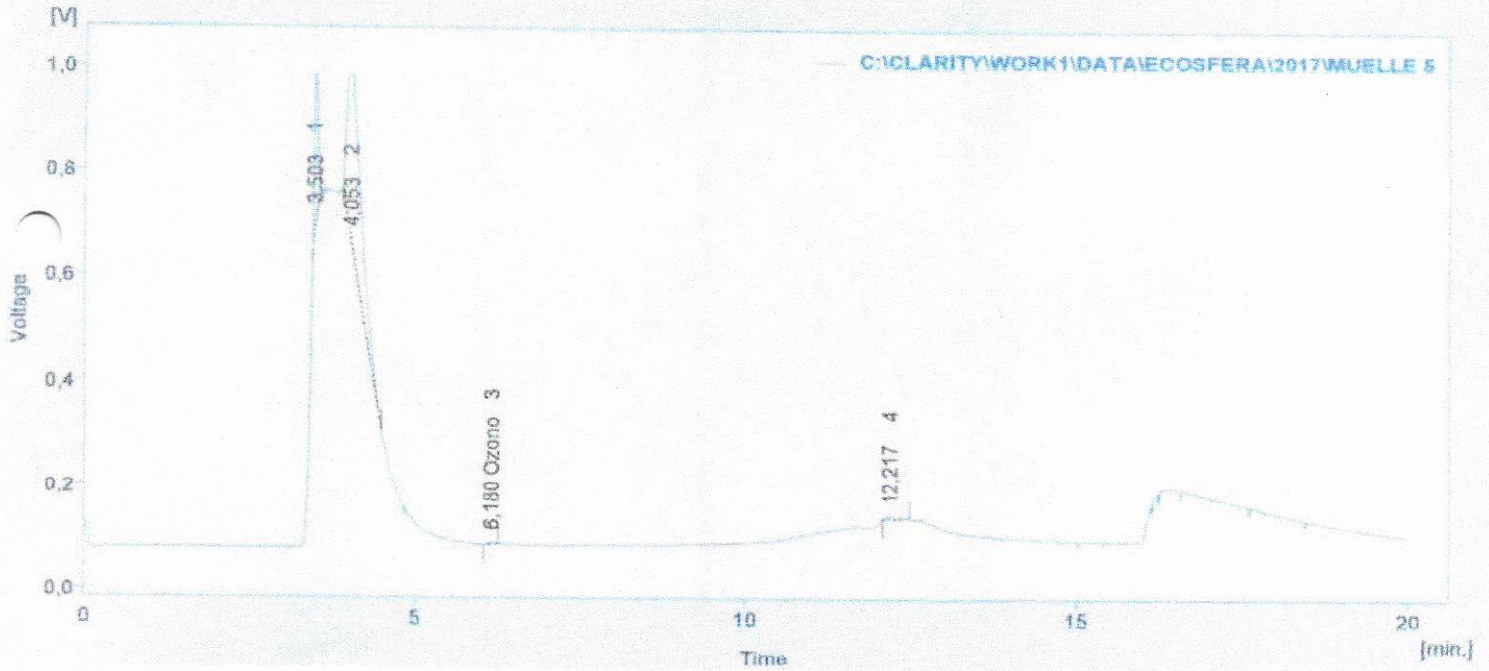
Clarity - Chromatography SW
ANALISIS DE OZONO
PERSONA DE CONTACTO: ING. HARRY VEINTIMILLA

Printed Version Info:

Printed Version : 24/04/2017 8:15:32 Recent (Linked Calibration) Printed Date : 24/04/2017 8:37:11
 Report Style : Chromatogram By : None
 Calibration File : OZONO

Sample Info:

Sample ID : ECOSFERA CIA. LTDA. Amount [ug/m3] : 1
 Sample : MUELLE 5 ISTD Amount : 0
 Inj. Volume [ml] : 1 Dilution : 1



Result Table (ESTD - C:\CLARITY\WORK1\DATA\ECOSFERA\2017\MUELLE 5)

Reten. Time [min]	Response	RB	Amount [ug/m3]	Amount [%]	Peak Type	Compound Name
3	6,180	22,183	A	22,868	2286,8	Ordnr Ozono
	Total			1,000	2286,8	



SUPELCO

CHEMICAL STANDARDS GENERAL USE STANDARDS
Phone: (314) 286-7750. FAX: (314) 771-5757 email: supelco@stal.com

Certificate of Analysis

Certificate Number: 0721311

Certification Date: 2016-05-09

Certificate expiration: 2017-05

Lot. Number: M-CNP24879


Supelco certifies that this unit has been verified in terms of the standards maintained by this laboratory, using instruments that are traceable to the U.S. National Institute of Standards and Technology (NIST). Supporting documentation is on file and available for inspection upon request.

Some of these products are classified as hazardous under European Union (EU) legislation. The risk and safety (R and S) phrases assigned by the EU are listed in the index of EU.

DESCRIPTION	CAT No	CONCENTRATION
CO	EPA PROTOCOLS COMPLIANCE	500 µg/mL each component
NO		Bal nitrogen
SO2		

Store between 25 +/- 5°C

Maximum usable shelf life one year from date of manufacture


William J. Sacher
Director of Technical Services

Document: 35266.CERT15.BMP

Visit our Web site at <http://www.sigma-alderich.com/supelco>



CERTIFICADO DE CALIBRACIÓN

Ciudadela Guayaquil, calle 1era mz 21 solar 10
Guayaquil - Ecuador Pbx 04-2282007 Fax ext. 403
http://www.elicrom.com mail: ventas@elicrom.com



CERTIFICADO No: CC-0254-004-17

IDENTIFICACIÓN DEL CLIENTE

EMPRESA: ELICROM CIA. LTDA.
DIRECCIÓN: CIUDADELA GUAYAQUIL, CALLE 1 ERA MZ 21 SOLAR 10
TELÉFONO: 2282007

IDENTIFICACIÓN DEL EQUIPO

EQUIPO:	TERMOHIGRÓMETRO	UNIDAD DE MEDIDA TEMPERATURA:	°C
MARCA:	ATM	RESOLUCIÓN TEMPERATURA:	0,1
MODELO/TIPO:	HT9214	RANGO TEMPERATURA:	(-10 a 50) °C
SERIE:	NO ESPECIFICA	UNIDAD DE MEDIDA HUMEDAD:	%HR
CÓDIGO DE CLIENTE:	EL_PT_211	RESOLUCIÓN HUMEDAD:	0,1
UBICACIÓN:	MEDIO AMBIENTE	RANGO HUMEDAD:	(20 a 99) %HR

EQUIPOS UTILIZADOS

CÓDIGO	NOMBRE	MARCA	MODELO	SERIE	FECHA CAL.	PROX. CAL.
EL_PC_013	TERMOHIGROMETRO PATRÓN	VAISALA	M170IHMP76B	H4510020/H4950006	06-feb.-15	08-feb.-17
EL_PT_038	CAMARA DE ESTABILIDAD	ELICROM	NO APLICA	NO APLICA	12-ago-16	12-ago-17
EL_PT_365	TERMOHIGROMETRO	CENTER	342	140103655	02-abr-16	02-abr-17

CALIBRACIÓN

MÉTODO: COMPARACIÓN DIRECTA CON TERMOHIGRÓMETRO PATRÓN Y CÁMARA DE ESTABILIDAD
 PROCEDIMIENTO: PEC.EL.04
 LUGAR DE CALIBRACIÓN: LABORATORIO T.H. (ELICROM)
 TEMPERATURA MEDIA (°C): 22,7
 HUMEDAD MEDIA (%HR): 49,0

Descripción	Unidad	Patrón	Equipo	Corrección	Incertidumbre
Temperatura interna 1	°C	28,04	28,0	0,0	1,0
Humedad 1	%HR	24,92	28,3	-3,5	4,9
Humedad 2	%HR	45,32	46,4	-1,1	4,9
Humedad 3	%HR	75,40	70,6	4,8	4,9

OBSERVACIONES:

El cálculo de la incertidumbre expandida se realizó en base a la guía OAE G02 R01, multiplicando la incertidumbre típica por el factor de cobertura $k=2,00$, que para una distribución t (de Student) con $V_{eff} = \infty$ (grados efectivos de libertad) corresponde a una probabilidad de cobertura de aproximadamente el 95,45%. La incertidumbre típica de medición se ha determinado conforme al documento EA-4/02. Este certificado no podrá reproducirse excepto en su totalidad sin la aprobación escrita del laboratorio Elicrom-Calibración. El presente certificado se refiere solamente al equipo arriba descrito al momento del ensayo.

CALIBRACIÓN REALIZADA POR: Sergio Rodríguez

FECHA CALIBRACIÓN: 2017-01-07 FECHA PRÓXIMA: 2017-07-07

AUTORIZADO POR:
Ing. Sergio Rodríguez
GERENTE TÉCNICO

RECIBIDO POR:
RESPONSABLE - CLIENTE





Calibration complies with
ISO/IEC 17025 and ANSI/NCSL Z540-1

Cert. No.: 3655-7473034

Traceable® Certificate of Calibration for Micro-Anemometer/Thermometer

Instrument Identification:

Model: 3655 S/N: 160252813 Manufacturer: Control Company

Standards/Equipment:

Description	Serial Number	Due Date	NIST Traceable Reference
Air Velocity Standard	1016965	11/21/16	201511211620
Digital Thermometer	90969500	10/01/16	4000-7091939

Certificate Information:

Technician: 177 Procedure: CAL-3655 Cal Date: 3/04/18 Cal Due: 3/04/18
Test Conditions: 22.1°C 42.0 %RH 1021 mBar

Calibration Data: (New Instrument)

Unit(s)	Nominal	As Found	In Tol	Nominal	As Left	In Tol	Min	Max	±U	TUR
FPM		N.A.		0	0	Y	20	20	7	2.9:1
FPM		N.A.		1,029	990	Y	736	1,322	7	>4:1
FPM		N.A.		1,630	1,499	Y	1,337	1,923	7	>4:1
°C		N.A.		24.22	23.4	Y	22.2	26.2	0.06	>4:1

This instrument was calibrated using instruments traceable to National Institute of Standards and Technology.

A Test Uncertainty Ratio of at least 4:1 is maintained unless otherwise stated and is calculated using the expanded measurement uncertainty. Uncertainty evaluation includes the instrument under test and is calculated in accordance with the ISO "Guide to the Expression of Uncertainty in Measurement" (GUM). The uncertainty represents an expanded uncertainty using a coverage factor k=2 to approximate a 95% confidence level. In tolerance conditions are based on test results falling within specified limits with no reduction by the uncertainty of the measurement. The results contained herein relate only to the tests indicated. This certificate shall not be reproduced except in full without the written permission of Control Company.

Aaron Justice, Technical Manager

Nominal=Standard's Reading, As Left=Instrument's Reading, In Tol=In Tolerance, Min/Max=Acceptance Range, ±U=Expanded Measurement Uncertainty, TUR=Test Uncertainty Ratio, Accuracy=(Max-Min)/2

Maintaining Accuracy:

In our opinion once calibrated your Micro-Anemometer/Thermometer should maintain its accuracy. There is no exact way to determine how long calibration will be maintained. Micro-Anemometer/Thermometers change little, if any at all, but can be affected by aging, temperature, shock, and contamination.

Recalibration:

For factory calibration and re-certification traceable to National Institute of Standards and Technology contact Control Company.

Control Company 4455 Rex Road Friendswood, TX 77546 USA
Phone 281 482-1714 Fax 281 482-9448 service@control3.com www.control3.com

Control Company is ISO 9001 Quality Certified by (DNV) Det Norske Veritas, Certificate No. CERT-01805-AQ-HDU



Calibration
Certificate No. 1750.01

Calibration complies with ISO/IEC
17025, ANSI/NCSL Z540-1, and 9001



Cert. No.: 1081-7473887

Traceable® Certificate of Calibration for Barometer with Clock

Instrument Identification:

Model: 1081 S/N: 160253706 Manufacturer: Control Company

Standards/Equipment:

Description	Serial Number	Due Date	NIST Traceable Reference
Digital Barometer	D4640001	9/21/16	1000380976
Non-Contact Frequency Counter	26 66887	5/16/16	1000374678

Certificate Information:

Technician: 57 Procedure: CAL-31 Cal Date: 3/01/16 Due Date: 3/01/16
Test Conditions: 24.3°C 43.0 %RH 1015 mBar

Calibration Data: (New Instrument)

Unit(s)	Nominal	As Found	In Tol	Nominal	As Left	In Tol	Min	Max	±U	TUR
mb/mPa		N.A.		926.45	927	Y	923	935	0.70	>4:1
mb/hPa		N.A.		979.75	977	Y	974	986	0.70	>4:1
mb/hPa		N.A.		1,014.55	1,011	Y	1,009	1,021	0.70	>4:1
Sec/24hr		N.A.		0.000	0.700	Y	-8.640	8.640	0.13	>4:1

This instrument was calibrated using instruments traceable to National Institute of Standards and Technology.

A Test Uncertainty Ratio of at least 4:1 is maintained unless otherwise stated and is calculated using the expanded measurement uncertainty. Uncertainty evaluation includes the instrument under test and is calculated in accordance with the ISO "Guide to the Expression of Uncertainty in Measurement" (GUM). The uncertainty represents an expanded uncertainty using a coverage factor k=2 to approximate a 95% confidence level. In tolerance conditions are based on test results falling within specified limits with no reduction by the uncertainty of the measurement. The results contained herein relate only to the item calibrated. This certificate shall not be reproduced except in full, without written approval of Control Company.

Nominal=Standard's Reading As Left=Instrument's Reading In Tol=In Tolerance Min/Max=Acceptance Range ±U=Expanded Measurement Uncertainty TUR=Test Uncertainty Ratio
Accuracy=±(Max-Min)/2 Min = As Left Nominal(Rounded) - Tolerance Max = As Left Nominal(Rounded) + Tolerance Date=MM/DD/YY

Nicol Rodriguez
Nicol Rodriguez, Quality Manager

Aaron Judice
Aaron Judice, Technical Manager

Maintaining Accuracy:

In our opinion once calibrated your Barometer with Clock should maintain its accuracy. There is no exact way to determine how long calibration will be maintained. Barometer with Clocks change little, if any at all, but can be affected by aging, temperature, shock, and contamination.

Recalibration:

For factory calibration and re-certification traceable to National Institute of Standards and Technology contact Control Company.

CONTROL COMPANY 4455 Rex Road Friendswood, TX 77546 USA
Phone 281 482-1714 Fax 281 482-9448 service@control3.com www.control3.com

Control Company is an ISO 17025:2005 Calibration Laboratory Accredited by (A2LA) American Association for Laboratory Accreditation, Certificate No. 1750-01
Control Company is ISO 9001:2008 Quality Certified by (DNV) Det Norske Veritas, Certificate No. CERT-01805-2008-AQ-HOU-RvA
International Laboratory Accreditation Cooperation (ILAC) - Multilateral Recognition Arrangement (MRA)