

Report By:

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



Report: TAB REPORT
Function: Test, Adjust, & Balance
Date: 09/11/2023

PROJECT
09-11-2023 WENDY'S - PLOVER, WI

Commons Circle

Plover, WI 54467

Client

Diversified Heating and Air

Issue List

- DOAS Gas Not Yet Started Up
- Hoods Not Flush With Wall



09-11-2023 WENDY'S - PLOVER, WI

Project Issue Information

Issue Name : DOAS Gas Not Yet Started Up
Description : DOAS gas valves are in the off position. Per GC, gas startup has not been completed on the units. Recommend gas startup is completed, and gas valves turned on.
Created By : National TAB **Assigned To :** National TAB - Michael McDonnell
Status : Open
Originated Date : 09/12/2023 - Michael McDonnell - National TAB

Project Issue File Details



ValveOff
09/12/2023

Project Issue Response Details

- **09/12/2023 National TAB - Michael McDonnell**
 - Door padding / Weather Stripping is stored in the gas manifold compartment. Recommend removal and installation.



RTU-1
09/12/2023



RTU-2(1)
09/12/2023



09-11-2023 WENDY'S - PLOVER, WI

Project Issue Information

Issue Name : Hoods Not Flush With Wall
Description : Exhaust hoods are not flush with the back wall. Recommend crack is sealed to prevent accumulation of grease and dirt.
Created By : National TAB **Assigned To :** National TAB - Michael McDonnell
Status : Open
Originated Date : 09/12/2023 - Michael McDonnell - National TAB

Project Issue File Details



HD
09/12/2023

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.

DOAS w/ Diffusers

Each of the DOAS were measured at their terminal devices or via traverse to establish a total flow for that unit. Each DOAS 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.

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	KITCHEN	3000	3037	2100	2087	900	950	30.0%	31.3%						
OUA-1	DINING	2200	2182	0	0	2200	2182	100.0%	100.0%						
EF-1	GRILL											1200	1200		
EF-2	FRYER											1500	1549		
EF-3	RR													300	297
TOTALS		5200	5219	2100	2087	3100	3132			0	0	2700	2749	300	297

NET BUILDING AIRFLOW CALCULATION

TOTALS	DESIGN	ACTUAL
TOTAL OA	3100	3132
TOTAL EXHAUST	3000	3046
NET AIRFLOW	100	86

DOOR TESTED	BUILDING PRESSURE MEASUREMENTS (IN. H2O)
FRONT	0.009
SIDE	0.008
REAR	0.005
AVERAGE	0.0073

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

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



RTU-1-Kitchen
09/11/2023

RTU-2

Comment:



RTU-2-Dining
09/11/2023

EF-1

Comment:



Unit_Label
09/12/2023



Grease_Duct
09/12/2023



EF_1
09/12/2023

EF-2

Comment:



EF-2
09/11/2023



Label
09/11/2023



Greaseduct
09/11/2023

EF-3

Comment:



EF_3
09/12/2023



Backdraft_Damper
09/12/2023

HOOD-1

Comment:



HD-1
09/12/2023

HOOD-2

Comment:



HD_2
09/12/2023



09-11-2023 WENDY'S - PLOVER, WI

CheckList Information

Name : TECH - STEP 1: INITIAL SITE WALKTHROUGH **Status :** Not Completed
Assigned Organization : National TAB **Asset :**
Requesting Organization : National TAB
Created Date : 09/08/2023 - Brian Turnbough - 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:

Yes



09-11-2023 WENDY'S - PLOVER, WI

CheckList Information

Name : TECH - STEP 2: UNIT DATA AND EVAL **Status :** Not Completed
Assigned Organization : National TAB **Asset :**
Requesting Organization : National TAB
Created Date : 09/08/2023 - Brian Turnbough - 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") N/A

Comment:

Motors are all operating below the FLA rating? Yes

Comment:

Are belts tight?

Comment:

NA, units are direct drive.

If direct drive unit is the speed controller working.

Comment:

Yes

Is gas piping installed and valves turned on?

No

Comment:

Heat startup not yet completed on DOAS units.

Unit free of noticeable noise and vibration

Yes

Comment:

EF's

Rotation is correct?

Yes

Comment:

Belts are tight?

Comment:

NA, fans are direct drive.

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:

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:

Unit free of noticeable noise and vibration?

Yes

Comment:

HOODS

Kitchen equipment installed in proper places?

Yes

Comment:

Can kitchen equipment be turned on for final smoke test?

No

Comment:

DOCUMENTATION

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

Yes

Comment:



09-11-2023 WENDY'S - PLOVER, WI

CheckList Information

Name : TECH - STEP 3: TEST, ADJUST AND BALANCE **Status :** Not Completed

Assigned Organization : National TAB **Asset :**

Requesting Organization : National TAB

Created Date : 09/08/2023 - Brian Turnbough - National TAB

CheckList Item Details

TEST, ADJUST, AND BALANCE ALL EQUIPMENT:

DURING TESTING MAKE NOTE OF THE FOLLOWING:

Is space free of drafting?	Yes
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Comment:

Is space comfortable in all areas?	Yes
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Comment:

Is the space free of ventilation noise?	No
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Comment:

Dining RTU causing some general ventilation noise. Not anticipated to cause any issue and should be drowned out by store operation and music.

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

Comment:

NA



09-11-2023 WENDY'S - PLOVER, WI

CheckList Information

Name : TECH - STEP 4: FINAL TESTS **Status :** Not Completed
Assigned Organization : National TAB **Asset :**
Requesting Organization : National TAB
Created Date : 09/08/2023 - Brian Turnbough - National TAB

CheckList Item Details

FINAL TESTS

HOOD CAPTURE TEST

List equipment turned on for testing

Comment:

None

List smoke candle type used

Comment:

45 second smoke emitter.

Smoke test capture - Perimeter of hood

Comment:

100%

Smoke test capture - Top of cooking surface

Comment:

100%

WITNESS

Date test was completed

09/11/2023

Comment:

TAB tech name / Firm

Comment:

Michael McDonnell / National Tab

Site super name / Firm

Comment:

Brett / BDH

Owner representative name / Firm (if Applicable)

Comment:

NA

Building pressure at front & back doors (All Systems On)

Comment:

0.007"

ADDITIONAL

Do actual net building airflow, design net building airflow, and pressure coincide? If not why? (All three should either be positive or negative)

Comment:

Yes

Thermostats are programmed?

Yes

Comment:

Kitchen DOAS occupancy interlocked with hood operation. Dining DOAS running off of a schedule, programmed.

National TAB

Project: 09-11-2023 WENDY'S - PLOVER, WI

System/Unit: AHU/RTU



Asset: OAU1

AREA:KITCHEN

Unit Data		
	Design	Actual
MFG	CAPTIVEAIRE	CAPTIVEAIRE
Serial Num	-	5800852
Model Num	CASRTU2-I.300-15-10T	CASRTU2-I.300-15-10T
Type	RTU	DOAS
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	2
OA Filter Size 1	-	20X25X2
Num Final Filter 1	-	8
Final Filter Size 1	-	16X20X2

Test Data		
	Design	Actual
SF CFM	2200	2182
SF RPM	-	1711
RA CFM	0	0
OA CFM	2200	2182
RL Voltage	-	207 [1]
RL Amperage	-	4.9 [1]
SF Rotation	-	CORRECT
RA Damper Position	-	0%
Min OA Damper Position	-	100% (10.0 V)
Min OA Damper Type	-	ECONOMIZER

Motor Data		
	Design	Actual
Motor MFG	-	TECO WESTINGHOUSE
Frame	-	145T
Horsepower	2.00	2.0
Motor Rpm	-	1740
Phase	3	3
Rated Voltage	208	230
Rated Amperage	-	5.48

Performance Data		
	Design	Actual
Fan Discharge SP	-	0.418"

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

Drive Data		
	Design	Actual
Motor Sheave Size	-	DD
Motor Bore Size	-	DD
Motor Sheave SetPt	-	59.0 HZ
Fan Sheave Size	-	DD
Fan Sheave Bore	-	DD
Belt CL Distance	-	DD
Num of Belts	-	DD
Belt Size	-	DD
Belt Alignment	-	DD

Completed By: Michael McDonnell on 09/11/2023

Notes:

- [1] READING TAKEN FROM VFD
- [2] UNIT OCCUPANCY INTERLOCKED WITH HOOD OPERATION.

Written By: Michael McDonnell on 09/11/2023

National TAB

Project:09-11-2023 WENDY'S - PLOVER, WI

AHU/RTU



Diffuser Supply (GRD)

OAU1/KITCHEN

Asset									
Asset Name	Location	Type	Size	DESIGN CFM	AK	CFM(1)	CFM(2)	FINAL CFM	% to design
DAU1-SGRD1	KITCHEN	SD3	10"	250	1.0	230	220	245	98.0
DAU1-SGRD2	KITCHEN	SD2	10"	245	1.0	257	248	224	91.4
DAU1-SGRD3	KITCHEN	SD2	10"	245	1.0	287	284	253	103.3
DAU1-SGRD4	KITCHEN	SD2	10"	245	1.0	244	286	234	95.5
DAU1-SGRD5	KITCHEN	SD2	10"	245	1.0	187	201	228	93.1
DAU1-SGRD6	KITCHEN	SD2	10"	245	1.0	231	241	264	107.8
DAU1-SGRD7	KITCHEN	SD3	10"	245	1.0	263	245	253	103.3
DAU1-SGRD8	KITCHEN	SD3	10"	245	1.0	200	212	236	96.3
DAU1-SGRD9	KITCHEN	SD3	10"	245	1.0	244	294	245	100.0
Total				2210		2143	2231	2182	98.73%

Completed By: Michael McDonnell on 09/11/2023

National TAB

Project: 09-11-2023 WENDY'S - PLOVER, WI

System/Unit: AHU/RTU



Asset: RTU1

AREA:KITCHEN

Unit Data		
	Design	Actual
MFG	CAPTIVEAIRE	CAPTIVEAIRE
Serial Num	-	5800852
Model Num	CASRTU2-I.150-18-10T	CASRTU2-I.150-18-10T
Type	RTU	RTU
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	2
OA Filter Size 1	-	20X25X2
Num Final Filter 1	-	8
Final Filter Size 1	-	16X20X2

Motor Data		
	Design	Actual
Motor MFG	-	TECO WESTINGHOUSE
Frame	-	182T
Horsepower	3.00	3.0
Motor Rpm	-	1755
Phase	3	3
Rated Voltage	208	230
Rated Amperage	-	8.6

Drive Data		
	Design	Actual
Motor Sheave Size	-	DD
Motor Bore Size	-	DD
Motor Sheave SetPt	-	62.0 HZ
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	3037
SF RPM	-	1814
RA CFM	2100	2087
OA CFM	900	950
RL Voltage	-	180 [1]
RL Amperage	-	7.7 [1]
SF Rotation	-	CORRECT
Min OA Damper Position	-	5.0V
Min OA Damper Type	-	ECONOMIZER

Performance Data		
	Design	Actual
Fan Discharge SP	-	0.649"

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

Completed By: Michael McDonnell on 09/11/2023

Notes:

[1] READING TAKEN FROM VFD

[2] OCCUPANCY OPERATING OFF OF SCHEDULE. NOT INTERLOCKED WITH HOOD OPERATION.

Written By: Michael McDonnell on 09/11/2023

National TAB

Project:09-11-2023 WENDY'S - PLOVER, WI

AHU/RTU



Diffuser Supply (GRD)

RTU1/KITCHEN

Asset									
Asset Name	Location	Type	Size	DESIGN CFM	AK	CFM(1)	CFM(2)	FINAL CFM	% to design
SGRD1	DINING	SD1	10"	385	1.0	309	382	384	99.7
SGRD2	DINING	SD1	10"	385	1.0	341	386	394	102.3
SGRD3	DINING	SD1	10"	385	1.0	339	378	388	100.8
SGRD4	DINING	SD1	10"	385	1.0	353	390	394	102.3
SGRD5	DINING	SD1	10"	385	1.0	365	396	400	103.9
SGRD6	DINING	SD1	10"	385	1.0	365	424	384	99.7
SGRD7	DINING	SD1	10"	385	1.0	340	367	385	100.0
SGRD8	DINING	SD3	6"	100	1.0	106	122	107	107.0
SGRD9	RESTROOM	SDD4	6"	100	1.0	67	94	95	95.0
SGRD10	RESTROOM	SD4	6"	100	1.0	199	212	106	106.0
Total				2995		2784	3151	3037	101.4%

Completed By: Michael McDonnell on 09/11/2023

National TAB

Project: 09-11-2023 WENDY'S - PLOVER, WI

System/Unit: FAN - Exhaust



Asset: EF1

AREA:HD1 GRILL

Unit Data		
	Design	Actual
MFG	CAPTIVEAIRE	CAPTIVEAIRE
Model Num	DU85HFA	DU85HFA
Serial Num	-	5800852
Type	UPBLAST	UPBLAST
Configuration	VERTICAL	VERTICAL

Motor Data		
	Design	Actual
Motor MFG	-	TELCO GREEN
Frame	-	NL
Horsepower	0.750	0.75
Motor Rpm	-	1800
Phase	1	1
Voltage (rated)	208	208
Amperage (rated)	-	5.2
Service Factor	-	NL

Test Data		
	Design	Actual
CFM	1200	1200
Fan RPM	-	1116
Fan Rotation	-	CORRECT
Motor RPM	-	1116
System SetPt	-	62%
RL Voltage	-	212
RL Amperage	-	1.6
Total ESP	1.250"	0.89"
Fan Inlet SP	-	-0.89"
Fan Discharge SP	-	ATM

Completed By: Michael McDonnell on 09/11/2023

National TAB

Project: 09-11-2023 WENDY'S - PLOVER, WI

System/Unit: FAN - Exhaust



Asset: EF2

AREA:HD2 FRYERS

Unit Data		
	Design	Actual
MFG	CAPTIVEAIRE	CAPTIVEAIRE
Model Num	DU85HFA	DU85HFA
Serial Num	-	5800852
Type	UPBLAST	UPBLAST
Configuration	VERTICAL	VERTICAL

Motor Data		
	Design	Actual
Motor MFG	-	TELCO GREEN
Frame	-	NL
Horsepower	0.750	0.75
Motor Rpm	-	1800
Phase	1	1
Voltage (rated)	208	208
Amperage (rated)	-	5.2
Service Factor	-	NL

Test Data		
	Design	Actual
CFM	1500	1549
Fan RPM	1332	1350
Fan Rotation	-	CORRECT
Motor RPM	-	1350
System SetPt	-	75%
RL Voltage	-	211
RL Amperage	-	2.9
Total ESP	1.250"	1.38"
Fan Inlet SP	-	-1.38"
Fan Discharge SP	-	ATM

Completed By: Michael McDonnell on 09/11/2023

National TAB

Project: 09-11-2023 WENDY'S - PLOVER, WI

System/Unit: FAN - Exhaust



Asset: EF3

AREA:

Unit Data		
	Design	Actual
MFG	CAPTIVEAIRE	CAPTIVEAIRE
Model Num	DR10HFA	DR10HFA
Serial Num	-	5800852
Type	DOWNBLAST	DOWNBLAST
Configuration	VERTICAL	VERTICAL

Motor Data		
	Design	Actual
Motor MFG	-	TELCO GREEN
Frame	-	NL
Horsepower	0.166	0.166
Motor Rpm	-	1800
Phase	1	1
Voltage (rated)	115	115
Amperage (rated)	-	1.9
Service Factor	-	NL

Test Data		
	Design	Actual
CFM	300	297
Fan RPM	-	1338
Fan Rotation	-	CORRECT
Motor RPM	-	1338
System SetPt	-	68%
RL Voltage	-	118
RL Amperage	-	1.1
Total ESP	0.340"	0.14"
Fan Inlet SP	-	-0.14"
Fan Discharge SP	-	ATM

Completed By: Michael McDonnell on 09/11/2023

National TAB

Project:09-11-2023 WENDY'S - PLOVER, WI

FAN - Exhaust



Diffuser Ret/Exh (GRD)

EF3/

Asset									
Asset Name	Location	Type	Size	DESIGN CFM	AK	CFM(1)	CFM(2)	FINAL CFM	% to design
EF3-EGRD1		RG-2	8"	150	1.0	186	164	160	106.7
EF3-EGRD2		RG-2	8"	150	1.0	146	138	137	91.3
Total				300		332	302	297	99%

Completed By: Michael McDonnell on 09/11/2023

National TAB

Project: 09-11-2023 WENDY'S - PLOVER, WI

System/Unit: Kitchen Hood Type I



Asset: HD1

AREA:GRILL

Unit Data		
	Design	Actual
MFG	CAPTIVEAIRE	CAPTIVEAIRE
Model Num	5424 ND-2	5424 ND-2
Job / Serial Num	-	5800852
Type	TYPE I LOW PROXIMITY	TYPE I CANOPY
Hood length	93"	93"
Hood Width	54"	54"

Test Data Exhaust		
	Design	Actual
Filter Type	CAPTRATE SOLO	CAPTRATE SOLO
Filter Size 1	16X16	16X16
Filter Qty 1	5	5
Filter AK factor size 1	1.62	1.62
Filter Total AK Area	8.1	8.1
Filter1 FPM	-	144
Filter2 FPM	-	156
Filter3 FPM	-	156
Filter4 FPM	-	141
Filter5 FPM	-	144
Filter Ave FPM(corr)	-	148.2
CFM	1200	1200

Cooking Equipment		
	Design	Actual
Item 1	-	GRIDDLE
Item 2	-	GRILL PRESS

Completed By: Michael McDonnell on 09/11/2023

National TAB

Project: 09-11-2023 WENDY'S - PLOVER, WI

System/Unit: Kitchen Hood Type I



Asset: HD2

AREA:FRYER

Unit Data

	Design	Actual
MFG	CAPTIVEAIRE	CAPTIVEAIRE
Model Num	5424 ND-2	5424 ND-2
Job / Serial Num	-	5800852
Type	TYPE I LOW PROXIMITY	TYPE I CANOPY
Hood length	108"	108"
Hood Width	54"	54"

Test Data Exhaust

	Design	Actual
Filter Type	CAPTRATE SOLO	CAPTRATE SOLO
Filter Size 1	16X16	16X16
Filter Qty 1	6	6
Filter AK factor size 1	1.62	1.62
Filter Total AK Area	9.72	9.72
Filter1 FPM	-	166
Filter2 FPM	-	163
Filter3 FPM	-	164
Filter4 FPM	-	169
Filter5 FPM	-	140
Filter6 FPM	-	154
Filter Ave FPM(corr)	-	159.33
CFM	1500	1549

Cooking Equipment

	Design	Actual
Item 1	-	FRYER
Item 2	-	FRYER

Completed By: Michael McDonnell on 09/11/2023

