

Report By:

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



Report: TAB REPORT
Function: Test, Adjust, & Balance
Date: 03/16/2023

PROJECT
03-13-23 FAMILY DOLLAR - LAMONI, IA

217 E MAIN ST

LAMONI , IA 50140

Client

Oliphant Heating
208 WOLLARD BLVD

RICHMOND, MO

National TAB

Project: 03-13-23 FAMILY DOLLAR - LAMONI, IA

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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.

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 and that the pressure measurement coincides with the actual and design net airflow. Any deviations from these standards are noted throughout the report.



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03-13-23 FAMILY DOLLAR - LAMONI, IA

Project Issue Information

Issue Name : RTUS Final Filters need installed

Description : Construction filters for each RTU are still in place. Final filters will need to be put in later. This does not affect scope of TAB.

Created By : National TAB

Assigned To : National TAB - Jacob Davidson

Status : Open

Originated Date : 03/14/2023 - Jacob Davidson - National TAB

Project Issue File Details



Filters.jpeg

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	STORAGE	1750	1419	1600	1256	150	163	8.6%	11.5%						
RTU-2	WEST SALES	2800	2838	2150	2179	650	659	23.2%	23.2%						
RTU-3	EAST SALES	2800	2807	2150	2152	650	655	23.2%	23.3%						
RTU-4	SOUTH SALES	3500	3587	2725	2829	775	758	22.1%	21.1%						
EF-1	RESTROOM													75	80
EF-2	RESTROOM													75	80
TOTALS		10850	10651	8625	8416	2225	2235			0	0	0	0	150	160

NET BUILDING AIRFLOW CALCULATION

TOTALS	DESIGN	ACTUAL
TOTAL OA	2225	2235
TOTAL EXHAUST	150	160
NET AIRFLOW	2075	2075

DOOR TESTED	BUILDING PRESSURE MEASUREMENTS (IN. H2O)
FRONT	0.032
SIDE	0.0184
REAR	0.034
AVERAGE	0.0281

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:

OA and building pressure taken on a day with windy conditions of 16 mph winds. Pressure was confirmed with returns in building.



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03-13-23 FAMILY DOLLAR - LAMONI, IA

CheckList Information

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

CheckList Item Details

STORE FRONT



Storefront.jpeg

RTU-1



RTU1.jpeg

RTU-2



RTU2.jpeg

RTU-3



RTU3.jpeg

RTU-4



RTU4.jpeg

EF-1



EF1.jpeg

EF-2



EF2.jpeg

Notes/Comments :



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03-13-23 FAMILY DOLLAR - LAMONI, IA

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

Review Plan Review Checklist, has it been signed off and meets our standards to start balancing? If not contact processor to ensure job is ready.	YES
All diffusers and grilles are installed and match design?	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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03-13-23 FAMILY DOLLAR - LAMONI, IA

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
There is no major leakage around base of fan?	NA
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

DOCUMENTATION

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

NA

Notes/Comments :



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03-13-23 FAMILY DOLLAR - LAMONI, IA

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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03-13-23 FAMILY DOLLAR - LAMONI, IA

CheckList Information

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

CheckList Item Details

FINAL TESTS

ADDITIONAL

Thermostats are programmed?	YES
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Notes/Comments :

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Project: 03-13-23 FAMILY DOLLAR - LAMONI, IA

System/Unit: AHU/RTU



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Asset: RTU1

AREA:STORAGE

Unit Data		
	Design	Actual
MFG	CARRIER	TRANE
Serial Num	-	22293519PA
Model Num	48GCE	GBC048A3EMB0000
Type	RTU	RTU
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	1 METAL MESH
OA Filter Size 1	-	13.5X27
Num Final Filter 1	-	4
Final Filter Size 1	-	16X16X2

Motor Data		
	Design	Actual
Motor MFG	-	MARATHON
Frame	-	56
Horsepower	-	1
Motor Rpm	-	1725
Phase	3	3
Rated Voltage	208	200-230/460
Rated Amperage	-	4.0-5.0/2.5

Drive Data		
	Design	Actual
Motor Sheave Size	-	3.25"
Motor Bore Size	-	5/8"
Motor Sheave SetPt	-	2 TURN OUT
Fan Sheave Size	-	5.5"
Fan Sheave Bore	-	11/16"
Belt CL Distance	-	14.5"
Num of Belts	-	1
Belt Size	-	AX40
Belt Alignment	-	VERIFIED GOOD

Test Data		
	Design	Actual
SF CFM	1750	1419
SF RPM	-	882
RA CFM	1600	1256
OA CFM	150	163
RL Voltage	-	209/207/210
RL Amperage	-	2.78/2.89/2.88
SF Rotation	-	CCW
RA Damper Position	-	0.5"
Min OA Damper Position	-	0.5"
Min OA Damper Type	-	ECONOMIZER
OA Enthalpy Setpt	-	E

Performance Data		
	Design	Actual
MA Plenum SP	-	-0.18"
Fan Suction SP	-	-0.39"
Fan Discharge SP	-	0.37"
Total ESP	1.0"	0.55"
Fan Total SP	-	0.76"

General		
	Design	Actual
Fan Rotation Correct	-	YES
Unit Filters Clean	-	NO, NEED FINAL FILTERS
Condensate Drain Installed	-	YES

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Notes: UNIT IS SCHEDULED FOR 1750 TOTAL BUT DIFFUSERS ONLY ADD UP TO 1400. UNIT WAS BALANCED TO 1400.

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Project:03-13-23 FAMILY DOLLAR - LAMONI, IA

AHU/RTU



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Diffuser Supply (GRD)

RTU1/STORAGE

Asset									
Asset Name	Location	Type	Size	DESIGN CFM	AK	CFM(1)	CFM(2)	FINAL CFM	% to design
SGRD1	STORAGE	D	14X6	275	0.3164	255	286	286	104.0
SGRD2	STORAGE	D	14X6	275	0.3164	201	277	277	100.7
SGRD3	STORAGE	D	14X6	275	0.3164	166	273	273	99.3
SGRD4	STORAGE	D	14X6	275	0.3164	284	291	291	105.8
SGRD5	OFFICE	A	8"	100	1	153	86	92	92.0
SGRD6	RR VESTIBULE	A	8"	100	1	184	99	101	101.0
SGRD7	RESTROOM	C	8"	50	1	126	40	47	94.0
SGRD8	RESTROOM	C	8"	50	1	218	42	52	104.0

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Project: 03-13-23 FAMILY DOLLAR - LAMONI, IA

System/Unit: AHU/RTU



Comfort. Under control.

Asset: RTU2

AREA: WEST SALES

Unit Data		
	Design	Actual
MFG	CARRIER	TRANE
Serial Num	-	222720005MX
Model Num	48FCE	GBC090A3EMA3YX9
Type	RTU	RTU
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	1 METAL MESH
OA Filter Size 1	-	19.25X35.25
Num Final Filter 1	-	4
Final Filter Size 1	-	18X25X2

Motor Data		
	Design	Actual
Motor MFG	-	MARATHON
Frame	-	56
Horsepower	-	2
Motor Rpm	-	1725
Phase	3	3
Rated Voltage	208	200-230/460
Rated Amperage	-	6.3-6.2/3.1

Drive Data		
	Design	Actual
Motor Sheave Size	-	6"
Motor Bore Size	-	7/8"
Motor Sheave SetPt	-	3.5 TURN OUT
Fan Sheave Size	-	BK115
Fan Sheave Bore	-	1"
Belt CL Distance	-	20"
Num of Belts	-	1
Belt Size	-	B66
Belt Alignment	-	VERIFIED GOOD

Test Data		
	Design	Actual
SF CFM	2800	2838
SF RPM	-	807
RA CFM	2150	2179
OA CFM	650	659
RL Voltage	-	208/209/211
RL Amperage	-	5.56/5.78/5.85
SF Rotation	-	CCW
RA Damper Position	-	3/8"
Min OA Damper Position	-	3/8"
Min OA Damper Type	-	ECONOMIZER
OA Enthalpy Setpt	-	D

Performance Data		
	Design	Actual
MA Plenum SP	-	-0.36"
Fan Suction SP	-	-0.51"
Fan Discharge SP	-	0.46"
Total ESP	1.0"	0.82"
Fan Total SP	-	0.97"

General		
	Design	Actual
Fan Rotation Correct	-	YES
Unit Filters Clean	-	NO, NEED FINAL FILTERS
Condensate Drain Installed	-	YES

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Notes:

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Project:03-13-23 FAMILY DOLLAR - LAMONI, IA

AHU/RTU



Comfort. Under control.

Diffuser Supply (GRD)

RTU2/WEST SALES

Asset									
Asset Name	Location	Type	Size	DESIGN CFM	AK	CFM(1)	CFM(2)	FINAL CFM	% to design
SGRD1	SALES	B	12"	350	1	330	379	346	98.9
SGRD2	SALES	B	12"	350	1	427	375	342	97.7
SGRD3	SALES	B	12"	350	1	434	376	343	98.0
SGRD4	SALES	B	12"	350	1	373	399	364	104.0
SGRD5	SALES	B	12"	350	1	394	426	384	109.7
SGRD6	SALES	B	12"	350	1	443	378	345	98.6
SGRD7	SALES	B	12"	350	1	447	383	349	99.7
SGRD8	SALES	B	12"	350	1	355	400	365	104.3

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Project: 03-13-23 FAMILY DOLLAR - LAMONI, IA

System/Unit: AHU/RTU



Comfort. Under control.

Asset: RTU3

AREA:EAST SALES

Unit Data		
	Design	Actual
MFG	CARRIER	TRANE
Serial Num	-	222720000MX
Model Num	48FCE	GBC090A3EMA3YX9
Type	RTU	RTU
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	1 METAL MESH
OA Filter Size 1	-	19.25X35.25
Num Final Filter 1	-	4
Final Filter Size 1	-	18X25X2

Motor Data		
	Design	Actual
Motor MFG	-	MARATHON
Frame	-	56
Horsepower	-	2
Motor Rpm	-	1725
Phase	3	3
Rated Voltage	208	200-230/460
Rated Amperage	-	6.3-6.2/3.1

Drive Data		
	Design	Actual
Motor Sheave Size	-	6"
Motor Bore Size	-	7/8"
Motor Sheave SetPt	-	3 TURNS OUT
Fan Sheave Size	-	BK115
Fan Sheave Bore	-	1"
Belt CL Distance	-	20"
Num of Belts	-	1
Belt Size	-	B66
Belt Alignment	-	VERIFIED GOOD

Test Data		
	Design	Actual
SF CFM	2800	2807
SF RPM	-	821
RA CFM	2150	2152
OA CFM	650	655
RL Voltage	-	211/209/212
RL Amperage	-	5.41/5.56/6.21
SF Rotation	-	CCW
RA Damper Position	-	0.5"
Min OA Damper Position	-	0.5"
Min OA Damper Type	-	ECONOMIZER
OA Enthalpy Setpt	-	D

Performance Data		
	Design	Actual
MA Plenum SP	-	-0.52"
Fan Suction SP	-	-0.66"
Fan Discharge SP	-	0.37"
Total ESP	1.0"	0.89"
Fan Total SP	-	1.04"

General		
	Design	Actual
Fan Rotation Correct	-	YES
Unit Filters Clean	-	NO, NEED FINAL FILTERS
Condensate Drain Installed	-	YES

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Notes:

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Project:03-13-23 FAMILY DOLLAR - LAMONI, IA

AHU/RTU



Comfort. Under control.

Diffuser Supply (GRD)

RTU3/EAST SALES

Asset									
Asset Name	Location	Type	Size	DESIGN CFM	AK	CFM(1)	CFM(2)	FINAL CFM	% to design
SGRD1	SALES	B	12"	350	1	347	372	346	98.9
SGRD2	SALES	B	12"	350	1	453	398	370	105.7
SGRD3	SALES	B	12"	350	1	397	412	383	109.4
SGRD4	SALES	B	12"	350	1	342	353	328	93.7
SGRD5	SALES	B	12"	350	1	372	385	358	102.3
SGRD6	SALES	B	12"	350	1	440	371	345	98.6
SGRD7	SALES	B	12"	350	1	440	378	351	100.3
SGRD8	SALES	B	12"	350	1	341	351	326	93.1

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Project: 03-13-23 FAMILY DOLLAR - LAMONI, IA

System/Unit: AHU/RTU



Comfort. Under control.

Asset: RTU4

AREA:SOUTH SALES

Unit Data		
	Design	Actual
MFG	CARRIER	TRANE
Serial Num	-	221140004MX
Model Num	48FCE	GBC120A3EMA3YX9
Type	RTU	RTU
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	1 METAL MESH
OA Filter Size 1	-	19.25X35.25
Num Final Filter 1	-	6
Final Filter Size 1	-	14X25X2

Motor Data		
	Design	Actual
Motor MFG	-	MARATHON
Frame	-	56
Horsepower	-	3
Motor Rpm	-	1725
Phase	3	3
Rated Voltage	208	200-230/460
Rated Amperage	-	8.8-8.7/4.4

Drive Data		
	Design	Actual
Motor Sheave Size	-	6"
Motor Bore Size	-	7/8"
Motor Sheave SetPt	-	1 TURN OUT
Fan Sheave Size	-	11.25"
Fan Sheave Bore	-	1"
Belt CL Distance	-	21"
Num of Belts	-	1
Belt Size	-	B66
Belt Alignment	-	VERIFIED

Test Data		
	Design	Actual
SF CFM	3500	3587
SF RPM	-	917
RA CFM	2725	2829
OA CFM	775	758
RL Voltage	-	209/212/213
RL Amperage	-	6.56/6.81/7.12
SF Rotation	-	CCW
RA Damper Position	-	3/4"
Min OA Damper Position	-	3/4"
Min OA Damper Type	-	ECONOMIZER
OA Enthalpy Setpt	-	D

Performance Data		
	Design	Actual
MA Plenum SP	-	-0.51"
Fan Suction SP	-	-0.72"
Fan Discharge SP	-	0.51"
Total ESP	1.0"	1.23"
Fan Total SP	-	1.23"

General		
	Design	Actual
Fan Rotation Correct	-	YES
Unit Filters Clean	-	NO, FINAL FILTERS NEEDED
Condensate Drain Installed	-	YES

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Notes:

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Project:03-13-23 FAMILY DOLLAR - LAMONI, IA

AHU/RTU



Comfort. Under control.

Diffuser Supply (GRD)

RTU4/SOUTH SALES

Asset									
Asset Name	Location	Type	Size	DESIGN CFM	AK	CFM(1)	CFM(2)	FINAL CFM	% to design
SGRD1	SALES	B	12"	440	1	396	412	412	93.6
SGRD2	SALES	B	12"	435	1	512	469	469	107.8
SGRD3	SALES	B	12"	435	1	470	476	476	109.4
SGRD4	SALES	B	12"	440	1	454	449	449	102.0
SGRD5	SALES	B	12"	440	1	399	409	409	93.0
SGRD6	SALES	B	12"	435	1	469	477	477	109.7
SGRD7	SALES	B	12"	435	1	477	476	476	109.4
SGRD8	SALES	B	12"	440	1	398	419	419	95.2

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Project: 03-13-23 FAMILY DOLLAR - LAMONI, IA

System/Unit: FAN - Exhaust



Comfort. Under control.

Asset: EF1

AREA:RESTROOM

Unit Data		
	Design	Actual
MFG	GREENHECK	BROAN
Model Num	SP-B110	QTXE080
Serial Num	-	UTO
Type	CEILING	CEILING
Configuration	VERTICAL	VERTICAL

Test Data		
	Design	Actual
CFM	75	80
Total ESP	0.25"	NA

Motor Data		
	Design	Actual

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Notes: UNIT WAS ALREADY SEALED INTO CEILING UPON ARRIVAL. UNIT AND MOTOR LABEL INACCESSIBLE. DATA TAKEN FROM SUBMITTALS.

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Project: 03-13-23 FAMILY DOLLAR - LAMONI, IA

System/Unit: FAN - Exhaust



Comfort. Under control.

Asset: EF2

AREA:RESTROOM

Unit Data		
	Design	Actual
MFG	GREENHECK	BROAN
Model Num	SP-B110	QTXE080
Serial Num	-	UTO
Type	CEILING	CEILING
Configuration	VERTICAL	VERTICAL

Motor Data		
	Design	Actual
Motor MFG	-	UTO
Frame	-	UTO
Horsepower	80W	UTO
Motor Rpm	-	UTO
Phase	1	1
Voltage (rated)	120	120
Amperage (rated)	-	0.3
Service Factor	-	UTO

Test Data		
	Design	Actual
CFM	75	80
Fan RPM	-	DD
Fan Rotation	-	UTO
Motor RPM	-	DD
System SetPt	-	NONE
RL Voltage	-	UTO
RL Amperage	-	UTO
Total ESP	0.25"	UTO
Fan Inlet SP	-	UTO
Fan Discharge SP	-	UTO

Completed By: Jacob Davidson

Notes: UNIT WAS ALREADY SEALED INTO CEILING UPON ARRIVAL. UNIT AND MOTOR LABEL INACCESSIBLE. DATA TAKEN FROM SUBMITTALS.

