Report By:

National TAB
1329 E. KEMPER ROAD
SUITE 4210
CINCINNATI, OH 45246

Report: CERTIFIED TAB REPORT

Function: Test, Adjust, & Balance

Date: 06/03/2024

PROJECT

Grain Valley Police Station (Grain Valley, MO)

719 NW Mize Rd

Grain Valley, MO 64029

Client

Temp-Con, Inc.

15670 S Keller St

Olathe, KS 66062

National TAB

Project: Grain Valley Police Station (Grain Valley, MO)

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PROJECT TEAM MEMBERS

Architect/Engineer/Consultant:	Smith and Boucher Engineers 25618 W 103rd St Olathe, KS, 66061
General Contractor:	McCown Gordon 850 Main Street Kansas City, MO, 64105
Mechanical Contractor:	Temp-Con, Inc. 15670 S Keller St Olathe, KS, 66062

CERTIFICATION

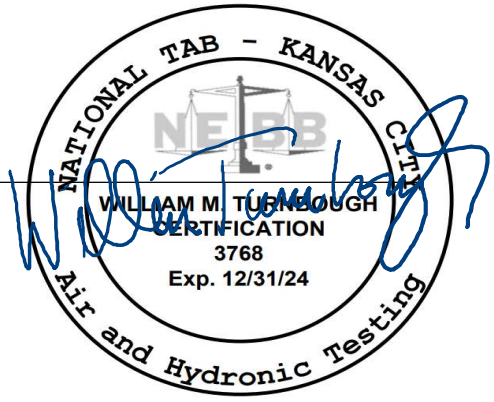
PROJECT: Grain Valley Police Station

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:	6/4/2024

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

The summary below provides a quick understanding of our scope of work and general testing procedures. Enclosed in the report is further detail about your building performance including recommendations, asset data, and pictures. Our focus is to work with the trades to remedy any issues or deficiencies during the actual field balancing and not after the balancing has occurred to achieve a positive environment and outcome. The level of success is determined by the availability of the trades, possible parts needed, or time constraints.

RTU's with VAV's and FPB's
Prior to balancing the outside air dampers were positioned to approximate final position. It was verified that filters were clean, fan rotation is correct, and belt tension was adequate. After each VAV and FPB was calibrated, the RTU's were tested in a maximum airflow condition to set up total flow. There is no diversity for either RTU so all boxes were put into a call for max cool. The fan speed is controlled by a static pressure set point. The setpoint was determined by ensuring that all boxes were satisfied and at least one VAV damper was 100% open. This was successfully completed for RTU-1. RTU-2 the total flow is within design and all boxes are satisfied except for VAV2-9 which was operating at 500 CFM out of a design of 600 CFM. Unable to increase the static pressure setpoint without overamping the motor.

Variable Air Volume (VAV) and Fan Parallel Fan Powered Box (FPB) Terminals
The VAV's were calibrated in a call for max cooling and the correction factors are reported on the individual asset. While in a call for full cooling, the individual air devices were then balanced within design tolerance. The VAVs were then stroked to minimum cool and the airflow values reported. The VAV was then stroked to heating and the airflow values reported. It was verified that there was a sufficient temp rise on each VAV. The FPB's are calibrated in the same way. For the FPB's fan, the airflow was measured at the diffusers and then the fan airflow was calculated by subtracting the airflow from the inlet. Adjustments were made to the fan until airflow was within design. Any equipment or diffusers that fell out of design are noted within the report.

General Exhaust Fans w/ Grilles
The general exhaust fans were measured by reading each air device with a flow hood. The total airflow for each fan is equivalent to the sum of these readings. Fan speed was then adjusted so that the airflow was within tolerance of design. Each terminal device was balanced to within tolerance of the design volume using the installed volume dampers. Any equipment that fell outside of this tolerance is noted throughout the report.

Ceiling Exhaust Fans
The ceiling exhaust fans were measured using a flow hood. If speed adjustment was provided, the fan speed was adjusted to within design tolerance. Any equipment that fell outside of this tolerance is noted throughout the report.

National TAB

Project: Grain Valley Police Station (Grain Valley, MO)

System/Unit: AHU/RTU

Asset: RTU1 AREA:WEST SIDE

Unit Data		
	Design	**Actual**
MFG	NA	JCI
Serial Num	-	N2L3969755
Model Num	NA	AD25T3DH4G1CGS14G2
Configuration	VERTICAL	VERTICAL
Num PreFilter 1	-	9
PreFilter Size 1	-	16X25X4
Num Final Filter 1	-	2 METAL MESH 16.5X30.5

Motor Data		
	Design	**Actual**
Motor MFG	-	MARATHON
Frame	-	184T
Horsepower	10	5
Motor Rpm	-	1765
Phase	3	3
Rated Voltage	460	230/460
Rated Amperage	18.7	12.6/6.3
Service Factor	-	1.15

Drive Data		
	Design	**Actual**
Motor Sheave Size	-	6"
Motor Bore Size	-	1-3/8"
Motor Sheave SetPt	-	4 TURNS OUT
Fan Sheave Size	-	7.25"
Fan Sheave Bore	-	1-7/16"
Belt CL Distance	-	12"
Num of Belts	-	1
Belt Size	-	5VX450

Test Data		
	Design	**Actual**
SF CFM	8175	7858
SF RPM	1197	1127
RA CFM	6000	5509
OA CFM	2175	2349
RL Voltage	460	469/469/470
RL Amperage	-	6.0/5.9/5.9
SF Motor Freq(HZ)	-	54HZ
SF System SetPt	-	1.18" of 1.5"
Min OA Damper Position	-	8%

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.36"
Fan Suction SP	-	-0.94"
Fan Discharge SP	-	1.69"
Total ESP	1.50	2.05"
Fan Total SP	-	3.74"

Completed By: Will Turnbough on 06/04/2024

National TAB

Project:Grain Valley Police Station (Grain Valley, MO)

AHU/RTU

VAV - Single Duct

RTU1/WEST SIDE

Asset											
Asset Name	MFG	Model Num	Type	Inlet Size	Design Max CFM	Max CFM	Design Min CFM	Min CFM	Design Heat CFM	Heat CFM	Ak (max)
RTU1-VAV1	PRICE	SDV-1-1	VAV	8"	650	635	195	188	325	330	1.704
RTU1-VAV2	PRICE	SDV-1-1	VAV	6	300	292	90	88	150	154	1.970
RTU1-VAV3	PRICE	SDV-1-1	VAV	7"	550	542	165	165	275	276	1.870
RTU1-VAV4	PRICE	SDV-1-1	VAV	9	900	934	270	273	450	460	1.780
RTU1-VAV5	PRICE	SDV-1-1	VAV	4	150	159	45	42	75	80	0.400
RTU1-VAV6	PRICE	SDV-1-1	VAV	8	700	703	210	220	350	360	1.87
RTU1-VAV7	PRICE	SD-1-1	VAV	4"	100	101	30	29	50	53	0.793
RTU1-VAV8	PRICE	SDV-1-1	VAV	5	200	196	60	59	100	100	1.194
RTU1-VAV9	PRICE	SDV-1-1	VAV	6	270	281	85	83	137	140	1.6941

VAV-Fan Powered Box

RTU1/WEST SIDE

Asset											
Asset Name	MFG	Model Num	Service	Type	Inlet Size	Design Max Cool CFM	Max Cool CFM	Design Min Cool CFM	Min Cool CFM	Design Fan CFM (Heat)	Fan CFM (Heat)	Ak (max)
RTU1-FPB1	PRICE	FDV5-3012		FAN POWERED VAV	12	1000	997	400	403	600	602	2.61
RTU1-FPB2	PRICE	FDV5-5016		FAN POWERED VAV	16	3000	3018	1000	996	0	2015	1.300

Diffuser Supply (GRD)

RTU1-FPB1/

Asset							
Asset Name	Location	Type	Size	DESIGN CFM	CFM(1)	FINAL CFM	% to design
RTU1-FPB1-SGRD1	LOBBY	SD1	6"	100	111	105	105.0
RTU1-FPB1-SGRD2	LOBBY	SD2	8"	150	167	145	96.7
RTU1-FPB1-SGRD3	LOBBY	SD2	8"	150	179	142	94.7
RTU1-FPB1-SGRD4	LOBBY	SD2	8"	150	142	153	102.0
RTU1-FPB1-SGRD5	LOBBY	SD2	8"	150	145	154	102.7
RTU1-FPB1-SGRD6	LOBBY	SD1	8"	100	61	91	91.0
RTU1-FPB1-SGRD7	WOMENS RR	SD1	6"	100	112	102	102.0
RTU1-FPB1-SGRD8	MENS RR	SD1	6"	100	102	105	105.0
Total				1000	1019	997	99.7%

RTU1-FPB2/

Asset							
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**CFM(1)**	**FINAL CFM**	**% to design**
RTU1-FPB2-SGRD1	COMMUNITY	SD3	12"	500	536	521	104.2
RTU1-FPB2-SGRD2	COMMUNITY	SD3	12"	500	447	489	97.8
RTU1-FPB2-SGRD3	COMMUNITY	SD3	12"	500	630	497	99.4
RTU1-FPB2-SGRD4	COMMUNITY	SD3	12"	500	389	501	100.2
RTU1-FPB2-SGRD5	COMMUNITY	SD3	12"	500	505	534	106.8
RTU1-FPB2-SGRD6	COMMUNITY	SD3	12"	500	464	476	95.2
Total				3000	2971	3018	100.6%

RTU1-VAV1/

Asset							
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**CFM(1)**	**FINAL CFM**	**% to design**
RTU1-VAV1-SGRD1	CHIEF	SD1	8"	150	140	144	96.0
RTU1-VAV1-SGRD2	CHIEF	SD1	8"	150	163	142	94.7
RTU1-VAV1-SGRD3	ADMIN	SD1	8"	150	175	160	106.7
RTU1-VAV1-SGRD4	PATROL	SD1	8"	200	162	189	94.5
Total				650	640	635	97.69%

RTU1-VAV2/

Asset							
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**CFM(1)**	**FINAL CFM**	**% to design**
RTU1-VAV2-SGRD1	CASE ROOM	SD1	8"	200	205	205	102.5
RTU1-VAV2-SGRD2	STANDARDS	SD1	8"	100	92	92	92.0
Total				300	297	297	99%

RTU1-VAV3/

Asset							
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**CFM(1)**	**FINAL CFM**	**% to design**
RTU1-VAV3-SGRD1	CONFERENCE	SD1	10"	275	246	270	98.2
RTU1-VAV3-SGRD2	CONFERENCE	SD1	10"	275	297	272	98.9
Total				550	543	542	98.55%

RTU1-VAV4/

Asset							
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**CFM(1)**	**FINAL CFM**	**% to design**
RTU1-VAV4-SGRD1	OFFICE	SD1	8"	150	198	145	96.7
RTU1-VAV4-SGRD2	OFFICE	SD1	8"	150	160	156	104.0
RTU1-VAV4-SGRD3	OFFICE	SD1	8"	150	142	165	110.0
RTU1-VAV4-SGRD4	OFFICE	SD1	8"	150	162	164	109.3
RTU1-VAV4-SGRD5	OFFICE	SD1	8"	150	135	146	97.3
RTU1-VAV4-SGRD6	OFFICE	SD1	8"	150	147	158	105.3
Total				900	944	934	103.78%

RTU1-VAV5/

Asset							
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**CFM(1)**	**FINAL CFM**	**% to design**
RTU1-VAV5-SGRD1	INT	SD1	6"	50	88	53	106.0
RTU1-VAV5-SGRD2	INT	SD1	6"	50	88	54	108.0
RTU1-VAV5-SGRD3	VICTIM ADVOCATE	SD1	6"	50	85	52	104.0
Total				150	261	159	106%

RTU1-VAV6/

Asset							
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**CFM(1)**	**FINAL CFM**	**% to design**
RTU1-VAV6-SGRD1	OPEN OFFICE	SD1	8"	175	173	184	105.1
RTU1-VAV6-SGRD2	OPEN OFFICE	SD1	8"	175	195	176	100.6
RTU1-VAV6-SGRD3	HALLWAY	SD1	8"	175	148	167	95.4
RTU1-VAV6-SGRD4	HALLWAY	SD1	8"	175	205	176	100.6
Total				700	721	703	100.43%

RTU1-VAV7/

Asset							
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**CFM(1)**	**FINAL CFM**	**% to design**
RTU1-VAV7-SGRD1	SOFT INT	SD1	6"	50	89	54	108.0
RTU1-VAV7-SGRD2	REPORT INT	SD1	6"	50	75	47	94.0
Total				100	164	101	101%

RTU1-VAV8/

Asset							
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**CFM(1)**	**FINAL CFM**	**% to design**
RTU1-VAV8-SGRD1	STORAGE	SD2	12X6	100	112	99	99.0
RTU1-VAV8-SGRD2	STORAGE	SD2	12X6	100	148	97	97.0
Total				200	260	196	98%

RTU1-VAV9/

Asset							
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**CFM(1)**	**FINAL CFM**	**% to design**
RTU1-VAV9-SGRD1	RECORDS	SD1	6"	75	90	75	100.0
RTU1-VAV9-SGRD2	RECORDS	SD1	6"	75	119	81	108.0
RTU1-VAV9-SGRD3	RECORD MASTER	SD1	6"	125	166	125	100.0
Total				275	375	281	102.18%

Asset	Notes	Date	Written By
RTU1-FPB1	FAN SPEED SET AT 2.74VDC	03/21/2024	Jacob Davidson
RTU1-FPB2	FAN IS NOT FUNCTIONING AT THIS TIME 03/19/24	03/21/2024	Jacob Davidson

National TAB

Project: Grain Valley Police Station (Grain Valley, MO)

System/Unit: AHU/RTU

Asset: RTU2 AREA:EAST SIDE

Unit Data		
	Design	**Actual**
MFG	NA	JCI
Serial Num	-	N2L3969754
Model Num	NA	AD25T3DH4G1CGS14G2
Configuration	VERTICAL	VERTICAL
Num PreFilter 1	-	9
PreFilter Size 1	-	16X25X4
Num Final Filter 1	-	2 METAL MESH 16.5X30.5

Motor Data		
	Design	**Actual**
Motor MFG	-	MARATHON
Frame	-	184T
Horsepower	10	10
Motor Rpm	-	1765
Phase	3	3
Rated Voltage	460	230/460
Rated Amperage	18.7	25.4/12.7
Service Factor	-	1.15

Drive Data		
	Design	**Actual**
Motor Sheave Size	-	6"
Motor Bore Size	-	1-3/8"
Motor Sheave SetPt	-	4 TURNS OUT
Fan Sheave Size	-	7.25"
Fan Sheave Bore	-	1-7/16"
Belt CL Distance	-	12"
Num of Belts	-	1
Belt Size	-	5VX450

Test Data		
	Design	**Actual**
SF CFM	7250	7223
SF RPM	1142	1217
RA CFM	5600	5481
OA CFM	1650	1742
RL Voltage	460	481/485/484
RL Amperage	-	13.0/11.6/12.6
SF Motor Freq(HZ)	-	60HZ
SF System SetPt	-	0.6"
Min OA Damper Position	-	10%

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-1.13"
Fan Suction SP	-	-1.56"
Fan Discharge SP	-	1.13"
Total ESP	1.50	2.26"
Fan Total SP	-	2.69"

Completed By: Will Turnbough on 06/04/2024

National TAB

Project:Grain Valley Police Station (Grain Valley, MO)

AHU/RTU

VAV - Single Duct

RTU2/EAST SIDE

Asset											
Asset Name	**MFG**	**Model Num**	**Type**	**Inlet Size**	**Design Max CFM**	**Max CFM**	**Design Min CFM**	**Min CFM**	**Design Heat CFM**	**Heat CFM**	**Ak (max)**
RTU2-VAV1	PRICE	SDV-1-1	VAV	5	200	190	60	57	150	151	0.885
RTU2-VAV2	PRICE	SDV-1-1	VAV	6	300	297	90	88	150	156	2.251
RTU2-VAV3	PRICE	SDV-1-1	VAV	7"	500	513	150	146	250	253	2.021
RTU2-VAV4	PRICE	SDV-1-1	VAV	12"	1400	1406	420	416	700	709	1.548
RTU2-VAV5	PRICE	SDV-1-1	VAV	5	200	201	60	58	100	99	1.083
RTU2-VAV6	PRICE	SDV-1-1	VAV	8"	600	585	180	175	300	301	2.168
RTU2-VAV7	PRICE	SDV-1-1	VAV	6	300	288	90	90	150	154	1.978
RTU2-VAV8	PRICE	SDV-1-1	VAV	5	175	179	55	52	87	86	1.091
RTU2-VAV9	PRICE	SDV-1-1	VAV	8"	600	602	180	175	300	295	2.317
RTU2-VAV10	PRICE	SDV-1-1	VAV	10	1250	1201	375	380	625	621	1.862
RTU2-VAV11	PRICE	SDV-1-1	VAV	4	200	197	40	37	62	65	0.772

VAV-Fan Powered Box

RTU2/EAST SIDE

Asset												
Asset Name	**MFG**	**Model Num**	**Service**	**Type**	**Inlet Size**	**Design Max Cool CFM**	**Max Cool CFM**	**Design Min Cool CFM**	**Min Cool CFM**	**Design Fan CFM (Heat)**	**Fan CFM (Heat)**	**Ak (max)**
RTU2-FPB1	PRICE	FDV5-3012		FPB	12	1600	1564	550	540	1050	1054	1.670

Diffuser Supply (GRD)

RTU2-FPB1/

Asset							
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**CFM(1)**	**FINAL CFM**	**% to design**
RTU2-FPB1-SGRD1	BREAKROOM	SD2	18X10	525	141	481	91.6
RTU2-FPB1-SGRD2	BREAKROOM	SD2	18X10	525	704	540	102.9
RTU2-FPB1-SGRD3	BREAKROOM	SD2	18X10	525	695	543	103.4
Total				1575	1540	1564	99.3%

RTU2-VAV1/

Asset							
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**CFM(1)**	**FINAL CFM**	**% to design**
RTU2-VAV1-SGRD1	MENS LOCKER	SD1	6"	50	70	49	98.0
RTU2-VAV1-SGRD2	MENS LOCKER	SD1	6"	50	54	47	94.0
RTU2-VAV1-SGRD3	MENS LOCKER	SD1	6"	50	42	46	92.0
RTU2-VAV1-SGRD4	MENS LOCKER	SD1	6"	50	36	48	96.0
Total				200	202	190	95%

RTU2-VAV10/

Asset							
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**CFM(1)**	**FINAL CFM**	**% to design**
RTU2-VAV10-SGRD1	QUIET ROOM	SD1	6"	50	82	49	98.0
RTU2-VAV10-SGRD2	DECON	SD1	6"	50	67	79	158.0
RTU2-VAV10-SGRD3	INTERVIEW	SD1	6"	50	55	50	100.0
RTU2-VAV10-SGRD4	BOOKING	SD1	12"	400	333	363	90.8
RTU2-VAV10-SGRD5	TEMP HOLDING	SD1	8"	150	145	155	103.3
RTU2-VAV10-SGRD6	BOOKING	SD1	12"	400	328	369	92.3
RTU2-VAV10-SGRD7	BONDING	SD1	8"	150	128	136	90.7
Total				1250	1138	1201	96.08%

RTU2-VAV11/

Asset							
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**CFM(1)**	**FINAL CFM**	**% to design**
RTU2-VAV11-SGRD1	WEAPONS	SD1	6"	75	64	68	90.7
RTU2-VAV11-SGRD2	ARMORIST	SD1	6"	50	54	52	104.0
RTU2-VAV11-SGRD3	K9	SD2	6X6	75	95	77	102.7
Total				200	213	197	98.5%

RTU2-VAV2/

Asset							
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**CFM(1)**	**FINAL CFM**	**% to design**
RTU2-VAV2-SGRD1	WOMENS LOCKER	SD1	8"	150	164	144	96.0
RTU2-VAV2-SGRD2	WOMENS LOCKER	SD1	8"	150	171	153	102.0
Total				300	335	297	99%

RTU2-VAV3/

Asset							
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**CFM(1)**	**FINAL CFM**	**% to design**
RTU2-VAV3-SGRD1	REPORTING	SD1	8"	175	213	185	105.7
RTU2-VAV3-SGRD2	REPORTING	SD1	8"	175	223	191	109.1
RTU2-VAV3-SGRD3	PACKAGING	SD1	8"	150	155	137	91.3
Total				500	591	513	102.6%

RTU2-VAV4/

Asset							
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**CFM(1)**	**FINAL CFM**	**% to design**
RTU2-VAV4-SGRD1	GYM	SD1	12"	350	339	347	99.1
RTU2-VAV4-SGRD2	GYM	SD1	12"	350	260	340	97.1
RTU2-VAV4-SGRD3	GYM	SD1	12"	350	369	365	104.3
RTU2-VAV4-SGRD4	GYM	SD1	12"	350	329	354	101.1
Total				1400	1297	1406	100.43%

RTU2-VAV5/

Asset							
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**CFM(1)**	**FINAL CFM**	**% to design**
RTU2-VAV5-SGRD1	SERGEANT	SD1	6"	100	129	97	97.0
RTU2-VAV5-SGRD2	SERGEANT	SD1	6"	100	143	104	104.0
Total				200	272	201	100.5%

RTU2-VAV6/

Asset							
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**CFM(1)**	**FINAL CFM**	**% to design**
RTU2-VAV6-SGRD1	RECEIVING	SD1	8"	150	110	139	92.7
RTU2-VAV6-SGRD2	PROPERTY STORAGE	SD1	8"	225	340	217	96.4
RTU2-VAV6-SGRD3	PROPERTY STORAGE	SD1	8"	225	249	229	101.8
Total				600	699	585	97.5%

RTU2-VAV7/

Asset							
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**CFM(1)**	**FINAL CFM**	**% to design**
RTU2-VAV7-SGRD1	ROLLCALL	SD1	8"	150	168	142	94.7
RTU2-VAV7-SGRD2	ROLLCALL	SD1	8"	150	182	146	97.3
Total				300	350	288	96%

RTU2-VAV8/

Asset							
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**CFM(1)**	**FINAL CFM**	**% to design**
RTU2-VAV8-SGRD1	JUVENILE	SD2	8	175	179	179	102.3
Total				175	179	179	102.29%

RTU2-VAV9/

Asset							
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**CFM(1)**	**FINAL CFM**	**% to design**
RTU2-VAV9-SGRD1	MALE CELL	SD1	6"	100	85	90	90.0
RTU2-VAV9-SGRD2	CORRIDOR	SD1	6"	100	132	99	99.0
RTU2-VAV9-SGRD3	MALE CELL	SD1	6"	100	83	98	98.0
RTU2-VAV9-SGRD4	CORRIDOR	SD1	6"	100	113	109	109.0
RTU2-VAV9-SGRD5	FEMALE CELL	SD1	6"	100	116	108	108.0
RTU2-VAV9-SGRD6	FEMALE CELL	SD1	6"	100	36	39	39.0
Total				600	565	543	90.5%

Asset	Notes	Date	Written By
RTU2-VAV11	Increased Design Max CFM from 125 to 200 due to diffuser design.	03/18/2024	Jacob Davidson
RTU2-FPB1	FAN SPEED SET AT 4.1 VDC	03/21/2024	Jacob Davidson
RTU2-VAV10-SGRD2	NO DAMPER TO LOWER AIRFLOW	03/21/2024	Jacob Davidson
RTU2-VAV9-SGRD6	DAMPER SHOULD BE FULLY OPEN BUT IT IS ABOVE HARD CEILING AND TECH IS UNABLE TO ACCESS THE DAMPER TO CONFIRM.	03/21/2024	Jacob Davidson

National TAB

Project: Grain Valley Police Station (Grain Valley, MO)

System/Unit: FAN - Exhaust

Asset: EF1 AREA:DOG WASH

Unit Data		
	Design	**Actual**
MFG	NA	GREENHECK
Model Num	NA	G-080-VG-1-17-X
Serial Num	-	22303910
Type	CRE	DOWNBLAST

Test Data		
	Design	**Actual**
CFM	235	259
RL Voltage	-	119
RL Amperage	-	NA
Total ESP	0.200	0.17"

Motor Data		
	Design	**Actual**
Motor MFG	-	BROAD OCEAN
Frame	-	NL
Horsepower	0.10	1/10
Motor Rpm	1725	300-1750
Phase	1	1
Voltage (rated)	115	115/208-230/277
Amperage (rated)	-	1.38/0.84/0.73
Service Factor	-	1

Completed By: Jacob Davidson on 04/16/2024

Notes:
MAX SPEED SETPOINT: 65%

Written By: Jacob Davidson on 04/16/2024

National TAB

Project:Grain Valley Police Station (Grain Valley, MO)

FAN - Exhaust

Diffuser Ret/Exh (GRD)

EF1/DOG WASH

Asset								
Asset Name	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**	**FINAL CFM**	**% to design**
EF1-EGRD1	EG1	12X12	75	0.877	100	124	75	100.0
EF1-EGRD2	EG1	12X12	75	0.877	149	128	78	104.0
EF1-EGRD3	EG1	12X12	50	0.877	85	84	52	104.0
EF1-EGRD4	EG1	12X12	50	0.877	87	89	54	108.0
Total			250		421	425	259	103.6%

Completed By: Jacob Davidson on 04/15/2024

National TAB

Project: Grain Valley Police Station (Grain Valley, MO)

System/Unit: FAN - Exhaust

Asset: EF2 AREA:CELLS

Unit Data		
	Design	**Actual**
MFG	NA	GREENHECK
Model Num	NA	G-080-VG-1-17-X
Serial Num	-	22303907
Type	CRE	DOWNBLAST

Test Data		
	Design	**Actual**
CFM	300	325
RL Voltage	-	121
RL Amperage	-	NA
Total ESP	0.200	0.26"

Motor Data		
	Design	**Actual**
Motor MFG	-	BROAD OCEAN
Frame	-	NL
Horsepower	0.10	1/10
Motor Rpm	1725	300-1725
Phase	1	1
Voltage (rated)	115	115/208-230/277
Amperage (rated)	-	1.38/0.84/0.73
Service Factor	-	1

Completed By: Jacob Davidson on 04/16/2024

National TAB

Project:Grain Valley Police Station (Grain Valley, MO)

FAN - Exhaust

Diffuser Ret/Exh (GRD)

EF2/CELLS

Asset								
Asset Name	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**	**FINAL CFM**	**% to design**
EF2-EGRD1	EG2	12X12	75	1	62	72	76	101.3
EF2-EGRD2	EG2	12X12	75	1	137	169	159	212.0
EF2-EGRD3	EG2	12X12	75	1	23	18	22	29.3
EF2-EGRD4	EG2	12X12	75	1	124	72	68	90.7
Total			300		346	331	325	108.33%

Asset	Notes	Date	Written By
EF2-EGRD2	Damper is stuck. Tech is unable to reduce flow on the diffuser. MC was also unable to free diffuser and was hesitant to break anything.	04/16/2024	Jacob Davidson
EF2-EGRD3	Damper is fully open.	04/16/2024	Jacob Davidson

National TAB

Project: Grain Valley Police Station (Grain Valley, MO)

System/Unit: FAN - Exhaust

Asset: EF3 AREA:WOMEN'S LOCKER/RR

Unit Data		
	Design	**Actual**
MFG	NA	GREENHECK
Model Num	NA	G-095-VG-1-17-X
Serial Num	-	22303904
Type	CRE	DOWNBLAST

Test Data		
	Design	**Actual**
CFM	625	622
RL Voltage	-	121
RL Amperage	-	NA
Total ESP	0.500	0.61

Motor Data		
	Design	**Actual**
Motor MFG	-	BROAD OCEAN
Frame	-	NL
Horsepower	0.16	1/6
Motor Rpm	1725	300-1750
Phase	1	1
Voltage (rated)	115	115/208-230/277
Amperage (rated)	-	2.2/1.7/1.5
Service Factor	-	1

Completed By: Jacob Davidson on 04/16/2024

National TAB

Project:Grain Valley Police Station (Grain Valley, MO)

FAN - Exhaust

Diffuser Ret/Exh (GRD)

EF3/WOMEN'S LOCKER/RR

Asset								
Asset Name	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**	**FINAL CFM**	**% to design**
EF3-EGRD1	EG1	12X12	75	1	94	118	115	153.3
EF3-EGRD2	EG1	12X12	75	1	120	140	127	169.3
EF3-EGRD3	EG1	22X22	100	1	259	124	119	119.0
EF3-EGRD4	EG1	22X22	225	1	178	153	224	99.6
EF3-EGRD5	EG1	12X12	75	1	26	42	33	44.0
EF3-EGRD6	EG1	8X8	75	1	43	45	34	45.3
Total			625		720	622	652	104.32%

Asset	Notes	Date	Written By
EF3-EGRD1	Diffuser needs a damper to reduce flow. MC is to add a damper and reduce the flow.	04/16/2024	Jacob Davidson
EF3-EGRD2	Diffuser needs a damper to reduce flow. MC is to add a damper and reduce the flow.	04/16/2024	Jacob Davidson
EF3-EGRD5	Damper fully open. Diffuser is at the end of long duct where it is difficult to push more air.	04/16/2024	Jacob Davidson
EF3-EGRD6	Damper fully open. Diffuser is at the end of long duct where it is difficult to push more air.	04/16/2024	Jacob Davidson

National TAB

Project: Grain Valley Police Station (Grain Valley, MO)

System/Unit: FAN - Exhaust

Asset: EF4 AREA:MEN'S LOCKER/RR

Unit Data		
	Design	**Actual**
MFG	NA	GREENHECK
Model Num	NA	G-095-VG-1-17-X
Serial Num	-	22303902
Type	CRE	DOWNBLAST

Test Data		
	Design	**Actual**
CFM	700	733
RL Voltage	-	122
RL Amperage	-	1.97
Total ESP	0.500	0.27"

Motor Data		
	Design	**Actual**
Motor MFG	-	BROAD OCEAN
Frame	-	NL
Horsepower	0.16	1/6
Motor Rpm	1725	300-1750
Phase	1	1
Voltage (rated)	115	115/208-230/277
Amperage (rated)	-	2.2/1.3/1.1
Service Factor	-	1

Completed By: Jacob Davidson on 03/21/2024

National TAB

Project:Grain Valley Police Station (Grain Valley, MO)

FAN - Exhaust

Diffuser Ret/Exh (GRD)

EF4/MEN'S LOCKER/RR

Asset									
Asset Name	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**	**FINAL CFM**	**% to design**	**Location**
EF4-EGRD1	EG1	22X2	100	1	55	96	96	96.0	
EF4-EGRD2	EG1	12X12	75	1	75	82	82	109.3	
EF4-EGRD3	EG1	12X12	75	1	75	82	82	109.3	
EF4-EGRD4	EG1	22X22	300	1	187	284	284	94.7	
EF4-EGRD5	EG1	12X12	75	1	205	73	73	97.3	
EF4-EGRD6	EG1	12X12	75	1	203	116	116	154.7	
Total			700		800	733	733	104.71%	

Completed By: Jacob Davidson on 03/20/2024

Asset	Notes	Date	Written By
EF4-EGRD6	DIFFUSER IS FULLY CLOSED. UNABLE TO REDUCE AIRFLOW.	03/20/2024	Jacob Davidson

National TAB

Project: Grain Valley Police Station (Grain Valley, MO)

System/Unit: FAN - Exhaust

Asset: EF5 AREA:PUBLIC RR'S

Unit Data		
	Design	**Actual**
MFG	NA	GREENHECK
Model Num	NA	G-090-VG-1-17-X
Serial Num	-	22303896
Type	CRE	DOWNBLAST

Test Data		
	Design	**Actual**
CFM	450	467
RL Voltage	-	121
RL Amperage	-	1.21
Total ESP	0.200	0.16"

Motor Data		
	Design	**Actual**
Motor MFG	-	BROAD-OCEAN
Frame	-	NL
Horsepower	0.10	1/10
Motor Rpm	1725	300-1750
Phase	1	1
Voltage (rated)	115	115/208-230/277
Amperage (rated)	-	1.38/0.84/0.73
Service Factor	-	1

Completed By: Jacob Davidson on 03/19/2024

Notes:
MAX SPEED SET AT 85%

Written By: Jacob Davidson on 03/19/2024

National TAB

Project:Grain Valley Police Station (Grain Valley, MO)

FAN - Exhaust

Diffuser Ret/Exh (GRD)

EF5/PUBLIC RR'S

Asset								
Asset Name	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**	**FINAL CFM**	**% to design**
EF5-EGRD1	EG1	12X12	225	1	324	259	228	101.3
EF5-EGRD2	EG1	12X12	225	1	228	262	239	106.2
Total			450		552	521	467	103.78%

Completed By: Jacob Davidson on 03/18/2024

National TAB

Project: Grain Valley Police Station (Grain Valley, MO)

System/Unit: FAN - Exhaust

Asset: EF6 AREA:JANITOR

Unit Data		
	Design	**Actual**
MFG	NA	GREENHECK
Model Num	NA	G-097-4-VG-1-19-X
Serial Num	-	22303895
Type	CRE	DOWNBLAST

Test Data		
	Design	**Actual**
CFM	75	80
RL Voltage	-	120
RL Amperage	-	NA
Total ESP	0.200	0.17"

Motor Data		
	Design	**Actual**
Motor MFG	-	BROAD OCEAN
Frame	-	NL
Horsepower	0.25	1/4
Motor Rpm	1725	300-1750
Phase	1	1
Voltage (rated)	115	115/208-230/277
Amperage (rated)	-	2.85/1.7/1.5
Service Factor	-	1

Completed By: Jacob Davidson on 04/15/2024

Notes:
NO ADJUSTMENT TO SPEED

Written By: Jacob Davidson on 04/16/2024

National TAB

Project:Grain Valley Police Station (Grain Valley, MO)

FAN - Exhaust

Diffuser Ret/Exh (GRD)

EF6/JANITOR

Asset								
Asset Name	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**	**FINAL CFM**	**% to design**
EF6-EGRD1	EG1	6X6	75	0.225	84	80	80	106.7
Total			75		84	80	80	106.67%

Completed By: Jacob Davidson on 04/15/2024

National TAB

Project: Grain Valley Police Station (Grain Valley, MO)

System/Unit: FAN - Exhaust

Asset: EF7 AREA:PROPERTY STORAGE

Unit Data		
	Design	**Actual**
MFG	NA	GREENHECK
Model Num	NA	G-120-5-VG-1-19-X
Serial Num	-	22303898
Type	CRE	DOWNBLAST

Test Data		
	Design	**Actual**
CFM	1175	1149
RL Voltage	-	120
RL Amperage	-	NA
Total ESP	0.500	0.39"

Motor Data		
	Design	**Actual**
Motor MFG	-	BROAD OCEAN
Frame	-	NL
Horsepower	0.50	1/2
Motor Rpm	1725	300-1750
Phase	1	1
Voltage (rated)	115	115/208-230/277
Amperage (rated)	-	6.4/3.8/3.2
Service Factor	-	1

Completed By: Jacob Davidson on 04/16/2024

Notes:
MAX SPEED SETPOINT: 80%

Written By: Jacob Davidson on 04/16/2024

National TAB

Project:Grain Valley Police Station (Grain Valley, MO)

FAN - Exhaust

Diffuser Ret/Exh (GRD)

EF7/PROPERTY STORAGE

Asset								
Asset Name	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**	**FINAL CFM**	**% to design**
EF7-EGRD1	EG1	12X8	100	0.510	171	108	90	90.0
EF7-EGRD2	EG1	12X12	350	0.877	249	420	341	97.4
EF7-EGRD3	EG1	12X12	175	0.877	484	235	166	94.9
EF7-EGRD4	EG1	12X12	350	0.877	441	437	368	105.1
EF7-EGRD5	EG1	12X8	200	0.510	173	210	184	92.0
Total			1175		1518	1410	1149	97.79%

Completed By: Jacob Davidson on 04/16/2024

National TAB

Project: Grain Valley Police Station (Grain Valley, MO)

System/Unit: FAN - Exhaust

Asset: EF8 AREA:SALLY PORT

Unit Data		
	Design	**Actual**
MFG	NA	GREENHECK
Model Num	NA	G-120-5-VG-1-19-X
Serial Num	-	22303900
Type	CRE	DOWNBLAST

Test Data		
	Design	**Actual**
CFM	1200	1231
RL Voltage	-	121
RL Amperage	-	4.89
Total ESP	0.500	0.39"

Motor Data		
	Design	**Actual**
Motor MFG	-	BROAD OCEAN
Frame	-	NL
Horsepower	0.50	1/2
Motor Rpm	1725	300-1750
Phase	1	1
Voltage (rated)	115	115/208-230/277
Amperage (rated)	-	6.4/3.8/3.2
Service Factor	-	1

Completed By: Jacob Davidson on 03/21/2024

Notes:
MAX SPEED SET TO 85%

Written By: Jacob Davidson on 03/21/2024

National TAB

Project:Grain Valley Police Station (Grain Valley, MO)

FAN - Exhaust

Diffuser Ret/Exh (GRD)

EF8/SALLY PORT

Asset								
Asset Name	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**	**FINAL CFM**	**% to design**
EF8-EGRD1	EG1	12X10	300	0.678	364	365	328	109.3
EF8-EGRD2	EG1	12X10	300	0.678	335	378	280	93.3
EF8-EGRD3	EG1	12X10	300	0.678	317	380	316	105.3
EF8-EGRD4	EG1	12X10	300	0.678	460	370	307	102.3
Total			1200		1476	1493	1231	102.58%

Completed By: Jacob Davidson on 03/21/2024

National TAB

Project: Grain Valley Police Station (Grain Valley, MO)

System/Unit: FAN - Exhaust

Asset: VF1 AREA:

Unit Data		
	Design	**Actual**
MFG	NA	GREENHECK
Model Num	NA	SQ-70-VGX-QD
Serial Num	-	21669318
Type	INLINE	INLINE

Test Data		
	Design	**Actual**
CFM	100	109

Motor Data		
	Design	**Actual**
Motor MFG	-	NA
Frame	-	NA
Horsepower	0.06	NA
Motor Rpm	1725	NA
Phase	1	NA
Voltage (rated)	115	NA
Amperage (rated)	-	1.3
Service Factor	-	NA

Completed By: Jacob Davidson on 03/20/2024

National TAB

Project: Grain Valley Police Station (Grain Valley, MO)

System/Unit: FAN - Exhaust

Asset: VF2 AREA:

Unit Data		
	Design	**Actual**
MFG	NA	GREENHECK
Model Num	NA	SQ-90-VG1X-QD
Serial Num	-	22223623
Type	INLINE	INLINE

Test Data		
	Design	**Actual**
CFM	250	243

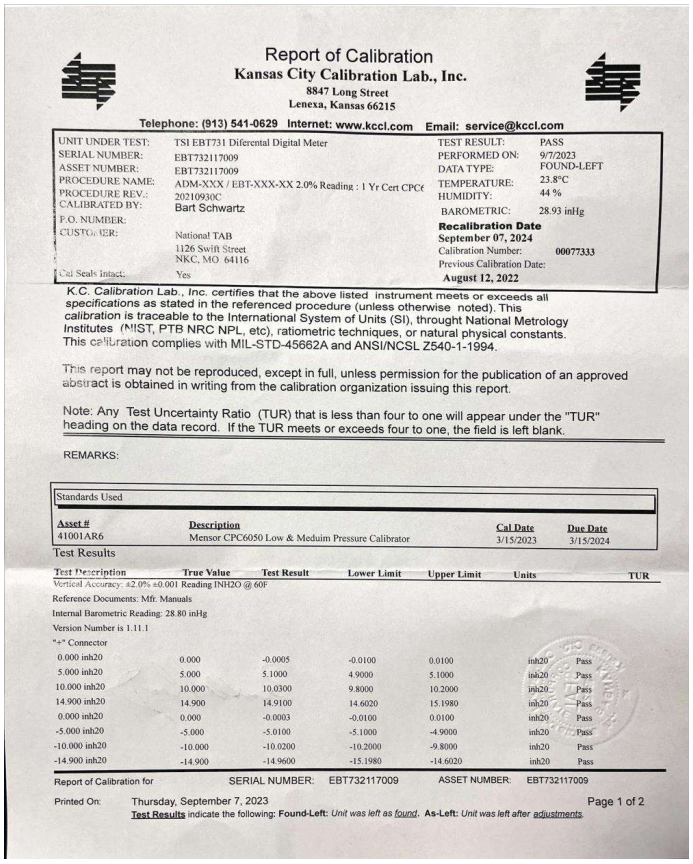
Motor Data		
	Design	**Actual**
Horsepower	0.10	1/10
Motor Rpm	1725	1725
Phase	1	1
Voltage (rated)	115	115
Amperage (rated)	-	1.38
Service Factor	-	1

Completed By: Jacob Davidson on 03/20/2024

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



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 Diferental 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:		**Recalibration Date**	
CUSTOMER:	National TAB 1126 Swift Street NKC, MO 64116	**September 07, 2024**	
		Calibration Number:	00077333
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), throught National Metrology Institutes (NIST, PTB NRC NPL, etc), ratiometric 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:

Standards Used

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

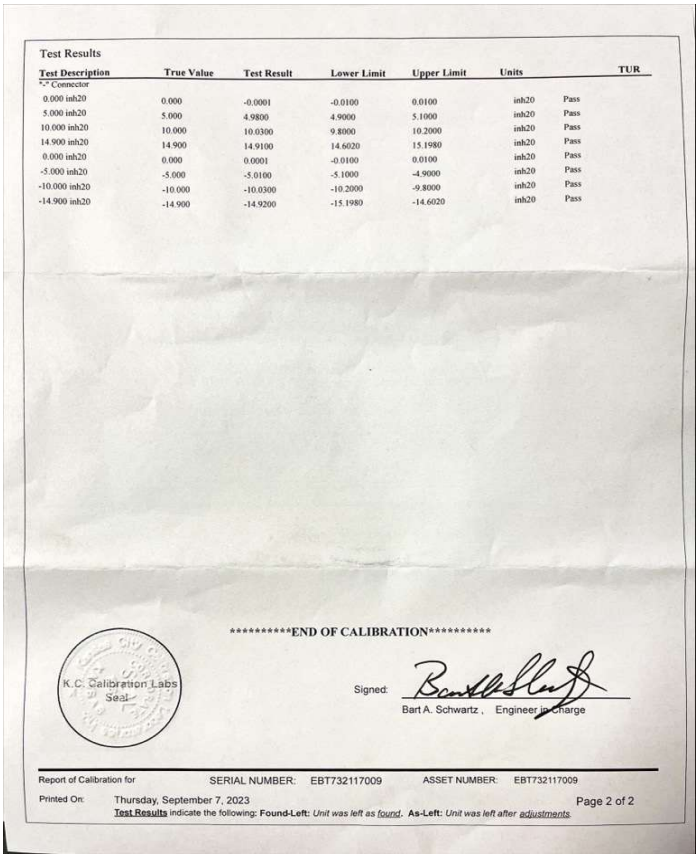
Test Results

Test Description	True Value	Test Result	Lower Limit	Upper Limit	Units	TUR
Vertical Accuracy: ±2.0% ±0.001 Reading INH2O @ 60F						
Reference Documents: Mfr. Manuals						
Internal Barometric Reading: 28.80 inHg						
Version Number is 1.11.1						
"+" Connector						
0.000 inh20	0.000	-0.0005	-0.0100	0.0100	inh20	Pass
5.000 inh20	5.000	5.1000	4.9000	5.1000	inh20	Pass
10.000 inh20	10.000	10.0300	9.8000	10.2000	inh20	Pass
14.900 inh20	14.900	14.9100	14.6020	15.1980	inh20	Pass
0.000 inh20	0.000	-0.0003	-0.0100	0.0100	inh20	Pass
-5.000 inh20	-5.000	-5.0100	-5.1000	-4.9000	inh20	Pass
-10.000 inh20	-10.000	-10.0200	-10.2000	-9.8000	inh20	Pass
-14.900 inh20	-14.900	-14.9600	-15.1980	-14.6020	inh20	Pass

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 Results

Test Description	True Value	Test Result	Lower Limit	Upper Limit	Units	TUR
"+" Connector						
0.000 inh20	0.000	-0.0001	-0.0100	0.0100	inh20	Pass
5.000 inh20	5.000	4.9800	4.9000	5.1000	inh20	Pass
10.000 inh20	10.000	10.0300	9.8000	10.2000	inh20	Pass
14.900 inh20	14.900	14.9100	14.6020	15.1980	inh20	Pass
0.000 inh20	0.000	0.0001	-0.0100	0.0100	inh20	Pass
-5.000 inh20	-5.000	-5.0100	-5.1000	-4.9000	inh20	Pass
-10.000 inh20	-10.000	-10.0300	-10.2000	-9.8000	inh20	Pass
-14.900 inh20	-14.900	-14.9200	-15.1980	-14.6020	inh20	Pass

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

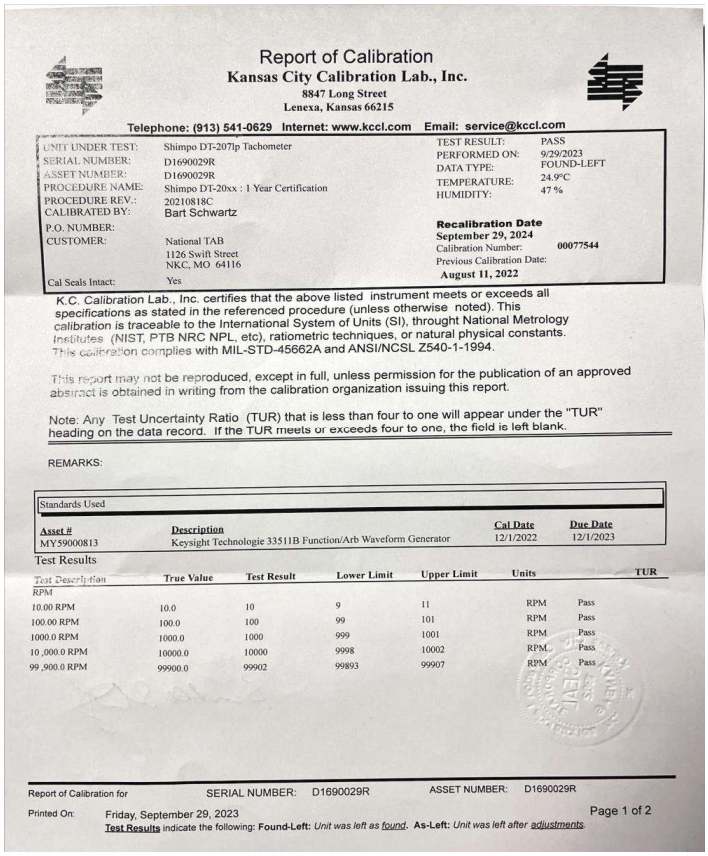
K.C. Calibration Labs Seal

Signed: Bart A. Schwartz , Engineer in Charge

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*.



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-207lp 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:		**Recalibration Date**	
CUSTOMER:	National TAB 1126 Swift Street NKC, MO 64116	**September 29, 2024**	
		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), throught National Metrology Institutes (NIST, PTB NRC NPL, etc), ratiometric 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:

Standards Used

Asset #	Description	Cal Date	Due Date
MY59000813	Keysight Technologie 33511B Function/Arb Waveform Generator	12/1/2022	12/1/2023

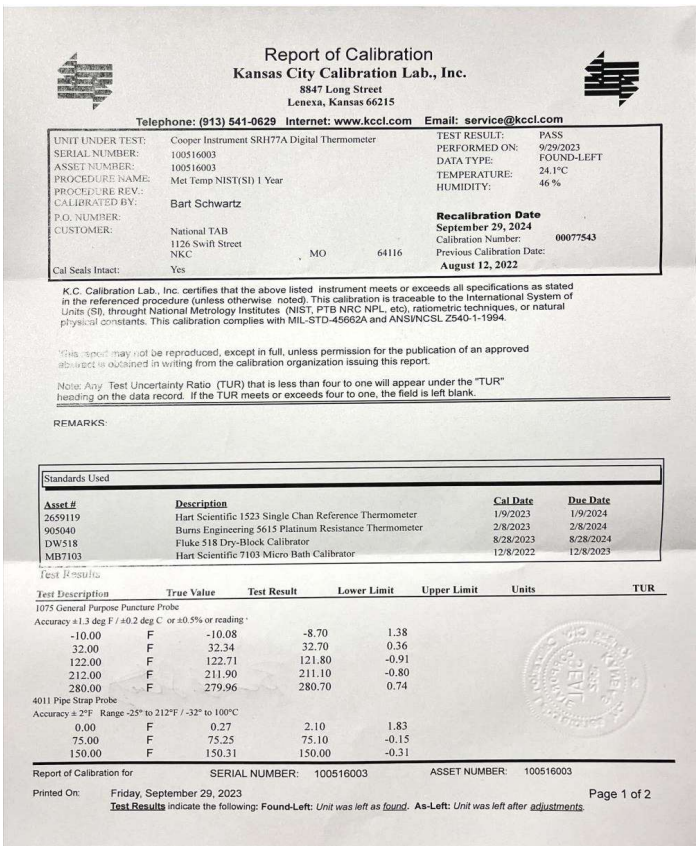
Test Results

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 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*.



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:		**Recalibration Date**	
CUSTOMER:	National TAB 1126 Swift Street NKC, MO 64116	**September 29, 2024**	
		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), throught National Metrology Institutes (NIST, PTB NRC NPL, etc), ratiometric 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:

Standards Used

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
DW518	Fluke 518 Dry-Block Calibrator	8/28/2023	8/28/2024
MB7103	Hart Scientific 7103 Micro Bath Calibrator	12/8/2022	12/8/2023

Test Results

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% or 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 Strap Probe						
Accuracy ± 2°F 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		

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 Results

Test Description	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 a						
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**********

K.C. Calibration Labs Seal

Signed: Bart A. Schwartz , Engineer in Charge

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

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

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**	
CUSTOMER:	National TAB 1126 Swift Street NKC, MO 64116	**September 29, 2024**	
		Calibration Number:	00077542
		Previous Calibration Date:	
Cal Seals Intact:	Unknown		

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), throught National Metrology Institutes (NIST, PTB NRC NPL, etc), ratiometric techniques, or natural physical constants. This calibration complies with MIL-STD-45662A and ANSI/NCSL Z540-1-1994.

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

Test Description	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	59.000	58.97	58.24	59.76	V	Pass
600 V Range						
590.0 V @ 60 Hz	590.00	589.7	582.4	597.6	V	Pass
1000 V Range						
990.0 V @ 60 Hz	990.00	991.0	970.1	1009.9	V	Pass
DC VOLTS TESTS						
600 mV Range						
600.0 mV	600.00	599.8	593.2	606.8	m V	Pass

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

Printed On: Friday, September 29, 2023 Page 1 of 3

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

Test Results

Test Description	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	60.000	59.96	59.37	60.63	V	Pass
600 V Range						
600.0 V	600.00	599.6	593.7	606.3	V	Pass
1000 V Range						
1000 V	1000.0	1001	985	1015	V	Pass
-1000 V	-1000.0	-1001	-1015	-985	V	Pass
CONTINUITY TESTS						
Audible Indicator ON @ 10 ohms						Pass
Audible Indicator OFF @ 51 ohms						Pass
RESISTANCE TESTS						
600 Ohm Range						
600.0 Ohm	600.00	601.2	590.5	609.5	Ω	Pass
6 kOhm Range						
6.000 kOhm	6.0000	6.000	5.905	6.095	k Ω	Pass
60 kOhm Range						
60.00 kOhm	60.000	59.99	59.05	60.95	k Ω	Pass
600 kOhm Range						
600.0 kOhm	600.00	599.9	590.5	609.5	k Ω	Pass
6 MOhm Range						
6.000 MOhm	6.0000	5.993	5.905	6.095	M Ω	Pass
60 MOhm Range						
60.00 MOhm	60.000	59.47	58.70	61.30	M Ω	Pass
DIODE CHECK TESTS						
Diode Voltage						Pass
FREQUENCY TESTS						
9.000 Hz @ 8 V	9.0000	8.999	8.905	9.095	Hz	Pass
90.00 Hz @ 8 V	90.000	90.00	89.05	90.95	Hz	Pass
900.0 Hz @ 8 V	900.00	900.0	890.5	909.5	Hz	Pass
9.000 kHz @ 8 V	9.0000	9.000	8.905	9.095	k Hz	Pass
90.00 kHz @ 8 V	90.000	90.00	89.05	90.95	k Hz	Pass
100.0 kHz @ 8 V	100.00	100.0	98.5	101.5	k Hz	Pass
DUTY CYCLE						
50.0 % @ 1 kHz	50.00	50.3	49.3	50.8	%	Pass
CAPACITANCE TESTS						
60 nF Range						
59.00 nF	59.000	59.96	55.70	62.30	n F	Pass
600 nF Range						
590.0 nF	590.00	597.1	571.8	608.2	n F	Pass
6 uF Range						
5.900 µF	5.9000	5.854	5.718	6.082	µ F	Pass
60 uF Range						
59.00 µF	59.000	58.87	57.18	60.82	µ F	Pass

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

Printed On: Friday, September 29, 2023 Page 2 of 3

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

Test Results

Test Description	True Value	Test Result	Lower Limit	Upper Limit	Units	TUR
600 uF Range						
590.0 µF	590.00	590.6	560.0	620.0	µ F	Pass
6000 uF Range						
5900 µF	5900.0	5957	5600	6200	µ F	Pass
TEMPATURE F TESTS						
-14 °F	-14.0	-10	-23	-5	°F	Pass
100 °F	100.0	102	94	106	°F	Pass
500 °F	500.0	502	490	510	°F	Pass
900 °F	900.0	902	873	927	°F	Pass
TEMPATURE C TESTS						
-25 °C	-25.0	-23	-31	-20	°C	Pass
100 °C	100.0	102	96	104	°C	Pass
350 °C	350.0	351	344	357	°C	Pass
500 °C	500.0	501	485	515	°C	Pass
AC CURRENT TESTS						
60 A Range						
50.00 A @ 60 Hz	50.000	49.60	48.92	51.08	A	Pass
50.00 A @ 400 Hz	50.000	50.00	48.92	51.08	A	Pass
400 A Range						
500.0 A @ 60 Hz	500.00	494.2	489.5	510.5	A	Pass
500.0 A @ 100 Hz	500.00	494.4	489.5	510.5	A	Pass
60 A Range						
50.00 A	50.000	49.20	48.92	51.08	A	Pass
600 A Range						
300.0 A	300.00	296.5	293.5	306.5	A	Pass
590.0 A	590.00	582.7	577.7	602.3	A	Pass

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

K.C. Calibration Labs Seal

Signed: Bart A. Schwartz , Engineer in Charge

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

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

Abbreviation List

A = Area (ft^2)	S.F. = Service Factor
AHU = Air Handling Unit	SF = Supply Fan
A_k = 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_{ma} = Mixed Air Temperature
CL = Center Distance (used in belt formula)	T_{oa} = Outside Air Temperature
CD = Ceiling Diffuser	T_{ra} = Return Air Temperature
CF = Correction Factor	H = Head (in wc, ft wc, psi)
CFM = Volumetric Flow: Cubic Feet Per Minute	h = Enthalpy
CO2 = Carbon Dioxide	HP = Horsepower
CO = Carbon Monoxide	hr = Hour
C_v = Flow Constant	K_v = 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_{ra} = Return Air Temperature
psid = PSI Differential	TS = Tip Speed (fpm) IP, (m/s) SI
r = Radius (in)	TSP = Total Static Pressure
$\%_{ra}$ = % 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