

**Report By:**

National TAB  
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**Report: Anderson GME (Cincinnati, OH)**

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

**Date: 07/13/2023**

# PROJECT

## Anderson GME (Cincinnati, OH)

8000 FIVE MILE RD

CINCINNATI, OH

### Client

Mechanical Optimizers

2145 Patterson Street

Cincinnati, OH 45214

# National TAB

Project: Anderson GME (Cincinnati, OH)

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# CERTIFICATION



**PROJECT:** Anderson GME (Cincinnati, OH)

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 Standards for Testing, Adjusting, and Balancing of Environmental Systems*. Any variances from design quantities, which exceed NEBB tolerances, are noted in the Test-Adjust-Balance Report Project Summary.

The air distribution system has been tested and balanced and final adjustments have been made in accordance with NEBB standards and the project specifications.

**NEBB TAB FIRM:** National TAB

**REGISTRATION NO:** 3629

**CERTIFIED BY:** Joe Hertenstein

**DATE:** 7/7/2023

The hydronic distribution system has been tested and balanced and final adjustments have been made in accordance with NEBB standards and the project specifications.

**NEBB TAB FIRM:** National TAB

**REGISTRATION NO:** 3629


**CERTIFIED BY:** Joe Hertenstein

**DATE:** \_\_\_\_\_

## Submitted and Certified by:

**NEBB TAB FIRM:** National TAB

**TAB PROFESSIONAL:** Joe Hertenstein

**SIGNATURE:** 

**REGISTRATION NO:** 3629

**CERTIFICATION EXP:** 12/31/2023





# 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 Alnor EBT 731 S/N EBT732044025	11/17/2022	11/17/2023
	AIR VELOCITY INSTRUMENT	50 fpm to 3900 fpm	+/- 5 % +/- 7 fpm	TSI Alnor EBT 731 S/N EBT732044025	11/17/2022	11/17/2023
	DIRECT HOOD READING	100 cfm to 2000 cfm	+/- 5 % +/- 7 cfm	TSI Alnor EBT 731 S/N EBT732044025	11/17/2022	11/17/2023
TEMPERATURE	AIR METER	-20 F to 240 F	+/- .5 % 2 F	Cooper ATKINS - SRH77A S/N 071118034	6/6/2023	6/6/2024
	AIR PROBE	-20 F to 240 F	+/- .5 % 2 F	Cooper ATKINS - PD1388 7-6 S/N 5028	6/6/2023	6/6/2024
	IMMERSION METER	-20 F to 240 F	+/- .5 % 2 F	Cooper ATKINS - SRH77A S/N 071118034	6/6/2023	6/6/2024
	IMMERSION PROBE	-20 F to 240 F	+/- .5 % 2 F	Cooper ATKINS - PD1388 7-6 S/N 1075	6/6/2023	6/6/2024
	CONTACT METER	-20 F to 240 F	+/- .5 % 2 F	Cooper ATKINS - SRH77A S/N 071118034	6/6/2023	6/6/2024
	CONTACT PROBE	-20 F to 240 F	+/- .5 % 2 F	Cooper ATKINS - PD1388 7-6 S/N 4011	6/6/2023	6/6/2024
HUMIDITY	HUMIDITY PROBE	10 % RH to 90 % RH	3% of reading	Cooper ATKINS - SRH77A S/N 071118034	6/6/2023	6/6/2024
ELECTRICAL	VOLTAGE MEASUREMENT	0 VAC to 600 VAC	2 % reading +/- 5 digits	Fluke 373 True RMS, S/N: 33290686	6/1/2023	6/1/2024
	AMPERAGE MEASUREMENT	0 Amperes to 100 Amperes	2 % reading +/- 5 digits	Fluke 373 True RMS, S/N: 33290686	6/1/2023	6/1/2024
ROTATION	ROTATION MEASUREMENT	60 rpm to 5000 rpm	2 % reading 2 rpm	SHIMPO DT-207LR S/N: D1530081R	6/1/2023	6/1/2024
HYDRONIC	PRESSURE MEASUREMENT	-30 in Hg to 200 psi	±2% of reading +/- 1 psi	Alnor HM675 S/N: 72214041	5/2023	5/2024
	DIFFERENTIAL PRESSURE MEASUREMENT	0 psi - 80 psi	±2% of reading +/- 1 psi	Alnor HM675 S/N: 72214041	5/2023	5/2024

## 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

**Project: Anderson GME**  
**Address: 8000 Five Mile Rd. Cincinnati, OH**

## Summary

Work performed includes balancing VAV, associated air devices, and (4) Exhaust grilles. All work was able to be successfully balanced within 10% of design.

# National TAB

**Project: Anderson GME**  
**Address: 8000 Five Mile Rd. Cincinnati, OH**

**Asset: VAV's (EXISTING)**

<b>Asset</b>	<b>Area Served</b>	<b>Type</b>	<b>Size</b>	<b>Design Max CFM</b>	<b>Actual Max CFM</b>	<b>Ak (max)</b>
VAV-1	104	VAV	8	490	481	0.63
VAV-2	101	VAV	8	425	431	0.86
VAV-3	108	VAV	14	1550	1531	0.38
VAV-4	131	VAV	10	1325	1365	0.57
VAV-5	128	VAV	12	1730	1775	0.76
VAV-6	115	VAV	14	1805	1826	0.69
VAV-8	120	VAV	6	375	383	0.61
VAV-10	142	VAV	8	250	254	1.31

# National TAB

**Project: Anderson GME**  
**Address: 8000 Five Mile Rd. Cincinnati, OH**

**Asset: SUPPLY**

Asset	Area Served	Type	Size	DESIGN CFM	Prelim CFM	FINAL CFM	% to design
1-1	103	CD	8	225	115	217	0.96
1-2	104	CD	8	225	171	222	0.99
1-3	105	CD	6	40	148	42	1.05
<b>VAV-1</b>				<b>490</b>		<b>481</b>	<b>0.98</b>
2-1	101	CD	8	125	225	118	0.94
2-2	101	CD	8	125	0	126	1.01
2-3	104	CD	8	125	236	133	1.06
2-4	HALL	CD	6	50	209	54	1.08
<b>VAV-2</b>				<b>425</b>		<b>431</b>	<b>1.01</b>
3-1	108	CD	10	250	184	237	0.95
3-2	131	CD	10	200	226	202	1.01
3-3	108	CD	10	225	215	240	1.07
3-4	106	CD	10	325	201	317	0.98
3-5	106	CD	10	300	184	289	0.96
3-6	131	CD	10	250	192	246	0.98
<b>VAV-3</b>				<b>1550</b>		<b>1531</b>	<b>0.99</b>
4-1	131	CD	10	300	412	320	1.07
4-2	131	CD	10	300	218	317	1.06
4-3	131	CD	6	125	0	118	0.94
4-4	131	CD	6	125	311	124	0.99
4-5 [1]	[2]	CD	6	50	76	49	0.98
4-6	131	CD	6	125	140	126	1.01
4-7	HALL	CD	6	50	28	52	1.04
4-8	144	CD	6	100	0	101	1.01
4-9 [1]	HALL	CD	6	50	145	52	1.04
4-10	140	CD	6	50	88	55	1.10
4-11 [1]	[2]	CD	6	50	101	51	1.02
<b>VAV-4</b>				<b>1325</b>		<b>1365</b>	<b>1.03</b>

# National TAB

**Project: Anderson GME**  
**Address: 8000 Five Mile Rd. Cincinnati, OH**

**Asset: SUPPLY**

Asset	Area Served	Type	Size	DESIGN CFM	Prelim CFM	FINAL CFM	% to design
5-1	131	CD	10	250	287	262	1.05
5-2	131	CD	10	275	329	289	1.05
5-3	109	CD	8	100	127	104	1.04
5-4	109	CD	6	90	162	91	1.01
5-5	130	CD	6	75	55	77	1.03
5-6	109	CD	8	100	0	105	1.05
5-7	129	CD	8	125	148	117	0.94
5-8	128	CD	6	80	118	84	1.05
5-9	127	CD	6	80	88	77	0.96
5-10	136	CD	6	100	71	105	1.05
5-11	126	CD	6	75	96	76	1.01
5-12	109	CD	6	90	75	85	0.94
5-13	125	CD	6	40	23	42	1.05
5-14	137	CD	6	100	124	103	1.03
5-15	138	CD	6	75	97	80	1.07
5-16	124	CD	6	75	88	78	1.04
<b>VAV-5</b>				<b>1730</b>		<b>1775</b>	<b>1.03</b>
6-1	116	CD	8	275	315	262	0.95
6-2	116	CD	8	275	295	269	0.98
6-3	117	CD	8	225	280	233	1.04
6-4	119	CD	8	250	267	271	1.08
6-5	119	CD	8	250	215	254	1.02
6-6	115	CD	8	115	194	119	1.03
6-7	114	CD	4	25	30	23	0.92
6-8	113	CD	8	100	116	107	1.07
6-9	112	CD	6	80	128	82	1.03
6-10	111	CD	6	80	92	78	0.98
6-11	110	CD	6	80	99	75	0.94
6-12 [1]	[2]	CD	6	50	105	53	1.06
<b>VAV-6</b>				<b>1805</b>		<b>1826</b>	<b>1.01</b>

# National TAB

**Project: Anderson GME**  
**Address: 8000 Five Mile Rd. Cincinnati, OH**

**Asset: SUPPLY**

Asset	Area Served	Type	Size	DESIGN CFM	Prelim CFM	FINAL CFM	% to design
8-1	139	CD	6	75	118	77	1.03
8-2	120	CD	8	150	142	148	0.99
8-3	123	CD	6	150	196	158	1.05
<b>VAV-8</b>				<b>375</b>		<b>383</b>	<b>1.02</b>
10-1	HALL	CD	6	50	46	52	1.04
10-2	142	CD	6	75	92	77	1.03
10-3	HALL	CD	6	50	85	46	0.92
10-4	141	CD	6	75	99	79	1.05
<b>VAV-10</b>				<b>250</b>		<b>254</b>	<b>1.02</b>

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**Project: Anderson GME**  
**Address: 8000 Five Mile Rd. Cincinnati, OH**

**Asset: EXHAUST [1]**

<b>Asset</b>	<b>Area Served</b>	<b>Type</b>	<b>Size</b>	<b>DESIGN CFM</b>	<b>Prelim CFM</b>	<b>FINAL CFM</b>	<b>% to design</b>
E1-1	118	EG	12X12	50	113	52	1.04
E1-2	114	EG	12X12	50	127	55	1.10
E1-3	107	EG	12X12	50	74	51	1.02
E1-4	105	EG	12X12	50	65	50	1.00