Report By:

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

Report: 5.11 (Lexington, KY) TAB Report

Function: Test, Adjust, & Balance

Date: 07/31/2023

PROJECT

5.11 (Lexington, KY)

2304 Barton Way

Lexington, KY 40509

Client

Champion Commercial HVAC

2638 Tem Mile Rd.

Melbourne, KY 41059

National TAB

Project: 5.11 (Lexington, KY)

Table Of Contents

CERTIFICATION

PROJECT: 5.11 (Lexington, KY)

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:	7/24/2023

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:	Joe Hertenstein
REGISTRATION NO:	3629
CERTIFICATION EXP:	12/31/2023

National TAB

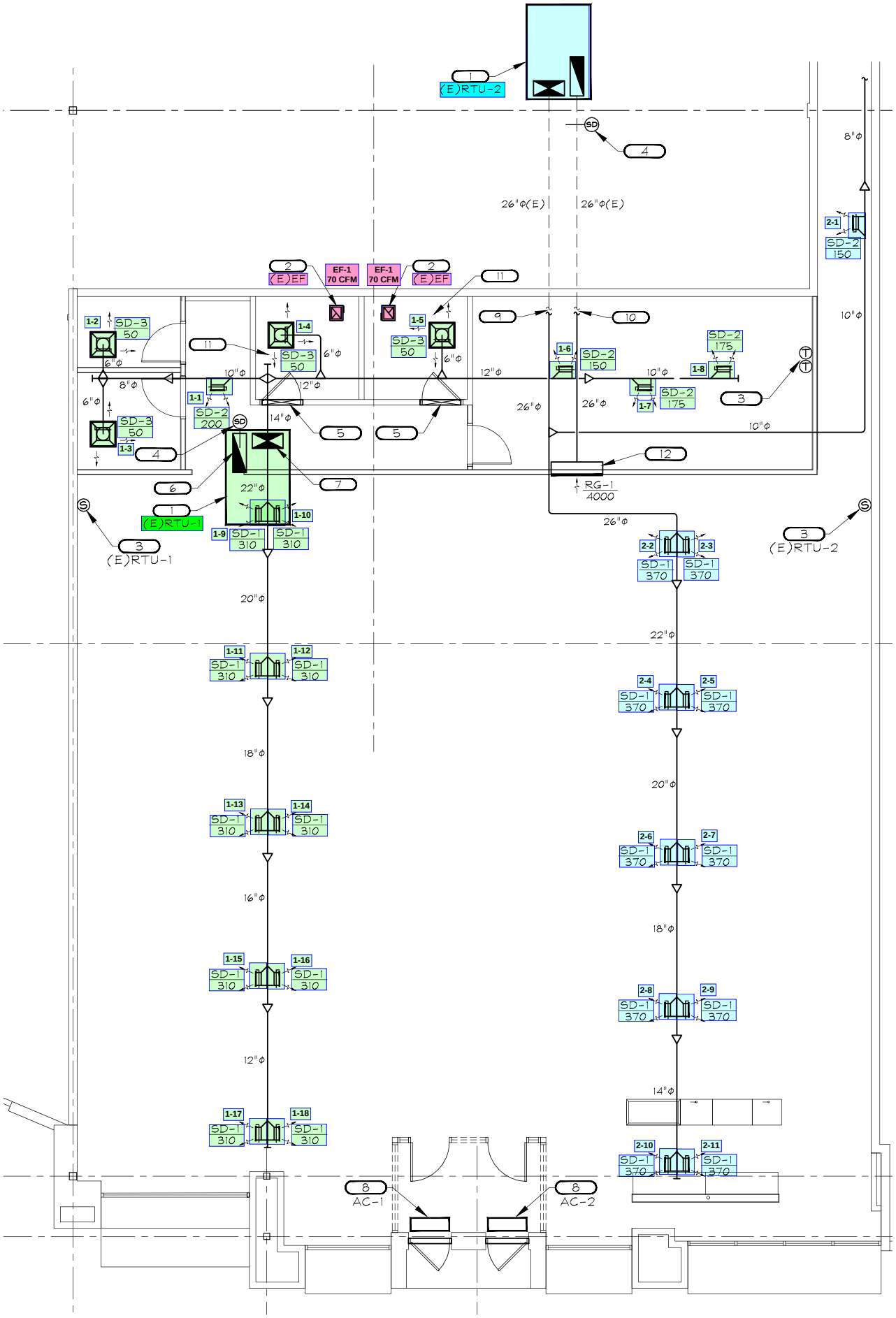
Testing, Adjusting, and Balancing Equipment

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 Amperers 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^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

Summary:
Included in this report is Test and Balance data for two rooftop units for the 5.11 location in Lexington KY. Note that exhaust fans were landlord supplied and not a part of the scope. TAB for the RTUs was completed by reading all terminal devices with a flow hood or velocity matrix to establish unit total flow. The units were then adjusted to design flow as needed via motor pulley adjustments. Once units were in the design flow for the terminal devices was adjusted to +/-10% of the design unless otherwise noted. The outdoor air was set for the rooftop units by measuring the air intake filter velocity and adjusting the minimum OA damper position until the outdoor air was at design.



MECHANICAL PLAN

2. EXISTING EXHAUST FAN / EXHAUST AIR GRILLE TO REMAIN AND BE REUSED. MECHANICAL CONTRACTOR SHALL REFURBISH TO PROPER WORKING CONDITIONS. ENSURE EXHAUST FAN / GRILLE IS SET TO SUPPLY A MINIMUM 70 CFM EXHAUST AIR, RE-BALANCE AS REQUIRED.

National TAB

Project: 5.11 Tactical

Address: 2304 Sir Barton Way, Ste 130 Lexington, KY

Asset: RTU-1 (EXISTING)

Unit Data	
Manufacturer	CARRIER
Model Num	48HCDD12B2A5A0F0A0
Serial Num	3112G10409
Configuration	VERTICAL
Num OA Filters	1
OA Filter Size	36X20
Num PreFilter	4
PreFilter Size	20X20X2

Test Data		
	Design	**Actual**
SF CFM	4000	4028
SF RPM		973
RA CFM	3200	3208
OA CFM	800	820
RL VOLTAGE	208-230	211.6/211.4/212.2
RL AMPERAGE		6.88/6.89/7.49
OA Damper Position		1"
Brake Horsepower		2.21

Motor Data	
Motor MFG	MARATHON
Frame	56HZ
Horsepower	3.7
Motor RPM	1725
Phase	3
Rated Voltage	208-230
Rated Amperage	11.7/11.4
Service Factor	1.15

Performance Data		
	Design	**Actual**
Fan Suction SP		-1.16"
Fan Discharge SP		0.75"
Fan Total SP		1.91"
DX Coil PD *		0.44"
Pre Filter PD		*combined
Total ESP		1.49"

National TAB

Project: 5.11 Tactical

Address: 2304 Sir Barton Way, Ste 130 Lexington, KY

Asset: RTU-1 SUPPLY

Asset	Area Served	Type	Size	DESIGN CFM	Prelim CFM	FINAL CFM	% to design
1-1	BOH HALL	SD-2	8X6	200	209	204	1.02
1-2	OFFICE	SD-3	24X24	50	82	54	1.08
1-3	OFFICE	SD-3	24X24	50	85	50	1.00
1-4	RESTROOM	SD-3	24X24	50	72	52	1.04
1-5	RESTROOM	SD-3	24X24	50	82	54	1.08
1-6	BOH	SD-2	8X6	150	120	155	1.03
1-7	BOH	SD-2	8X6	175	144	180	1.03
1-8	BOH	SD-2	8X6	175	129	169	0.97
1-9	SALES	SD-1	14X6	310	409	314	1.01
1-10	SALES	SD-1	14X6	310	387	321	1.04
1-11	SALES	SD-1	14X6	310	290	301	0.97
1-12	SALES	SD-1	14X6	310	278	289	0.93
1-13	SALES	SD-1	14X6	310	266	289	0.93
1-14	SALES	SD-1	14X6	310	340	298	0.96
1-15	SALES	SD-1	14X6	310	360	332	1.07
1-16	SALES	SD-1	14X6	310	345	315	1.02
1-17	SALES	SD-1	14X6	310	330	329	1.06
1-18	SALES	SD-1	14X6	310	409	322	1.04
RTU-1				**4000**	4337	**4028**	**1.01**

National TAB

Project: 5.11 Tactical

Address: 2304 Sir Barton Way, Ste 130 Lexington, KY

Asset: RTU-2 (EXISTING)

Unit Data	
Manufacturer	CARRIER
Model Num	48HCDD12B2A5A0F0A0
Serial Num	3112G10408
Configuration	VERTICAL
Num OA Filters	1
OA Filter Size	36X20
Num PreFilter	4
PreFilter Size	20X20X2

Test Data		
	Design	**Actual**
SF CFM	4000	4048
SF RPM		974
RA CFM	3200	3216
OA CFM	800	832
RL VOLTAGE	208-230	209.2/209.4/210
RL AMPERAGE		8.18/7.27/7.24
OA Damper Position		1"
Brake Horsepower		2.38

Motor Data	
Motor MFG	MARATHON
Frame	56HZ
Horsepower	3.7
Motor RPM	1725
Phase	3
Rated Voltage	208-230
Rated Amperage	11.7/11.4
Service Factor	1.15

Performance Data		
	Design	**Actual**
Fan Suction SP		-1.19"
Fan Discharge SP		0.70"
Fan Total SP		1.89"
DX Coil PD *		*0.44"
Pre Filter PD		*combined
Total ESP		1.45"

National TAB

Project: 5.11 Tactical

Address: 2304 Sir Barton Way, Ste 130 Lexington, KY

Asset: RTU-2 SUPPLY

Asset	Area Served	Type	Size	DESIGN CFM	Prelim CFM	FINAL CFM	% to design
2-0	HALL	SD-2	8X6	150	171	155	1.03
2-1	HALL	SD-2	8X6	150	182	151	1.01
2-2	SALES	SD-1	14X6	370	364	371	1.00
2-3	SALES	SD-1	14X6	370	379	364	0.98
2-4	SALES	SD-1	14X6	370	396	367	0.99
2-5	SALES	SD-1	14X6	370	329	380	1.03
2-6	SALES	SD-1	14X6	370	342	381	1.03
2-7	SALES	SD-1	14X6	370	366	371	1.00
2-8	SALES	SD-1	14X6	370	381	384	1.04
2-9	SALES	SD-1	14X6	370	367	372	1.01
2-10	SALES	SD-1	14X6	370	391	380	1.03
2-11	SALES	SD-1	14X6	370	394	372	1.01
				4000	**4062**	**4048**	**1.01**