Report By:

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

NATIONAL TAB

Comfort. Under control.

Report: TAB REPORT
Function: Test, Adjust, & Balance
Date: 05/09/2023

PROJECT

Sleep Outfitters (Kansas City, MO)

8992 NW Skyview

Kansas City, MO 64154

Client

AFC HEATING & COOLING
824 NW MAIN STREET

LEE'S SUMMIT, MO 64086

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Project: Sleep Outfitters (Kansas City, MO)

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CERTIFICATION

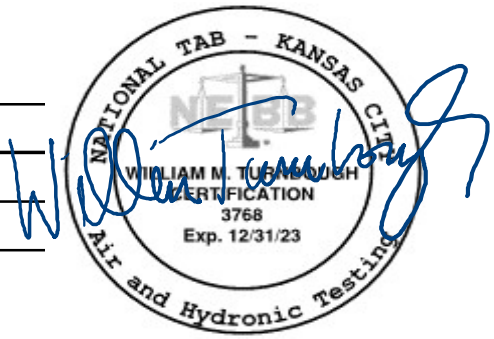
PROJECT: SLEEP OUTFITTERS (KANSAS CITY, MO)

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:	6/14/2023

Submitted and Certified by:

NEBB TAB FIRM:	National TAB - Kansas City
TAB PROFESSIONAL:	Will Turnbough
REGISTRATION NO:	CP-24289
CERTIFICATION EXP:	12/31/2023



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 (Roof Top Units) w/ Diffusers

Each of the RTU's were measured at their terminal devices or via traverse to establish a total flow for that unit. Each RTU was adjusted to within tolerance of the engineer's design flow. Each outlet was then adjusted to within tolerance of the design flow. Outside air was measured by reading the intake air opening with a velocity grid and multiplying by the free area. The outside air damper was adjusted until the airflow was within the design requirements. Any equipment that fell outside of that 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: Sleep Outfitters (Kansas City, MO)

System/Unit: AHU/RTU

Asset: (E)RTU-1 AREA:105

Unit Data		
	Design	**Actual**
MFG	NA	CARRIER
Serial Num	-	0608G50282
Model Num	NA	48TME007---501--
Configuration	-	VERTICAL
Num OA Filters 1	-	1 METAL MESH
OA Filter Size 1	-	14X28
Num PreFilter 1	-	2
PreFilter Size 1	-	16X25X2

Motor Data		
	Design	**Actual**
Motor MFG	-	GENERAL ELECTRIC
Frame	-	56Y
Horsepower	-	NL
Motor Rpm	-	1725
Phase	-	3
Rated Voltage	-	208-230/460
Rated Amperage	-	5.2/2.6
Service Factor	-	1.15

Drive Data		
	Design	**Actual**
Motor Sheave Size	-	4"
Motor Bore Size	-	5/8"
Motor Sheave SetPt	-	0 TURNS OUT
Fan Sheave Size	-	4.75"
Fan Sheave Bore	-	1-3/16"
Belt CL Distance	-	14.25"
Num of Belts	-	1
Belt Size	-	AX40

Test Data		
	Design	**Actual**
SF CFM	2400	1906
SF RPM	-	1491
RA CFM	2105	1599
OA CFM	295	307
RL Voltage	-	208/209/209
RL Amperage	-	4.29/4.37/4.21
OA Damper Position	-	11/16" GAP

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.47"
Fan Suction SP	-	-1.03"
Fan Discharge SP	-	0.95"
Total ESP	-	1.42"
Fan Total SP	-	1.98"

Completed By: Michael Gabbert on

Notes:MOTOR PULLEY MAXIMIZED. AIRFLOW IS 80% OF DESIGN. PULLEY CHANGE REQUIRED TO INCREASE AIRFLOW FURTHER. DIFFUSERS BALANCED PROPORTIONALLY LOW.

Date:06/14/2023

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Diffuser Supply (GRD)

(E)RTU-1/105

Asset							
Asset Name	Location	Type	Size	DESIGN CFM	CFM(1)	FINAL CFM	% to design
1-1	102	SD-E	12"	540	435	435	80.6
1-2	106	SD-E	12"	565	476	476	84.2
1-3	102	SD-E	12"	540	420	420	77.8
1-4	104	SD-E	8"	70	52	52	74.3
1-5	103	SD-E	12"	355	278	278	78.3
1-6	105	SD-E	12"	330	245	245	74.2

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Project: Sleep Outfitters (Kansas City, MO)

System/Unit: AHU/RTU

Asset: (E)RTU-2 AREA:101

Unit Data		
	Design	**Actual**
MFG	NA	CARRIER
Serial Num	-	0708G20694
Model Num	NA	48TME008---501--
Configuration	-	VERTICAL
Num OA Filters 1	-	1 METAL MESH
OA Filter Size 1	-	19X35
Num PreFilter 1	-	4
PreFilter Size 1	-	16X20X2

Motor Data		
	Design	**Actual**
Motor MFG	-	GENERAL ELECRTRIC
Frame	-	56Y
Horsepower	-	NL
Motor Rpm	-	1725
Phase	-	3
Rated Voltage	-	208-230/460
Rated Amperage	-	5.2/2.6
Service Factor	-	1.15

Drive Data		
	Design	**Actual**
Motor Sheave Size	-	3.75"
Motor Bore Size	-	5/8"
Motor Sheave SetPt	-	0 TURNS OUT
Fan Sheave Size	-	7.25"
Fan Sheave Bore	-	1"
Belt CL Distance	-	16.5"
Num of Belts	-	1
Belt Size	-	AX48

Test Data		
	Design	**Actual**
SF CFM	3000	2687
SF RPM	-	805
RA CFM	2455	2167
OA CFM	545	520
RL Voltage	-	207/208/209
RL Amperage	-	3.81/3.89/3.99
OA Damper Position	-	3/8" GAP

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.51"
Fan Suction SP	-	-0.81"
Fan Discharge SP	-	0.55"
Total ESP	-	1.06"
Fan Total SP	-	1.36"

Completed By: Michael Gabbert on

Notes:MOTOR PULLEY MAXIMIZED. AIRFLOW IS 89% OF DESIGN. PULLEY CHANGE REQUIRED TO INCREASE AIRFLOW FURTHER.

Date:05/10/2023

Comfort. Under control.

Diffuser Supply (GRD)

(E)RTU-2/101

Asset						
Asset Name	Location	Type	DESIGN CFM	CFM(1)	FINAL CFM	% to design
2-1	102	SD-E	370	370	370	100.0
2-2	102	SD-E	370	455	455	123.0
2-3	102	SD-E	380	373	373	98.2
2-4	102	SD-E	380	302	302	79.5
2-5	102	SD-E	370	332	332	89.7
2-6	102	SD-E	370	264	264	71.4
2-7	101	SD-E	380	287	287	75.5
2-8	101	SD-E	380	304	304	80.0

Asset	Notes	Date
2-1	DAMPER HANDLES STUCK UNDER PANDUIT STRAPS. UNABLE TO PROPORTIONALLY BALANCE DIFFUSERS.	06/14/2023

National TAB

Project: Sleep Outfitters (Kansas City, MO)

System/Unit: FAN - Exhaust

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Asset: EF1 AREA:

Unit Data		
	Design	**Actual**
MFG	NA	LOREN COOK
Model Num	NA	GEMINI 122 SONEBUSTER
Serial Num	-	NL

Test Data		
	Design	**Actual**
CFM	-	46

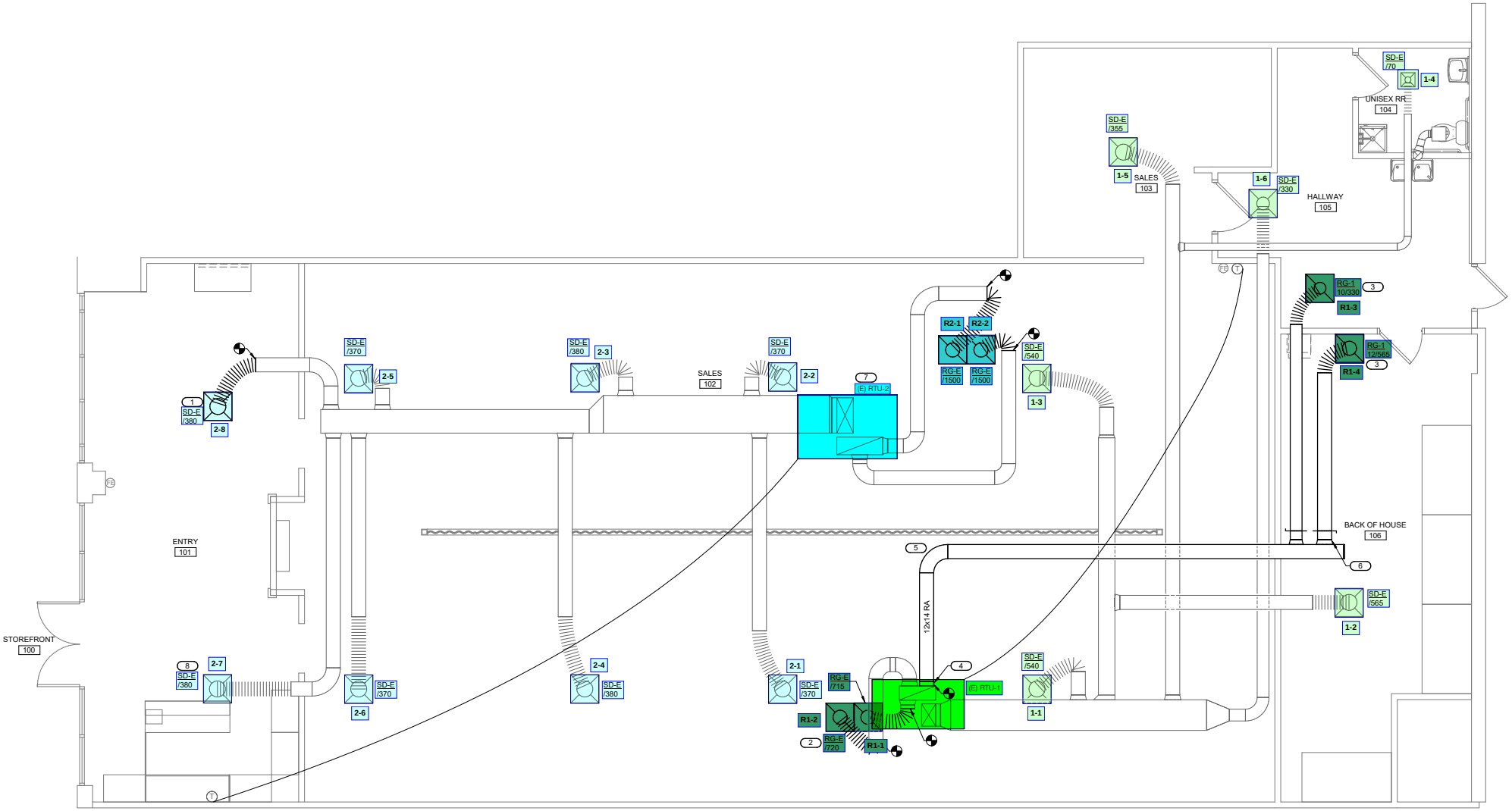
Motor Data		
	Design	**Actual**
Motor MFG	-	FASCO
Horsepower	-	NL
Motor Rpm	-	1550/900
Phase	-	1
Voltage (rated)	-	115
Amperage (rated)	-	0.8/0.6

Completed By: Jacob Davidson on 04/10/2023

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	8/12/2022	8/12/2023
	AIR VELOCITY INSTRUMENT	50 fpm to 3900 fpm	+/- 5 % +/- 7 fpm	Evergreen Telemetry CH-15D 1600185	5/20/2022	5/20/2023
	DIRECT HOOD READING	100 cfm to 2000 cfm	+/- 5 % +/- 7 cfm	Evergreen Telemetry CH-15D 1600185	5/20/2022	5/20/2023
TEMPERATURE	AIR METER	-20 F to 240 F	+/- .5 % 2 F	Cooper SRH77A S/N 100516003	8/12/2022	8/12/2023
	AIR PROBE	-20 F to 240 F	+/- .5 % 2 F	Cooper SRH77A S/N 100516003	8/12/2022	8/12/2023
	IMMERSION METER	-20 F to 240 F	+/- .5 % 2 F	Cooper SRH77A S/N 100516003	8/12/2022	8/12/2023
	IMMERSION PROBE	-20 F to 240 F	+/- .5 % 2 F	Cooper SRH77A S/N 100516003	8/12/2022	8/12/2023
	CONTACT METER	-20 F to 240 F	+/- .5 % 2 F	Cooper SRH77A S/N 100516003	8/12/2022	8/12/2023
	CONTACT PROBE	-20 F to 240 F	+/- .5 % 2 F	Cooper SRH77A S/N 100516003	8/12/2022	8/12/2023
HUMIDITY	HUMIDITY PROBE	10 % RH to 90 % RH	3% of reading	Cooper SRH77A S/N 100516003	8/12/2022	8/12/2023
ELECTRICAL	VOLTAGE MEASUREMENT	0 VAC to 600 VAC	2 % reading +/- 5 digits	Fluke 323 S/N 35491023WS	8/11/2022	8/11/2023
	AMPERAGE MEASUREMENT	0 Amperers to 100 Amperes	2 % reading +/- 5 digits	Fluke 323 S/N 35491023WS	8/11/2022	8/11/2023
ROTATION	ROTATION MEASUREMENT	60 rpm to 5000 rpm	2 % reading 2 rpm	Shimpo DT 207Lp S/N D1690029R	8/11/2022	8/11/2023
HYDRONIC	PRESSURE MEASUREMENT	-30 in Hg to 200 psi	±2% of reading +/- 1 psi	Hydronic Manometer - Dwyer 490W-6-HKIT S/N: 359515093207912	8/12/2022	8/12/2023
	DIFFERENTIAL PRESSURE MEASUREMENT	0 psi - 80 psi	±2% of reading +/- 1 psi	Hydronic Manometer - Dwyer 490W-6-HKIT S/N: 359515093207912	8/12/2022	8/12/2023

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



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