Report By:

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

Report: REVIVE REPORT

Function: Test, Adjust, & Balance

Date: 10/08/2024

Completed By: National TAB

PROJECT

10-07-24 CULVERS RED WING MN REVIVE

179 Tyler Road

South Red Wing, MN 55066

Client

Bowe Business Group

National TAB

Project: 10-07-24 CULVERS RED WING MN REVIVE

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Project Summary

The purpose of the visit to the Culver's in Red Wing MN was to resolve negative building pressure issues.

Arrived on site and found the building to be highly negative. The initial building pressure was measured around -0.08" wc.

Measured the airflows out on all equipment. Found RTU-1 (Dining) airflow to be initially 4678 CFM out of originally design of 6000 CFM. Went to the roof, and sped up the maximum frequency to get airflow within design. The VFD frequency was also modulating causing building pressure swings. There is no low speed OA damper setpoint so the fan speed was changed to operate at a constant speed.

RTU-2 airflow was found within design and no changes were made to fan speed.

The outside air dampers for both RTU-1 and RTU-2 were found completely shut. This was the major contributing factor to the negative building pressure. These were opened and set to a minimum amount of outside air.

RTU-1 is a non-Humiditrol unit and RTU-2 is a Humiditrol unit. The outside air for RTU-2 was set higher since it has these humidity control capabilities. There is a humidity sensor error on the unit however which means dehumidification may not be working properly. A service company needs to resolve this.

The exhaust fans were measured out only and not adjustments were made. The hoods are working well and did not want to affect the hood capture.

The schedule for the thermostats was also set for occupied hours to start at 10am. This was causing the outside air dampers for the RTU's not to open until 10am. The hoods are turned on around 7:15am so from that time until 10am the building was very negative. The thermostats were re-programmed to start occupied hours at 7:15am.

After all changes the building pressure was improved to -0.01" wc (slightly negative). This is within acceptable tolerances of -0.02" wc to +0.02" wc. It will not be feasible to get the building pressure positive without lowering exhaust rates and the possibility of disrupting the hood capture. So no further changes are recommended.

Next Steps:

1. A service company needs to contact Lennox technical support to troubleshoot the humidity sensor error on RTU-2. (Error 76). It appears that possibly the sensor is damaged. Wiring appeared to be correct but should be verified with Lennox. They also need to verify that all settings are set up correctly for dehumidification. If this is not resolved, there could be comfort issues in the summertime due to the high amount of outside air required through the RTU's.

Issue List

- 01: Rtu 2 humidity sensor
- 02: Flex Duct in Kitchen

10-07-24 CULVERS RED WING MN REVIVE

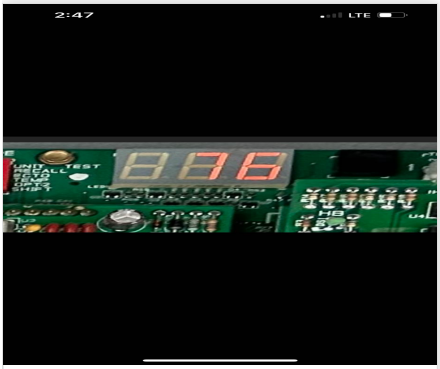
Project Issue Information

Issue Name : 01: Rtu 2 humidity sensor

Description : Rtu 2 is showing alarm 76 meaning there is an issue with the humidity sensor. A service company should contact Lennox to troubleshoot and replace if necessary. It is critical for dehumidification to function properly due to the high amount of OA required through the RTU's.

Created By :	National TAB	**Assigned To :**	National TAB - Dan Hertenstein
Status :	Open		
Priority :	High	**Asset Tag :**	RTU2
Originated Date :	10/08/2024 - Gabe Merk - National TAB		

Project Issue File Details



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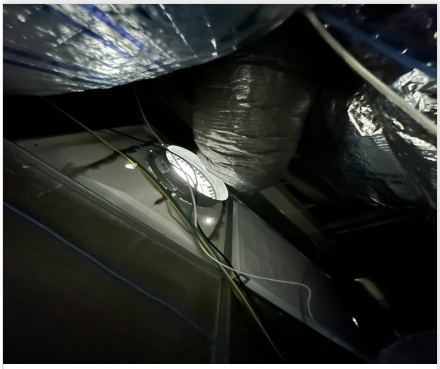
Project Issue Information

Issue Name : 02: Flex Duct in Kitchen

Description : Flex duct for CD-12 diffuser by dish hood has fallen off and was blowing above the ceiling. This was repaired by NTi while on site. No further action required.

Created By :	National TAB	**Assigned To :**	National TAB - Dan Hertenstein
Status :	Closed		
Priority :	InfoOnly	**Asset Tag :**	
Originated Date :	10/08/2024 - Gabe Merk - National TAB		

Project Issue File Details



10/08/2024

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AIR BALANCE SCHEDULE

	HVAC SUPPLY		HVAC RETURN		HVAC OUTDOOR		OA %		HOOD MAKE-UP		HOOD EXHAUST		GENERAL EXH.	
UNIT	DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL
RTU-1	6000	5842	4130	4279	1870	1563	31.2%	26.8%						
RTU-2	6500	6723	4630	4605	1870	2118	28.8%	31.5%						
PRV 2											1300	1591		
PRV 3											1375	1778		
PRV 4											610	413		
PRV-1													375	382
EF-1													75	53
TOTALS	12500	12565	8760	8884	3740	3681			0	0	3285	3782	450	435

NET BUILDING AIRFLOW CALCULATION

TOTALS	DESIGN	ACTUAL
TOTAL OA	3740	3681
TAL EXHAU	3735	4217
ET AIRFLO	5	-536

DOOR TESTED	BUILDING PRESSURE MEASUREMENTS (IN. H20)
LEFT SIDE	-0.014
RIGHT SIDE	-0.015
REAR	-0.001
AVERAGE	**-0.01**

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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Project: 10-07-24 CULVERS RED WING MN REVIVE

System/Unit: AHU/RTU

Asset: RTU1 AREA:DINING

Unit Data		
	Design	**Actual**
MFG	LENNOX	LENNOX
Serial Num	-	5619F07102
Model Num	LGC-180-H2B	KGB180S4MM2Y
Type	RTU	RTU
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	3
OA Filter Size 1	-	25”x16”
Num Final Filter 1	-	6
Final Filter Size 1	-	24”x24”x2”

Motor Data		
	Design	**Actual**
Motor MFG	-	INERLINK
Frame	-	56hz
Horsepower	-	3
Motor Rpm	-	1750
Phase	3	3
Rated Voltage	208/230	200/230
Rated Amperage	-	8.0-7.8

Drive Data	
	Actual
Motor Sheave Size	3.5”
Motor Bore Size	0.875”
Motor Sheave SetPt	1 OUT
Fan Sheave Size	9.75”
Fan Sheave Bore	1.5”
Belt CL Distance	21”
Num of Belts	1
Belt Alignment	OKAY

Test Data		
	Design	**Actual**
SF CFM	6000	5842
SF RPM	-	833
RA CFM	4130	4279
OA CFM	1870	1563
RL Voltage	-	220VFD
RL Amperage	-	7.4/7.3/7.4
SF System SetPt	-	71HZ
Min OA Damper Position	-	5VDC
Min OA Damper Type	-	ECONOMIZER
OA Enthalpy Setpt	-	

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.55"
Fan Suction SP	-	-0.75"
Fan Discharge SP	-	0.47"
Total ESP	1.00"	1.02"
Fan Total SP	-	1.22"

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

Unit Data - PHOTO LOG

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Project: 10-07-24 CULVERS RED WING MN REVIVE

System/Unit: AHU/RTU

Asset: RTU2 AREA:KITCHEN

Unit Data		
	Design	**Actual**
MFG	LENNOX	LENNOX
Serial Num	-	5607E00559
Model Num	LGC-210-H2B	LGC210H2BH2Y
Type	RTU	RTU
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	3
OA Filter Size 1	-	25”x16”
Num Final Filter 1	-	6
Final Filter Size 1	-	24”x24”x2”

Test Data		
	Design	**Actual**
SF CFM	6500	6723
SF RPM	-	871
RA CFM	4630	4605
OA CFM	1870	2118
RL Voltage	-	210/210/210
RL Amperage	-	10.5/10.3/10.2
SF Rotation	-	CCW
Min OA Damper Position	-	3.5 VDC
Min OA Damper Type	-	ECONOMIZER
OA Enthalpy Setpt	-	D

Motor Data		
	Design	**Actual**
Motor MFG	-	CENTURY
Horsepower	-	5
Motor Rpm	-	1720
Phase	3	3
Rated Voltage	208/230	208
Rated Amperage	-	15.3

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.49"
Fan Suction SP	-	-0.73"
Fan Discharge SP	-	0.55"
Total ESP	1.00"	1.04"
Fan Total SP	-	1.28"

Drive Data	
	Actual
Motor Sheave Size	6.5”
Motor Bore Size	1.25”
Fan Sheave Size	10.5”
Fan Sheave Bore	1.5”
Belt CL Distance	21.5”
Num of Belts	1
Belt Size	BX66
Belt Alignment	GOOD

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

Unit Data - PHOTO LOG

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Project: 10-07-24 CULVERS RED WING MN REVIVE

System/Unit: FAN - Exhaust

Asset: EF1 AREA:

Unit Data		
	Design	**Actual**
MFG	GREENHECK	GREENHECK
Model Num	SP880	SP880
Type	CEILING	CEILING

Test Data		
	Design	**Actual**
CFM	75	53

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Project: 10-07-24 CULVERS RED WING MN REVIVE

System/Unit: FAN - Exhaust

Asset: PRV1 AREA:RESTROOM

Unit Data		
	Design	**Actual**
MFG	GREENHECK	GREENHECK
Model Num	G-80-D	G-090-D-X
Serial Num	-	10845367 0704
Type	DOWNBLAST	DOWNBLAST
Configuration	VERTICAL	VERTICAL

Test Data		
	Design	**Actual**
CFM	375	382
RL Voltage	-	INACCESSIBLE
RL Amperage	-	1.2
Total ESP	-	0.23"
Fan Inlet SP	-	-0.23"

Motor Data		
	Design	**Actual**
Motor MFG	-	MCMILLAN
Horsepower	-	1/15
Motor Rpm	-	1550
Phase	1	1
Voltage (rated)	115	120
Amperage (rated)	-	1.2

Unit Data - PHOTO LOG

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Project: 10-07-24 CULVERS RED WING MN REVIVE

System/Unit: FAN - Exhaust

Asset: PRV2 AREA:HOOD 1

Unit Data		
	Design	**Actual**
MFG	GREENHECK	GREENHECK
Model Num	CUBE161XP	CUBE160XP
Serial Num	-	25174568
Type	UPBLAST	UPBLAST
Configuration	VERTICAL	VERTICAL

Test Data		
	Design	**Actual**
CFM	1300	1591
Total ESP	-	1.10"
Fan Inlet SP	-	-1.10"

Motor Data		
	Design	**Actual**
Motor MFG	-	WEG
Horsepower	-	1.5
Motor Rpm	-	1760
Phase	3	3
Voltage (rated)	208	208
Amperage (rated)	-	4.20
Service Factor	-	1.15

Unit Data - PHOTO LOG

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Project: 10-07-24 CULVERS RED WING MN REVIVE

System/Unit: FAN - Exhaust

Asset: PRV3 AREA:HOOD 2

Unit Data		
	Design	**Actual**
MFG	GREENHECK	GREENHECK
Model Num	CUBE161XP	CUBE161XP
Serial Num	-	17348261
Type	UPBLAST	UPBLAST
Configuration	VERTICAL	VERTICAL

Test Data		
	Design	**Actual**
CFM	1375	1778
RL Voltage	-	INACCESSIBLE
RL Amperage	-	INACCESSIBLE
Total ESP	-	1.43"
Fan Inlet SP	-	-1.43"

Motor Data		
	Design	**Actual**
Motor MFG	-	WEG
Horsepower	-	1.5
Motor Rpm	-	1760
Phase	3	3
Voltage (rated)	208	208
Amperage (rated)	-	4.2
Service Factor	-	1.15

Unit Data - PHOTO LOG

Image_5_1_293592363.j..

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Project: 10-07-24 CULVERS RED WING MN REVIVE

System/Unit: FAN - Exhaust

Asset: PRV4 AREA:DISH HOOD

Unit Data		
	Design	**Actual**
MFG	GREENHECK	GREENHECK
Model Num	G-131-D	G-131-B-X
Serial Num	-	10845368
Type	DOWNBLAST	DOWNBLAST
Configuration	VERTICAL	VERTICAL

Test Data		
	Design	**Actual**
CFM	610	413
RL Voltage	-	INACCESSIBLE
RL Amperage	-	INACCESSIBLE
Total ESP	-	0.64"
Fan Inlet SP	-	-0.64"

Motor Data		
	Design	**Actual**
Frame	-	48Y
Horsepower	-	1/6
Motor Rpm	-	1140
Phase	1	1
Voltage (rated)	115	115
Amperage (rated)	-	2.2
Service Factor	-	1.00

Unit Data - PHOTO LOG

Image_4_1_989978988.j..

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Project: 10-07-24 CULVERS RED WING MN REVIVE

System/Unit: Kitchen Hood Type I

Asset: HD1 AREA:

Unit Data		
	Design	**Actual**
MFG	GREENHECK	GREENHECK
Model Num	GGEP-FB	NL
Job / Serial Num	-	NL
Type	TYPE I	TYPE 1
Hood length	64"	64"
Hood Width	26"	26"

Test Data Exhaust		
	Design	**Actual**
Filter Type	GREASE GRABBER	EXTRACTOR
Filter Size 1	16X16	16X16
Filter Qty 1	-	4
Filter AK factor size 1	-	1.53
Filter Total AK Area	-	6.12
Filter1 FPM	-	249
Filter2 FPM	-	265
Filter3 FPM	-	243
Filter4 FPM	-	283
Filter Ave FPM(corr)	-	397.8
CFM	1300	1591

Cooking Equipment	
	Actual
Item 1	GRIDDLE

Unit Data - PHOTO LOG

HOOD_1_1583100260

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Project: 10-07-24 CULVERS RED WING MN REVIVE

System/Unit: Kitchen Hood Type I

Asset: HD2 AREA:

Unit Data		
	Design	**Actual**
MFG	GREENHECK	GREENHECK
Model Num	GGEP-FB	NL
Job / Serial Num	-	NL
Type	TYPE I	TYPE 1
Hood length	83"	83"
Hood Width	26"	26"

Test Data Exhaust		
	Design	**Actual**
Filter Type	GREASE GRABBER	EXTRACTOR
Filter Size 1	16X16	16X16
Filter Qty 1	-	5
Filter AK factor size 1	-	1.53
Filter Total AK Area	-	7.65
Filter1 FPM	-	258
Filter2 FPM	-	227
Filter3 FPM	-	217
Filter4 FPM	-	224
Filter5 FPM	-	236
Filter Ave FPM(corr)	-	355.6
CFM	1375	1778

Cooking Equipment	
	Actual
Item 1	FRYER

Unit Data - PHOTO LOG

hood2_1590573359

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Project: 10-07-24 CULVERS RED WING MN REVIVE

System/Unit: Kitchen Hood Type II

Asset: HD3 AREA:

Unit Data		
	Design	**Actual**
MFG	GREENHECK	GREENHECK
Model Num	GD-3	NL
Serial Num	-	NL
Type	TYPE II	TYPE II
Hood length	42"	42"
Hood Width	42"	42"

Test Data		
	Design	**Actual**
Exhaust CFM	610	413

Unit Data - PHOTO LOG

Image_2_1_1671349423...

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