

Report By:

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



Report: TAB REPORT
Function: Test, Adjust, & Balance
Date: 05/03/2024

PROJECT
04-29-24 ARBYS #10078 - BIXBY, OK

14985 South Memorial Drive

Bixby , OK 74008

Client

Flynn Restaurant Group
6200 Oak Tree Boulevard
Suite 250
Independence, OH 44131

National TAB

Project: 04-29-24 ARBYS #10078 - BIXBY, OK

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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.

Issue List

- RTU-1 Diffuser 10,12 are low on flow
- RTU-1/RTU-2 heating/cooling



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Project Issue Information

Issue Name : RTU-1 Diffuser 10,12 are low on flow
Description : Diffuser 10,12 side door vestibule and men’s RR are low on flow. Unable to force air to diffusers. Noticed that these diffusers are flex ducted into another flex duct run and do not have individual dampers. See pictures attached.

Created By : National TAB **Assigned To :** National TAB - Dylan Crisman
Status : Open
Priority : Low **Asset Tag :**
Originated Date : 05/01/2024 - Dylan Crisman - National TAB

Project Issue File Details



IMG_3953
05/01/2024



IMG_4602
05/01/2024



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Project Issue Information

Issue Name : RTU-1/RTU-2 heating/cooling
Description : RTU-2 dining room unit only runs in cooling or fan only. No alarms on thermostat. RTU-1 kitchen unit only runs in heating or fan only. Alarm showing E2, per trane manual E2 references a cooling fault. Significant temperature change when Walking between the two spaces. Temperatures on thermostats reading the same at 72 degrees. Recommend MC Service

Created By : National TAB **Assigned To :** National TAB - Dylan Crisman

Status : Open

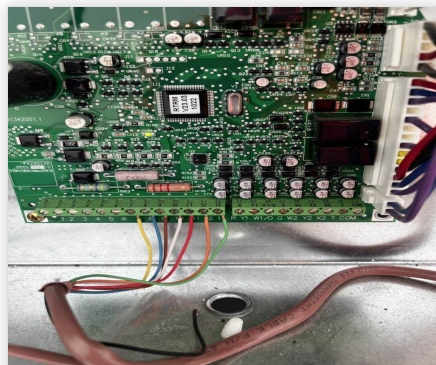
Priority : High **Asset Tag :**

Originated Date : 05/01/2024 - Dylan Crisman - National TAB

Project Issue File Details



IMG_3951
05/01/2024



IMG_3952
05/01/2024

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	3000	3014	2200	2189	800	825	26.7%	27.4%						
RTU-2	KITCHEN	3000	3174	2200	2368	800	806	26.7%	25.4%						
EF-1	HOOD 1											1000	1001		
EF-2	RESTROOM													300	303
TOTALS		6000	6188	4400	4557	1600	1631			0	0	1000	1001	300	303

NET BUILDING AIRFLOW CALCULATION

TOTALS	DESIGN	ACTUAL
TOTAL OA	1600	1631
TOTAL EXHAUST	1300	1304
NET AIRFLOW	300	327

DOOR TESTED	BUILDING PRESSURE MEASUREMENTS (IN. H2O)
FRONT	0.0072
SIDE	0.0034
REAR	0.0088
AVERAGE	0.0065

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:

CheckList List

- SITE PICTURES
- TECH - STEP 1: INITIAL WALKTHROUGH
- TECH - STEP 2: UNIT DATA AND EVAL.
- TECH - STEP 3: TEST, ADJUST AND BALANCE
- TECH - STEP 4: FINAL TESTS



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CheckList Information

Name : SITE PICTURES **Status :** Completed
Assigned Organization : National TAB **Asset :**
Requesting Organization : National TAB
Created Date : 04/26/2024 - Wale Odofin - National TAB
Completed Date : 04/30/2024 - Dylan Crisman - National TAB

CheckList Item Details

RTU-1

Comment:



IMG_3937
04/30/2024

RTU-2

Comment:



IMG_3940
04/30/2024

EF-1

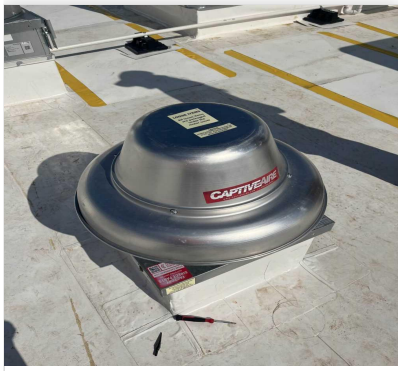
Comment:



IMG_3942
04/30/2024

EF-2

Comment:



IMG_3947
04/30/2024

HOOD-1

Comment:



IMG_3935
04/30/2024



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CheckList Information

Name : TECH - STEP 1: INITIAL WALKTHROUGH **Status :** Completed
Assigned Organization : National TAB **Asset :**
Requesting Organization : National TAB
Created Date : 04/26/2024 - Wale Odofin - National TAB
Completed Date : 04/30/2024 - Dylan Crisman - National TAB

CheckList Item Details

INITIAL SITE WALKTHROUGH

All diffusers and grilles are installed and match design? Yes

Comment:

All hood filters installed and accounted for? Yes

Comment:

Hoods are wired and have power? Yes

Comment:

Hood is free of alarms? Yes

Comment:

Thermostats have power? Yes

Comment:

Have trades/general contractor been notified about any issues and are they created on FaciliBuild?

Comment:



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CheckList Information

Name : TECH - STEP 2: UNIT DATA AND EVAL. **Status :** Completed
Assigned Organization : National TAB **Asset :**
Requesting Organization : National TAB
Created Date : 04/26/2024 - Wale Odofin - National TAB
Completed Date : 04/30/2024 - Dylan Crisman - 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

Comment:

DCV Max damper opening position is set to minimum? Yes

Comment:

Free cooling enthalpy set point set for lowest setting (Typically "D") Yes

Comment:

Set to E.

Motors are all operating below the FLA rating? Yes

Comment:

Are belts tight?

Comment:

NA/DD

If direct drive unit is the speed controller working.

Comment:

YES

Is gas piping installed and valves turned on?

Yes

Comment:

Unit free of noticeable noise and vibration

Yes

Comment:

EF's

Rotation is correct?

Yes

Comment:

Belts are tight?

Comment:

NA/DD

Grease cup installed on hood fan?

Yes

Comment:

Hinge kit installed installed on hood fan?

Yes

Comment:

Lean fan back. Is grease duct installation adequate and is duct ran all the way to the base of the fan?

Yes

Comment:



IMG_3948
04/30/2024



IMG_3949
04/30/2024

Flex conduit is long enough so that fan can be completely tilted back?

Yes

Comment:

There is no major leakage around base of fan?

Yes

Comment:

Is the motor operating below the motor FLA rating?

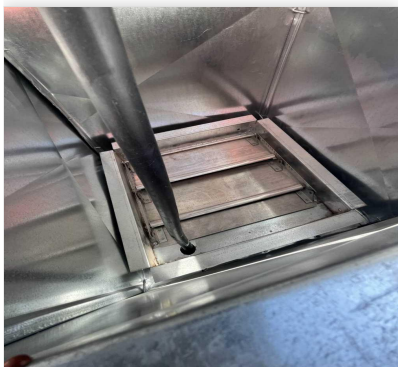
Yes

Comment:

For restroom fan(s) is the back draft damper installed and can it fully open?

Yes

Comment:



IMG_3950
04/30/2024

Unit free of noticeable noise and vibration? Yes

Comment:

MUA

Rotation is correct? N/A

Comment:

Gas piping is installed and valves are in on position? N/A

Comment:

Heater tested and is functional? N/A

Comment:

Internal motorized damper is fully opening? N/A

Comment:

Motor is operating below the FLA rating? N/A

Comment:

Unit free of noticeable noise and vibration? N/A

Comment:

HOODS

Kitchen equipment installed in proper places? Yes

Comment:

Can kitchen equipment be turned on for final smoke test? Yes

Comment:

DOCUMENTATION

Have trades/general contractor been notified about any issues and are they created on FaciliBuild? Yes

Comment:



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CheckList Information

Name : TECH - STEP 3: TEST, ADJUST AND BALANCE **Status :** Completed
Assigned Organization : National TAB **Asset :**
Requesting Organization : National TAB
Created Date : 04/26/2024 - Wale Odofin - National TAB
Completed Date : 05/01/2024 - Dylan Crisman - National TAB

CheckList Item Details

TEST, ADJUST, AND BALANCE ALL EQUIPMENT:

DURING TESTING MAKE NOTE OF THE FOLLOWING:

Is space free of drafting? Yes

Comment:

Is space comfortable in all areas? No

Comment:

Is the space free of ventilation noise? Yes

Comment:

If deviations from design were necessary to resolve 1-3 what were they? Otherwise put "NA".

Comment:

Dining unit only runs in cooling Kitchen unit only runs in heating or fan only modes. MC is scheduled to correct.

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Project: 04-29-24 ARBYS #10078 - BIXBY, OK

System/Unit: AHU/RTU



Asset: RTU1

AREA:DINING

Unit Data		
	Design	Actual
MFG	TRANE	TRANE
Serial Num	-	223013007L
Model Num	YHC092F3RZA	YHC092F3RZA
Type	RTU	RTU
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	1
OA Filter Size 1	-	36x15.5
Num Final Filter 1	-	4
Final Filter Size 1	-	20x25x2

Motor Data		
	Design	Actual
Motor MFG	-	NL
Frame	-	NL
Horsepower	-	2.75
Motor Rpm	-	NL
Phase	3	3
Rated Voltage	208	208
Rated Amperage	-	7.30

Drive Data		
	Design	Actual
Motor Sheave Size	-	DD
Motor Bore Size	-	DD
Motor Sheave SetPt	-	3.4VDC
Fan Sheave Size	-	DD
Fan Sheave Bore	-	DD
Belt CL Distance	-	DD
Num of Belts	-	DD
Belt Size	-	DD
Belt Alignment	-	DD

Test Data		
	Design	Actual
SF CFM	3000	3014
SF RPM	-	NA
RA CFM	2200	2189
OA CFM	800	825
RL Voltage	-	206/207/204
RL Amperage	-	2.7/2.7/2.6
SF Rotation	-	CW
RA Damper Position	-	75%
Min OA Damper Position	-	25%
Min OA Damper Type	-	ECONOMIZER
OA Enthalpy Setpt	-	E

Performance Data		
	Design	Actual
MA Plenum SP	-	-0.25"
Fan Suction SP	-	-0.55"
Fan Discharge SP	-	0.42"
Total ESP	1.00	0.67"
Fan Total SP	1.14"	0.97"

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

Completed By: Dylan Crisman on 05/01/2024

Notes:

[1] Diffusers 10,11,12 are low on flow. Issue created.

Written By: Dylan Crisman on 05/01/2024

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Project:04-29-24 ARBYS #10078 - BIXBY, OK

AHU/RTU



Diffuser Supply (GRD)

RTU1/DINING

Asset									
Asset Name	Location	Type	Size	DESIGN CFM	AK	CFM(1)	CFM(2)	FINAL CFM	% to design
SGRD1	DINING	D1	8"	175	1.0	144	161	188	107.4
SGRD2	DINING	D1	10"	300	1.0	401	366	326	108.7
SGRD3	DINING	D1	10"	300	1.0	367	339	310	103.3
SGRD4	DINING	D1	10"	300	1.0	402	361	304	101.3
SGRD5	QUE AREA	D1	10"	300	1.0	334	323	314	104.7
SGRD6	QUE AREA	D1	10"	300	1.0	410	384	319	106.3
SGRD7	DINING	D1	10"	300	1.0	355	340	314	104.7
SGRD8	DINING	D1	10"	300	1.0	433	406	322	107.3
SGRD9	DINING	D1	10"	300	1.0	433	383	317	105.7
SGRD10	VESTIBLE	D1	8"	175	1.0	39	33	98	56.0
SGRD11	RESTROOM	D1	8"	125	1.0	110	83	115	92.0
SGRD12	RESTROOM	D1	8"	125	1.0	93	70	87	69.6
Total				3000		3521	3249	3014	100.47%

Completed By: Dylan Crisman on 05/01/2024

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Project: 04-29-24 ARBYS #10078 - BIXBY, OK

System/Unit: AHU/RTU



Asset: RTU2

AREA:KITCHEN

Unit Data		
	Design	Actual
MFG	TRANE	TRANE
Serial Num	-	223013017L
Model Num	YHC092F3RZA	YHC092F3RZA
Type	RTU	RTU
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	1
OA Filter Size 1	-	36x15.5
Num Final Filter 1	-	4
Final Filter Size 1	-	20x25x2
Num Final Filter 2	-	
Final Filter Size 2	-	

Test Data		
	Design	Actual
SF CFM	3000	3174
SF RPM	-	NA
RA CFM	2200	2368
OA CFM	800	806
RL Voltage	-	206/207/204
RL Amperage	-	2.7/2.7/2.6
SF Rotation	-	CW
RA Damper Position	-	75%
Min OA Damper Position	-	25%
Min OA Damper Type	-	ECONOMIZER
OA Enthalpy Setpt	-	E

Motor Data		
	Design	Actual
Motor MFG	-	NL
Frame	-	NL
Horsepower	-	2.75
Motor Rpm	-	NL
Phase	3	3
Rated Voltage	208	208
Rated Amperage	-	7.30

Performance Data		
	Design	Actual
MA Plenum SP	-	-0.38"
Fan Suction SP	-	-0.60"
Fan Discharge SP	-	0.44"
Total ESP	1.00'	0.82"
Fan Total SP	1.14"	1.04"

Drive Data		
	Design	Actual
Motor Sheave Size	-	DD
Motor Bore Size	-	DD
Motor Sheave SetPt	-	3.3VDC
Fan Sheave Size	-	DD
Fan Sheave Bore	-	DD
Belt CL Distance	-	DD
Num of Belts	-	DD
Belt Size	-	DD
Belt Alignment	-	DD

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

Completed By: Dylan Crisman on 05/01/2024

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Project:04-29-24 ARBYS #10078 - BIXBY, OK

AHU/RTU



Diffuser Supply (GRD)

RTU2/KITCHEN

Asset									
Asset Name	Location	Type	Size	DESIGN CFM	AK	CFM(1)	CFM(2)	FINAL CFM	% to design
SGRD1	DRIVE THRU	D2	10"	350	1.0	539	374	374	106.9
SGRD2	KITCHEN	D2	10"	400	1.0	167	432	432	108.0
SGRD3	KITCHEN	D2	10"	400	1.0	639	424	424	106.0
SGRD4	KITCHEN	D2	10"	350	1.0	544	365	365	104.3
SGRD5	KITCHEN	D2	10"	300	1.0	526	313	313	104.3
SGRD6	KITCHEN	D2	10"	400	1.0	288	431	431	107.8
SGRD7	KITCHEN	D2	10"	400	1.0	522	419	419	104.8
SGRD8	EQUIP.	D2	10"	400	1.0	83	416	416	104.0
Total				3000		3308	3174	3174	105.8%

Completed By: Dylan Crisman on 05/01/2024

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Project: 04-29-24 ARBYS #10078 - BIXBY, OK

System/Unit: FAN - Exhaust



Asset: EF1

AREA:HOOD 1

Unit Data		
	Design	Actual
MFG	CAPTIVEAIRE	CAPTIVEAIRE
Model Num	DU150HFA	DU150HFA
Serial Num	-	6174002
Type	UPBLAST	UBLAST
Configuration	VERTICAL	VERTICAL

Motor Data		
	Design	Actual
Motor MFG	-	TELCO-GREEN
Frame	-	NL
Horsepower	-	0.500
Motor Rpm	-	1800
Phase	1	1
Voltage (rated)	115	115
Amperage (rated)	-	6.3
Service Factor	-	1.15

Test Data		
	Design	Actual
CFM	1000	1001
Fan RPM	1370	1620
Fan Rotation	-	CCW
Motor RPM	-	1620
System SetPt	-	90%
RL Voltage	-	119
RL Amperage	-	6.2
Total ESP	0.75"	0.81"
Fan Inlet SP	-	-0.81"
Fan Discharge SP	-	ATM

Completed By: Dylan Crisman on 05/01/2024

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Project: 04-29-24 ARBYS #10078 - BIXBY, OK

System/Unit: FAN - Exhaust



Asset: EF2

AREA:

Unit Data		
	Design	Actual
MFG	CAPTIVEAIRE	CAPTIVEAIRE
Model Num	DR12HFA	DR12HFA
Serial Num	-	6174002
Type	UPBLAST	DOWNBLAST
Configuration	VERTICAL	VERTICAL

Motor Data		
	Design	Actual
Motor MFG	-	TELCO-GREEN
Frame	-	NL
Horsepower	-	0.250
Motor Rpm	-	1800
Phase	1	1
Voltage (rated)	115	115
Amperage (rated)	-	2.9
Service Factor	-	1.15

Test Data		
	Design	Actual
CFM	300	303
Fan RPM	1003	1424
Fan Rotation	-	CCW
Motor RPM	-	1424
System SetPt	-	73P
RL Voltage	-	NA
RL Amperage	-	NA
Total ESP	0.25"	0.19"
Fan Inlet SP	-	-0.19"
Fan Discharge SP	-	ATM

Completed By: Dylan Crisman on 05/01/2024

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Project:04-29-24 ARBYS #10078 - BIXBY, OK

FAN - Exhaust



Diffuser Ret/Exh (GRD)

EF2/

Asset									
Asset Name	Location	Type	Size	DESIGN CFM	AK	CFM(1)	CFM(2)	FINAL CFM	% to design
EGRD1	MENS RR			150	1.0	69	147	147	98.0
EGRD2	WOMENS RR			150	1.0	110	156	156	104.0
Total				300		179	303	303	101%

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Project: 04-29-24 ARBYS #10078 - BIXBY, OK

System/Unit: Kitchen Hood Type I



Asset: HD1

AREA:

Unit Data		
	Design	Actual
MFG	CAPTIVEAIRE	CAPTIVEAIRE
Model Num	5424-ND2	5424-ND2
Job / Serial Num	-	6174002
Type	TYPE I	TYPE I
Hood length	60"	60"
Hood Width	24"	54"

Test Data Exhaust		
	Design	Actual
Filter Type	-	BAFFLE
Filter Size 1	-	16x16
Filter Size 2	-	
Filter Qty 1	-	3
Filter Qty 2	-	
Filter AK factor size 1	-	1.62
Filters AK factor size 2	-	
Filter Total AK Area	-	4.86
Filter1 FPM	-	175
Filter2 FPM	-	231
Filter3 FPM	-	212
Filter4 FPM	-	
Filter5 FPM	-	
Filter6 FPM	-	
Filter7 FPM	-	
Filter8 FPM	-	
Filter9 FPM	-	
Filter10 FPM	-	
Filter11 FPM	-	
Filter12 FPM	-	
Filter Ave FPM(corr)	-	206
CFM	1000	1001

Cooking Equipment		
	Design	Actual
Item 1	-	FRYER
Item 2	-	FRYER

Completed By: Dylan Crisman on 04/30/2024

