Report By:

National TAB
1329 E. KEMPER ROAD
SUITE 4210
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Report: Papa Johns (Sussex, WI) TAB REPORT

Function: Test, Adjust, & Balance

Date: 10/26/2023

PROJECT

Papa Johns (Sussex, WI)

W249 N5245 EXECUTIVE DR.

Sussex, WI 53089

Client

Air Temperature Services

5301 Voges Road

Madison , WI 53718

CERTIFICATION

PROJECT: Papa Johns (Sussex, WI)

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.

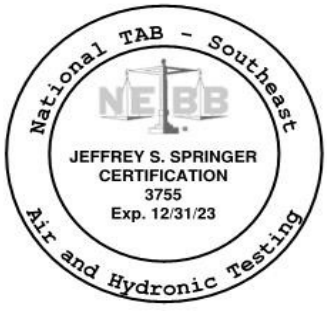
NEBB TAB FIRM: National TAB-Southeast
REGISTRATION NO: 3755
CERTIFIED BY: J. Scott Springer 23312
DATE: 10/26/2023

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-Southeast
REGISTRATION NO: 3086
CERTIFIED BY: J. Scott Springer 23312
DATE:

Submitted and Certified by:

NEBB TAB FIRM: National TAB-Southeast
TAB PROFESSIONAL: J. Scott Springer
SIGNATURE:
REGISTRATION NO: 3755 (NTAB) / 23312
CERTIFICATION EXP: 12/31/2023



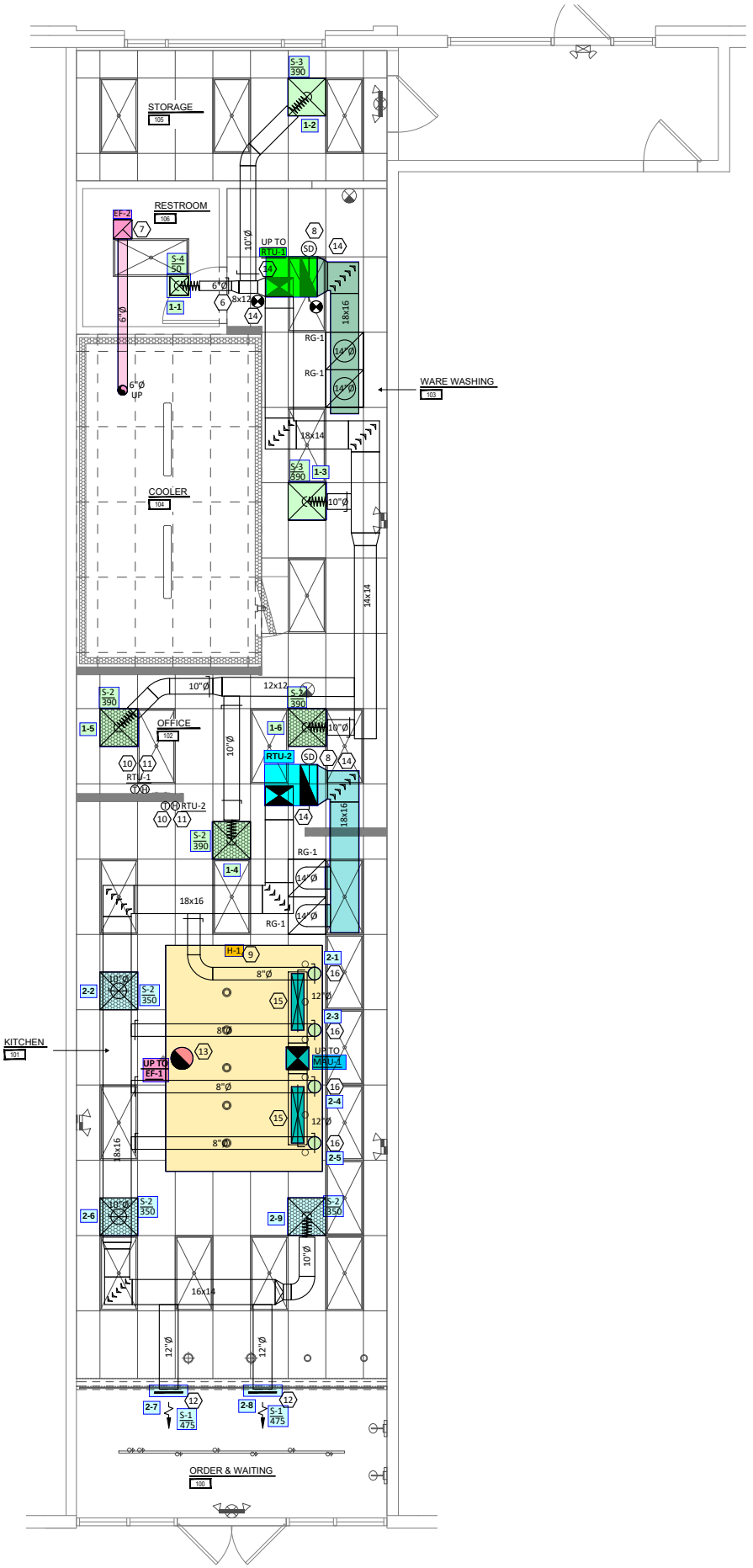
National TAB

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



01 M2-1 **MECHANICAL PLAN**

1/4" = 1'-0"

National TAB

Project: Papa Johns (Sussex, WI)

System/Unit: AHU/RTU

Asset: RTU-1 AREA:101

Unit Data		
	Design	**Actual**
MFG	NA	TRANE
Serial Num	-	233712590L
Model Num	NA	YSC060G3RHB2F0
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	1
OA Filter Size 1	-	27X11
Num PreFilter 1	-	2
PreFilter Size 1	-	20X35X2

Motor Data		
	Design	**Actual**
Motor MFG	-	U.S. MOTORS
Frame	-	NL
Horsepower	-	1.0
Motor Rpm	-	NL
Phase	-	1
Rated Voltage	-	208
Rated Amperage	-	6.90
Service Factor	-	NL

Test Data		
	Design	**Actual**
SF CFM	2000	2021
SF RPM	-	956
RA CFM	1800	1811
OA CFM	200	210
RL Voltage	208	212
RL Amperage	-	4.6
OA Damper Position	-	0.75" POSTION MARKED
Brake Horse Power	2.4	0.66

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.38"
Fan Suction SP	-	-0.55"
Fan Discharge SP	-	0.48"
Total ESP	0.80	0.86"
Fan Total SP	-	1.03"

Completed By: Michael McDonnell on 10/09/2023

National TAB

Project:Papa Johns (Sussex, WI)

AHU/RTU

Diffuser Supply (GRD)

RTU-1/101

Asset							
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**CFM(1)**	**FINAL CFM**	**% to design**
1-1	106	S-4	6	50	121	55	110.0
1-2	105	S-3	10	390	408	407	104.4
1-3	103	S-3	10	390	395	428	109.7
1-4	101	S-2	10	390	242	376	96.4
1-5	102	S-2	10	390	409	363	93.1
1-6	101	S-2	10	390	323	392	100.5
Total				2000	1898	2021	101.05%

Completed By: Michael McDonnell on 10/06/2023

National TAB

Project: Papa Johns (Sussex, WI)

System/Unit: AHU/RTU

Asset: RTU-2 AREA:H-1 101

Unit Data		
	Design	**Actual**
MFG	NA	CARRIER
Serial Num	-	4916C83817
Model Num	NA	48TCEA06A2A5A0A0A0
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	1
OA Filter Size 1	-	28X14
Num PreFilter 1	-	2
PreFilter Size 1	-	16X25X2

Motor Data		
	Design	**Actual**
Motor MFG	-	MARATHON
Frame	-	56Y
Horsepower	-	1.5
Motor Rpm	-	1725
Phase	-	3
Rated Voltage	-	208-230
Rated Amperage	-	5.2
Service Factor	-	1.15

Drive Data		
	Design	**Actual**
Motor Sheave Size	-	4"
Motor Bore Size	-	5/8"
Motor Sheave SetPt	-	2 TURNS OPEN
Fan Sheave Size	-	AFD44 (4.25")
Fan Sheave Bore	-	5/8"
Belt CL Distance	-	14.25"
Num of Belts	-	1
Belt Size	-	A38

Test Data		
	Design	**Actual**
SF CFM	2000	2018
SF RPM	-	1268
RA CFM	1780	1784
OA CFM	220	234
RL Voltage	208	212/212/212
RL Amperage	-	3.5/3.5/3.6
OA Damper Position	-	0.75" POSITION MARKED
Brake Horse Power	2.4	1.02

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.56"
Fan Suction SP	-	-0.89"
Fan Discharge SP	-	0.29"
Total ESP	0.50	0.85"
Fan Total SP	-	1.18"

Completed By: Michael McDonnell on 10/09/2023

Notes:
RTU DESIGN IS 2000 CFM
DIFFUSER TOTAL IS 2500 CFM
[1] RTU IS EXISTING 5 TON UNIT. BALANCED TO 400 CFM/TON FOR PERFORMANCE AND EFFICIENCY (2000 CFM). BALANCED HOOD ACPSP TO DESIGN, 500 CFM, PROPORTIONALLY REDUCED ALL OTHER DIFFUSERS.
[2] ECONOMIZER IS OPERATIONAL, BUT GETS STUCK IN POSITION. POTENTIOMETER BUSTED. RECOMMEND SERVICE.

Written By: Michael McDonnell on 10/09/2023

National TAB

Project:Papa Johns (Sussex, WI)

AHU/RTU

Diffuser Supply (GRD)

RTU-2/H-1 101

Asset								
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**FINAL CFM**	**% to design**
2-1	HD	ACPSP	6"X144"	500	4.68	459	512	102.4
2-2	101	S-2	10	260				
2-3	101	S-2	10	260				
2-4	100	S-1	12	360				
2-5	100	S-1	12	360				
2-6	101	S-2	10	260				
Total				2000		1965	512	25.6%

Completed By: Michael McDonnell on 10/06/2023

National TAB

Project: Papa Johns (Sussex, WI)

System/Unit: FAN - Supply

Asset: MUA-1 AREA:H-1 101

Unit Data		
	Design	**Actual**
MFG	NA	CAPTIVEAIRE
Model Num	NA	A1-D.250-15D-MPU
Serial Num	-	5950724
Type	GAS FIRED	MAU
Configuration	VERTICAL	VERTICAL

Motor Data		
	Design	**Actual**
Motor MFG	-	TELCO GREEN
Frame	-	NL
Horsepower	1.00	1.0
Motor Rpm	1709	1800
Phase	1	1
Voltage (rated)	115	115
Amperage (rated)	-	11.6
Service Factor	-	NL

Drive Data		
	Design	**Actual**
Motor Sheave Size	-	DD
Motor Bore Size	-	DD
Motor Sheave SetPt	-	95%
Fan Sheave Size	-	DD
Fan Sheave Bore	-	DD
Belt CL Distance	-	DD
Num of Belts	-	DD
Belt Size	-	DD

Test Data		
	Design	**Actual**
CFM	1350	1338
SF RPM	1709	1710
RL Voltage	-	121
RL Amperage	-	6.6
Discharge ESP	-	0.62"
Total ESP	0.500	0.62"
Brake Horse Power	-	0.568

Completed By: Michael McDonnell on 10/09/2023

Notes:
[1] MAU HEATER WAS TESTED AND IS FUNCTIONAL. UNABLE TO TEST COOLING, AS UNIT HAD NOT YET BEEN FULLY STARTED UP.

Written By: Michael McDonnell on 10/09/2023

National TAB

Project: Papa Johns (Sussex, WI)

System/Unit: FAN - Exhaust

Asset: EF-1 AREA:H-1 101

Unit Data		
	Design	**Actual**
MFG	NA	CAPTIVEAIRE
Model Num	NA	DU85HFA
Serial Num	-	5950724
Type	CRE UPBLAST	CRE UPBLAST

Test Data		
	Design	**Actual**
CFM	1500	1581
RL Voltage	-	122
RL Amperage	-	1.9
Total ESP	1.0	0.40"

Motor Data		
	Design	**Actual**
Motor MFG	-	TELCO GREEN
Frame	-	NL
Horsepower	0.75	0.75
Motor Rpm	1251	1800
Phase	1	1
Voltage (rated)	115	115
Amperage (rated)	-	8.9
Service Factor	-	NL

Completed By: Michael McDonnell on 10/09/2023

Notes:
[1] MOTOR SETPOINT: 52% / 1025 RPM

Written By: Michael McDonnell on 10/09/2023

National TAB

Project: Papa Johns (Sussex, WI)

System/Unit: FAN - Exhaust

Asset: EF-2 AREA:RR 106

Unit Data		
	Design	**Actual**
MFG	NA	BROAN
Model Num	NA	AE80B-B
Serial Num	-	32H16T
Type	CEILING	CEILING

Test Data		
	Design	**Actual**
CFM	75	69
RL Voltage	-	122
RL Amperage	-	NR
Total ESP	0.25	NR

Motor Data		
	Design	**Actual**
Motor MFG	-	NL
Frame	-	NL
Horsepower	21W	21W
Motor Rpm	-	NL
Phase	1	1
Voltage (rated)	120	120
Amperage (rated)	-	0.3
Service Factor	-	NL

Completed By: Michael McDonnell on 10/09/2023

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Project: Papa Johns (Sussex, WI)

System/Unit: Kitchen Hood Type I

Asset: H-1 AREA:101

Unit Data		
	Design	**Actual**
MFG	NA	CAPTIVEAIRE
Model Num	NA	7824 ND-2WI-PO-ACPSP-F
Job / Serial Num	-	5950724
Type	TYPE I CANOPY	TYPE I ISLAND
Hood length	132	132
Hood Width	78	78
Supply Plenum Type	-	ACPSP
Supply Plenum Width	12	12
Supply Plenum Length	144	144

Test Data Exhaust		
	Design	**Actual**
Filter Type	CAPTRATE SOLO	CAPTRATE SOLO
Filter Size 1	16X16	16X16
Filter Qty 1	8	8
Filter AK factor size 1	1.62	1.62
Filter Total AK Area	12.96	12.96
Filter1 FPM	-	123
Filter2 FPM	-	128
Filter3 FPM	-	121
Filter4 FPM	-	128
Filter5 FPM	-	129
Filter6 FPM	-	123
Filter7 FPM	-	115
Filter8 FPM	-	109
Filter Ave FPM(corr)	-	122
CFM	1500	1581

Cooking Equipment		
	Design	**Actual**
Item 1	-	PIZZA OVEN

Test Data Supply		
	Design	**Actual**
Total AK Area	-	12
Kv factor (Vel)	-	0.87
Num of Readings	-	10
Reading1 FPM	-	161
Reading2 FPM	-	120
Reading3 FPM	-	104
Reading4 FPM	-	119
Reading5 FPM	-	90
Reading6 FPM	-	122
Reading7 FPM	-	133
Reading8 FPM	-	131
Reading9 FPM	-	134
Reading10 FPM	-	168
Ave FPM(corr)	-	111.53
CFM	1350	1338

Completed By: Michael McDonnell on 10/09/2023

Notes:
EXHAUST DESIGN IS 1500 CFM
MUA DESIGN IS 1350 CFM
AC DESIGN IS 500 CFM
TOTAL SUPPLY DESIGN IS 1850 CFM

[1] HOOD HAS SEVERAL ALARMS DUE TO CORE FIRE SYSTEM NOT YET INSTALLED OR OPERATIONAL.
[2] COOKING EQUIPMENT NOT YET ON SITE AT TIME OF BALANCE.

Written By: Michael McDonnell on 10/09/2023