

**Report By:**

**National TAB - Kansas City  
1126 Swift St  
N Kansas City, MO 64116**



**Report: CERTIFIED TAB REPORT**

**Function: Test, Adjust, & Balance**

**Date: 06/21/2024**

# **PROJECT**

## **Aubrey Bend MS Multi Purpose Add (Overland Park, KS)**

12501 W. 175th Street

Overland Park, KS 66221

### **Client**

Set Point Mechanical, LLC

6244 W 156th St

Overland Park, KS 66223

# National TAB

Project: Aubrey Bend MS Multi Purpose Add (Overland Park, KS)

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# CERTIFICATION



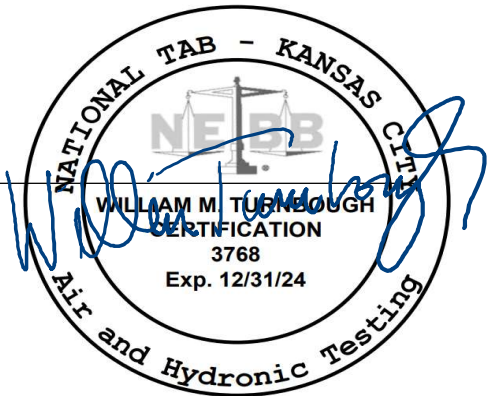
**PROJECT:** AUBREY BEND MS MULTI PURPOSE (OVERLAND PARK, KS)

The data presented in this report is a record of system measurements and final adjustments that have been obtained in accordance with the current edition of the NEBB Procedural Standard for Testing, Adjusting and Balancing of Environmental Systems. The measurements shown, and the information given, in this report are certified to be accurate and complete, at the time and date information was gathered. Any variances from design quantities, which exceed NEBB tolerances, are noted in the TAB report project summary.

**NEBB TAB FIRM:** National TAB - Kansas City  
**REGISTRATION NO:** 3768  
**CERTIFIED BY:** Will Turnbough  
**DATE:** 6/21/2024

## Submitted and Certified by:

**NEBB TAB FIRM:** National TAB - Kansas City  
**TAB PROFESSIONAL:** Will Turnbough  
**REGISTRATION NO:** CP-24289  
**CERTIFICATION EXP:** 12/31/2024



## Project Summary

### RTU-1

The RTU has a supply fan as well as an exhaust fan with a heat wheel. There is a mechanically linked outside air and return air damper. The exhaust and return both pull from a return grille in the multi purpose room. The exhaust was measured by positioning the return damper to the closed position and then taking velocity readings at the face of the grille with a velgrid and multiplying by the free area of the grille. A traverse was taken in the ductwork but it was too turbulent to get accurate readings. Adjustments were made at the VFD to bring the airflow within design. The supply side serves exposed spiral duct in the multi purpose room. The pre-filters were very dirty so half of them were removed to approximate a clean filter condition. The two branches in the multipurpose room were traversed.. The sum of these readings was equal to the total flow for the unit. The airflow was also traversed at the OA intake with the damper 100% open and to confirm pitot tube readings. Airflow was adjusted at the VFD until airflow was within tolerance. The branch on the east side was initially high on flow. The branch damper was adjusted to proportion air to each branch. Then airflow at each diffuser was measured using an RVA or velgrid by developing a K factor. The diffuser airflow design did not match the scheduled airflow. The diffuser designs were proportionally to match the scheduled airflow. The total flow for the unit is within tolerance, however not all diffusers are within tolerance. This is not anticipated to be an issue since the diffusers serve an open space. The outside air was set at the roof for both the minimum position and absolute minimum position.

### EF-1

Airflow was measured using a flow hood. The airflow is above design and there is no speed controller installed to reduce airflow.

### SS-3

The thermostat was first set to full cool and high fan speed. The airflow at each diffuser was measured using a flow hood. The sum of these readings is equal to the total flow for the unit. The airflow was initially low. Adjustments were made to the parameters inside the thermostat to increase airflow. The diffuser outside of the restroom was high on flow and the damper was closed slightly to ensure all diffusers were balanced to design.

# National TAB

Project: Aubrey Bend MS Multi Purpose Add (Overland Park, KS)



## System/Unit: AHU-DUAL FAN

Asset: RTU-1

AREA:A160

UNIT DATA - SUPPLY		
	Design	Actual
Manufacturer	AAON	AAON
Model Number	RN-030-3-0-EB09-18A	RN-030-3-0-EB09-18A
Serial Number	-	202312-BNET29795
No. Pre-Filters / Size (1)	-	6 / 16x20x2
No. Final Filters / Size (1)	-	6 / 20x25x2
No. Final Filters / Size (2)	-	6 / 20x25x4

MOTOR DATA - SUPPLY		
	Design	Actual
Horsepower / RPM	-	10.00 / 1760
Rated Volts / Phase	-	408 / 3
Rated Amperage / SF	-	12.5

TEST DATA - SUPPLY		
	Design	Actual
Total CFM	9000	8398
OA CFM	5700	5549 (55% SETPOINT)
Fan RPM	1599	1877
VFD Speed	-	64 HZ
RL Voltage	480	485
RL Amperage	-	12.3
Motor B.H.P.	9.08	9.84

PERFORMANCE DATA - SUPPLY		
	Design	Actual
Static Pressure Stpt	-	CAV
Suction S.P.	-	-3.30"
Discharge S.P.	-	0.92"
Total S.P.	3.07"	4.22"
DX Coil P.D.	-	1.42" (INCLUDES FILTERS)
Heat Wheel P.D.	0.91"	1.25" (-0.63" PRE, -1.88" POST)
Total ESP	0.12"	1.08"

UNIT DATA - EXHAUST/RETURN		
	Design	Actual
Manufacturer	AAON	AAON
Model Number	RN-030-3-0-EB09-18A	RN-030-3-0-EB09-18A
Serial Number	-	202312-BNET29795
No. Pre-Filters / Size (1)	-	3 / 12 x20x2
No. Pre-Filters / Size (2)	-	3 / 14x20x2

MOTOR DATA - EXHAUST/RETURN		
	Design	Actual
Motor MFG / FRAME	-	BALDOR / 215T
Horsepower / RPM	-	10.0 / 1770
Rated Volts / Phase	-	480 / 3
Rated Amperage / SF	-	12.5 / 1.15

DRIVE DATA - EXHAUST/RETURN		
	Design	Actual
Motor Sheave Size / Bore	-	6.5" / 1-3/8"
Fan Sheave Size / Bore	-	BK70 / 1"
No. Belts / Size	-	1 / B63

TEST DATA - EXHAUST/RETURN		
	Design	Actual
Total CFM	8500	7815
Fan RPM	1715	1935
VFD Speed	-	65 HZ
RL Voltage	480	472
RL Amperage	-	7.8
Motor B.H.P.	6.30	6.24

PERFORMANCE DATA - EXHAUST/RETURN		
	Design	Actual
Static Pressure Stpt	-	CAV
Suction S.P.	-	-1.80"
Discharge S.P.	-	0.90"
Total S.P.	2.02"	2.70"
Heat Wheel P.D.	-	0.63"
Total ESP	0.66"	1.17"

Completed By: Will Turnbough on 06/21/2024

Notes:

DIFFUSER TOTAL IS 9000 CFM AND SCHEDULED AIRFLOW IS 8500 CFM. PROPORTIONALLY ADJUSTED DIFFUSER DESIGNS TO MATCH SCHEDULED AIRFLOW. TOTAL FLOW IS WITHIN TOLERANCE. A FEW DIFFUSERS ARE SLIGHTLY BELOW TOLERANCE. THE MOTOR IS AT FLA AND CANNOT BE INCREASED FURTHER. NOT ANTICIPATED TO CAUSE AN ISSUE SINCE IT SERVES AN OPEN AREA.

ABSOLUTE MIN OA = 1709 CFM @ 9% SETPOINT

Written By: Will Turnbough on 06/21/2024

# National TAB

Project: Aubrey Bend MS Multi Purpose Add (Overland Park, KS)

## AHU-DUAL FAN



### Diffuser Supply (GRD)

#### RTU-1/A160

Asset							
Asset Name	Location	Type	Size	DESIGN CFM	CFM(1)	FINAL CFM	% to design
1-1	A160	SG1	14X8	500	315	463	92.6
1-3	A160	SG1	14X8	500	511	447	89.4
1-3	A160	SG1	14X8	500	535	459	91.8
1-4	A160	SG1	14X8	500	416	452	90.4
1-5	A160	SG1	14X8	500	492	427	85.4
1-6	A160	SG1	14X8	500	426	440	88.0
1-7	A160	SG1	14X8	500	350	431	86.2
1-8	A160	SG1	14X8	500	441	450	90.0
1-9	A160	SG1	14X8	500	418	510	102.0
1-10	A160	SG1	14X8	500	283	478	95.6
1-11	A160	SG1	14X8	500	420	459	91.8
1-12	A160	SG1	14X8	500	483	499	99.8
1-13	A160	SG1	14X8	500	442	458	91.6
1-14	A160	SG1	14X8	500	400	463	92.6
1-15	A160	SG1	14X8	500	439	497	99.4
1-16	A160	SG1	14X8	500	223	520	104.0
1-17	A160	SG1	14X8	500	142	497	99.4
1-18	A160	SG1	14X8	500	479	448	89.6
Total				9000	7215	8398	93.31%

Completed By: Will Turnbough on 06/21/2024

Asset	Notes	Date	Written By
1-1	K FACTOR = 0.98 (MEASURED WITH VELGRID)	06/21/2024	Will Turnbough
1-3	K FACTOR FOR DIFFUSERS 1-2 TO 1-18 = 0.55 (MEASURED W/ RVA)	06/21/2024	Will Turnbough

# National TAB

Project: Aubrey Bend MS Multi Purpose Add (Overland Park, KS)



## System/Unit: Split Sys Furnace

Asset: SS-3

AREA:A163

Unit Data		
	Design	Actual
MFG	NA	LG
Model Num	NA	LD097HV4
Configuration	HORIZONTAL	HORIZONTAL

Motor Data		
	Design	Actual
Phase	1	1
Voltage	208	208
Amperage	-	0.40

Test Data		
	Design	Actual
SF CFM	325	311
Motor Speed SetPt	-	HIGH: 130 / MED: 118 / LOW: 109
RL Voltage	-	208
RL Amperage	-	0.65
RA CFM	325	311
OA CFM	0	0

Performance Data		
	Design	Actual
Discharge ESP	-	0.09"
Total ESP	0.2	0.09"

Completed By: Will Turnbough on 06/21/2024

# National TAB

Project:Aubrey Bend MS Multi Purpose Add (Overland Park, KS)

## Split Sys Furnace



### Diffuser Supply (GRD)

#### SS-3/A163

Asset							
Asset Name	Location	Type	Size	DESIGN CFM	CFM(1)	FINAL CFM	% to design
SS3-1	A159	CSD1	10	250	213	241	96.4
SS3-2	A163	CSD1	6	75	51	70	93.3
Total				325	264	311	95.69%

Completed By: Will Turnbough on 06/21/2024

# National TAB

Project: Aubrey Bend MS Multi Purpose Add (Overland Park, KS)

## System/Unit: FAN - Exhaust



Asset: EF-1

AREA:A163

Unit Data		
	Design	Actual
MFG	GREENHECK	COOK
Model Num	SQ-97-VG	90SQN17DEC
Serial Num	-	299PK87719-0170000731
Type	INLINE	INLINE

Test Data		
	Design	Actual
CFM	125	192
RL Voltage	-	NA
RL Amperage	-	NA
Total ESP	0.3"	0.67"

Motor Data		
	Design	Actual
Horsepower	0.25	0.167
Motor Rpm	1118	1113
Phase	1	1
Voltage (rated)	115	115

Completed By: Will Turnbough on 06/21/2024

Notes:  
NO SPEED CONTROLLER INSTALLED.

Written By: Will Turnbough on 06/21/2024

# National TAB

Project:Aubrey Bend MS Multi Purpose Add (Overland Park, KS)

## FAN - Exhaust



### Diffuser Ret/Exh (GRD)

#### EF-1/A163

Asset								
Asset Name	Type	Size	DESIGN CFM	AK	CFM(1)	CFM(2)	FINAL CFM	% to design
E1-1	CEG1	10X10	125	1	192	192	192	153.6
Total			125		192	192	192	153.6%

Completed By: Will Turnbough on 06/21/2024

## Abbreviation List

A = Area (ft <sup>2</sup> )	S.F. = Service Factor
AHU = Air Handling Unit	SF = Supply Fan
A <sub>k</sub> = Effective Area	SP = Static Pressure
BHP = Brake Horsepower (IP) HP	SR = Supply Register
Btu = British Thermal Unit	T = Temperature
Btu/h = Btuh = BTUH = BTU/Hour	T <sub>ma</sub> = Mixed Air Temperature
CL = Center Distance (used in belt formula)	T <sub>oa</sub> = Outside Air Temperature
CD = Ceiling Diffuser	T <sub>ra</sub> = Return Air Temperature
CF = Correction Factor	H = Head (in wc, ft wc, psi)
CFM = Volumetric Flow: Cubic Feet Per Minute	h = Enthalpy
CO <sub>2</sub> = Carbon Dioxide	HP = Horsepower
CO = Carbon Monoxide	hr = Hour
C <sub>v</sub> = Flow Constant	K <sub>v</sub> = Flow constant (SI)
d = Diameter (in.) IP	kW = Kilowatt = 1000 Watts
Δ = Difference or Change (Final - Initial)	LAT = Leaving Air Temperature
DB = Dry Bulb	lb = Pounds
EA = Exhaust Air	LWT = Leaving Water Temperature
EAT = Entering Air Temperature	ma = Mixed Air
EF = Exhaust Fan	MIN = Minimum
Eff = Efficiency	MAX = Maximum
EG = Exhaust Grille	N/A = Not Applicable
ESP = External Static Pressure	NA = No Access
EWT = Entering Water Temperature	NL = Not Listed
°F = Degrees Fahrenheit, °F	NPSHA = Net Positive Suction Head Available
FPB = Fan Powered Box	NS = Not Specified
FLA = Full Load Amps	OA = Outside Air
fpm = Feet per Minute (fpm)	OAT = Outside Air Temperature
ft = Foot	PD = Sheave Pitch Diameter
gal = Gallons	P.D. = Pressure Drop
GPM = Gallons Per Minute (GPM)	PF = Power Factor
h = Enthalpy (BTU/lb dry air)	SG = Supply Grille
P = Pressure	SR = Supply Register
ppm = parts per million	TP = Total Pressure
psi = Pounds Per Square Inch	T <sub>ra</sub> = Return Air Temperature
psid = PSI Differential	TS = Tip Speed (fpm) IP, (m/s) SI
r = Radius (in)	TSP = Total Static Pressure
% <sub>ra</sub> = % of Return Air	V = Velocity
RA = Return Air	VAV = Variable Air Volume
RAT = Return Air Temperature	VD = Volume Damper
RF = Return Fan	VFD = Variable Frequency Drive
RG = Return Grille	W = Watt
RH = Relative Humidity	WB = Wet Bulb
RPM = Revolutions Per Minute	wg = wc = water gauge = water column
RTU = Roof Top Unit	WHP = Water Horsepower (IP)
SA = Supply Air	ω = Humidity Ratio



# National TAB

Testing, Adjusting, and Balancing Equipment



Function		Range	Minimum Accuracy	Instrument Information	Calibration Date	Date Due
AIR	AIR PRESSURE	0 in wg to 10 in wg	2% +/- 0.001 in wg	TSI EBT731 EBT732117009	9/7/2023	9/7/2024
	AIR VELOCITY INSTRUMENT	50 fpm to 3900 fpm	+/- 5 % +/- 7 fpm	TSI EBT731 EBT732117009	9/7/2023	9/7/2024
	DIRECT HOOD READING	100 cfm to 2000 cfm	+/- 5 % +/- 7 cfm	TSI EBT731 EBT732117009	9/7/2023	9/7/2024
TEMPERATURE	AIR METER	-20 F to 240 F	+/- .5 % 2 F	Cooper SRH77A S/N 100516003	9/29/2023	9/29/2024
	AIR PROBE	-20 F to 240 F	+/- .5 % 2 F	Cooper SRH77A S/N 100516003	9/29/2023	9/29/2024
	IMMERSION METER	-20 F to 240 F	+/- .5 % 2 F	Cooper SRH77A S/N 100516003	9/29/2023	9/29/2024
	IMMERSION PROBE	-20 F to 240 F	+/- .5 % 2 F	Cooper SRH77A S/N 100516003	9/29/2023	9/29/2024
	CONTACT METER	-20 F to 240 F	+/- .5 % 2 F	Cooper SRH77A S/N 100516003	9/29/2023	9/29/2024
	CONTACT PROBE	-20 F to 240 F	+/- .5 % 2 F	Cooper SRH77A S/N 100516003	9/29/2023	9/29/2024
HUMIDITY	HUMIDITY PROBE	10 % RH to 90 % RH	3% of reading	Cooper SRH77A S/N 100516003	9/29/2023	9/29/2024
ELECTRICAL	VOLTAGE MEASUREMENT	0 VAC to 600 VAC	2 % reading +/- 5 digits	Klein Tools CL800 S/N 1220C-C1	9/29/2023	9/29/2024
	AMPERAGE MEASUREMENT	0 Amperers to 100 Amperes	2 % reading +/- 5 digits	Klein Tools CL800 S/N 1220C-C1	9/29/2023	9/29/2024
ROTATION	ROTATION MEASUREMENT	60 rpm to 5000 rpm	2 % reading 2 rpm	Shimpo DT 207Lp S/N D1690029R	9/29/2023	9/29/2024



# National TAB

Testing, Adjusting, and Balancing Equipment



**Report of Calibration**  
**Kansas City Calibration Lab., Inc.**  
 8847 Long Street  
 Lenexa, Kansas 66215

Telephone: (913) 541-0629 Internet: www.kccl.com Email: service@kccl.com

UNIT UNDER TEST: TSI EBT731 Differential Digital Meter	TEST RESULT: PASS
SERIAL NUMBER: EBT732117009	PERFORMED ON: 9/7/2023
ASSET NUMBER: EBT732117009	DATA TYPE: FOUND-LEFT
PROCEDURE NAME: ADM-XXX / EBT-XXX-XX 2.0% Reading: 1 Yr Cert CPC	TEMPERATURE: 23.8°C
PROCEDURE REV.: 20210930C	HUMIDITY: 44 %
CALIBRATED BY: Bart Schwartz	BAROMETRIC: 28.93 inHg
P.O. NUMBER:	<b>Recalibration Date</b> September 07, 2024
CUSTOMER: National TAB 1126 Swift Street NKC, MO 64116	Calibration Number: 0007333
Cal Seals Intact: Yes	Previous Calibration Date: August 12, 2022

K.C. Calibration Lab., Inc. certifies that the above listed instrument meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). This calibration is traceable to the International System of Units (SI), through National Metrology Institutes (NIST, PTB NRC NPL, etc), radiometric techniques, or natural physical constants. This calibration complies with MIL-STD-45662A and ANSI/NCSL Z540-1-1994.

This report may not be reproduced, except in full, unless permission for the publication of an approved abstract is obtained in writing from the calibration organization issuing this report.

Note: Any Test Uncertainty Ratio (TUR) that is less than four to one will appear under the "TUR" heading on the data record. If the TUR meets or exceeds four to one, the field is left blank.

REMARKS:

Asset #	Description	Cal Date	Due Date
41001AR6	Mensor CPC6050 Low & Medium Pressure Calibrator	3/15/2023	3/15/2024

Report of Calibration for SERIAL NUMBER: EBT732117009 ASSET NUMBER: EBT732117009

Printed On: Thursday, September 7, 2023 Page 1 of 2

Test Results indicate the following: Found-Left: Unit was left as found. As-Left: Unit was left after adjustments.

Test Description	True Value	Test Result	Lower Limit	Upper Limit	Units	TUR
** Connector						
0.000 inH2O	0.000	-0.0005	-0.0100	0.0100	inH2O	Pass
5.000 inH2O	5.000	5.1000	4.9000	5.1000	inH2O	Pass
10.000 inH2O	10.000	10.0300	9.8000	10.2000	inH2O	Pass
14.900 inH2O	14.900	14.9100	14.6020	15.1980	inH2O	Pass
0.000 inH2O	0.000	-0.0003	-0.0100	0.0100	inH2O	Pass
-5.000 inH2O	-5.000	-5.0100	-5.1000	-4.9000	inH2O	Pass
-10.000 inH2O	-10.000	-10.0200	-10.2000	-9.8000	inH2O	Pass
-14.900 inH2O	-14.900	-14.9600	-15.1980	-14.6020	inH2O	Pass

**Test Results**

Test Description	True Value	Test Result	Lower Limit	Upper Limit	Units	TUR
** Connector						
0.000 inH2O	0.000	-0.0001	-0.0100	0.0100	inH2O	Pass
5.000 inH2O	5.000	4.9800	4.9000	5.1000	inH2O	Pass
10.000 inH2O	10.000	10.0300	9.8000	10.2000	inH2O	Pass
14.900 inH2O	14.900	14.9100	14.6020	15.1980	inH2O	Pass
0.000 inH2O	0.000	0.0001	-0.0100	0.0100	inH2O	Pass
-5.000 inH2O	-5.000	-5.0100	-5.1000	-4.9000	inH2O	Pass
-10.000 inH2O	-10.000	-10.0300	-10.2000	-9.8000	inH2O	Pass
-14.900 inH2O	-14.900	-14.9200	-15.1980	-14.6020	inH2O	Pass

\*\*\*\*\*END OF CALIBRATION\*\*\*\*\*

Report of Calibration for SERIAL NUMBER: EBT732117009 ASSET NUMBER: EBT732117009

Printed On: Thursday, September 7, 2023 Page 2 of 2

Test Results indicate the following: Found-Left: Unit was left as found. As-Left: Unit was left after adjustments.

K.C. Calibration Lab. Seal

Signature: Bart A. Schwartz, Engineer in Charge

**Report of Calibration**  
**Kansas City Calibration Lab., Inc.**  
 8847 Long Street  
 Lenexa, Kansas 66215

Telephone: (913) 541-0629 Internet: www.kccl.com Email: service@kccl.com

UNIT UNDER TEST: Shimpo DT-2077p Tachometer	TEST RESULT: PASS
SERIAL NUMBER: D1690029R	PERFORMED ON: 9/29/2023
ASSET NUMBER: D1690029R	DATA TYPE: FOUND-LEFT
PROCEDURE NAME: Shimpo DT-20xx: 1 Year Certification	TEMPERATURE: 24.9°C
PROCEDURE REV.: 20210818C	HUMIDITY: 47 %
CALIBRATED BY: Bart Schwartz	
P.O. NUMBER:	<b>Recalibration Date</b> September 29, 2024
CUSTOMER: National TAB 1126 Swift Street NKC, MO 64116	Calibration Number: 00077544
Cal Seals Intact: Yes	Previous Calibration Date: August 11, 2022

K.C. Calibration Lab., Inc. certifies that the above listed instrument meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). This calibration is traceable to the International System of Units (SI), through National Metrology Institutes (NIST, PTB NRC NPL, etc), radiometric techniques, or natural physical constants. This calibration complies with MIL-STD-45662A and ANSI/NCSL Z540-1-1994.

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REMARKS:

Asset #	Description	Cal Date	Due Date
MYS900813	Keysight Technologies 33511B Function/Arb Waveform Generator	12/1/2022	12/1/2023

Report of Calibration for SERIAL NUMBER: D1690029R ASSET NUMBER: D1690029R

Printed On: Friday, September 29, 2023 Page 1 of 2

Test Results indicate the following: Found-Left: Unit was left as found. As-Left: Unit was left after adjustments.

Test Description	True Value	Test Result	Lower Limit	Upper Limit	Units	TUR
RPM						
10.00 RPM	10.0	10	9	11	RPM	Pass
100.00 RPM	100.0	100	99	101	RPM	Pass
1000.0 RPM	1000.0	1000	999	1001	RPM	Pass
10,000.0 RPM	10000.0	10000	9998	10002	RPM	Pass
99,900.0 RPM	99900.0	99902	99893	99907	RPM	Pass

**Report of Calibration**  
**Kansas City Calibration Lab., Inc.**  
 8847 Long Street  
 Lenexa, Kansas 66215

Telephone: (913) 541-0629 Internet: www.kccl.com Email: service@kccl.com

UNIT UNDER TEST: Cooper Instrument SRH77A Digital Thermometer	TEST RESULT: PASS
SERIAL NUMBER: 100516003	PERFORMED ON: 9/29/2023
ASSET NUMBER: 100516003	DATA TYPE: FOUND-LEFT
PROCEDURE NAME: Met Temp NIST(SI) 1 Year	TEMPERATURE: 24.1°C
PROCEDURE REV.:	HUMIDITY: 46 %
CALIBRATED BY: Bart Schwartz	
P.O. NUMBER:	<b>Recalibration Date</b> September 29, 2024
CUSTOMER: National TAB 1126 Swift Street NKC, MO 64116	Calibration Number: 00077543
Cal Seals Intact: Yes	Previous Calibration Date: August 12, 2022

K.C. Calibration Lab., Inc. certifies that the above listed instrument meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). This calibration is traceable to the International System of Units (SI), through National Metrology Institutes (NIST, PTB NRC NPL, etc), radiometric techniques, or natural physical constants. This calibration complies with MIL-STD-45662A and ANSI/NCSL Z540-1-1994.

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Note: Any Test Uncertainty Ratio (TUR) that is less than four to one will appear under the "TUR" heading on the data record. If the TUR meets or exceeds four to one, the field is left blank.

REMARKS:

Asset #	Description	Cal Date	Due Date
2659119	Hart Scientific 1523 Single Chan Reference Thermometer	1/9/2023	1/9/2024
905040	Burns Engineering 5615 Platinum Resistance Thermometer	2/8/2023	2/8/2024
DWS18	Fluke 518 Dry-Block Calibrator	8/28/2023	8/28/2024
MB7103	Hart Scientific 7103 Micro Bath Calibrator	12/8/2022	12/8/2023

Report of Calibration for SERIAL NUMBER: 100516003 ASSET NUMBER: 100516003

Printed On: Friday, September 29, 2023 Page 1 of 2

Test Results indicate the following: Found-Left: Unit was left as found. As-Left: Unit was left after adjustments.

Test Description	True Value	Test Result	Lower Limit	Upper Limit	Units	TUR
1075 General Purpose Puncture Probe						
Accuracy ±1.3 deg F / ±0.2 deg C or ±0.5% of reading:						
-10.00	F	-10.08	-8.70	1.38		
32.00	F	32.34	32.70	0.36		
122.00	F	122.71	121.80	-0.91		
212.00	F	211.90	211.10	-0.80		
280.00	F	279.96	280.70	0.74		
4011 Pipe Strip Probe						
Accuracy ±2% Range -25° to 212°F / -32° to 100°C						
0.00	F	0.27	2.10	1.83		
75.00	F	75.25	75.10	-0.15		
150.00	F	150.31	150.00	-0.31		



# National TAB

Testing, Adjusting, and Balancing Equipment



Test Results	True Value	Test Result	Lower Limit	Upper Limit	Units	TUR
5028 Slim Humidity Probe						
Accuracy ±2% from 20 to 80%RH, ±3% below 20 and ±						
10.0 %RH @ 23.0°C	%RH	10.0	16	6.0		
25.0 %RH @ 23.0°C	%RH	25.0	30	5.0		
50.0 %RH @ 23.0°C	%RH	50.0	53	3.0		
75.0 %RH @ 23.0°C	%RH	75.0	77	2.0		
23.0°C @ 10.0 %RH	C	23.0	23.2	0.2		
23.0°C @ 25.0 %RH	C	23.0	23.2	0.2		
23.0°C @ 50.0 %RH	C	23.0	23.2	0.2		
23.0°C @ 75.0 %RH	C	23.0	23.1	0.1		

\*\*\*\*\*END OF CALIBRATION\*\*\*\*\*

Signed: *Bart A. Schwartz*  
Bart A. Schwartz, Engineer in Charge

Report of Calibration for SERIAL NUMBER: 100516003 ASSET NUMBER: 100516003 Page 2 of 2

Printed On: Friday, September 29, 2023  
Test Results indicate the following: Found-Left: Unit was left as found. As-Left: Unit was left after adjustments.

### Report of Calibration

Kansas City Calibration Lab., Inc.  
8847 Long Street  
Lenexa, Kansas 66215

Telephone: (913) 541-0629 Internet: www.kccl.com Email: service@kccl.com

UNIT UNDER TEST:	Klein Tools CL800 True RMS Digital Clampmeter	TEST RESULT:	PASS
SERIAL NUMBER:	1220C-C1	PERFORMED ON:	9/29/2023
ASSET NUMBER:	1220C-C1	DATA TYPE:	FOUND-LEFT
PROCEDURE NAME:	Klein Tools CL800 : (1 year) CAL VER / 5520	TEMPERATURE:	24.9°C
PROCEDURE REV.:	20230928	HUMIDITY:	46 %
CALIBRATED BY:	Bart Schwartz		
P.O. NUMBER:		Recalibration Date	September 29, 2024
CUSTOMER:	National TAB 1126 Swift Street NKC, MO 64116	Calibration Number:	0007542
	Unknown	Previous Calibration Date:	

Cal Seals Intact:

K.C. Calibration Lab., Inc. certifies that the above listed instrument meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). This calibration is traceable to the International System of Units (SI), through National Metrology Institutes (NIST, PTB, NRC, NPL, etc), radiometric techniques, or natural physical constants. This calibration complies with MIL-STD-45662A and ANSI/NCISL Z540-1-1994.

This report may not be reproduced, except in full, unless permission for the publication of an approved abstract is obtained in writing from the calibration organization issuing this report.

Note: Any Test Uncertainty Ratio (TUR) that is less than four to one will appear under the "TUR" heading on the data record. If the TUR meets or exceeds four to one, the field is left blank.

REMARKS:

Standards Used	Asset #	Description	Cal Date	Due Date
	3277903	Fluke 5522A Multi-Product Calibrator	11/30/2022	11/30/2023

Test Results	True Value	Test Result	Lower Limit	Upper Limit	Units	TUR
Root Difference Square guardbanding method used						
AC VOLTS TESTS						
6 V Range						
5.900 V @ 60 Hz	5.9000	5.897	5.807	5.994	V	Pass
60 V Range						
59.00 V @ 60 Hz	59.0000	58.97	58.24	59.76	V	Pass
600 V Range						
590.0 V @ 60 Hz	590.000	589.7	582.4	597.6	V	Pass
1000 V Range						
990.0 V @ 60 Hz	990.000	991.0	970.1	1009.9	V	Pass
DC VOLTS TESTS						
600 mV Range						
600.0 mV	600.000	599.8	593.2	606.8	m V	Pass

Report of Calibration for SERIAL NUMBER: 1220C-C1 ASSET NUMBER: 1220C-C1 Page 1 of 3

Printed On: Friday, September 29, 2023  
Test Results indicate the following: Found-Left: Unit was left as found. As-Left: Unit was left after adjustments.

Test Results	True Value	Test Result	Lower Limit	Upper Limit	Units	TUR
-600.0 mV	-600.00	-599.9	-606.8	-593.2	m V	Pass
6 V Range						
6.000 V	6.0000	5.997	5.937	6.063	V	Pass
-6.000 V	-6.0000	-5.995	-6.063	-5.937	V	Pass
60 V Range						
60.00 V	60.0000	59.96	59.37	60.63	V	Pass
600 V Range						
600.0 V	600.0000	599.6	593.7	606.3	V	Pass
1000 V Range						
1000.0 V	1000.0000	1001	985	1015	V	Pass
-1000.0 V	-1000.0000	-1001	-1015	-985	V	Pass
CONTINUITY TESTS						
Audible Indicator ON @ 10 ohms						
Audible Indicator OFF @ 51 ohms						
RESISTANCE TESTS						
600 Ohm Range						
600.0 Ohm	600.000	601.2	590.5	609.5	Ω	Pass
6 kOhm Range						
6.000 kOhm	6.00000	6.000	5.905	6.095	k Ω	Pass
60 kOhm Range						
60.00 kOhm	60.0000	59.99	59.05	60.95	k Ω	Pass
600 kOhm Range						
600.0 kOhm	600.0000	599.9	590.5	609.5	k Ω	Pass
6 MOhm Range						
6.000 MOhm	6.00000	5.993	5.905	6.095	M Ω	Pass
60 MOhm Range						
60.00 MOhm	60.00000	59.47	58.70	61.30	M Ω	Pass
DIODE CHECK TESTS						
Diode Voltage						
FREQUENCY TESTS						
9.00 Hz @ 8 V						
9.00 Hz @ 8 V	9.00000	8.999	8.905	9.095	Hz	Pass
90.00 Hz @ 8 V						
90.00 Hz @ 8 V	90.00000	90.000	89.05	90.95	Hz	Pass
900.0 Hz @ 8 V						
900.0 Hz @ 8 V	900.00000	900.000	890.5	909.5	Hz	Pass
9.000 kHz @ 8 V						
9.000 kHz @ 8 V	9.0000000	9.000	8.905	9.095	k Hz	Pass
90.00 kHz @ 8 V						
90.00 kHz @ 8 V	90.0000000	90.000	89.05	90.95	k Hz	Pass
100.0 kHz @ 8 V						
100.0 kHz @ 8 V	100.0000000	100.000	98.5	101.5	k Hz	Pass
DUTY CYCLE						
50.0 % @ 1 kHz						
50.0 % @ 1 kHz	50.000	50.3	49.3	50.8	%	Pass
CAPACITANCE TESTS						
60 nF Range						
59.00 nF	59.0000	59.96	55.70	62.30	n F	Pass
600 nF Range						
590.0 nF	590.0000	597.1	571.8	608.2	n F	Pass
6 uF Range						
5.900 uF	5.900000	5.854	5.718	6.082	u F	Pass
60 uF Range						
59.00 uF	59.000000	58.87	57.18	60.82	u F	Pass

Report of Calibration for SERIAL NUMBER: 1220C-C1 ASSET NUMBER: 1220C-C1 Page 2 of 3

Printed On: Friday, September 29, 2023  
Test Results indicate the following: Found-Left: Unit was left as found. As-Left: Unit was left after adjustments.

Test Results	True Value	Test Result	Lower Limit	Upper Limit	Units	TUR
6000 uF Range						
5900 uF	5900.000	590.6	560.0	620.0	u F	Pass
TEMPERATURE F TESTS						
5900 uF						
5900 uF	5900.000	5957	5600	6200	u F	Pass
-14 °F						
-14 °F	-14.0	-10	-23	-5	°F	Pass
100 °F						
100 °F	100.0	102	94	106	°F	Pass
500 °F						
500 °F	500.0	502	490	510	°F	Pass
900 °F						
900 °F	900.0	902	873	927	°F	Pass
TEMPERATURE C TESTS						
-25 °C						
-25 °C	-25.0	-23	-31	-20	°C	Pass
100 °C						
100 °C	100.0	102	96	104	°C	Pass
350 °C						
350 °C	350.0	351	344	357	°C	Pass
500 °C						
500 °C	500.0	501	485	515	°C	Pass
AC CURRENT TESTS						
60 A Range						
50.00 A @ 60 Hz	50.0000	49.60	48.92	51.08	A	Pass
50.00 A @ 400 Hz	50.0000	50.00	48.92	51.08	A	Pass
400 A Range						
500.0 A @ 60 Hz	500.0000	494.2	489.5	510.5	A	Pass
500.0 A @ 100 Hz	500.0000	494.4	489.5	510.5	A	Pass
60 A Range						
50.00 A	50.0000	49.20	48.92	51.08	A	Pass
600 A Range						
300.0 A	300.0000	296.5	293.5	306.5	A	Pass
590.0 A	590.0000	582.7	577.7	602.3	A	Pass

\*\*\*\*\*END OF CALIBRATION\*\*\*\*\*

Signed: *Bart A. Schwartz*  
Bart A. Schwartz, Engineer in Charge

Report of Calibration for SERIAL NUMBER: 1220C-C1 ASSET NUMBER: 1220C-C1 Page 3 of 3

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