

 THE SCIENCE OF WHAT'S POSSIBLE.™	Installation Qualification Report		
	Report No: TE82774-3-IQR	Iteration No: 00	SAP No: TE0082774QX

INSTALLATION QUALIFICATION REPORT

For the Alliance Column Heater / Cooler Test Station (TE82774-3)

PREPARED BY

Name	Role	Signature	Date
Emma Pierce	Test Validation Engineer		30 NOV 2017

REVIEWED BY

Name	Role	Signature	Date
Ed Jackson	Principal Test Engineer		30-Nov-2017

APPROVED BY

Name	Role	Signature	Date
Andre Kopoyan	Senior Operations Quality Engineer		30 Nov 2017

The "Prepared By" signature denotes that this document accurately describes the qualification activities.

The "Reviewed By" signature[s] denotes agreement with the description of the qualification activities.

The "Approved By" signature denotes that this document has been reviewed and approved for overall quality and completeness.

REVISION HISTORY

Version	Author	Summary of change
00	Emma Pierce	First document for approval

1.0 Purpose

The Alliance Column Heater / Cooler Test Station (TE82774-3) is located in the Venture Contract Manufacturer Site in Singapore. The station is used to test column heaters and column heater / coolers of the following part numbers: 186001863, 186001791, 186015011, 186179100, 186186301, 186017008, 186017009, 186017014, 186017015, N2971011. This station does not test 2695 or 2795 Alliance Column Heaters of the following part numbers: WAT270852, 186000266, 186000267, 186000306, and 186000320. The tests include checking communications and wiring, fan and door operation, heating, cooling (if applicable), and valve functionality (if applicable). For a detailed list of which UUTs undergo which tests, refer to Table 1: Instrument Test Summary in the Alliance Column Heater / Cooler Functional Test TSP 735000698, Ver. 13.

Once the operator connects the UUT to the test station, they must use the "Select UUT" button to choose the part number being tested from the dialog box that appears. When prompted, the operator must verify that the UUT has passed a Hi-Pot Ground Continuity test, close the heater door, and verify the functionality of the external and internal (if applicable) fan(s) as directed. The rest of the test is automated. Upon completion, the operator must reset the Rotary Switch at the back of the UUT to Position 0 and collect the automatically generated Test Record from the printer.

This Installation Qualification is being performed as required by TE82774-15SEP2017-VAF, which can be found in the TE0082774QX directory of SAP.

2.0 Scope of Report

This Installation Qualification Report details the qualification activities undertaken for the Alliance Column Heater / Cooler Test Station (TE82774-3) based on the requirements of the Installation Qualification Procedure 730004135, Ver. 00.

This Installation Qualification Report defines the documents used to qualify the Alliance Column Heater / Cooler Test Station (TE82774-3).

3.0 Summary of Results - Statement of Fitness for Intended Use

The Alliance Column Heater / Cooler Test Station was tested in accordance with the Installation Qualification Procedure 730004135, Ver. 00. All Test Scripts were performed and all objective evidence requirements have been met.

Waters now has the necessary documentation in place to ensure that the Alliance Column Heater / Cooler Test Station complies with Waters' requirements, the latest relevant quality system regulations, and cGMP practices.

Following the approval of this Qualification Report, the Alliance Column Heater / Cooler Test Station (TE82774-3) can be considered fully qualified and fit for intended use with the following part numbers: 186001791, 186001863, 186015011, 186179100, 186186301, 186017008, 186017009, 186017014, 186017015, and N2971011.

4.0 Glossary

The following definitions are used in this document:

Term	Explanation
CAL/PM	Calibration/Preventive Maintenance
CH	Column Heater
CHC	Column Heater Cooler
cGMP	Current Good Manufacturing Practice
FSD	Functional Specification Document
Hz	Hertz
ID	Identification
IQ	Installation Qualification
IQR	Installation Qualification Report
N/A	Not Applicable

Term	Explanation
P/N	Part Number
SAP	Enterprise Resource Planning Software
S/N	Serial Number
TSP	Test Specification and Procedure
UUT	Unit Under Test
VAC	Volts Alternating Current
VAF	Validation Assessment Form

5.0 Training

The operator of the Alliance Column Heater / Cooler Test Station (TE82774-3) was trained according to the Alliance Column Heater / Cooler Functional Test TSP 735000698, Ver. 13. The executor of this qualification was trained according to the Installation Qualification Procedure 730004135, Ver. 00. Both training records are provided as Attachments 7.1 and 7.2, respectively.

6.0 Qualification Results

6.1 Test Script IQ-01: Associated Documentation Verification was performed according to Installation Qualification Procedure 730004135, Ver. 00. The completed Test Script Data Sheet is provided as Attachment 7.3.

6.1.1 The Alliance Column Heater / Cooler Functional Test TSP 735000698, Ver. 13 was confirmed to be in SAP with a status of Release General, as evidenced below:

Document List After Selection

14 Hits

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ChooseSaveThumbnails (Images)

Type	Rev	Lev	Document	Vs	Description	From date	Change Number	Status text	Long name
TSP	A		735000698	00	Alliance Column Heater/Cooler Func Test	12/04/2002	9101913	RELEASE GENERAL	Rosely Downen
TSP			735000698	01	Alliance Column Heater/Cooler Func Test	05/07/2003		ABANDON	GENERIC ID
TSP	B		735000698	02	Alliance Column Heater/Cooler Func Test	05/07/2003	9103811	RELEASE GENERAL	GENERIC ID
TSP	C		735000698	03	Alliance Column Heater/Cooler Func Test	06/09/2003	9104148	RELEASE GENERAL	Rosely Downen
TSP	D		735000698	04	Alliance Column Heater/Cooler Func Test	03/18/2005	9112582	RELEASE GENERAL	Edward Jackson
TSP			735000698	05	Alliance Column Heater/Cooler Func Test	12/04/2007		ABANDON	Rosely Downen
TSP	E		735000698	06	Alliance Column Heater/Cooler Func Test	02/01/2008	9131877	RELEASE GENERAL	Edward Jackson
TSP	F		735000698	07	Alliance Column Heater/Cooler Func Test	04/29/2010	9151560	RELEASE GENERAL	Chris Green
TSP	G		735000698	08	Alliance Column Heater/Cooler Func Test	03/06/2013	9177682	RELEASE GENERAL	Edward Jackson
TSP	H		735000698	09	Alliance Column Heater/Cooler Func Test	11/20/2013	9184502	RELEASE GENERAL	Edward Jackson
TSP	J		735000698	10	Alliance Column Heater/Cooler Func Test	11/11/2014	9193072	RELEASE GENERAL	Edward Jackson
TSP	K		735000698	11	Alliance Column Heater/Cooler Func Test	03/02/2015	9195573	RELEASE GENERAL	Edward Jackson
TSP	L		735000698	12	Alliance Column Heater/Cooler Func Test	10/05/2015	9200681	RELEASE GENERAL	Edward Jackson
TSP			735000698	13	Alliance Column Heater/Cooler Func Test	09/27/2017		READY	Edward Jackson

6.1.2 The Alliance Column Heater / Cooler Calibration Procedure 735000727, Ver. 00 / Rev. A was confirmed to be in SAP with a status of Release General, as evidenced below:

Document List After Selection

1 Hits

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Type	Rev	Lev	Document	Vs	Description	From date	Change Number	Status text	Long name
CAL	A		735000727	00	cal proc .alliance col htr/clr tester	02/11/2003	9102648	RELEASE GENERAL	Rosely Downen

6.2 Test Script IQ-02: Site Verification was performed according to Installation Qualification Procedure 730004135, Ver. 00. The completed Test Script Data Sheet is provided as Attachment 7.4.

6.2.1 The ambient temperature and humidity were measured using alarm hygrometer (S/N #AA13015316) and were determined to be within specification as defined by the Acquity Arc Bio System FSD 721013355, Ver. 01. The calibration record is provided as Attachment 7.5.

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- 6.2.2 The electrical supply was measured using a Fluke 115 Multimeter (S/N #23372874), and was determined to be within specification as defined by the Acquity Arc Bio System FSD 721013355, Ver. 01. The calibration record is provided as Attachment 7.6.
- 6.2.3 The Test Station was confirmed to have more than the two (2) dedicated electrical outlets required.
- 6.2.4 The space and test bench of the Alliance Column Heater / Cooler Test Station (TE82774-3) were confirmed to have adequate space for testing and service. The bench was confirmed to be large and strong enough to support all test equipment. A picture of the Test Station work area is provided as Attachment 7.7.
- 6.3 Test Script IQ-03: Instrumentation Calibration Verification was performed according to Installation Qualification Procedure 730004135, Ver. 00. The completed script is provided as Attachment 7.8.
 - 6.3.1 The Alliance Column Heater / Cooler Test Station (TE82774-3) was confirmed to be in the Calibration Master List with a twelve (12) month maintenance cycle. A screen capture from the database is provided as Attachment 7.9.
 - 6.3.2 The Test Station was confirmed to have had preventative maintenance within this time frame. The most recent PM Record is provided as Attachment 7.10.
- 6.4 Test Script IQ-04: Software and Instrument Firmware Version was performed according to Installation Qualification Procedure 730004135, Ver. 00. The completed Test Script Data Sheet is provided as Attachment 7.11.
 - 6.4.1 The Test Equipment Software (Test Stand User Interface) version listed in the Alliance Column Heater / Cooler Functional Test TSP 735000698, Ver. 13 is Test Software 1.0 and was verified to match the version listed in the test equipment program display. A screen capture of the program display is provided as Attachment 7.12.
 - 6.4.2 The Test Equipment Software (Test Stand Model) version listed in the Alliance Column Heater / Cooler Functional Test TSP 735000698, Ver. 13 is Test Software 1.0 and was verified to match the version listed in the test equipment program display. Refer to the screen capture of the program display provided as Attachment 7.12.
 - 6.4.3 The Test Equipment Software (Sequence) version listed in the Alliance Column Heater / Cooler Functional Test TSP 735000698, Ver. 13 is Test Software 1.0 and was verified to match the version listed in the test equipment program display. Refer to the screen capture of the program display provided as Attachment 7.12.
 - 6.4.4 This test station does not download instrument firmware.
- 6.5 Test Script IQ-05: General Safety and Alarms was performed according to Installation Qualification Procedure 730004135, Ver. 00. The completed Test Script Data Sheet is provided as Attachment 7.13.
 - 6.5.1 It was confirmed that there were no mechanical safety pinch points or sharp edges.
- 6.6 Test Script IQ-06: Functional Verification was performed according to Installation Qualification Procedure 730004135, Ver. 00. The completed Test Script Data Sheet is provided as Attachment 7.15.
 - 6.6.1 The Alliance CH (P/N: 186186301) and the Alliance CHC (P/N: 186179100) were chosen as the UUTs for this Installation Qualification because they undergo all tests applicable to a unit with a printed circuit board P/N: 210000400. The Alliance CHC (P/N: 186179100) has equivalent functionality to the Acquity Arc Bio CHC (P/N: 186017015) that was specified as the UUT in the Validation Assessment Form TE82774-15SEP2017-VAF.
 - 6.6.2 It was verified that only units with a printed circuit board P/N: 210000400 of the following part numbers could be tested on this test station: 186001791, 186001863, 186015011, 186179100, 186186301, 186017008, 186017009, 186017014, 186017015, and N2971011. Two UUTs with P/N 186186301 and 186179100 were used for functional verification. A screen capture of the tests available to the operator is provided in Attachment 7.12.

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6.6.3 Two (2) UUTs were tested using the Alliance Column Heater / Cooler Test Station (TE82774-3) with all tests passing. The test record is provided as Attachment 7.16.

6.7 This table provides a summary of each test script as performed according to 730004135, Ver. 00 along with the attachment location of all objective evidence. The table also indicates any deviation taken from the scripts during qualification.

Script or Section	Pass/Fail	Objective Evidence	Deviations
IQ-01	Pass	Attachment 7.3	None
IQ-02	Pass	Attachments 7.4, 7.5, 7.6, and 7.7	None
IQ-03	Pass	Attachments 7.8, 7.9, and 7.10	None
IQ-04	Pass	Attachments 7.11 and 7.12	None
IQ-05	Pass	Attachments 7.13 and Attachment 7.14	None
IQ-06	Pass	Attachment 7.15, and 7.16	None

7.0 Attachments

- 7.1 Completed Operator Training Record 735000698, Ver. 13
- 7.2 Completed Executor Training Record 730004135, Ver. 00
- 7.3 Completed Test Script IQ-01: Associated Document Verification
- 7.4 Completed Test Script IQ-02: Site Verification
- 7.5 Objective Evidence IQ-02: Hygro-thermometer (S/N# AA13015316) Calibration Record
- 7.6 Objective Evidence IQ-02: Fluke 115 Multimeter (S/N #23372874) Calibration Record
- 7.7 Objective Evidence IQ-02: Picture of Test Station Work Area
- 7.8 Completed Test Script IQ-03: Instrument Calibration Verification
- 7.9 Objective Evidence IQ-03: Screen Capture of Alliance Column Heater / Cooler Test Station (TE82774-3) in Calibration Master List
- 7.10 Objective Evidence IQ-03: Alliance Column Heater / Cooler Test Station (TE82774-3) PM Record
- 7.11 Completed Test Script IQ-04: Test Software and Instrument Firmware Version
- 7.12 Objective Evidence IQ-04: Screen Capture of the Test Software Program Display
- 7.13 Completed Test Script IQ-05: General Safety and Alarms
- 7.14 Objective Evidence IQ-05: Hi Pot Calibration Record
- 7.15 Completed Test Script IQ-06: Functional Verification of UUTs P/N: 186186301 (S/N: L17SMH436G) and P/N: 186179100 (S/N: L17SMC256G)
- 7.16 Objective Evidence IQ-06: Test Records for UUTs P/N: 186186301 (S/N: L17SMH436G) and P/N: 186179100 (S/N: L17SMC256G)

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8.0 Deviation from Test Equipment Qualification

There were no deviations generated during the execution of the Installation Qualification Procedure 730004135, Ver. 00.

9.0 References

The current approved versions of the following documents are referenced within this report:

Document Number	Document Title
730004135, Ver. 00	Installation Qualification Procedure
735000698, Ver. 13	Alliance Column Heater / Cooler Functional Test TSP
735000727, Ver. 00 / Rev. A	Alliance Column Heater / Cooler Tester Calibration Procedure
721013355, Ver. 01	Acquity Arc Bio System FSD
WAT046538, Ver. 09	Generic Electrical Safety Test Procedure
TE82774-15SEP2017-VAF	Validation Assessment Form for Alliance Column Heater / Cooler Test Station

Doc Nr: TEP2774-3-1GR
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vss 29 NOV 17
exp 30 NOV 2017

WORK INSTRUCTION / OPERATING PROCEDURE

Title: Installation Qualification Procedure

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Appendix A: TRAINING RECORD

Document No. 735000698 Procedure Title Alliance Column Heater/Cooler Version 13
Functional Test TSP
 Training by: SELF N/A N/A
 Printed name Signature Date

By signing you acknowledge that you have reviewed, understand, and agree to comply with the policies and practices of the procedure defined above.

[illegible]

Copy this Training Record Template as needed

Template 730000483 V06

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WORK INSTRUCTION / OPERATING PROCEDURE
02 entry error EXP 30 NOV 2017
Title: Installation Qualification Procedure

Document No: 730004135

Version No: 00

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Appendix A: TRAINING RECORD

Document No. 430004135 Procedure Title Installation Configuration Procedure Version 00
Training by: SELF N/A N/A
Printed name Signature Date

By signing you acknowledge that you have reviewed, understand, and agree to comply with the policies and practices of the procedure defined above.

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Type	Syllabus ID	Syllabus	Course ID	Course	Attended	Freq	Expires	Score	Status
Requirement	MILTESTENG	Test Engineering	03	Test Engineering Management Policy	6/9/2017	0			Completed
Requirement	MILTESTENG	Test Engineering	730001834-VER-02	New Test Equipment Development Procedure	6/12/2017	0			Completed
Requirement	MILTESTENG	Test Engineering	730001835-VER-05	Process Validation Procedure for Milford	6/9/2017	0			Completed
Requirement	MILTESTENG	Test Engineering	730001836-VER-01	Sustaining Test Equipment Procedure	6/13/2017	0			Completed
Requirement	MILTESTENG	Test Engineering	730001936-VER-03	Test Method Validation Protocol	6/14/2017	0			Completed
Requirement	MILTESTENG	Test Engineering	730002232-VER-03	Process Validation Master Plan - Milford	6/14/2017	0			Completed
Requirement	MILTESTENG	Test Engineering	730002738-VER-00	New Product Intro Process - Milford (WIDP)	6/14/2017	0			Completed
Requirement	MILTESTENG	Test Engineering	730004135-VER-00	Installation Qualification Protocol	6/13/2017	0			Completed
Requirement	MILMFGOPSALL	All Milford Manufacturing & Support Personnel	EHS0000-VER-02	EHS Policies	6/6/2017	12	6/6/2018		Completed
Requirement	MILMFGOPSALL	All Milford Manufacturing & Support Personnel	LCDHR01-REV-01	Sexual Harassment Policy	6/9/2017	12	6/9/2018		Completed
Requirement	MILMFGOPSALL	All Milford Manufacturing & Support Personnel	QA0002-REV-01	Good Manufacturing Practices	6/12/2017	0			Completed
Requirement	MILMFGOPSALL	All Milford Manufacturing & Support Personnel	QA0008-REV-01	Quality Management Systems	6/13/2017	0			Completed

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Document No.: TE92774-3-1QR

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Attachment 7.3

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WORK INSTRUCTION / OPERATING PROCEDURE

Title: Installation Qualification Procedure

Document No: 730004135

Version No: 00

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IQ Test name: Associated Documentation Verification		Test Script No.: IQ-01	
Equipment No./ID: TE82774-3		Equipment Name: Alliance Column Heater / Cooler Test Station	
Installation Site: Venture : Singapore			
Purpose: To verify that supporting documentation is available prior to the completion of qualification.			
Test execution: List all applicable documents (Preventive Maintenance, Calibration, Operating Procedures, Test Specification Procedures, Manufacturing Procedures, etc.) under the Document type header and then complete the table below. If applicable documents are unavailable state why in the comments section. All applicable documents must be in either Ready, Pre-Rel-Prod, or Release General state in SAP. Enter N/A for any parameter or cell that is not used or not applicable.			
Objective evidence:			
Completed Test Script Data Sheet			
SAP Screen shot of below available document(s)			
Document Type	Title; Doc. No.; Revision/Version No.	Status in SAP	Initial & Date
TSP	Alliance Column Heater/cooler Function/ 735D00698, ver. 13 Test TSP	Ready	YSY 24 Nov 17
CAL	Alliance Column Heater/cooler Test 735D00727, ver. 00/Rev.A CAL Procedure	Release General	YSY 24 Nov 17
N/A EEP 12 Oct 2017			
N/A EEP 12 Oct 2017			
N/A EEP 12 Oct 2017			
N/A EEP 12 Oct 2017			
N/A EEP 12 Oct 2017			
N/A EEP 12 Oct 2017			
Comments: N/A EEP 12 Oct 2017			
Overall Test Conclusion: ☒ Pass ☐ Fail			

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Attachment 7.4

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WORK INSTRUCTION / OPERATING PROCEDURE

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Title: Installation Qualification Procedure

Document No: 730004135

Version No. 00

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IQ Test name: Site Verification		Test Script No.: IQ-02		
Equipment No./ID: TEP2774-3	Equipment Name: Alliance Column Heater/ Cooler Test Station			
Installation Site: Venture : Singapore				
Purpose: To verify the location in which the test equipment is to be installed is suitable for use.				
Test execution: List any additional applicable environmental parameters in the Parameters column. Using the applicable equipment documentation, define the specifications in the Acceptance Criteria column, as appropriate. Verify and/or measure the applicable parameters and complete the table below. Do not delete any of the listed defined parameters. Enter N/A for any parameter or cell that is not used or applicable.				
Objective evidence: Completed Test Script Data Sheet.				
Photo(s) of the work area, if applicable. ②				
Copies of calibration certificates for gauges or meters used for measurement, if applicable.				
Parameters	Acceptance criteria	As found	Pass/Fail	Initial & Date
Ambient Temperature	4-40°C	21°C ①	Pass	YSY 28 Nov 17 29 Nov 17
Relative Humidity	20-80% noncondensing	53.2% ①	Pass	YSY 28 Nov 17 29 Nov 17
Workspace	Adequate space for testing and service	Adequate space for testing and service	Pass	YSY 28 Nov 17
Test Station Bench	Large and strong enough to support all equipment	Large and strong enough to support equipment	Pass	YSY 28 Nov 17
Electrical Supply	47-63 Hz / 100-240 VAC	235.7 Vac, 50 Hz ①	Pass	YSY 28 Nov 17
Electrical Outlets	≥ 2	06	Pass	YSY 28 Nov 17
Network Available	≥ 1	01	Pass	YSY 28 Nov 17
N/A ECT 12 Oct 2017				
Comments: Temp, humidity, and electrical supply specified in 721013355, ver. 01 ① See Attachment 7.5 for Hygrometer calibration certificates See Attachment 7.6 for Multimeter calibration certificates ② See Attachment 7.7 for test station photo YSY 28 Nov 17				
Overall Test Conclusion: ☒ Pass ☐ Fail				

Copy this Test Script as needed

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Attachment 7.5

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MICRO PRECISION CALIBRATION PTE LTD
BLOCK 5008 ANG MO KIO AVENUE 5 #07-04
TECHPLACE II SINGAPORE 569874
65 67484384



Certificate of Calibration

Date: Apr 7, 2017

Cert No. 512200812788484

Customer:

GES SINGAPORE PTE LTD
28 MARSILING LANE
SINGAPORE 739152

Work Order #: SG-11005191

MPC Control #: AA13015316
Asset ID: N/A
Gage Type: ALARM HYGROMETER
Manufacturer: DR SENSOR
Model Number: HT-5B
Size: N/A
Temp/RH: 21.0°C / 58.0%
Location: Calibration performed at MPC facility

Serial Number: AA13015316
Department: N/A
Performed By: ZHIYUAN LIM
Received Condition: IN TOLERANCE
Returned Condition: IN TOLERANCE
Cal. Date: April 07, 2017
Cal. Interval: 12 MONTHS
Cal. Due Date: April 07, 2018

Calibration Notes:

See attached calibration data. (1 page)

Standards Used to Calibrate Equipment

I.D.	Description	Model	Serial	Manufacturer	Cal. Due Date	Traceability #
CC8451	HUMIDITY/TEMPERATURE INDICATOR & PROBE	HMI41 / HMP45	V0330143 / V0920024	VAISALA	Oct 10, 2017	CS162163
CAB154	TEMPERATURE & HUMIDITY TEST CHAMBER	TPAV-120-20	AFC425826-1	ISUZU CAP	Apr 19, 2017	222200812333017

Procedures Used in this Event

Procedure Name
MPC-00180

Description
Temperature Recorders, General, 3-7-2016 rev02

Calibrating Technician:

ZHIYUAN LIM

QC Approval:

GARLO DOMINGO

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k=2$, which for normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with EA's Publication and NIST Technical Note 1287, 1994 Edition. Services rendered comply with ISO/IEC 17025:2005, ANSI/NCSL Z540-1-1994, ANSI/NCSL Z540.3-2006, MPC Quality Manual, MPC CSD and with customer purchase order instructions.

Calibration cycles and resulting due dates were submitted/approved by the customer. Any number of factors may cause an instrument to drift out of tolerance before the next scheduled calibration. Recalibration cycles should be based on frequency of use, environmental conditions and customer's established systematic accuracy. The information on this report, pertains only to the instrument identified.

All standards are traceable to SI through the National Institute of Standards and Technology (NIST) and/or recognized national or international standards laboratories. Services rendered include proper manufacturer's service instruction and are warranted for no less than thirty (30) days. This report may not be reproduced in part or in a whole without the prior written approval of the issuing MPC lab.

J
TAN H. C.
11/APR/2017

Attachment 7-5

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Dr. Storage HT-5B Thermohygrometer

Procedure: MPC-00160
 ID Number: AA13015316
 Asset Number: N/A

Order Number: SG-11005191
 Serial Number: AA13015316
 Calibration Date: April 7, 2017

Temperature Accuracy

Range	Temp Set Value	REF Measured Value	Lower Limit	UUT Measured Value	Deviation	Error	Upper Limit	Result	Uncertainty (±)
0 to 50 °C	20 °C	20.1 °C	19.1 °C	20.3 °C	0.2 °C	1.00 %	21.1 °C	PASS	0.13 °C
0 to 50 °C	21 °C	21.1 °C	20.1 °C	21.3 °C	0.2 °C	0.95 %	22.1 °C	PASS	0.13 °C
0 to 50 °C	22 °C	22.0 °C	21.0 °C	22.1 °C	0.1 °C	0.45 %	23.0 °C	PASS	0.13 °C
0 to 50 °C	23 °C	23.0 °C	22.0 °C	23.1 °C	0.1 °C	0.43 %	24.0 °C	PASS	0.13 °C
0 to 50 °C	24 °C	24.0 °C	23.0 °C	24.1 °C	0.1 °C	0.42 %	25.0 °C	PASS	0.13 °C
0 to 50 °C	25 °C	25.0 °C	24.0 °C	25.1 °C	0.1 °C	0.40 %	26.0 °C	PASS	0.13 °C
0 to 50 °C	26 °C	26.0 °C	25.0 °C	26.2 °C	0.2 °C	0.77 %	27.0 °C	PASS	0.13 °C
0 to 50 °C	27 °C	27.0 °C	26.0 °C	27.2 °C	0.2 °C	0.74 %	28.0 °C	PASS	0.13 °C

Relative Humidity Accuracy

Range	RH Set Value	REF Measured Value	Lower Limit	UUT Measured Value	Deviation	Error	Upper Limit	Result	Uncertainty (±)
10 to 90 % RH	30 %RH	29.2 %RH	26.2 %RH	31.4 %RH	2.2 %RH	7.53 %	32.2 %RH	PASS	1.1 %RH
10 to 90 % RH	40 %RH	39.1 %RH	36.1 %RH	41.3 %RH	2.2 %RH	5.63 %	42.1 %RH	PASS	1.1 %RH
10 to 90 % RH	50 %RH	48.8 %RH	45.8 %RH	50.9 %RH	2.1 %RH	4.30 %	51.8 %RH	PASS	1.1 %RH
10 to 90 % RH	60 %RH	58.8 %RH	55.8 %RH	60.9 %RH	2.1 %RH	3.57 %	61.8 %RH	PASS	1.1 %RH

Attachment 7-6

Doc No: TE82774-3-1QR
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QMS-176/WI-QMS-044

MULTIMETER CALIBRATION REPORT

Equipment : Multimeter Cal Date : 06 / Jan / 2017
Brand Name : FLUKE Next Cal Date : 06 / Jan / 2018
Model : FLUKE 115 Environment Cond. : N.A.
GES/Mfg Serial No. : 23372874 Equipment Used : Yokogawa Portable Calibrator
Cal Procedure : WI-QMS-044 S/No. 2422

Calibration Data

Calibrator Output	Accuracy		Measured Reading (before)	Measured Reading (after)
	Digital	Analog		
300 mV	297.9 ~ 302.1 mV	270.0 ~ 330.0 mV	300.3	N.A.
3 V	2.979 ~ 3.021 V	2.700 ~ 3.300 V	3.000	N.A.
30 V	29.79 ~ 30.21 V	27.00 ~ 33.00 V	29.99	N.A.
20 mA	19.86 ~ 21.14 mA	18.00 ~ 22.00 mA	20.00	N.A.

Result : Pass / Fail

Remarks : Multimeter is tested ok within calibration range.

Calibrated by

Name/sign : Lee Kwang Quek

Designation : Senior Technician

Date : 06-Jan-2017

Reviewed by

Name/sign : Sheliyan Sathivelu

Designation : Senior QA Engineer

Date : 10/01/2017

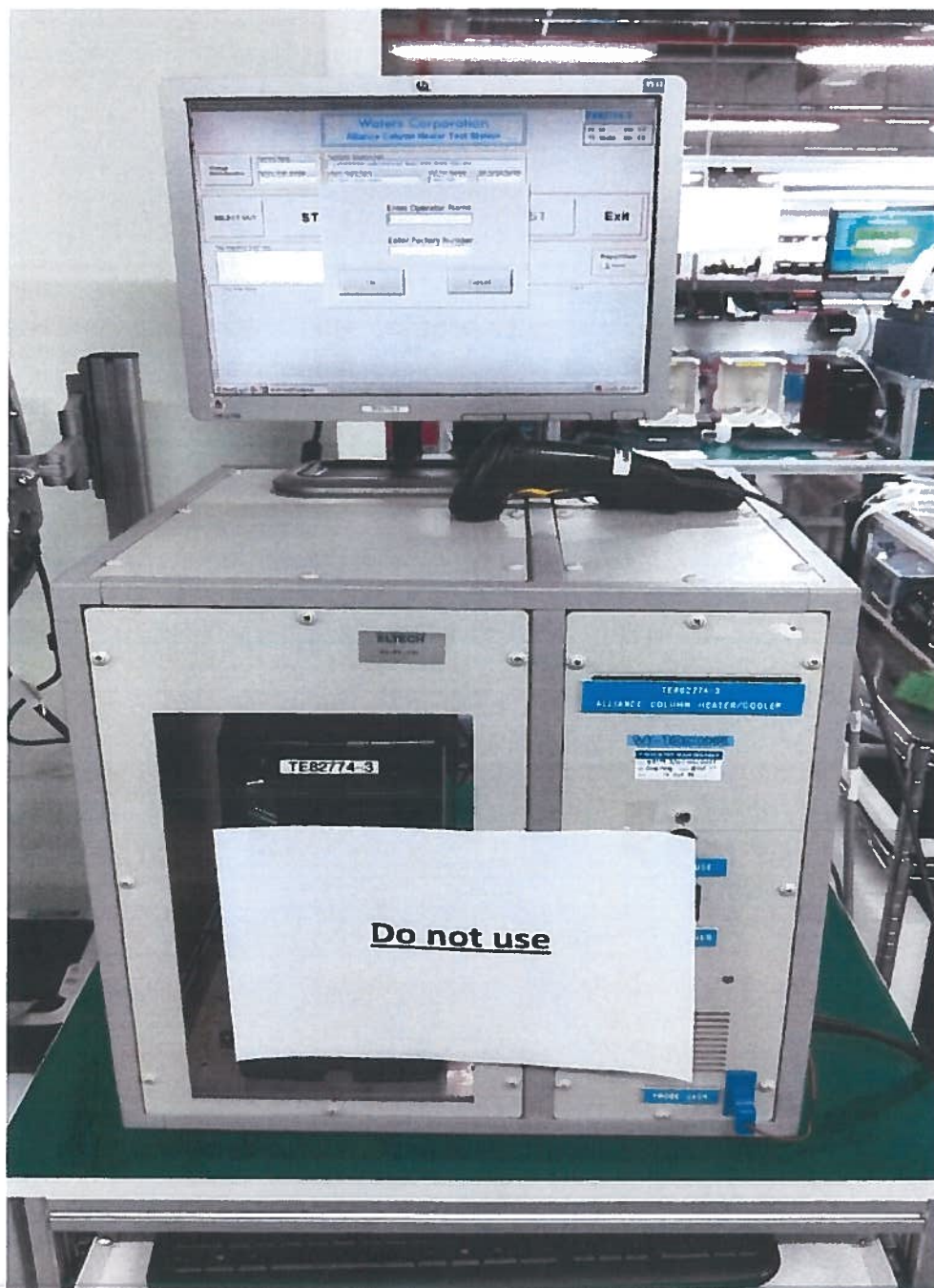
Attachment 7.7

Doc No. : TE82774-3-IQR Iteration 00 exp 30 NOV 2017

Description: Photo of Test Station TE82774-3

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Attachment 7.8

Doc No.: TE82774-3-1QR Iteration 00 Exp 30 Nov 2017

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Waters

THE SCIENCE OF WHAT'S POSSIBLE.™

WORK INSTRUCTION / OPERATING PROCEDURE

Title: Installation Qualification Procedure

Document No: 730004135

Version No: 00

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IOQ Test name: Instrumentation Calibration Verification				Test Script No.: IQ-03	
Equipment No./ID: TE82774-3			Equipment Name: Alliance Column Heater/ Cooler Test Station		
Installation Site: Venture : Singapore					
Purpose: To verify that all critical instruments are in the calibration system and calibrated or a preventive maintenance has been performed, as appropriate.					
Test execution: List all critical instruments/components and/or sub-systems (System, TUV, Sample Manager, BSM, Column Manager, Test Solutions, Meters, Gauges, Scales, etc.) in the Description column and complete the table below. Verify that all critical instruments have had a preventive maintenance and/or calibration performed, in accordance with the PM and/or Calibration procedures, and have been included in the preventive maintenance/calibration schedule. For test solutions note the expiration date. Enter N/A for any parameter or cell that is not used or applicable.					
Objective evidence: Completed Test Script Data Sheet Copies of calibration and/or maintenance certificates.					
Description	Waters P/N and Asset No.	Serial Number	Last Cal/PM Performed Date	PM Cal/Due / Expiration Date	Initial & Date
Alliance Column Heater/ Cooler Test Station	TE82774-3	N/A	16 OCT 2017	16 OCT 2018	YSY 25 Nov 17
N/A Exp 12 Oct 2017					
N/A Exp 12 Oct 2017					
N/A Exp 12 Oct 2017					
N/A Exp 12 Oct 2017					
N/A Exp 12 Oct 2017					
N/A Exp 12 Oct 2017					
N/A Exp 12 Oct 2017					
Comments: N/A Exp 12 Oct 2017					
Overall Test Conclusion: ☒ Pass ☐ Fail					

Copy this Test Script as needed

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Template 730000483 V06

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Attachment 7.9
 Iteration 00 EEP 30 Nov 2017
 Doc N: TEP2774-3-1QR page 01 of 01 YSY 29 Nov 17



Waters Consigned Equipment PM Master List

Form No: WAT-157100 (WAT-WAT-002)

NO	LOCATION	EQUIPMENT ID	EQUIPMENT NAME	MANUFACTURER SERIAL NO	MODEL	MANUFACTURER	LAST PM	NEXT PM	PM CYCLE	PM SOURCE	REMARK
57	WATERS	W1-16G0065	Alliance Column Heater/Cooler	TE82774-2	LACIE 32	WATERS	16/10/2017	16/10/2018	12	VENTURE	Consigned equipment. To be Verification by Hong Cheng for PM at yearly only Base on new document release
58	WATERS	W1-16G0066	Alliance Column Heater/Cooler	TE82774-3	LACIE 32	WATERS	16/10/2017	16/10/2018	12	VENTURE	Consigned equipment. To be Verification by Hong Cheng for PM at yearly only Base on new document release
59	WATERS	W1-16G0067	Acquity SDS Automated Test Station	TE82943-24	NA	WATERS	11/10/2017	11/10/2018	12	VENTURE	Consigned equipment. To be Verification by Hong Cheng for PM at yearly only

Attachment 7-10

Iteration 00 30 NOV 2017

Doc No. 7EP274-3-16R

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Form Number: WAT-145/00 (WI-WAT-002)



GES Singapore Pte Ltd

Preventive Maintenance Record

Preventive Maintenance Record

Date: 16-Oct-2017
 Equipment I.D.: TES274-3/WI-16GC0066
 Due Date: N/A
 Interval (Months): 12 months
 Procedure: 735000727

Performer: Tan Hong Cheng
 Equipment Name: Alliance Column Heater/Cooler Tester
 Location: Venture GES
 Next Due Date: 16-Oct-2018

Measurements:

Equipment Used	Serial Number	Calibration or PM Date
<u>BONKOTE</u>	<u>010903878</u>	<u>07-AUG-2017</u>
<u>Model: MCA-900</u>		

Procedure Step	Nominal (Include Tolerance)	As Found Result	As Left Result	Comments
<u>2.6</u>	<u>+/- 1.0 °C</u>	<u>20.03 °C</u>	<u>20.00 °C</u>	<u>Temperature reading within Specification</u>

Preventive Maintenance:

Procedure Step	Action(s) Taken
<u>N/A</u>	<u>N/A</u>

Verification Results:

Pass



Fail

Notes: N/A

No field should be left blank; Insert "N/A" if Not Applicable

N/A
 Place Expiry Label Here

Attachment 7-11

Doc No: 7E82774-3-10R

Iteration 00 EEP 30 Nov 2017

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Waters

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WORK INSTRUCTION / OPERATING PROCEDURE

Title: Installation Qualification Procedure

Document No: 730004135

Version No: 00

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IOQ Test name: Test Software and Instrument Firmware Version			Test Script No.: IQ-04	
Equipment No./ID: TE82774-3		Equipment Name: Alliance Column Heater / Cooler Test Station		
Installation Site: Venture: Singapore				
Purpose: To verify that the installed firmware/software is correct per the applicable design/operational documents (TSP, ASP, MPR, BOM, and/or other Design documents).				
Test execution: List all critical instruments/components and/or sub-systems that require software and/or firmware in the Description column. List the associated required software/firmware version, as defined in the applicable design/operational documents, in the Acceptance criteria column. Verify that the software/firmware version on the Test Equipment match the acceptance criteria and are identical. Enter N/A for any parameter or cell that is not used or applicable.				
Objective evidence: Completed Test Script Data Sheet Identify the applicable design/operational document that defined the required software/firmware version(s) in the associated Installation Qualification Report.				
Description	Acceptance criteria	As found	Pass/Fail	Initial & Date
Test Equipment Software (Test Stand user interface)	Version: 1.0	Version: 1.0	Pass	Y5Y 28 Nov 17
Test Equipment Software (Test Stand Model)	Version: 1.0	Version: 1.0	Pass	Y5Y 28 Nov 17
Test Sequence	Version: 1.0	Version: 1.0	Pass	Y5Y 28 Nov 17
	Version:	Version:		
	Version:	Version:		
	Version:	Version: N/A EEP		12 Oct 2017
	Version:	Version:		
	Version:	Version:		
Comments: Software types and versions specified in 735000698, ver. 13 EEP 12 Oct 2017				
Overall Test Conclusion: ☒ Pass ☐ Fail				

Copy this Test Script as needed

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Attachment 7-12

Doc No. : TE82774-3-IQR

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Waters Corporation TestStand Operator Interface

TE82774-3
TS - UI Ver. 1.0
TS - Model Ver. 1.0

**Waters Corporation
Alliance Column Heater Test Station**

TestStand Sequence Path
C:\ColumnHeaterCooler\TestStand Seqs\Arc Column HeaterCooler (TD6).seq

Operator Name
Factory Order Number

Change Name/Number

Column Heater Name
Bio Arc 30cm Column Heater/Cooler

UIT Part Number
186017015

Test Version Number
1.0

START TEST

STOP TEST

Exit

Test Sequence Stack View

Test Probe °C
0.000

Column Heater °C
0.000

ReportView
Viewer

Test Step Name

(Measurement, Test Type, Units, Limits, Referenced vi)

Status

Waters Corporation TestStand Operator Interface

TE82774-3
TS - UI Ver. 1.0
TS - Model Ver. 1.0

Waters Corporation
Alliance Column Heater Test Station

TestStand Configuration Path

Operator Station
Factory C

Change Name/Number

SELECT UUT

Test Sequence Stack View

Test Step Name

Exit

ReportView Viewer

Status

Select Test Unit Type

2X9X Column Heater /Cooler - 186001791
2X9X Column Heater - 186001863
AcQuity Column Heater /Cooler - 186015011
2X9X Column Heater /Cooler - 186179100
2X9X Column Heater - 186186301
Arc 30cm Column Heater /Cooler - 186017009
Arc 30cm Column Heater - 186017008
Altus A-10 Column Heater - N2971011
Bio Arc 30cm Column Heater /Cooler - 186017015
Bio Arc 30cm Column Heater - 186017014

OK

Cancel

Attachment 7-13

Doc No: TEP2774-3-1002

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WORK INSTRUCTION / OPERATING PROCEDURE

Title: Installation Qualification Procedure

Document No: 730004135

Version No. 00

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IOQ Test name: General Safety and Alarms		Test Script No.: IQ-05	
Equipment No./ID: TEP2774-3	Equipment Name: Alliance Column Heater / Cooler Test Station		
Installation Site: Venture: Singapore			
Purpose: To verify that the test equipment can operate in a safe manner, within its designated location.			
Test List any additional safety related conditions or alarms in the Safety Inspection column. List the associated safety requirement/specification in the Acceptance Criteria column. Perform an inspection/test of the equipment to assess its safety related conditions. Enter N/A for any parameter or cell that is not used or applicable.			
Objective evidence: Completed Test Script Data Sheet Photo of the secured glass bottles and/or tanks, if applicable			
Safety Inspection	Acceptance criteria	Pass/Fail	Initial & Date
Mechanical Safety/ Pinch Points/Sharp Edges	None Found	Pass	YSY 28 Nov 17
Electrical Safety Hi Pot/Ground Continuity	Passed per test specification WAT046538	Pass	YSY 28 Nov 17
Glass Bottles are secure	Secure	N/A	N/A
Tanks are secure	Secure	N/A	N/A
N/A Exp 12 Oct 2017			
Comments: Hi-Pot/Ground Continuity Test performed with ID# 91356, Quantech Guardian 6000 See Attachment 7-14 for calibration record. YSY 28 Nov 17			
Overall Test Conclusion: ☒ Pass ☐ Fail			

Copy this Test Script as needed

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Attachment 7.14

Doc No: TES2774-3-10R
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Waters

Calibration/Preventive Maintenance Procedure

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Document Number: 735003029

Revision: D

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QUADTECH GUARDIAN 6000 SETUP RECORD

ID Number: 91356 (7312754)

Performed By: Chua Chong Keong Date: Nov 28, 2017

Memory 1: 12345678			
	PARAMETER	VALUE	SETTING
Step 1	Mode	GR	GR
	Current	20.00A	20.00A
	High Limit	100.0mΩ	100.0mΩ
	Low Limit	Disable	Disable
	Test Time	3.0s	3.0s
Step 2	Mode	WDC	WDC
	Voltage	2.121 kV	2.121kV
	High Limit	5.00mA	5.00mA
	Low Limit	Disable	Disable
	Arc Limit	Disable	Disable
	Test Time	3.0s	3.0s
	Ramp Time	2.0s	2.0s

Key Lock locked ☒ (Key Lock LED illuminated)

Program displayed: MD1 (M01)

Approved by:

Performer: Chua Chong Keong

Date: Nov 28, 2017

Verified By: Test Engineering

Name: Loo Kok Leong

Title: Section Manager

Signature: [Signature]

Date: Nov 28, 2017

End User Approval: Manufacturing Technician

Name: Goh Siew Tin

Title: Technician

Signature: [Signature]

Date: Nov 28, 2017

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Effective from: 15.08.2016 thru: ... 735003029 CAL 000 03 RELEASE GENERAL



Attachment 7.14
Pot No: TEB2774-3-102
MICRO PRECISION CALIBRATION PTE LTD
BLOCK 5008 ANG MO KIO AVENUE 5 #07-04
TECHPLACE II SINGAPORE 569874
65 67484384

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Certificate of Calibration

Date: Nov 15, 2017

Cert No. 512200813117345

Customer:

GES SINGAPORE PTE LTD
28 MARSILING LANE
SINGAPORE 739152

Work Order #: SG-11006755

MPC Control #: 7312754
Asset ID: N/A
Gage Type: ELECTRICAL SAFETY ANALYZER
Manufacturer: QUADTECH
Model Number: GUARDIAN 6000
Size: N/A
Temp/RH: 21.2°C / 42.0%
Location: Calibration performed at MPC facility

Serial Number: 7312754
Department: N/A
Performed By: STEVEN CHOO
Received Condition: IN TOLERANCE
Returned Condition: IN TOLERANCE
Cal. Date: November 15, 2017
Cal. Interval: 12 MONTHS
Cal. Due Date: November 15, 2018

Calibration Notes:

Please refer to the attached calibration data. (3 pages)

Standards Used to Calibrate Equipment

I.D.	Description.	Model	Serial	Manufacturer	Cal. Due Date	Traceability #
AP4205	MULTIMETER	3458A	2823A17096	HEWLETT PACKARD	Aug 10, 2018	512200812551809
CH2324	CURRENT SHUNT	34330A	0804	AGILENT	Sep 7, 2018	512200813018499
CH4975	HIGH RESISTANCE DECADE BOX	N/A	N/A	N/A	Aug 24, 2018	512200812995468
CH2775	SYNTHESIZED FUNCTION GENERATOR	3325B	2847A08652	HEWLETT PACKARD	Nov 28, 2017	1-8355234983-1
CN2593	UNIVERSAL COUNTER	53132A	KR91200136	HEWLETT PACKARD	Mar 7, 2018	512200812749000
CA8100	DECADE RESISTANCE BOX	2793	00060U	YOKOGAWA	May 26, 2018	512200812858599
DD2799	PRECISION HV METER	4700	019419	VITREK	Dec 4, 2017	222008122788840

Procedures Used in this Event

Procedure Name

QUADTECH 6000

Description

Electrical Safety Analyzer Instruction Manual, Form 150354A

Calibrating Technician:

STEVEN CHOO

QC Approval:

GARLO DOMINGO

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k=2$, which for normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with EA's Publication and NIST Technical Note 1287, 1994 Edition. Services rendered comply with ISO/IEC 17025:2005, ANSI/NCSL Z540-1-1994, ANSI/NCSL Z540-3-2006, MPC Quality Manual, MPC CSD and with customer purchase order instructions.

Calibration cycles and resulting due dates were submitted/approved by the customer. Any number of factors may cause an instrument to drift out of tolerance before the next scheduled calibration. Recalibration cycles should be based on frequency of use, environmental conditions and customer's established systematic accuracy. The information on this report, pertains only to the instrument identified.

All standards are traceable to SI through the National Institute of Standards and Technology (NIST) and/or recognized national or international standards laboratories. Services rendered include proper manufacturer's service instruction and are warranted for no less than thirty (30) days. This report may not be reproduced in part or in a whole without the prior written approval of the issuing MPC lab.

TAN H.C.
24/NOV/17

7.14
Attachment 7 Entygen vxy 28 Nov 17
Doc No: TE82774-3-1QR Iteration 00 EEP 30 NOV 2017
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By 28 Nov 17



Quadtech Guardian 6000 Electrical Safety Analyzer

Procedure: QUADTECH 6000
ID Number: 7312754
Asset Number: N/A

Order Number: SG-11006755
Serial Number: 7312754
Calibration Date: Nov 15, 2017

AC Voltage Accuracy (@60 Hz)

Range	Nominal Value	Lower Limit	As Found	As Left	Error	Upper Limit	Result	Uncertainty (±)
0.5 to 5 kV	1.000 kV	0.985 kV	0.996 kV	0.996 kV	0.40 %	1.015 kV	PASS	0.0012 kV
0.5 to 5 kV	2.000 kV	1.975 kV	1.993 kV	1.993 kV	0.35 %	2.025 kV	PASS	0.00060 kV
0.5 to 5 kV	3.000 kV	2.965 kV	2.989 kV	2.989 kV	0.37 %	3.035 kV	PASS	0.00060 kV
0.5 to 5 kV	4.000 kV	3.955 kV	3.986 kV	3.986 kV	0.35 %	4.045 kV	PASS	0.00060 kV
0.5 to 5 kV	5.000 kV	4.945 kV	4.985 kV	4.985 kV	0.30 %	5.055 kV	PASS	0.00060 kV

DC Voltage Accuracy

Range	Nominal Value	Lower Limit	As Found	As Left	Error	Upper Limit	Result	Uncertainty (±)
0.5 to 6 kV	1.000 kV	0.985 kV	0.993 kV	0.993 kV	0.70 %	1.015 kV	PASS	0.0025 kV
0.5 to 6 kV	2.000 kV	1.975 kV	1.989 kV	1.989 kV	0.55 %	2.025 kV	PASS	0.0048 kV
0.5 to 6 kV	3.000 kV	2.965 kV	2.989 kV	2.989 kV	0.37 %	3.035 kV	PASS	0.0072 kV
0.5 to 6 kV	4.000 kV	3.955 kV	3.984 kV	3.984 kV	0.40 %	4.045 kV	PASS	0.010 kV
0.5 to 6 kV	5.000 kV	4.945 kV	4.985 kV	4.985 kV	0.30 %	5.055 kV	PASS	0.012 kV
0.5 to 6 kV	6.000 kV	5.935 kV	5.983 kV	5.983 kV	0.28 %	6.065 kV	PASS	0.014 kV

AC Current Accuracy (@60 Hz)

Range	Nominal Value	Lower Limit	As Found	As Left	Error	Upper Limit	Result	Uncertainty (±)
1 µA to 40 mA	0.500 mA	0.490 mA	0.495 mA	0.495 mA	1.00 %	0.510 mA	PASS	0.00059 mA
1 µA to 40 mA	1.000 mA	0.985 mA	0.992 mA	0.992 mA	0.80 %	1.015 mA	PASS	0.00063 mA
1 µA to 40 mA	2.000 mA	1.975 mA	1.987 mA	1.987 mA	0.65 %	2.025 mA	PASS	0.00074 mA
1 µA to 40 mA	5.000 mA	4.945 mA	4.984 mA	4.984 mA	0.32 %	5.055 mA	PASS	0.0017 mA
1 µA to 40 mA	10.000 mA	9.895 mA	9.968 mA	9.968 mA	0.32 %	10.105 mA	PASS	0.0027 mA
1 µA to 40 mA	20.00 mA	19.75 mA	19.83 mA	19.83 mA	0.85 %	20.25 mA	PASS	0.0074 mA
1 µA to 40 mA	35.00 mA	34.60 mA	34.81 mA	34.81 mA	0.54 %	35.40 mA	PASS	0.014 mA

Attachment 7.14

Doc No: 7E82774-3-10R
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**Quadtech Guardian 6000 Electrical Safety Analyzer**

Procedure: QUADTECH 6000
 ID Number: 7312754
 Asset Number: N/A

Order Number: SG-11006755
 Serial Number: 7312754
 Calibration Date: Nov 15, 2017

DC Current Accuracy

Range	Nominal Value	Lower Limit	As Found	As Left	Error	Upper Limit	Result	Uncertainty (±)
0.1 µA to 20 mA	0.200 mA	0.193 mA	0.198 mA	0.198 mA	1.00 %	0.207 mA	PASS	0.00057 mA
0.1 µA to 20 mA	0.500 mA	0.490 mA	0.497 mA	0.497 mA	0.60 %	0.510 mA	PASS	0.00057 mA
0.1 µA to 20 mA	1.000 mA	0.985 mA	0.998 mA	0.998 mA	0.20 %	1.015 mA	PASS	0.00057 mA
0.1 µA to 20 mA	2.000 mA	1.975 mA	2.007 mA	2.007 mA	0.35 %	2.025 mA	PASS	0.00058 mA
0.1 µA to 20 mA	5.000 mA	4.945 mA	5.011 mA	5.011 mA	0.22 %	5.055 mA	PASS	0.00065 mA
0.1 µA to 20 mA	10.000 mA	9.895 mA	10.014 mA	10.014 mA	0.14 %	10.105 mA	PASS	0.00082 mA
0.1 µA to 20 mA	15.00 mA	14.80 mA	15.07 mA	15.07 mA	0.47 %	15.20 mA	PASS	0.0057 mA

Insulation DC Voltage Accuracy

Function Tested	Nominal Value	Lower Limit	As Found	As Left	Error	Upper Limit	Result	Uncertainty (±)
0.500 kV	0.500 kV	0.490 kV	0.495 kV	0.495 kV	1.00 %	0.510 kV	PASS	0.0013 kV
1.000 kV	1.000 kV	0.985 kV	0.989 kV	0.989 kV	1.10 %	1.015 kV	PASS	0.0025 kV

Insulation Resistance Accuracy

Voltage Setting	Nominal Value	Lower Limit	As Found	As Left	Error	Upper Limit	Result	Uncertainty (±)
500 V	1.00 MΩ	0.85 MΩ	1.02 MΩ	1.02 MΩ	2.00 %	1.15 MΩ	PASS	0.0057 MΩ
500 V	10.00 MΩ	9.45 MΩ	10.12 MΩ	10.12 MΩ	1.20 %	10.55 MΩ	PASS	0.0057 MΩ
500 V	100.0 MΩ	94.5 MΩ	100.1 MΩ	100.1 MΩ	0.10 %	105.5 MΩ	PASS	0.059 MΩ
500 V	1000 MΩ	895 MΩ	990 MΩ	990 MΩ	1.00 %	1105 MΩ	PASS	0.59 MΩ
500 V	10.00 GΩ	8.45 GΩ	9.77 GΩ	9.77 GΩ	2.30 %	11.55 GΩ	PASS	0.013 GΩ
1000 V	1.00 MΩ	0.85 MΩ	0.98 MΩ	0.98 MΩ	2.00 %	1.15 MΩ	PASS	0.0057 MΩ
1000 V	10.00 MΩ	9.45 MΩ	10.11 MΩ	10.11 MΩ	1.10 %	10.55 MΩ	PASS	0.0057 MΩ
1000 V	100.0 MΩ	94.5 MΩ	100.8 MΩ	100.8 MΩ	0.80 %	105.5 MΩ	PASS	0.059 MΩ
1000 V	1000 MΩ	895 MΩ	994 MΩ	994 MΩ	0.60 %	1105 MΩ	PASS	0.59 MΩ
1000 V	10.00 GΩ	8.45 GΩ	9.85 GΩ	9.85 GΩ	1.50 %	11.55 GΩ	PASS	0.013 GΩ

Ground Bond AC Current Accuracy

Function Tested	Nominal Value	Lower Limit	As Found	As Left	Error	Upper Limit	Result	Uncertainty (±)
5.000 A	5.000 A	4.947 A	5.014 A	5.014 A	0.28 %	5.053 A	PASS	0.0073 A
10.000 A	10.000 A	9.897 A	10.013 A	10.013 A	0.13 %	10.103 A	PASS	0.014 A
15.00 A	15.00 A	14.82 A	14.98 A	14.98 A	0.13 %	15.18 A	PASS	0.022 A
20.00 A	20.00 A	19.77 A	19.97 A	19.97 A	0.15 %	20.23 A	PASS	0.029 A
25.00 A	25.00 A	24.72 A	24.94 A	24.94 A	0.24 %	25.28 A	PASS	0.036 A
30.00 A	30.00 A	29.67 A	29.93 A	29.93 A	0.23 %	30.33 A	PASS	0.043 A

Attachment 7.14

Doc No: TEG-774-3-1012

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Quadtech Guardian 6000 Electrical Safety Analyzer

Procedure: QUADTECH 6000
ID Number: 7312754
Asset Number: N/A

Order Number: SG-11006755
Serial Number: 7312754
Calibration Date: Nov 15, 2017

Resistance Accuracy

Function Tested	Nominal Value	Lower Limit	As Found	As Left	Error	Upper Limit	Result	Uncertainty (±)
@ 25 A	100.0 mΩ	98.7 mΩ	99.5 mΩ	99.5 mΩ	0.50 %	101.3 mΩ	PASS	0.15 mΩ

Timer Accuracy Check

Nominal Value	As Found	As Left	Error	Uncertainty (±)
5.00 s	5.00 s	5.00 s	0.00 %	0.14 s
10.00 s	10.00 s	10.00 s	0.00 %	0.14 s

Attachment 7.15

Doc No: TE82774-3-1QR
Iteration 00 exp 30 Nov 2017
Page 01 of 01 YSY 29 Nov 17

Waters

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WORK INSTRUCTION / OPERATING PROCEDURE

Title: Installation Qualification Procedure

Document No: 730004135

Version No: 00

Page 9 of 11

IQ Test name: Functional Verification		Test Script No.: IQ-06	
Equipment No./ID: TE82774-3	Equipment Name: Alliance Column Heater / Cooler Test Station		
Installation Site: Venture, Singapore			
Purpose: To verify that system transfer and/or qualification activities have not adversely affected system functionality.			
Test execution: One UUT shall be tested to verify that the test equipment functions as expected. If the system creates and/or tests more than one part number, the UUT to be tested per this Script should be a "worst case" product, and defined within the associated Installation Qualification Report. Enter N/A for any parameter or cell that is not used or applicable.			
Objective evidence: Completed Test Script Data Sheet Copy of the system Test Record for the UUT, if applicable.			
UUT Part Number/Serial Number	Acceptance criteria	Pass/Fail	Initial & Date
UUT Part Number: ① UUT Serial Number: ①	All required CTQ Specification measurements result in a Pass.	Pass	YSY 28 Nov 17
Comments: ① P/N: 186186301 ; SIN: L17SMH436 G (Column Heater) P/N: 186179100 ; SIN: L17SMC256 G (Column Heater Cooler) YSY 28 Nov 17 End of comment N/A YSY 28 Nov 2017			
Overall Test Conclusion: ☒ Pass ☐ Fail			

Copy this Test Script as needed

Waters Confidential

Template 730000483 V06

It is the responsibility of the user to verify they are using the current released version.

HARD COPY UNCONTROLLED UNLESS STAMPED, SIGNED AND DATED BY AUTHORISED PERSONNEL

Waters Corporation

COLUMN HEATER ASSEMBLY TEST RECORD

Part Number:	186186301	Description:	2X9X Column Heater
Tested By:	siew tin	Date:	11/28/2017
Serial Number:	L17SMH436G	Control Number:	NA
Software Revision:	NA	Factory Order:	WATS171013FA

- | | | |
|---------------------------------|--|--|
| 1) SERIAL COMMUNICATIONS TEST | PASS ☒ FAIL ☐ | see note # _____ PASS ☐ |
| 2) FAN ON AND OFF TEST | PASS ☒ FAIL ☐ | see note # _____ PASS ☐ |
| 3) DOOR OPEN AND CLOSE TEST | PASS ☒ FAIL ☐ | see note # _____ PASS ☐ |
| 4) HEAT TEST | PASS ☒ FAIL ☐ | see note # _____ PASS ☐ |
| 5) RHEODYNE COMMUNICATIONS TEST | PASS ☒ FAIL ☐ | see note # _____ PASS ☐ |

Instrument Result: PASS ☒ FAIL ☐ Signed: Siew Tin Date: NOV/ 28 / 2017

Notes:

TE 82774-3

Time Started

10.52am

Time End:

10.56am

Temperature

21.2°C

Humidity:

50.2%

This Test Record and any data contained within it are proprietary to Waters Corporation and must be retained by Waters for the time period prescribed in its Quality Records Retention Policy. If any of the individual tests noted above fail; a note must be referenced that details the work performed to correct that specific deficiency. An overall failure indicates a special circumstance in which case a complete retest is to be done. A second form is required to document that testing; the initial form must be attached and retained.

Attachment 7.16
Doc No: TE82774-3-1AR
page 02 of 02
HERA
exp 30 Nov 2017
vsy 28 Nov 17

Waters Corporation

COLUMN HEATER ASSEMBLY TEST RECORD

Part Number:	186179100	Description:	2X9X Column Heater/Cooler
Tested By:	siew tin	Date:	11/28/2017
Serial Number:	L17SMC256G	Control Number:	NA
Software Revision:	NA	Factory Order:	WATS171012FA

- | | | | |
|--------------------------------------|--|------------------|-------------------------------|
| 1) SERIAL COMMUNICATIONS TEST | PASS ☒ FAIL ☐ | see note # _____ | PASS ☐ |
| 2) FAN ON AND OFF TEST | PASS ☒ FAIL ☐ | see note # _____ | PASS ☐ |
| 3) DOOR OPEN AND CLOSE TEST | PASS ☒ FAIL ☐ | see note # _____ | PASS ☐ |
| 4) HEAT AND COOL TEST | PASS ☒ FAIL ☐ | see note # _____ | PASS ☐ |
| 5) RHEODYNE COMMUNICATIONS TEST | PASS ☒ FAIL ☐ | see note # _____ | PASS ☐ |
| 6) GROUND CONTINUITY AND HI-POT TEST | PASS ☒ FAIL ☐ | see note # _____ | PASS ☐ |

Instrument Result: PASS ☒ FAIL ☐ Signed: *Siew Tin* Date: *Nov / 28 / 2017*

Notes:

TE 82774-3

Time Started

2.00pm

Time End

2.16pm

Temperature

21.8°C

Humidity

46.8%

This Test Record and any data contained within it are proprietary to Waters Corporation and must be retained by Waters for the time period prescribed in its Quality Records Retention Policy. If any of the individual tests noted above fail; a note must be referenced that details the work performed to correct that specific deficiency. An overall failure indicates a special circumstance in which case a complete retest is to be done. A second form is required to document that testing; the initial form must be attached and retained.