

APEX INSTRUMENTS, INC.

Appendix K Automated Mercury Source Sampler – Model XC-6000EPC

Console Audit Manual

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XC6000 Quarterly Audit Procedure

This procedure assumes the user is familiar with the basic operation of the Apex Instruments MercSampler XC-6000. If necessary please refer to the XC-6000 User Manual for additional information on connections and operations.

This document, and screen shots in this manual, is based on version 80711-94 software and firmware. If your unit has an earlier version please contact Apex Instruments, Inc. to obtain the latest version.

Equipment needed:

XC6000 System including: Console, Gas Sample Conditioner, Probe and Sample Lines PC / Laptop running Apex XC6000 Console application Printer or PDF Printer connected to the PC (PDF printer S/W located on the XC-6000 CD) Communication cable (USB or Ethernet)

AK-6000 MercSampler Audit Kit -or-Barometer read in inches Hg. (NIST Traceable) Thermometer read in deg. F (NIST Traceable) Vacuum Gauge read in inches Hg. Volumetric standard (wet test meter or dry gas meter) (NIST Traceable) Thermocouple Pig Tail with male Type K connector Ice / water bath (for verifying thermocouples)

The AK-6000 MercSampler Audit kit includes:

Volumetric standard (15 point calibrated DGM with built in temperature output) (NIST Traceable) Barometer read in inches Hg. (NIST Traceable) Thermocouple Simulator Digital Thermometer read in deg. F (NIST Traceable) Vacuum Gauge read in inches Hg. Thermocouple Pig Tail with male Type K connector Wide Mouth Vacuum Bottle for Ice / water bath (for verifying thermocouples) Portable carrying case



Figure 4 Volumetric and Vacuum standard



Figure 2 Barometric Reference



Figure 1 Thermocouple Simulator



Figure 6 Type K Thermocouple Pig Tail



Figure 5 Digital Thermometer



Figure 3 Wide Mouth Vacuum Bottle

Audit Setup:

Depending on the type of enclosure the XC-6000 is mounted in it may be necessary to remove the XC-6000 from its enclosure.

Open the XC6000 console by removing the screws from the top of the chassis.

Users with XC6000 portable units (Hardigg Storm Case) gain access by turning the 2 release screws counter clockwise at the top of the front panel and swinging the panel down.

Connect the console, gas conditioner, and probe. Do not turn on the probe heater (switch on the front panel should be off) or the Heated sample line (the AUX switch on the Gas conditioner front panel should be off). Only connect the Stack thermocouple. Sample lines, pitot lines and other thermocouples do not need to be connected.

Power on the XC6000 console and start the XC6000 application on the PC.

Connect the PC to the console by pressing the "Connect" button on the XC-6000 Main screen.

Ensure that the XC6000 Time and Date are correct.



Figure 7 XC-6000 Main Screen

Enter the Config / Utilities screen by pressing the "Config / Utilities" button on the XC-6000 Main Screen.



Figure 8 Config / Utilities Screen

To verify the internal operation of the XC-6000 open the Stats screen by pressing the "Stats" button on the left side of the Config / Utilities screen. Verify the correct date and time are displayed in the lower left corner and that the time is incrementing. If correct Press the "Close" button to return to the Config/Utils screen.

Stat: Apex Instr	uments					(
	Current	Sample Avg.	Run Avg.	Unit	Trap_Probe	Value	Unit
Mass Flow A	5	Ō	1000	CCM	Heater Set Temp.	250	°F
Mass Flow B	3	0	1001	CCM			
Vac. A	0.00	0.00	0.23	Inch			
Vac. B	0.01	0.00	0.33	Inch	Heater Target	250	°F
Baro.	29.75	0.00	29.76	Inch			
Delta_P (Int)	0.00	0.0	0.0	Inch	Elow Dota	Volua	1 Inite
Ext. Flow	0.000	0.000	0.000		riuw Raie	value	Omi
Ext. MAC	0.0	0.0	2.0	%	Flow Rate Baseline	n/a	CCM
Stack	0.0	0.0	86.7	°F	Flow Rate Initial	1000	CCM
Probe	0.0	0.0	85.4	°F	Flow Manual Adjust	0	CCM
Chiller	0.0	0.0	84.2	°F	Propor. Adjust	n/a	CCM
Aux	0.0	0.0	85.1	°F	Target Flow Rate	1000	CCM
DGM-A	83.9	0.0	84.9	°F			
DGM-B	84.4	0.0	86.6	°F	Max Vac. A	0.48	Inch
Trap	0.0	0.0	84.5	°F	Max Vac. B	0.75	Inch
Internal	85.9	0.0	87.0	°F			
DGM-Vol-A DGM-Vol-B	0.000 0.000			L	Avg. Period rem'd (sec	i.)	40 0
Time Started	Jul 1	1,2008 1:	3:42:06				
Elapse	0d 0)h Om OOs					
Remained							
Console Reply Avg	g. (ms): 141	Console F	eply Time (ms): 156			
Saturday - Jul 12	, 2008 11:	28:59 AM					Close

Figure 9 Stats Screen

If the date and time are not correct or there is an error displayed. Press the "Close" button, to return to the Config/Utils Screen and press the "Set Clock" button. The following message will be displayed.



Press the "Close" Button to return to the Config/Utils Screen. Press the "Reset XC-6000" button wait 30 seconds then press the "Stats" button and verify the time and date are correct and there is no error shown. Press the "Close" button on the Stats screen to return to the Config/Utilities screen.

Prior to beginning the Console Audit the XC-6000 and the Reference flow device should be warmed up. Connect the sample line of the AK-6000, or Reference Flow Device to the Sample A in line. Setup a test run for 30 minutes and let it complete. See the XC-6000 Operators Manual for test setup if needed.

Starting the Console Audit:

Open the Console Audit screen by pressing the "Console Audit" button on the left side of the Config / Utilities screen.

Enter the name of the auditor in the yellow text box.

XC6000 Audit - Console Sr# XC6KEPC-025 Audit By: Apex Calibration Technician	Date: 07/12/08	Ver.:80711-94
Barometer (inHg) Next		
Notes on Barometric Ref. and Vacuum Gauge Model/Serial #		
*RFD - Reference Flow Device: this can be a Wet Test Meter or Certified Dry Gas Meter.	Print	Cancel Audit

Figure 11 Console Audit Screen

Barometric Pressure Test:

If the Barometric test fails the Console Audit will fail and must be re-run.

Enter the Barometric pressure from your traceable barometer in inches Hg, xx.xx and press the "Next" button.

If the Barometric test passes the following screen is displayed. Enter the information for your reference barometric and vacuum device in the box provided.

XC6000 Audit - Console S		
Audit By: Apex Calibration Technician	Date: 07/12/08	Ver.:80711-94
Barometer (inHg) 29.75 29.75 PASSED Notes on Barometric Ref. and Vacuum Gauge Model/Serial # Barometric reference BAR-DA833 SN 1234 Vacuum reference DGM-SK25SRD SN 1234	Vacuum (inHg) Reference <u>Side A</u> <u>Side B</u> press the [Start Pump] button to continue.	Start Pump
"HFD - Heterence Flow Device: this can be a Wet Test Meter or Certified Dry Gas Meter.	Print	Cancel Audit

Figure 12 Barometric Test Pass

If the barometric test fails the following message will be displayed. You may continue the Console Audit to determine if there are any other areas out of calibration or end the Console Audit and correct each item as they are discovered. The Console Audit must be re-run if the Barometric Sensor Test fails.

See the section at the end of this document on how to resolve Out of Tolerance or Failed Console Audit items.



Barometric Sensor Failed

XC6000 Audit - Console	e Sr# XC6KEPC-025	
Audit By: Apex Calibration Technician	Date: 07/12/08	Ver.:80711-94
Barometer (in Hg) 29 29.76 FAIL Notes on Barometric Ref. and Vacuum Gauge Model/Serial #	Vacuum (inHg) Reference <u>Side A</u> <u>Side B</u>	Start Pump
Connect the Vacuum Gauge to the Sample A In port a	and press the [Start Pump] button to continue	
· · · · · · · · · · · · · · · · · · ·		
*RFD - Reference Flow Device: this can be a	Print	Cancel Audit
Wet Test Meter or Certified Dry Gas Meter.	Frint	

Figure 14 Barometric Sensor Test Failed

Vacuum Sensor Test:

The Vacuum Sensor Test will not cause the Console Audit to fail if out of tolerance.

Connect the AK-6000 Audit Kit sample line, or your vacuum gauge, to the A Sample In port on the back of the XC-6000 Console. Close the valve on the AK-6000 by turning clockwise. Do not connect the AK-6000 TC at this time.

Press the "Start Pump" button and wait for the vacuum gauge to stabilize. Enter the value into the Side A reference box and Press "Stop Pump".

A message of PASSED or Out of Tolerance will be displayed. If Out of Tolerance you can continue the Console Audit. See the section at the end of this document on how to resolve Out of Tolerance or Failed Console Audit items.

Move the AK-6000 sample line, or vacuum gauge, to the B Sample In port on the back of the XC-6000 console.

Press the "Start Pump button" and wait for the vacuum gauge to stabilize. Enter the value into the Side B reference box and Press "Stop Pump".

A message of PASSED or Out of Tolerance will be displayed. If Out of Tolerance you can continue the Console Audit. See the section at the end of this document on how to resolve Out of Tolerance or Failed Console Audit items.

Open the Flow Control on the front of the AK-6000 by turning counter-clockwise.

×C600	0 Audit - Conso	le Sr# XC6KE	PC-025	
Audit By: Apex Calibra	tion Technician		Date: 07/12/08	Ver.:80711-94
Barometer (inHg) 29.75 Notes on Barometric Ref. and Vacuum Barometric reference BAR-DA833 SN 1 Vacuum reference DGM-SK25SRD SN	29.76 PASSED Gauge Model/Serial # 234 1234	Vacuum (ir	Hg) Reference Conso <u>Side A</u> 20.5 20.73 <u>Side B</u> 21 21.2	le 2 PASSED 1 PASSED
Thermocouples (F)	Ice Bath Tempera	ture	Thermometer Mode	/Serial # and Notes
DGM A 84.4 DGM B 84.9	<u>Stack</u>	<u>Chiller</u>		
*RFD - Reference Flow Device: this ca Wet Test Meter or Certified Dow	n be a Gas Meter		Print	Cancel Audit

Figure 15 Vacuum Sensor Test Passed

×C000	0 Audit - Consol	le Sr# XC6KEF	PC-025	
Audit By: Apex Calibra	tion Technician		Date: 07/12/08	Ver.:80711-94
Barometer (inHg) 29.75 Notes on Barometric Ref. and Vacuur Barometric reference BAR-DA833 SN Vacuum reference DGM-SK25SRD St	29.76 PASSED Gauge Model/Serial # 1234 1 1234	Vacuum (inf	lg) Reference Conso <u>Side A</u> 22 0.31 <u>Side B</u> .1 21.1	le Out of Tolerand 1 Out of Tolerand
Thermocouples (F)	Ice Bath Temperat	ure	Thermometer Mode	I/Serial # and Notes
DGM A 83.9 DGM B 84.9 Next	<u>Stack</u>	<u>Chiller</u>		

Figure 16 Vacuum Sensor Test Out of Tolerance

Thermocouple Test:

Enter the information for the traceable thermometer in the space provided.

Prepare an Ice Water bath by filling the vacuum bottle with a mixture of ice and water. Use the traceable thermometer to measure the temperature of the ice bath and enter the value in the yellow box next to Ice Bath Temperature.

Remove the DGM thermocouples from the DGM fittings. Please note which thermocouple is removed from which meter. Users with XC6000 portable units (Hardigg Storm Case) must pull the DGM thermocouple wires out the top wire grommet.



XC6000 DGM Thermocouple

XC6000 DGM Thermocouple Removed



XC6000 Portable Case DGM Thermocouple



Portable Case DGM Thermocouple Removed

Place the DGM thermocouples and the traceable thermometer in the ice bath. Watch the thermocouple readings on the audit screen until the DGM temperatures stabilize. When the DGM temperatures have stabilized press the "Next" button. If the XC6000 DGM thermocouples are within tolerance, the screen will show "PASSED". If the DGM thermocouples are out of tolerance a message box will be displayed and the screen will display "FAIL". Press the "OK" button to continue.

See the section at the end of this document on how to resolve Out of Tolerance or Failed Console Audit items.

Replace the DGM thermocouples into the DGMs taking care to place the A TC into DGM A and the B TC into DGM B.

XC6000 Audit - Console Sr# XC6KEPC-020	
Audit By: Apex Calibration Technician	Date: 07/12/08 Ver.:80711-94
Barometer (inHg) 30.1 30.08 PASSED Vacuum (inHg) Ref Notes on Barometric Ref. and Vacuum Gauge Model/Serial # Side A Barometric reference BAR-DA833 SN 1234 Side B Vacuum reference DGM-SK25SRD SN 1234 Side B	erence Console 21.12 21.10 PASSED 21.6 21.59 PASSED
Thermocouples (F) Ice Bath Temperature 34 DGM A 34.8 PASSED Stack Next Chiller DGM B 34.4 PASSED 32.8	Thermometer Model/Serial # and Notes DPT-168-NIST Thermometer SN 1234
has stabilized. Then press the [Next] button to continue.	
*RFD - Reference Flow Device: this can be a Wet Test Meter or Certified Dry Gas Meter.	Print Cancel Audit

Figure 17 DGM Thermocouple Test PASSED

хс6000
ALERT: Critial part of the Audit has failed. You can however, continue with this Audit.
ОК
Figure 18

DGM Thermocouple Test FAILED Message Box

XC60	00 Audit - Consol	e Sr# XC6K	EPC-020	
Audit By: Apex Calibr	ation Technician		Date: 07	7/13/08 Ver.:80711-94
Barometer (inHg) 29.85 Notes on Barometric Ref. and Vacu Barometric reference BAR-DA833 SI Vacuum reference DGM-SK25SRD	29.92 PASSED um Gauge Model/Serial # 1234 SN 1234	Vacuum	(inHg) Reference <u>Side A</u> 21 <u>Side B</u> 21	Console 20.85 PASSED 21.47 PASSED
Thermocouples (F)	Ice Bath Temperatu	ire 32	Thermome	ter Model/Serial # and Notes
<u>DGM A</u> 86.6 FAIL <u>DGM B</u> 85.5 FAIL	<u>Stack</u> Next 0.0	Chiller		
has stabilized. Then press t	e [Next] button to continu	ie.		
*RFD - Reference Flow Device: this Wet Test Meter or Certified D	can be a ry Gas Meter.		Pri	nt Cancel Audit

Figure 19 DGM Thermocouple Test FAILED

At the end of the probe is the Stack thermocouple. Now dip the end of the probe into the ice bath. When the temperature stabilizes Press "Next."



Figure 21 Stack Thermocouple



Figure 21 Stack Thermocouple in Ice Bath

A message box will be displayed providing information when using the AK-6000 Audit Kit. Press the "OK" button to continue.

xc6000
The next step is the CHILLER TC Audit: you have the OPTION to use the Chiller TC as the the temperature input for the *RFD in the next section of the Audit. Selecting this option requires the Chiller TC to pass the Audit.
ОК
Figure 22
Message Box

If the stack thermocouple is within tolerance the screen will show "PASSED" If the thermocouple is not in tolerance "Out of Tolerance" will be displayed. See the section at the end of this document on how to resolve Out of Tolerance or Failed Console Audit items.

Audit By: Apex Calibra			
	ation Technician		Date: 07/12/08 Ver.:80711-94
Barometer (inHg) 30.1 Notes on Barometric Ref. and Vacuu Barometric reference BAR-DA833 SN Vacuum reference DGM-SK25SRD S	30.08 PASSED m Gauge Model/Serial # 1234 N 1234	Vacuum (inHg) <u>Sida</u> Sida	ReferenceConsoleA21.1221.10PASSEDB21.621.59PASSED
Thermocouples (F)	Ice Bath Temper	ature 34	Thermometer Model/Serial # and Notes
DGM A 34.8 PASSED	Stack	Chiller Neut	DPT-168-NIST Thermometer SN 1234
DGM B 34.4 PASSED	33.9 PASSED	82.8	
		📃 Use Chiller TC input f	or RFD* temperature

Figure 23 Stack Thermocouple Test PASSED

Audit By: Apex Calibr	ation Technician	ole SI# ACOREFC-0	Date: 07/13/08 Ver.:80711-94
Barometer (inHg) 29.85	29.85 PASSED	Vacuum (inHg)	Reference Console
Notes on Barometric Ref. and Vacu	um Gauge Model/Serial #	Side	21 20.95 PASSED
Barometric reference BAR-DA833 SI Vacuum reference DGM-SK25SRD	N 1234 SN 1234	Side	<u>B</u> 21 21.47 PASSED
Thermocouples (F)	Ice Bath Temper	ature 32	Thermometer Model/Serial # and Notes
2 <i>GM_A</i> 86.6 FAIL	<u>Stack</u>	Chiller Next	
2 <u>GM B</u> 85.5 FAIL	0.0	83.9	
	Out of Tolerand		
ease connect the Cal-kit T C6000. Then place the oth abilized, press the [Next] t	C connector (or TC pig er end of the TC in the outton to continue.	tail) to the CHILLER Thermo same reference Ice Bath. (ocouple port on the back of the Once the temperature has
lease connect the Cal-kit T C6000. Then place the oth abilized, press the [Next] t	C connector (or TC pig ler end of the TC in the button to continue.	tail) to the CHILLER Thermo same reference Ice Bath. (ocouple port on the back of the Once the temperature has
lease connect the Cal-kit T C6000. Then place the oth abilized, press the [Next] t	C connector (or TC pig ler end of the TC in the putton to continue.	tail) to the CHILLER Thermo	ocouple port on the back of the Once the temperature has
lease connect the Cal-kit T C6000. Then place the oth abilized, press the [Next] t	C connector (or TC pig er end of the TC in the outton to continue.	tail) to the CHILLER Thermo	ocouple port on the back of the Once the temperature has
lease connect the Cal-kit T C6000. Then place the oth abilized, press the [Next] t	C connector (or TC pig er end of the TC in the outton to continue.	tail) to the CHILLER Thermo	ocouple port on the back of the Once the temperature has

Figure 24 Stack Thermocouple Out of Tolerance

If the internal thermocouple of the AK-6000 Audit Kit is being used click the check box "Use Chiller TC Input for RFD Temperature."

When using the Chiller TC for RFD temperature the Chiller TC Sensor test must pass.

Plug the Thermocouple Pig Tail into the Chiller port on the back of the XC-6000 and place the other end into the ice bath. When the temperature has stabilized press the "Next" button. If the chiller thermocouple is within tolerance the screen will show "PASSED" and a message box will be displayed with instructions to connect the RFD to the Sample A in port on the back panel of the XC-6000.

Unplug the Thermocouple Pig Tail when finished and plug the RFD Thermocouple into the Chiller jack and also connect the RFD to the Sample_A_IN port on the back of the XC-6000 console. Then press the "OK" button to continue.

xC6000
DGM_A Audit: Please connect the Reference Flow Device (*RFD) to the Sample_A_in on the back of the console.
ОК
Figure 25

Connect Sample Line Message

XC6	000 Audit - Con	sole Sr# XC6KEP	C-020	
Audit By: Apex Cali	bration Technician		Date: 07/	12/08 Ver.:80711-94
Barometer (inHg) 30 Notes on Barometric Ref. and Va Barometric reference BAR-DA833 Vacuum reference DGM-SK25SR	I.1 30.11 PASSED cuum Gauge Model/Serial # SN 1234 D SN 1234	Vacuum (inH	g) Reference (<i>Side A</i> 21.12 <i>Side B</i> 21.6	Console 21.10 PASSED 21.59 PASSED
DGM_A34.8PASSEDDGM_B34.4PASSED	lce Bath Temp <u>Stack</u> 33.9 PASSED	perature 34 <u>Chiller</u> 34.9 PASSED ✓ Use Chiller TC in	Thermomete DPT-168-N put for RFD* tempera	r Model/Serial # and Notes IST Thermometer SN 1234 ture
*RFD Model/Serial #:				
DGM_A Serial #: 80025: *RFD (Gamma): Flow Rate (Lpm): Vol. To Test (L):	80 <u>*RFD </u> 	<u>Start</u> [L]: [F]: 36.0 Console Encoder (L): 0.000	Note	21
Calibrated Gamma: . 995	Audit Gamma: – ? –	Diff: -?-	Next	
Plea	se fill in all of the yell	ow text boxes, then press	[Next] to continue.	
*RFD - Reference Flow Device: th Wet Test Meter or Certified	is can be a Dry Gas Meter.		Prin	t Cancel Audit

Figure 26 Chiller TC Sensor Test PASSED

If the thermocouple is not in tolerance "Out of Tolerance" or "FAIL will be displayed. See the section at the end of this document on how to resolve Out of Tolerance or Failed Console Audit items.

If the Chiller TC is being used for RFD temperature and the test FAILS the Console Audit will end. The user will have the opportunity to print the screen for reference.

Х	xc6000 🛛 🔀
	ALERT: Critical part of the Audit has failed. You selected to use the Chiller TC for the input temperature for the *RFD. This requires that the Chiller TC to pass the Audit, which it didn't. Sorry, the Audit cannot continue.
	OK

Figure 27 Chiller Thermocouple Sensor Test FAILED

XC6000 Audit - Console Sr# XC6KEPC-020						
Audit By: Apex Calib	ation Technician		Date: 07/13/0	8 Ver.:80711-94		
Barometer (inHg) 29.81 Notes on Barometric Ref. and Vacu Barometric reference BAR-DA833 S Vacuum reference DGM-SK25SRD	29.85 PASSED um Gauge Model/Serial # N 1234 SN 1234	Vacuum (ii	nHg) Reference Cons <u>Side A</u> 21 20.1 <u>Side B</u> 21 21.4	ole 95 PASSED 47 PASSED		
Thermocouples (F)	Ice Bath Temperat	ure 32	Thermometer Mod	lel/Serial # and Notes		
DGM A 86.6 FAIL DGM B 85.5 FAIL	<u>Stack</u> 0.0 Out of Tolerance	<u>Chiller</u> 83,9 FAIL				
		🗹 Use Chiller TC	input for RFD* temperature			
*RFD - Reference Flow Device: this Wet Test Meter or Certified D	can be a ry Gas Meter.		Print	Cancel Audit		

Figure 28 Chiller Thermocouple Sensor Test FAILED

Dry Gas Meter Audit:

Enter the model and serial number of the Reference Flow Device (RFD) into the space provided.

If using the AK-6000 connect the AK-6000 sample line to the Sample A In port and the AK-6000 thermocouple connector into the Chiller jack on the back of the console if not already done. If using a RFD connect the sample line to the Sample A In port on the back of the console.

Make sure the Flow Control on the AK-6000 is open by turning counter-clockwise.

Enter the AK-6000/RFD Gamma, test flow rate in L/min and test volume in L into the boxes provided. Apex Instruments recommends a minimum of 5L for test volume and a flow rate that is the average used in normal operation.

Press the reset on the totalizer on the AK-6000 to reset the counter to zero and enter the number 0 into the RFD start box. The AK-6000 will automatically enter the RFD starting temperature. If not using the AK-6000 enter the starting value, in liters, and the temperature, in °F of the RFD.

XC6000	Audit - Cons	ole Sr# XC6KEP	PC-020
Audit By: Apex Calibratio	n Technician		Date: 07/12/08 Ver.:80711-94
Barometer (inHg) 30.1 31 Notes on Barometric Ref. and Vacuum Ga Barometric reference BAR-DA833 SN 123 Vacuum reference DGM-SK25SRD SN 12	D.10 PASSED auge Model/Serial # 4 234	Vacuum (inH	Hg) Reference Console <u>Side A</u> 21.12 21.10 PASSED <u>Side B</u> 21.6 21.59 PASSED
Thermocouples (F)	Ice Bath Tempe	rature 34	Thermometer Model/Serial # and Notes
DGM A 34.8 PASSED	<u>Stack</u>	<u>Chiller</u>	DPT-168-NIST Thermometer SN 1234
DGM B 34.4 PASSED	33.9 PASSED	PASSED	
		Use Chiller TC in	nput for RFD* temperature
*RFD Model/Serial #: Vacuum refe	rence DGM-SK25SI	RD SN 1234	
DGM_A Serial #: 8002530		<u>Start</u>	Notes
*RFD (Gamma): 1.003	<u>*RFD (L</u>)	<u>:</u> 0	
Flow Rate (Lpm): .5	<u>*RFD Temp. (F</u>	<u>:</u> 86.0	
Vol. To Test (L): 5 DGM	_A Temp(F): 87.7	Console Encoder (L): 0.000	
Calibrated Gamma: , 995 At	ıdit Gamma: -? -	Diff: -?-	Next
Please fill	in all of the yellow	v text boxes, then press	[Next] to continue.
*RFD - Reference Flow Device: this can b	e a Meter		Print Cancel Audit

Figure 29 DGM A Test Setup

Press "Next" the XC-6000 pumps will start and the status of the test will be displayed. When the test volume has been reached the pumps will automatically stop.

When the test volume is reached enter the reading from the AK-6000 totalizer into the RFD End box and Press "Next" If not using the AK-6000 enter the ending value, in liters, and the temperature, in °F of the RFD and Press "Next".

If the Calibrated Gamma and the Audited Gamma are within $\pm 5\%$ the test will pass and a message box will be displayed instructing the user to connect the AK-6000/RFD to the Sample_B_In port on the back of the XC-6000 console.

Connect the AK-6000/RFD to the Sample_B_In port on the back of the XC-6000 console. Press the "OK" button to continue.

xC6000
Now for the DGM_B Audit: Please connect the Reference Flow Device (*RFD) to the Sample_B_In port on the back of the console.
OK
Figure 30

DGM_A PASSED and Connect the RFD to Sample_B_In

XC6	000 Audit - Con	sole Sr# XC6K	EPC-020		
Audit By: Apex Cali	bration Technician		Date:	07/12/08 Ver.:80711-94	
Barometer (inHg) 30 Notes on Barometric Ref. and Va Barometric reference BAR-DA833 Vacuum reference DGM-SK25SR	1.1 30.08 PASSED cuum Gauge Model/Serial # SN 1234 D SN 1234	Vacuum	(inHg) Reference <u>Side A</u> 21.12 <u>Side B</u> 21.6	Console 21.10 PASSED 21.59 PASSED	
Thermocouples (F)	Ice Bath Temp	erature 34	Thermor	meter Model/Serial # and Notes	
DGM A 34.8 PASSED	Stack	Chiller	DPT-16	58-NIST Thermometer SN 1234	
DGM B 34.4 PASSED	33.9	34.9			
	PASSED	VASSED	C input for RFD* temp	erature	
*RFD Model/Serial #: Vacuu	m reference DGM-SK255	SRD SN 1234]		
DGM A Serial #: 80025:	30	Start End	Compute	Notes	
*RFD (Gamma): 1.003	<u>*RFD (</u>	L1: 0 5.016	5.0160	10103	
Flow Rate (Lpm): .5	<u>*RFD Temp. (</u>	F]: 86.0 86.0	86.0		
Vol. To Test (L): 5	DGM_ATemp(F): 88.2	Console Encoder (L): 5	5.017		
Calibrated Gamma: . 995	Audit Gamma: 1,00	38 Diff: -0,9%	PASSED		
DGM_B Serial #: 800250	07	<u>Start</u>	1	Notes	
*RFD (Gamma): 1.003	<u>*RFD (</u>)				
Flow Rate (Lpm): <mark>.5</mark>	<u>*RFD Temp. (</u>	F]: 86.0			
Vol. To Test (L): <mark>5</mark>	DGM_ATemp(F): 87.1	Console Encoder (L): (0.000		
Calibrated Gamma: 1.009	Audit Gamma: -? -	Diff: -?-	Next		
Please fill in all of the yellow text boxes, then press [Next] to continue.					
*RFD - Reference Flow Device: th Wet Test Meter or Certified	is can be a Dry Gas Meter.		F	Print Cancel Audit	

Figure 31 DGM A Audit PASSED

If the test exceeds the limit the test will fail. See the section at the end of this document on how to resolve Out of Tolerance or Failed Console Audit items.



DGM B

If using the AK-6000 connect the AK-6000 sample line to the Sample B In port. If using a RFD connect the sample line to the Sample B In port on the back of the console if not already done.

The AK-6000/RFD Gamma, test flow rate in L/min and test volume in L will be automatically filled in based on the information already entered. These values can be changed if desired.

Press the reset on the totalizer on the AK-6000 to reset the counter to zero and enter the number 0 into the RFD start box. The AK-6000 will automatically enter the RFD starting temperature.

If not using the AK-6000 enter the starting value, in liters, and the temperature, in F of the RFD.

Press "Next" and the XC-6000 pumps will start and the status of the test will be displayed. When the test volume has been reached the pumps will stop.

When the test volume is reached enter the reading from the AK-6000 totalizer into the RFD End box and press the "Next" button to continue. If not using the AK-6000 enter the ending value, in liters, and the temperature, in F of the RFD and press the "Next" button to continue.

XC6	000 Audit - Con	sole Sr# X	C6KEPC	-020	
Audit By: Apex Cali	bration Technician			Date: 07	7/12/08 Ver.:80711-94
Barometer (inHg) 30 Notes on Barometric Ref. and Va Barometric reference BAR-DA833	0.1 30.08 PASSED cuum Gauge Model/Serial # SN 1234	Vac	uum (inHg) <u>Sid</u>	Reference <u>de A</u> 21.12 de R 21.6	Console 21.10 PASSED 21.59 PASSED
Vacuum reference DGM-SK25SR	D SN 1234				
Thermocouples (F)	Ice Bath Temp	erature 34		Thermome	ter Model/Serial # and Notes
DGM_A 34.8 PASSED DGM_B 34.4 PASSED	<u>Stack</u> 33.9 PASSED	<u>Chiller</u> 34.9 PASSED		DPT-168-	NIST Thermometer SN 1234
		🗹 Use C	hiller TC input	for RFD* temper	ature
*RFD Model/Serial #: Vacuu	m reference DGM-SK255	SRD SN 1234			
DGM_A Serial #: 80025: *RFD (Gamma): 1.003 Flow Rate (Lpm): .5 Vol. To Test (L): 5	30 <u>*RFD (I</u> <u>*RFD Temp. (I</u> DGM_A Temp(F): 88.2	Start L: 0 Fi: 86.0 Console Encode	End 5.016 86.0 rr (L): 5.017	Compute No 5.0160 86.0	tes
Calibrated Gamma: . 995	Audit Gamma: 1,003	38 Diff: -0, 99	8 PASSE	ED	
DGM_B Serial #: 800250 *RFD (Gamma): 1.003 Flow Rate (Lpm): .5)7 <u>*RFD (I</u> <u>*RFD Temp. (</u>)	<u>Start</u> L1: 0 F1: 86.0	<u>End</u> 5.013 86.0	No	ites
Vol. To Test (L): 5 Calibrated Gamma: 1.009	DGM_A Temp(F): 87.6 Audit Gamma: -?-	Console Encode Diff: - ? -	er (L): 5.013	Next	
Enter the End	ing volume and curren	t temperature f	or the Refere	ence Flow Devi	ce (*RFD).
*RFD - Reference Flow Device: th Wet Test Meter or Certified	is can be a I Dry Gas Meter.			Pri	nt Cancel Audit

Figure 33 DGM B Enter Ending Values

If the Calibrated Gamma and the Audited Gamma are within $\pm 5\%$ the test will pass. If the test exceeds the limit the test will fail.

XC6	000 Audit - Conso	le Sr# XC6K	EPC-020	
Audit By: Apex Cal	ibration Technician		Date:	07/12/08 Ver.:80711-94
Barometer (inHg) 3 Notes on Barometric Ref. and Va Barometric reference BAR-DA83 Vacuum reference DGM-SK25SF	0.1 30.08 PASSED acuum Gauge Model/Serial # 3 SN 1234 3D SN 1234	Vacuum	(inHg) Reference <u>Side A</u> 21.12 <u>Side B</u> 21.6	Console 21.10 PASSED 21.59 PASSED
Thermocouples (F) <u>DGM A</u> 34.8 PASSED <u>DGM B</u> 34.4 PASSED	lce Bath Tempera <u>Stack</u> 33.9 PASSED	tture 34 <u>Chiller</u> 34.9 PASSED ✓ Use Chiller 1	Thermor DPT-10 C input for RFD* temp	meter Model/Serial # and Notes 58-NIST Thermometer SN 1234 rerature
*RFD Model/Serial #: Vacuu	Im reference DGM-SK25SRI	D SN 1234]	
DGM_A Serial #: 80025 *RFD (Gamma): 1.003 Flow Rate (Lpm): .5 Vol. To Test (L): 5 Calibrated Gamma: .995	30 <u>*RFD (L):</u> <u>*RFD Temp. (F):</u> DGM_A Temp(F): 88.2 C Audit Gamma: 1.0038	Start End 0 5.016 86.0 86.0 onsole Encoder (L): 5 Diff: -0.9%	<u>Compute</u> 5.0160 86.0 5.017 PASSED	Notes
DGM_B Serial #: 80025 *RFD (Gamma): 1.003 Flow Rate (Lpm): .5 Vol. To Test (L): 5 Calibrated Gamma: 1.009	07 <u>"RFD (L):</u> <u>"RFD Temp. (F):</u> DGM_A Temp(F): 87.6 Audit Gamma: 1.0019	Start End 0 5.013 86.0 86.0 onsole Encoder (L): 5 Diff: 0.7%	Compute 5.0130 86.0 5.018 PASSED	Notes
**** *RFD - Reference Flow Device: th Wet Test Meter or Certifie	Console Audit PASSED ** nis can be a d Dry Gas Meter.	** Saturday - Jul '	12, 2008 01:08:36	PM Print Done!

Figure 34 DGM B Audit Passed and Console Audit PASSED

Printing the Console Audit:

When the Console Audit is complete a message at the bottom of the screen will display Console Audit Passed with the current date and time.

XC6000 Audit - Console Sr# XC6KEPC-025 Audit By: Apex Barometer (inHg) 29.79 PASSED Vacuum (inHg) Reference Consol 21.01 PASSED Side A Notes on Barometric Ref. and V
 Side A
 20.9
 21.01
 PASSED

 Side B
 21
 21.30
 PASSED
 Ice Bath Temperature 31.8 Thermocouples (F)
 DGM_A
 31.2
 PASSED
 Chiller
 Stack

 DGM_B
 31.7
 PASSED
 32.1
 31.9

 PASSED
 PASSED
 PASSED
 PASSED
 Aux 31.9 PASSED 31.9 PASSED V Use TC *RFD Model/Serial #: RFD refere
 THD Medicisenal II: ("F") Interenties Listen Subject District."

 DGM_A
 Serial #: 6002582
 Statt

 THD Genome: [992]
 THD Listen, [F];
 []

 Flow Rate Cump: [5]
 DGM_A Temp(F); 78,0
 Console End

 Val. To Test (L); [5]
 DGM_A Temp(F); 78,0
 Console End
 End Compute 4.8500 76.8 ler (L): 5.027 Calibrated Gamma: .9990 Audit Gamma: 0.9687 Diff: 3.0% PASSED End 4.8100 77.1 "RFD (Gamma): 999:
 *RED (L);
 0
 4

 "RED Temp. (E);
 77.7
 7

 Temp(F):
 79.6
 Console Encoder

 Gemma:
 0.9834
 Diff:
 3.3%
 *RFD (L): Flow Rate (Lpm): Vol. To Test (L): er (L): 5.016 PASSED * Console Audit PASS **** Thursday - Jul 3, 2008 09:23:15 AM Print Done!

If the Console Audit failed the message Failed will be displayed.

Press the print button and the Console Audit will be printed to the Windows default printer. If you are using a PDF printer a dialog box will open. Enter a file name and select a location to save the Console Audit then Press Save.

Save As		? 🗙
Save in: 🗀	Audit Procedure 💌 🗢 🛍 (-111 *
🔁 Audit Repor	't document	
File <u>n</u> ame:	Unit 025 Console Audit 7-3-08	<u>S</u> ave
Save as <u>t</u> ype:	PDF Files (*.pdf)	Cancel
Move up to Cu Easily merge & header/footer,	itePDF Pro and get advanced control over your PDF split PDFs, add security, digital signature, stamps, bo make booklets, n-Up, save PDF forms, scan to PDF <u>http://www.C</u>	documents. okmarks or and more! utePDF.com

Verify your Console Audit printed correctly. Press the "Done" button and a confirmation box will be displayed. Press the "Yes" button to exit or No to go back to the Console Audit screen to re-print the Console Audit Report.



How to correct Out of Tolerance or Failed sections in the Console Audit:

If it is required to recalibrate the XC-6000 to factory specifications contact your Apex Instruments Account Representative or refer to the XC-6000 Calibration Manual.

Barometric Test: If the Barometric test fails the XC-6000 fails the Console Audit and should not be used until recalibrated to factory specifications.

DGM TC Test: If the DGM TC test fails the XC-6000 fails the Console Audit and should not be used until recalibrated to factory specifications.

DGM Volume: If the DGM Volumetric test fails the XC-6000 fails the Console Audit and should not be used until recalibrated to factory specifications.

Vacuum Test: If the Vacuum test results are Out of Tolerance the XC-6000 will pass the Console Audit and can continue to be used.

Chiller TC Test: If the Chiller TC test results are Out of Tolerance the XC-6000 will pass the Console Audit and can continue to be used.

Stack TC Test: If the Stack TC test results are Out of Tolerance the XC-6000 will pass the Console Audit and can continue to be used.