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: 05/03/2023

PROJECT

04-03-23 PENN STATION - SPRINGFIELD, TN

3522 TOM AUSTIN HWY

SPRINGFIELD , TN 37172

Client

C&T DESIGN

4025 PORT UNION RD.

FAIRFIELD, OH 45014

National TAB

Project: 04-03-23 PENN STATION - SPRINGFIELD, TN

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.

MUA (Make Up Air Unit) w/ PSP
Total flow for the MAU (Make-up Air Unit) unit was measured by readings taken at the discharge of the hood's perforated supply plenum. Readings taken with a velocity matrix were averaged and multiplied by a manufacturer's corrected area. Adjustments to the fan speed were made in order to bring the unit to within design tolerance. Any MUA'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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04-03-23 PENN STATION - SPRINGFIELD, TN

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

DOAS-1.jpeg

Label.jpeg

Motor.jpeg

RTU-2

DOAS-2.jpeg

Unabletoreach.jpeg

KEF-1

KEF-1.jpeg

Label.jpeg

Motor.jpeg

KEF-2

KEF-2.jpeg

Label.jpeg

Motor.jpeg

KEF-3

KEF-3.jpeg

Label.jpeg

Motor.jpeg

HOOD-1

HOOD1.jpeg

HOOD-2

Hood-2.jpeg

HOOD-3

HOOD-3.jpeg

Label.jpeg

HOOD-3.jpeg

Notes/Comments :

Comfort. Under control.

04-03-23 PENN STATION - SPRINGFIELD, TN

CheckList Information

Name :	TECH - STEP 1: INITIAL WALKTHROUGH	**Status :**	Submitted
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
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?	

Notes/Comments :

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04-03-23 PENN STATION - SPRINGFIELD, TN

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?	NA
If direct drive unit is the speed controller working.	Yes
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
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?	Yes
Unit free of noticeable noise and vibration?	Yes
MUA	
Rotation is correct?	DOAS/YES
Gas piping is installed and valves are in on position?	DOAS/YES
Heater tested and is functional?	Yes
Internal motorized damper is fully opening?	YES
Motor is operating below the FLA rating?	
Unit free of noticeable noise and vibration?	
HOODS	
Kitchen equipment installed in proper places?	
Can kitchen equipment be turned on for final smoke test?	
DOCUMENTATION	
Have trades/general contractor been notified about any issues and are they created on FaciliBuild?	

Notes/Comments :

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04-03-23 PENN STATION - SPRINGFIELD, TN

CheckList Information

Name :	TECH - STEP 3: TEST, ADJUST AND BALANCE	**Status :**	Submitted
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 :

Comfort. Under control.

04-03-23 PENN STATION - SPRINGFIELD, TN

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	GRIDDLE, SANDWHICH COOKER/PIZZA OVEN/ FRYER
List smoke candle type used	S-102
Smoke test capture - Perimeter of hood	YES,100%
Smoke test capture - Top of cooking surface	YES,100%
WITNESS	
Date test was completed	
TAB tech name / Firm	JOASH ALBIN
Site super name / Firm	VIDEO CAPTURE
Owner representative name / Firm (if Applicable)	VIDEO CAPTURE
Building pressure at front & back doors (All Systems On)	-0.011 FRONT/ 0.018 REAR
ADDITIONAL	
Do actual net building airflow, design net building airflow, and pressure coincide? If not why? (All three should either be positive or negative)	
PROGRAM THERMOSTATS	
Occupied 7:15AM-10:15PM: 68 Heat/72 Cool (NOTE: 3 degree MAX setback)	

Unoccupied 10:16PM-7:14AM: 65 Heat/75 Cool

Notes/Comments :

National TAB

Project: 04-03-23 PENN STATION - SPRINGFIELD, TN

System/Unit: AHU/RTU

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Asset: DOAS1 AREA:KITCHEN

Unit Data		
	Design	**Actual**
MFG	CAPTIVEAIRE	CAPTIVEAIRE
Serial Num	-	5464013
Model Num	CASRTU1-I.200-15-7.5T-DOAS	CASRTU1-I.200-15-7.5T-DOAS
Type	DOAS	DOAS
Configuration	VERTICAL	VERTICAL

Motor Data		
	Design	**Actual**
Motor MFG	-	WESTINGHOUSE
Frame	-	145T
Horsepower	2	2
Motor Rpm	-	1740
Phase	3	3
Rated Voltage	208	208
Rated Amperage	-	5.48

Drive Data		
	Design	**Actual**
Motor Sheave Size	-	DD
Motor Bore Size	-	DD
Motor Sheave SetPt	-	DD
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	2000	1883
SF RPM	-	DD
RA CFM	525	
OA CFM	1475	
RL Voltage	-	
RL Amperage	-	
SF Rotation	-	CCW
RA Damper Position	-	
Min OA Damper Position	-	
Min OA Damper Type	-	
OA Enthalpy Setpt	-	
Brake Horse Power	-	

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.30"
Fan Suction SP	-	-1.10"
Fan Discharge SP	-	0.28"
Total ESP	0.7"	0.58"
Fan Total SP	-	1.38"

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

Completed By: Dan Hertenstein

Notes:

National TAB

Project:04-03-23 PENN STATION - SPRINGFIELD, TN

AHU/RTU

Comfort. Under control.

Diffuser Supply (GRD)

DOAS1/KITCHEN

Asset									
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**	**FINAL CFM**	**% to design**
SGRD1	PREP		10"	300	1	605	275	275	91.7
SGRD2	PREP		10"	300	1	418	272	272	90.7
SGRD3	SERVING			250	1	256	231	231	92.4
SGRD4	SERVING		10"	300	1	185	288	288	96.0
SGRD5	SERVING		10"	300	1	188	294	294	98.0
SGRD6	SERVING		10"	300	1	188	278	278	92.7
SGRD7	SERVING		10"	250	1	65	245	245	98.0

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Project: 04-03-23 PENN STATION - SPRINGFIELD, TN

System/Unit: AHU/RTU

Comfort. Under control.

Asset: DOAS2 AREA:DINING

Unit Data		
	Design	**Actual**
MFG	CAPTIVEAIRE	CAPTIVEAIRE
Model Num	CASRTU1-I.200-15-7.5T-DOAS	CASRTU1-I.200-15-7.5T-DOAS
Type	DOAS	DOAS
Configuration	VERTICAL	VERTICAL

Motor Data		
	Design	**Actual**

Drive Data		
	Design	**Actual**

Test Data		
	Design	**Actual**
SF CFM	2200	2095
RA CFM	925	-
OA CFM	1275	-

Performance Data		
	Design	**Actual**

General		
	Design	**Actual**

Completed By: JOASH ALBIN

Notes:

National TAB

Project:04-03-23 PENN STATION - SPRINGFIELD, TN

AHU/RTU

Comfort. Under control.

Diffuser Supply (GRD)

DOAS2/DINING

Asset									
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**	**FINAL CFM**	**% to design**
SGRD1	HALL		6"	70	1	60	74	74	105.7
SGRD2	HALL		8"	100	1	107	95	95	95.0
SGRD3	MEN		8"	130	1	160	120	120	92.3
SGRD4	DINING		10"	200	1	245	191	191	95.5
SGRD5	DINING		10"	250	1	230	241	241	96.4
SGRD6	DINING		10"	200	1	198	205	205	102.5
SGRD7	DINING		10"	250	1	286	235	235	94.0
SGRD8	DINING		10"	200	1	175	189	189	94.5
SGRD9	DINING		10"	400	1	388	385	385	96.3
SGRD10	DINING		10"	400	1	267	360	360	90.0

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Project: 04-03-23 PENN STATION - SPRINGFIELD, TN

System/Unit: FAN - Exhaust

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Asset: EF4 AREA:

Unit Data		
	Design	**Actual**
MFG	NA	COOK
Model Num	NA	180 SERIES
Serial Num	-	NL
Type	-	CEILING
Configuration	-	VETICAL

Motor Data		
	Design	**Actual**
Motor MFG	-	QUACE
Frame	-	S33
Horsepower	-	NL
Motor Rpm	-	1350
Phase	-	1
Voltage (rated)	-	120
Amperage (rated)	-	1
Service Factor	-	1

Test Data		
	Design	**Actual**
CFM	150	140
Fan RPM	-	1350
Fan Rotation	-	CCW
Motor RPM	-	DD
System SetPt	-	HIGH
RL Voltage	-	120
RL Amperage	-	0.91
Total ESP	-	0.57
Fan Inlet SP	-	-0.57
Fan Discharge SP	-	ATM

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Notes: EF 4&5VSHARE DISCHARGE

National TAB

Project: 04-03-23 PENN STATION - SPRINGFIELD, TN

System/Unit: FAN - Exhaust

Comfort. Under control.

Asset: EF5 AREA:

Unit Data		
	Design	**Actual**
MFG	NA	COOK
Model Num	NA	120
Serial Num	-	NL
Type	-	CEILING
Configuration	-	VERTICAL

Motor Data		
	Design	**Actual**
Motor MFG	-	QUACE
Frame	-	S33
Horsepower	-	NL
Motor Rpm	-	1550
Phase	-	1
Voltage (rated)	-	115
Amperage (rated)	-	0.20
Service Factor	-	1

Test Data		
	Design	**Actual**
CFM	75	78
Fan RPM	-	1550
Fan Rotation	-	CCW
Motor RPM	-	DD
System SetPt	-	HIGH
RL Voltage	-	120
RL Amperage	-	0.17
Total ESP	-	0.57"
Fan Inlet SP	-	-0.57"
Fan Discharge SP	-	ATM

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Notes:

National TAB

Project: 04-03-23 PENN STATION - SPRINGFIELD, TN

System/Unit: FAN - Exhaust

Comfort. Under control.

Asset: KEF1 AREA:HD1 GRILL

Unit Data		
	Design	**Actual**
MFG	CAPTIVEAIRE	CAPTIVEAIRE
Model Num	DU85HFA	DU85HFA
Serial Num	-	5464013
Type	UPBLAST	UPBLAST
Configuration	VERTICAL	VERTICAL

Motor Data		
	Design	**Actual**
Motor MFG	-	TELCO
Frame	-	48EC
Horsepower	.75	0.75
Motor Rpm	-	1800
Phase	1	1
Voltage (rated)	115	115
Amperage (rated)	-	2.8
Service Factor	-	1

Test Data		
	Design	**Actual**
CFM	1050	998
Fan RPM	1199	DD
Fan Rotation	-	CCW
Motor RPM	-	DD
System SetPt	-	56%
RL Voltage	-	120
RL Amperage	-	1.5
Total ESP	1.15"	0.76"
Fan Inlet SP	-	-0.76"
Fan Discharge SP	-	ATM

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Notes:

National TAB

Project: 04-03-23 PENN STATION - SPRINGFIELD, TN

System/Unit: FAN - Exhaust

Comfort. Under control.

Asset: KEF2 AREA:HD3 OVEN

Unit Data		
	Design	**Actual**
MFG	CAPTIVEAIRE	CAPTIVEAIRE
Model Num	DU33HFA	DU33HFA
Serial Num	-	5464013
Type	UPBLAST	UPBLAST
Configuration	VERTICAL	VERTICAL

Motor Data		
	Design	**Actual**
Motor MFG	-	TELCO
Frame	-	48EC
Horsepower	.333	0.33
Motor Rpm	-	1800
Phase	1	1
Voltage (rated)	115	120
Amperage (rated)	-	3.75
Service Factor	-	1

Test Data		
	Design	**Actual**
CFM	600	600
Fan RPM	-	DD
Fan Rotation	-	CCW
Motor RPM	-	DD
System SetPt	-	68%
RL Voltage	-	120
RL Amperage	-	2.4
Total ESP	0.6"	0.51"
Fan Inlet SP	-	-0.51"
Fan Discharge SP	-	ATM

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Notes:

National TAB

Project: 04-03-23 PENN STATION - SPRINGFIELD, TN

System/Unit: FAN - Exhaust

Comfort. Under control.

Asset: KEF3 AREA:HD 3 FRYER

Unit Data		
	Design	**Actual**
MFG	CAPTIVEAIRE	CAPTIVEAIRE
Model Num	DU85HFA	DU85HFA
Serial Num	-	5464013
Type	UPBLAST	UPBLAST
Configuration	VERTICAL	VERTICAL

Motor Data		
	Design	**Actual**
Motor MFG	-	TELCO
Frame	-	48EC
Horsepower	.75	075
Motor Rpm	-	1800
Phase	1	1
Voltage (rated)	115	115
Amperage (rated)	-	7.2
Service Factor	-	1

Test Data		
	Design	**Actual**
CFM	800	783
Fan RPM	1210	DD
Fan Rotation	-	CCW
Motor RPM	-	DD
System SetPt	-	63%
RL Voltage	-	120
RL Amperage	-	4.87
Total ESP	1.2"	1.11"
Fan Inlet SP	-	-1.11"
Fan Discharge SP	-	ATM

Completed By: JOASH ALBIN

Notes:

National TAB

Project: 04-03-23 PENN STATION - SPRINGFIELD, TN

System/Unit: Kitchen Hood Type I

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Asset: HD1 AREA:

Unit Data		
	Design	**Actual**
MFG	CPATIVEAIRE	CPATIVEAIRE
Model Num	3650-BD2	3650-BD2
Job / Serial Num	-	5464013
Type	TYPE I LOW PROXIMITY	TYPE I
Hood length	72"	72"
Hood Width	36"	36"

Test Data Exhaust		
	Design	**Actual**
Filter Type	CAPTRATE SOLO FILTER	CAPTRATESOLO
Filter Size 1	16X16	16X16
Filter Qty 1	4	4
Filter AK factor size 1	1.62	1.62
Filter Total AK Area	6.48	6.48
Filter1 FPM	-	150
Filter2 FPM	-	155
Filter3 FPM	-	159
Filter4 FPM	-	152
Filter Ave FPM(corr)	-	158
CFM	-	998

Cooking Equipment		
	Design	**Actual**
Item 1	-	GRIDDLE

Performance Data		
	Design	**Actual**
Smoke Generation Type	-	S-102
Hood Capture %	-	100%
End Panels Installed (Y/N)	-	YES

General		
	Design	**Actual**

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Notes:

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Project: 04-03-23 PENN STATION - SPRINGFIELD, TN

System/Unit: Kitchen Hood Type I

Comfort. Under control.

Asset: HD2 AREA:

Unit Data		
	Design	**Actual**
MFG	CAPTIVEAIRE	CAPTIVEAIRE
Model Num	4412PS-OVN	4412PS-OVN
Job / Serial Num	-	NL
Type	TYPE I LOW PROXIMITY	TYPE I LOW PROX
Hood length	21.25"	21.25"
Hood Width	44"	44"

Test Data Exhaust		
	Design	**Actual**
Filter Type	SS BAFFLE W/ HANDELS	SS BAFFLE
Filter Size 1	10X20	10X20
Filter Qty 1	2	2
Filter AK factor size 1	-	1.23
Filter1 FPM	-	220
Filter2 FPM	-	228
Filter Ave FPM(corr)	-	224
CFM	-	582

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

Performance Data		
	Design	**Actual**
Smoke Generation Type	-	S-102
Hood Capture %	-	100%
End Panels Installed (Y/N)	-	NO

General		
	Design	**Actual**
Third Party Witness	-	VIDEO CAPTURE
Third Party Company	-	VIDEO CAPTURE
Tech Witness	-	VIDEO CAPTURE

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Notes:

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Project: 04-03-23 PENN STATION - SPRINGFIELD, TN

System/Unit: Kitchen Hood Type I

Comfort. Under control.

Asset: HD3 AREA:

Unit Data		
	Design	**Actual**
MFG	CAPTIVEAIRE	CAPTIVEAIRE
Model Num	3650BD-2	3650BD-2
Job / Serial Num	-	5464013
Type	TYPE 1 LOW PROXIMITY	TYPE I
Hood length	50"	50"
Hood Width	36"	36"

Test Data Exhaust		
	Design	**Actual**
Filter Type	CAPTRATE SOLO FILTER	CAPTRATE SOLO
Filter Size 1	16X16	16X16
Filter Qty 1	3	3
Filter AK factor size 1	1.62	1.62
Filter Total AK Area	4.86	4.86
Filter1 FPM	-	160
Filter2 FPM	-	168
Filter3 FPM	-	154
Filter Ave FPM(corr)	-	161
CFM	-	782

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

Performance Data		
	Design	**Actual**
Smoke Generation Type	-	S-102
Hood Capture %	-	100%
End Panels Installed (Y/N)	-	YES

General		
	Design	**Actual**
Third Party Witness	-	VIDEO CAPTURE
Third Party Company	-	VIDEO CAPTURE
Tech Witness	-	VIDEO CAPTURE

Completed By: JOASH ALBIN

Notes: