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: 12/13/2022

PROJECT

12-01 MOD PIZZA - LENEXA, KS

8742 Loiret Blvd

Lenexa, KS 66219

Client

Oliphant Heating
208 WOLLARD BLVD

RICHMOND, MO

National TAB

Project: 12-01 MOD PIZZA - LENEXA, KS

Table Of Contents

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.

Kitchen Exhaust Hood & Associated Fans

Each kitchen exhaust fan was measured at the hood filter bay utilizing a velocity matrix and a manufacturer's correction factor. Each filter velocity is multiplied by the manufacturer's corrected area. The sum of these readings equals the total flow of the exhaust fans. The total flow of the exhaust was then adjusted to within tolerance of the design flow. . Any EF's that fell outside of this tolerance is noted throughout 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.

Final Building Tests

After completing the test and balance the final building pressure was measured. It was confirmed that the building pressure fell within acceptable tolerances of -0.02" wc to +0.02" wc and that the pressure measurement coincides with the actual and design net airflow. Any deviations from these standards are noted throughout the report.

The hood capture was tested at the perimeter of the hood and the cook top level with the equipment heat on to ensure satisfactory hood capture and containment.

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12-01 MOD PIZZA - LENEXA, KS

Project Issue Information

Issue Name : EF2/EF3 low flow, no speed control

Description : EF2 and EF3 are low on flow. There is no speed control to increase it any further. Recommend ensuring that the internal backdraft dampers are fully open.

Created By : National TAB **Assigned To :** National TAB - Will Turnbough

Status : Open

Originated Date : 11/21/2022 - Jacob Davidson - National TAB

Project Issue File Details

EF2.jpeg

Insidefan.jpeg

Ef3.jpeg

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12-01 MOD PIZZA - LENEXA, KS

Project Issue Information

Issue Name : EF2/EF3/EF4 discharge duct leakage

Description : Discharge duct for the restroom exhaust fans is disconnected above the ceiling. Recommend connecting.

Created By : National TAB **Assigned To :** National TAB - Will Turnbough

Status : Open

Originated Date : 11/21/2022 - Jacob Davidson - National TAB

Project Issue File Details

Ductleak.jpeg

NATIONAL TAB

AIR BALANCE SCHEDULE

UNIT	AREA SERVED	HVAC SUPPLY		HVAC RETURN		HVAC OUTDOOR		OA %		HOOD MAKE-UP		HOOD EXHAUST		GENERAL EXH.	
		DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL
RTU-1	DINING	4000	3984	3200	3156	800	828	20.0%	20.8%						
RTU-2	KITCHEN	3400	3104	2800	2490	600	614	17.6%	19.8%						
EF-1	HD1 PIZZA OVEN											900	901		
EF-2	RESTROOM													75	38
EF-3	RESTROOM													75	51
EF-4	ICE MACHINE													75	80
TOTALS		7400	7088	6000	5646	1400	1442			0	0	900	901	225	169

NET BUILDING AIRFLOW CALCULATION

TOTALS	DESIGN	ACTUAL
TOTAL OA	1400	1442
TOTAL EXHAUST	1125	1070
NET AIRFLOW	275	372

DOOR TESTED	BUILDING PRESSURE MEASUREMENTS (IN. H20)
FRONT	0.0006
SIDE	0.0004
REAR	0.0003
AVERAGE	**0.0004**

FINAL CHECKS

ACTUAL NET AIRFLOW COINCIDES WITH DESIGN: ✓

MEASURED PRESSURES COINCIDES WITH ACTUAL NET AIRFLOW: ✓

PRESSURE FALLS WITHIN IMC TOLERANCE OF +/-0.02" W.C. ✓

NOTES:

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12-01 MOD PIZZA - LENEXA, KS

CheckList Information

Name :	SITE PICTURES	**Status :**	NotSubmitted
Assigned Organization :	National TAB	**Asset :**	
Requesting Organization :	National TAB		

CheckList Item Details

STORE FRONT

Front.jpeg

RTU-1

Rtu1.jpeg

RTU-2

RTU2.jpeg

EF-1

ef1.jpeg

HOOD-1

Hood.jpeg

Notes/Comments :

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12-01 MOD PIZZA - LENEXA, KS

CheckList Information

Name :	TECH - STEP 1: INITIAL WALKTHROUGH	**Status :**	NotSubmitted
Assigned Organization :	National TAB	**Asset :**	
Requesting Organization :	National TAB		

CheckList Item Details

INITIAL SITE WALKTHROUGH

All diffusers and grilles are installed and match design?	YES
All hood filters installed and accounted for?	YES
Hoods are wired and have power?	YES
Hood is free of alarms?	YES
Thermostats have power?	YES
Have trades/general contractor been notified about any issues and are they created on FaciliBuild?	NA

Notes/Comments :

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12-01 MOD PIZZA - LENEXA, KS

CheckList Information

Name :	TECH - STEP 2: UNIT DATA AND EVAL	**Status :**	NotSubmitted
Assigned Organization :	National TAB	**Asset :**	
Requesting Organization :	National TAB		

CheckList Item Details

UNIT DATA AND EVALUATION WHILE GATHERING UNIT DATA CHECK THE FOLLOWING:

RTU's/AHU's	
Economizers are assembled and functional?	YES
DCV Max damper opening position is set to minimum?	YES
Free cooling enthalpy set point set for lowest setting (Typically "D")	YES
Motors are all operating below the FLA rating?	YES
Are belts tight?	YES
If direct drive unit is the speed controller working.	NA
Is gas piping installed and valves turned on?	YES
Unit free of noticeable noise and vibration	YES
EF's	
Rotation is correct?	YES
Belts are tight?	NA
Grease cup installed on hood fan?	YES
Hinge kit installed installed on hood fan?	YES
Lean fan back. Is grease duct installation adequate and is duct ran all the way to the base of the fan?	YES

Flex conduit is long enough so that fan can be completely tilted back?	YES
There is no major leakage around base of fan?	YES, NO MAJOR LEAKAGE
Is the motor operating below the motor FLA rating?	YES
For restroom fan(s) is the back draft damper installed and can it fully open?	NA
Unit free of noticeable noise and vibration?	YES
HOODS	
Kitchen equipment installed in proper places?	YES
Can kitchen equipment be turned on for final smoke test?	YES
DOCUMENTATION	
Have trades/general contractor been notified about any issues and are they created on FaciliBuild?	YES

Notes/Comments :

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CheckList Information

Name :	TECH - STEP 3: TEST, ADJUST AND BALANCE	**Status :**	NotSubmitted
Assigned Organization :	National TAB	**Asset :**	
Requesting Organization :	National TAB		

CheckList Item Details

TEST, ADJUST, AND BALANCE ALL EQUIPMENT:

DURING TESTING MAKE NOTE OF THE FOLLOWING:

Is space free of drafting?	YES
Is space comfortable in all areas?	YES
Is the space free of ventilation noise?	YES
If deviations from design were necessary to resolve 1-3 what were they? Otherwise put "NA".	NA

Notes/Comments :

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CheckList Information

Name :	TECH - STEP 4: FINAL TESTS	**Status :**	NotSubmitted
Assigned Organization :	National TAB	**Asset :**	
Requesting Organization :	National TAB		

CheckList Item Details

FINAL TESTS	
HOOD CAPTURE TEST	
List equipment turned on for testing	PIZZA OVEN
List smoke candle type used	45 SECOND SMOKE EMITTER
Smoke test capture - Perimeter of hood	100%
Smoke test capture - Top of cooking surface	100%
WITNESS	
Date test was completed	12/06/2022
TAB tech name / Firm	JACOB DAVIDSON
Site super name / Firm	CHRIS SMITH / MOD PIZZA
Owner representative name / Firm (if Applicable)	CHRIS SMITH / MOD PIZZA
Building pressure at front & back doors (All Systems On)	0.0006" FRONT 0.0004" BACK
ADDITIONAL	
Do actual net building airflow, design net building airflow, and pressure coincide? If not why? (All three should either be positive or negative)	YES
Thermostats are programmed?	YES

Notes/Comments :

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Project: 12-01 MOD PIZZA - LENEXA, KS

System/Unit: AHU/RTU

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Asset: RTU1 AREA:DINING

Unit Data		
	Design	**Actual**
MFG	CARRIER	CARRIER
Serial Num	-	0722P96423
Model Num	48HCD09	48HCED11A2M5A6B0G0
Type	RTU	RTU
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	1 METAL MESH
OA Filter Size 1	-	19.25X35
Num Final Filter 1	-	4
Final Filter Size 1	-	20X20X2

Motor Data		
	Design	**Actual**
Motor MFG	-	MARATHON
Frame	-	56HZ
Horsepower	-	NL
Motor Rpm	-	1750
Phase	-	3
Rated Voltage	-	230/460
Rated Amperage	-	9.2/4.6

Drive Data		
	Design	**Actual**
Motor Sheave Size	-	4.75"
Motor Bore Size	-	7/8"
Motor Sheave SetPt	-	2 TURNS OUT
Fan Sheave Size	-	7.25"
Fan Sheave Bore	-	1”
Belt CL Distance	-	16.75”
Num of Belts	-	1
Belt Size	-	AX49
Belt Alignment	-	VERIFIED GOOD

Test Data		
	Design	**Actual**
SF CFM	4000	3984
SF RPM	-	998
RA CFM	3200	3156
OA CFM	800	828
RL Voltage	-	211/212/212
RL Amperage	-	7.9/8.1/8.5
SF Rotation	-	CCW
RA Damper Position	-	4.4V HIGH/5.25V LOW
Min OA Damper Position	-	30% HIGH/ 40% LOW
Min OA Damper Type	-	ECONOMIZER
OA Enthalpy Setpt	-	48 Degree Drybulb

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.98”
Fan Suction SP	-	-1.46”
Fan Discharge SP	-	0.38”
Total ESP	-	1.36"
Fan Total SP	-	1.84"

General		
	Design	**Actual**
Fan Rotation Correct	-	YES
Unit Filters Clean	-	YES
Condensate Drain Installed	-	YES

Completed By: Jacob Davidson

Notes:

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Project:12-01 MOD PIZZA - LENEXA, KS

AHU/RTU

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Diffuser Supply (GRD)

RTU1/DINING

Asset									
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**	**FINAL CFM**	**% to design**
SGRD1	DINING	SD1	18X6	400	0.59	402	363	405	101.3
SGRD2	DINING	SD1	18X12	650	0.54	321	550	613	94.3
SGRD3	DINING	SD1	18X12	550	0.54	301	490	548	99.6
SGRD4	DINING	SD1	18X6	350	0.59	468	325	362	103.4
SGRD5	DINING	SD1	18X6	350	0.59	407	347	379	108.3
SGRD6	DINING	SD1	18X12	550	0.54	262	407	454	82.5
SGRD7	DINING	SD1	18X6	350	0.59	401	321	358	102.3
SGRD8	DINING	SD1	18X6	350	0.59	510	345	383	109.4
SGRD9	DINING	SD1	18X6	350	0.59	558	340	379	108.3
SGRD10	RESTROOM	SD3	6"	50	1	53	54	53	106.0
SGRD11	RESTROOM	SD3	6"	50	1	47	59	50	100.0

Completed By: Jacob Davidson on

Asset	Notes
SGRD6	Damper is fully open. Turbulence from the duct is preventing more airflow to diffuser due to it being after a 90 degree transition. Airflow only s lightly low and will not cause any comfort issues.

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Project: 12-01 MOD PIZZA - LENEXA, KS

System/Unit: AHU/RTU

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Asset: RTU2 AREA:KITCHEN

Unit Data		
	Design	**Actual**
MFG	CARRIER	CARRIER
Serial Num	-	0522P95514
Model Num	48HCD09	48HCED09A2M5A6B0G0
Type	RTU	RTU
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	1 METAL MESH
OA Filter Size 1	-	19.25X35
Num Final Filter 1	-	4
Final Filter Size 1	-	20X20X2

Motor Data		
	Design	**Actual**
Motor MFG	-	MARATHON
Frame	-	56HZ
Horsepower	-	NL
Motor Rpm	-	1670
Phase	-	3
Rated Voltage	-	208-230/460
Rated Amperage	-	6.7-6.6/3.3

Drive Data		
	Design	**Actual**
Motor Sheave Size	-	4.25"
Motor Bore Size	-	5/8"
Motor Sheave SetPt	-	1.5 TURNS OUT
Fan Sheave Size	-	7.25"
Fan Sheave Bore	-	1"
Belt CL Distance	-	16.75"
Num of Belts	-	1
Belt Size	-	A48
Belt Alignment	-	VERIFIED GOOD

Test Data		
	Design	**Actual**
SF CFM	3400	3104
SF RPM	-	850
RA CFM	2800	2490
OA CFM	600	614
RL Voltage	-	211/211/212
RL Amperage	-	5.0/5.5/6.4
SF Rotation	-	CCW
RA Damper Position	-	3.55V HIGH/ 5.00V LOW
Min OA Damper Position	-	19% HIGH / 37% LOW
Min OA Damper Type	-	ECONOMIZER
OA Enthalpy Setpt	-	48 DEGREES DRYBULB

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.58”
Fan Suction SP	-	-0.95”
Fan Discharge SP	-	0.43”
Total ESP	-	1.01"
Fan Total SP	-	1.38"

General		
	Design	**Actual**
Fan Rotation Correct	-	YES
Unit Filters Clean	-	YES
Condensate Drain Installed	-	YES

Completed By: Jacob Davidson

Notes:

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Project:12-01 MOD PIZZA - LENEXA, KS

AHU/RTU

Comfort. Under control.

Diffuser Supply (GRD)

RTU2/KITCHEN

Asset									
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**	**FINAL CFM**	**% to design**
SGRD1	DINING	SD1	12X10	375	0.517	313	315	370	98.7
SGRD2	DINING	SD1	12X10	375	0.517	520	294	367	97.9
SGRD3	DINING	SD1	12X10	375	0.517	287	313	338	90.1
SGRD4	DINING	SD1	12X10	375	0.517	300	301	341	90.9
SGRD5	DINING	SD1	12X10	350	0.517	303	278	318	90.9
SGRD6	DINING	SD1	12X10	350	0.517	389	277	316	90.3
SGRD7	KITCHEN	SD2	10"	400	1	227	265	304	76.0
SGRD8	KITCHEN	SD2	10"	400	1	267	312	367	91.8
SGRD9	KITCHEN	SD2	10"	400	1	288	325	383	95.8

Completed By: Jacob Davidson on

Asset	Notes
SGRD7	Damper is fully open. Takeoff for the diffuser comes after a 90 degree turn and is causing turbulence in the duct, preventing more airflow to diffuser. Not anticipated to cause any major comfort issues.

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Project: 12-01 MOD PIZZA - LENEXA, KS

System/Unit: FAN - Exhaust

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Asset: EF1 AREA:HD1 PIZZA OVEN

Unit Data		
	Design	**Actual**
MFG	CAPTIVEAIRE	CAPTIVEAIRE
Model Num	CARES13BD	CASRE11DD
Serial Num	-	5404217
Type	UTILITY	UTILITY
Configuration	VERTICAL	VERTICAL

Motor Data		
	Design	**Actual**
Motor MFG	-	TELCO GREEN
Frame	-	NL
Horsepower	0.5	1/2
Motor Rpm	-	1800
Phase	1	1
Voltage (rated)	120	115
Amperage (rated)	-	6.3
Service Factor	-	NL

Drive Data		
	Design	**Actual**

Test Data		
	Design	**Actual**
CFM	900	901
Fan RPM	1362	1581
Fan Rotation	-	CCW
Motor RPM	-	1581
RL Voltage	-	119
RL Amperage	-	3.3
Suction ESP	-	UTO
Discharge ESP	-	UTO
Total ESP	0.55"	UTO

Completed By: Jacob Davidson

Notes: FAN SPEED SET AT 81P

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Project: 12-01 MOD PIZZA - LENEXA, KS

System/Unit: FAN - Exhaust

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Asset: EF2 AREA:RESTROOM

Unit Data		
	Design	**Actual**
MFG	COOK	BROAN
Model Num	GC-146	AE80B-B
Serial Num	-	NL
Type	CEILING	CEILING
Configuration	VERTICAL	VERTICAL

Motor Data		
	Design	**Actual**
Motor MFG	-	NL
Frame	-	NL
Horsepower	33.1W	NL
Motor Rpm	-	60HZ
Phase	1	1
Voltage (rated)	120	120
Amperage (rated)	-	0.3
Service Factor	-	NL

Test Data		
	Design	**Actual**
CFM	75	38
Fan RPM	900	DD
Fan Rotation	-	CCW
Motor RPM	-	DD
System SetPt	-	NO SPEED CONTROL
RL Voltage	-	121
RL Amperage	-	NOT SAFE
Total ESP	0.375"	UTO
Fan Inlet SP	-	UTO
Fan Discharge SP	-	UTO

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Notes: Single Speed fan below hard ceiling. Unable to increase speed.

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Project: 12-01 MOD PIZZA - LENEXA, KS

System/Unit: FAN - Exhaust

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Asset: EF3 AREA:RESTROOM

Unit Data		
	Design	**Actual**
MFG	COOK	BROAN
Model Num	GC-146	AE80B-B
Serial Num	-	NL
Type	CEILING	CEILING
Configuration	VERTICAL	VERTICAL

Motor Data		
	Design	**Actual**
Motor MFG	-	NL
Frame	-	NL
Horsepower	33.1W	NL
Motor Rpm	-	60HZ
Phase	1	1
Voltage (rated)	120	120
Amperage (rated)	-	0.3
Service Factor	-	NL

Test Data		
	Design	**Actual**
CFM	75	51
Fan RPM	900	DD
Fan Rotation	-	CCW
Motor RPM	-	DD
System SetPt	-	NO SPEED CONTROL
RL Voltage	-	121
RL Amperage	-	NOT SAFE
Total ESP	0.375"	UTO
Fan Inlet SP	-	UTO
Fan Discharge SP	-	UTO

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Notes: Single Speed fan below hard ceiling. Unable to increase speed.

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Project: 12-01 MOD PIZZA - LENEXA, KS

System/Unit: FAN - Exhaust

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Asset: EF4 AREA:ICE MACHINE

Unit Data		
	Design	**Actual**
MFG	COOK	BROAN
Model Num	GC-146	AE80B-B
Serial Num	-	NL
Type	CEILING	CEILING
Configuration	VERTICAL	VERTICAL

Motor Data		
	Design	**Actual**
Motor MFG	-	NL
Frame	-	NL
Horsepower	33.1W	NL
Motor Rpm	-	60HZ
Phase	1	1
Voltage (rated)	120	120
Amperage (rated)	-	0.3
Service Factor	-	NL

Test Data		
	Design	**Actual**
CFM	75	80
Fan RPM	900	DD
Fan Rotation	-	CCW
Motor RPM	-	DD
System SetPt	-	NO SPEED CONTROL
RL Voltage	-	122
RL Amperage	-	NOT SAFE
Total ESP	0.375"	UTO
Fan Inlet SP	-	UTO
Fan Discharge SP	-	UTO

Completed By: Jacob Davidson

Notes:

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Project: 12-01 MOD PIZZA - LENEXA, KS

System/Unit: Kitchen Hood Type I

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Asset: HD1 AREA:

Unit Data		
	Design	**Actual**
MFG	NA	CAPTIVE AIRE
Model Num	NA	4824 ND-2
Job / Serial Num	-	540217
Type	-	TYPE I CANOPY
Hood length	-	72"
Hood Width	-	48"

Test Data Exhaust		
	Design	**Actual**
Filter Type	-	CAPTRATE SOLO
Filter Size 1	-	16X16
Filter Qty 1	-	4
Filter AK factor size 1	-	1.62
Filter Total AK Area	-	6.48
Filter1 FPM	-	142
Filter2 FPM	-	149
Filter3 FPM	-	135
Filter4 FPM	-	132
Filter Ave FPM(corr)	-	139
CFM	900	901

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

Completed By: Jacob Davidson

Notes: