Report By:

National TAB
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NATIONAL TAB

Comfort. Under control.

Report: FINAL TAB REPORT
Function: Test, Adjust, & Balance
Date: 7/20/2022

PROJECT

06-13 BLUE SUSHI - NASHVILLE, TN

NEED ADDRESS

NASHVILLE, TN

Client

National Engineering
784 Morrison Rd

Columbus, OH 43230

National TAB

Project: 06-13 BLUE SUSHI - NASHVILLE, TN

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Project Summary

Introduction

Purpose of the visit to Blue Sushi in Nashville TN was to evaluate cause of hood smoke containment complaints and uncomfortable space temperatures. Blue Sushi (BS) recently turned over and the issues were present since then. The systems were balanced by a contractor during the construction phase and multiple visits by OEM's and service companies had taken place since turnover.

National TAB performed an initial visit on 6/5/2022. And then a follow up visit was completed on 6/15/2022 and Rich Jones with National Engineering was present as well. This summary below is a combination of NT findings with comments from NE copied in as well. A summary of recommendations are provided at the bottom of the summary, but Blue Sushi should consult National Engineering for final recommendations.

Grease Duct/PCU/Smoke Concerns

After speaking with the manager, the major smoke complaint is in the patio area. The space has a PCU but there is more smoke and odor that was anticipated. The PCU discharges directly over the patio area. The smoke also migrates into the space when the large doors are open.
Grease cleanout door was initially found missing on the discharge of the PCU. There is also another door that appears to be loose. The missing cleanout door was not found above the ceiling anywhere. Airflow was initially 2662 CFM out of 2600 CFM design. The hood filters on the right side above the grill are dirty and impacting flow and need to be cleaned. These probably should be cleaned every night. The filter velocity was much lower on this side of the hood (130 FPM vs 170 FPM) which is causing worse performance. Recommend cleaning and keeping on a schedule.

One of the cooks stated that from time to time the PCU fan would shut off and this would cause a lot of smoke to escape the hood. During a period of slower cooking, The technician checked the temperatures on the hood control panel. It was stating that the room temperature was 74.1 but the duct temp sensor was 87.4. The offset temperature setting in the hood was 15 degrees. This means if the hoods are "on by temperature" and not manually pressed on by button, that they would have shut off. He lowered this to 11 degrees which should keep the hoods on even during periods of slow cooking

There are some doors/windows that open up to the patio that can be fully opened. These are also right below the discharge of the PCU. PCU's are really good at removing most grease from the air but they cannot remove all odor. It will probably always be the case that odor will be drawn into the space when these doors are open. The building pressure was measured to be negative (see below)and resolving this could help the issue some.

A smoke test was performed and was capturing well. The cooks also cooked a very smokey dish and it captured everything. The smoke is a little lazy but it was all contained. They stated that smoke would escape when they cooked multiple smokey dishes at high volumes—but we did not get to witness that.

A 2nd visit was completed it was verified that the missing and loose cleanout doors were now properly installed. The Mechanical did not fix the first cleanout door that was loose and only halfway on, so NT fixed it as well as checked all cleanout doors for tightness and air leaks. Some cleanout doors were fully tight and still had trace amounts of air blowing through the gasket. At this point knowing we have fully sealed the duct, we checked the exhaust flow and found it was reduced by 40%. Completed various checks to make sure fan was operating correctly and it was determined that the additional 5 90-degree bends are causing the restriction in the duct.

Smoke coming from the louvers is being blasted directly onto couches that are located on the patio. The grease duct currently butts up right to the louver without any transition which is creating a nozzle effect with

exhaust having a high velocity and is of course directed down to the couch. Adding a full-size transition from grease duct to the full louver size and flipping the louvers upside down will lower the exhaust velocity and direct the air upwards. The louvers are underneath a 2' overhang so water infiltration should not be a concern and upstairs tenants are air sealed to the outside with no balconies so they would not be affected.

It was confirmed that there is noticeable odor and smoke from the louver. Verified that there are two banks of carbon filters with model numbers matching the submittals, 2 banks of HEPA filters, and then one banks of the SS captrate Solo filters. PCU's while effective at reducing odor and smoke will not ever fully remove all odor. However, it should be re-evaluated once the exhaust flow is within design.

The PCU Fan has a drive belt that has been thrown off. Found that the inner motor sheave has come off its threads which caused the belt to become loose. Tried to fix by removing the key but unfortunately the key was seized in the pulley, so I was not able to fix. Recommend getting a new motor pulley and ensure that all setscrews are tightened down. Should the one remaining belt fail then the store or cooking will likely be shut down until it can be fixed since there is no redundant safety of the second belt.

The right end panel of the hood is held on by clamps and there is an inch gap from the panel to the end of the hood. Currently smoke does escape through that gap, (mostly due to the low exhaust flow) we looked at the cooking equipment and it appears that all the equipment could be slid to the left an inch which would allow for the proper end panel installation.

AHU's

The space has major issues maintaining temperature setpoint. Portable AC units have been setup to help improve comfort.

Airflows were measured on all AHU's.1,2,4 were all found slightly low. Increased these units by 2-3% until motor amperage was maxed out. AHU 4 has some supply leakage at the discharge of the unit where canvas connector attaches two pieces of duct. Sealing the leakage will likely put the unit closer to 100% flow. AHUs 1,2,4 all have dirty air filters some are even starting to collapse. AHU-2 filters were particularly bad due to sucking in greasy smoke from to the capture issues. One diffuser that has pinched flex duct should switched to a 12x24" diffuser with three-way throw pattern so it can be installed against the wall, but ill add it should be placed closer to the center of the prep area and not towards the pass-through window where it currently is. Drawing shows it more centered in that area.

AHU-3 supply duct was traversed and around 500 cfm was measured but measuring air velocity of the return grille showed the unit was returning 1800cfm. The only access to the unit was removing a diffuser above the sushi bar but this is only visual access where we were able to feel supply leakage coming from the unit heater, the intended access doors were installed above the sushi counters so ladder placement is not possible. The unit heater was installed as an elbow meaning the fan discharges horizontally into the heater then the mechanical contractor installed their duct to the top of the heater, so it discharges vertically. Duct heaters should typically be installed with the same inlet and outlet configuration, meaning horizontal inlet and horizontal exit or vertical/vertical. Since the heater is currently used as an elbow it may be creating turbulence since there are no turning vanes in a duct heater, this would cause ununiform heating of the airstream and potentially be the cause of the leakage we are seeing. Again, better access to the unit is needed to be able to get to the filters and water balance valve.

On all AHU's, the OA damper and return damper motor is a power open motor that is supposed to have a mechanical stop on the motor, however self-tapping screws were used to physically stop the damper blades from opening. My concern is if the self-tapping screws eventually fail then the units will only be able to pull in outside air which will cause heating and cooling issues along with building pressure issues. Ideally 0-10v damper motor and controller should be installed or a proper motor mechanical stop should be used.

Outdoor air/Building pressure:

OA flow was measured with all OA dampers shut and MUA on as approx. 1550 CFM (with the MUA on). With the MUA on the airflow was approx. 1250 CFM. The MUA is fighting against OA ducts and based on the difference in airflow appears that it is pulling from the AHU returns. Briefly discussed with Rich and an inline supply fan may be necessary to ensure OA airflow at design. Building pressure is currently -0.06” wc and -1686 CFM which is highly negative.

Chilled Water:

Only AHUs 1,2,4 balance valves were able to be read out. AHU-3 is not accessible. Found that all Air handler balance valves are oversized, and all units were getting well above design GPM, so water flow is not a concern for the cooling issues. AHU control valves are open/close when cooling and not cooling, but the MUA valve was modulating and could not be fully opened to get a reading. Unit appeared to be cooling OK and not anticipated to be an issue.

Other Exhaust:

Dish exhaust is within design spec and is capturing the steam well. No adjustments were made. The restroom exhaust was just at 90% of design. Exhaust grille in the women’s restroom was not getting any flow. Recommend mechanical contractor verifying that there is flow.

Summary of Recommendations

1. Main cause of low airflow is the additional transitions that are added on the PCU discharge duct. These need to be reworked so that it is installed per design. This should increase airflow significantly as was observed when the grease cleanout door was not installed and airflow could bypass the transitions.
2. Recommend rotating the PCU discharge louvers 180 degrees so that smoke discharged upwards away from seating and not downwards.
3. Slide cooking equipment to the left and fully/permanently install the end panel so that smoke does not drift through the gap.
4. Building is currently net -1686 CFM and -0.06” wc which is very negative. This is likely the largest cause of discomfort in the building. The MUA is fighting against the AHU OA and is causing low overall outside air. Recommend adding a supply fan inline on the OA duct to improve the overall OA in the space. .
5. Replace the 24/24 diffuser in the prep area with a 12/24 and move it a one ceiling tile. This should improve airflow on AH-2.
6. Improve access to AH-3, and verify that OA damper is working properly (not full open or full closed). Low flow on this unit needs to be investigated further but it could not be accessed to inspect.
7. Locate and seal the duct leaks on AH-3 and AH-4
8. Redo the elbow/duct heater at AH-3
9. Replace all filters in the AHUs
10. OA/Return air damper motors for all AHU’s are missing a mechanical stop and are secured in place with sheet metal screws. Recommend repairing mechanical stop so that the sheet metal screws do not fail.

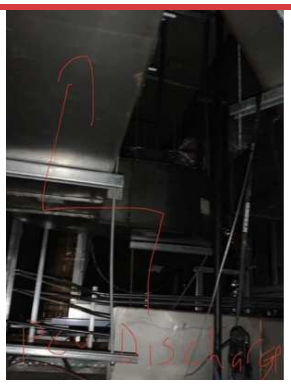
FOUND LOOSE GREASE DOOR WAS NOT FIXED

NTAB corrected this

FAN BELT HAS COME OFF

DIFFUSER FLEX STILL CRUSHED UNDER THE PCU

ADDED TURNS TO THE GREASE DUCT



GREASE DUCT WAS DESIGNED TO HAVE 2 45 DEGREE ELBOWS

PCU- INNER FAN SHEAVE HAS COME LOOSE

NTAB tried to remove the key to put the sheave back on but the key was stuck in. Recommend replacing the Motor sheave

PCU HAS TWO SETS OF CARBON FILTERS

FIRST BANK OF CARBON FILTER CLEANLINESS

AHU-3

Unit has a lot of supply leakage coming from the heater section. Access the the OA damper and water valve is not possible do to counter being underneath the access doors

AHU-4 LEAKAGE AT THE DISHARGE DUCT

AHU4 LEAKAGE IS AT THE CANVAS CONNECTOR SEAM

AHU-4 RETURN DUCT DOES NOT CONNECT SQUARELY TO THE RETURN PLENUM

This installation is reducing free flow area of the duct and could cause lower flow when unit is pulling full return

AHU-4 FILTERS ARE DIRTY

AHU-2 FILTERS ARE EXTREMELY DIRTY

TYPICAL AHU OA AND RETURN DAMPER

If there is a mechanical stopper on the damper it is not accessible due to being butted up against the outside of the unit

AHU-1 OA DAMPER STOPPED BY SELF TAPPING SCREWS

AHU-1 FILTERS

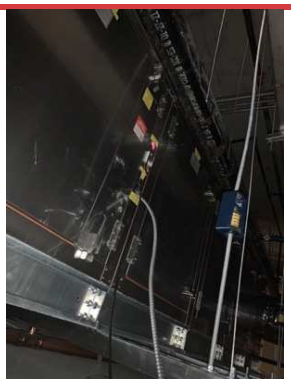
AHU-1

AHU-2

AHU-4

EF-1

EF-2



PCU

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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
AHU-1	KITCHEN	2400	2288	1800	3926	600	538	25.0%	12.1%						
AHU-2	KITCHEN	2400	2176	1800		600		25.0%							
AHU-3	DINING	2400	545	1800	1805	600	NR	25.0%	NR						
AHU-4	DINING	2400	2315	1800	NR	600	NR	25.0%	NR						
MUA-1	HD1									1300	1674				
EF-1	HD2 DISH											1200	1090		
PCU-1	HD1											2600	1581		
EF-2	RESTROOMS													300	265
TOTALS		9600	7324	7200	5731	2400	1250			1300		3800	2671	300	265

NET BUILDING AIRFLOW CALCULATION

TOTALS	DESIGN	ACTUAL
TOTAL OA	3700	1250
TOTAL EXHAUST	4100	2936
NET AIRFLOW	-400	-1686

DOOR TESTED	BUILDING PRESSURE MEASUREMENTS (IN. H20)
FRONT	-0.06
SIDE	
REAR	
AVERAGE	**-0.06**

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:

TOTAL OA WAS TRAVERSED AS 1250 CFM APPROXIMATELY WITH THE MUA RUNNING. THAT INDICATES THAT THE MUA IS PULLING FROM THE AHU RETURNS.

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06-13 BLUE SUSHI - NASHVILLE, TN

CheckList Information

Name :	TECH - STEP 1: INITIAL READINGS	**Status :**	NotSubmitted
Assigned Organization :	National TAB	**Asset :**	
Requesting Organization :	National TAB		

CheckList Item Details

INITIAL BUILDING REVIEW:	
What is the initial building pressure before making any changes?	Initial trip pressures were -0.03", on return trip after grease doors installed pressure decreased to -0.06" avg.
Are thermostats programmed?	Controlled by BAS
Are building pressure relief working properly?	When building is occupied OA dampers open to mechanically set position. The mechanically set position is a couple self tapping screws set into the sheet-metal to stop the damper from further opening.
INITIAL AIRFLOWS:	
SUPPLY RTU-1	2220cfm
OA RTU-1	OA as follows: Total OA flow measured to building when in unocc mode (ahu Economizers closed) and MUA on: Total oa flow was 1550cfm. When building was OCC, Economizers to min position OA flow in 24" duct was 1240cfm. This indicates MAU is stealing air from AHU's when in OCC mode and causing the excess negative building pressure. ALSO WITH ALL SYSTEMS ON/OCC, OA DUCT FEEDING AHU1 AND AHU2 WAS TRAVERSED FOR 538CFM BETWEEN THE TWO UNITS.
SUPPLY RTU-2	2136cfm
OA RTU-2	see OA notes
SUPPLY RTU-3	545cfm/2400cfm
OA RTU-3	see OA notes
EF-1	Dish exhaust: 1090cfm
EF-2	rr ex: 265cfm

EF-3	PCU flow: 1581cfm
EF-4	n/a
MAU-1	1674 cfm

Notes/Comments :

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CheckList Information

Name :	TECH - STEP 2: INITIAL WALKTHROUGH	**Status :**	NotSubmitted
Assigned Organization :	National TAB	**Asset :**	
Requesting Organization :	National TAB		

CheckList Item Details

INITIAL SITE WALKTHROUGH

All diffusers and grilles are installed and match design?	Yes
All hood filters installed and accounted for?	Yes, and are freshly cleaned
Hoods are wired and have power?	Yes
Hood is free of alarms?	Yes
Thermostats have power?	Building is controlled by BAS
Have trades/general contractor been notified about any issues and are they created on FaciliBuild?	N/a. discussed all issues while onsite with Rich

Notes/Comments :

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CheckList Information

Name :	TECH - STEP 3: 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?	AHU ECONOMIZER BLADES USE SELF TAPPING SCREWS AS THE MECHANICAL STOPS. THIS IS NOT IDEAL.
DCV Max damper opening position is set to minimum?	N/A
Free cooling enthalpy set point set for lowest setting (Typically "D")	N/A
Motors are all operating below the FLA rating?	ALL MOTORS ARE AT FLA
Are belts tight?	N/A
If direct drive unit is the speed controller working.	YES, AHUs ARE EQUIPPED WITH A FAN SPEED CONTROLLER
Is gas piping installed and valves turned on?	N/A UNITS ARE ELECTRIC HEAT
Unit free of noticeable noise and vibration	YES
EF's	
Rotation is correct?	YES
Belts are tight?	PCU HAS A BELT THROWN OFF, FOUND INNER MOTOR SHEAVE CAME LOOSE
Grease cup installed on hood fan?	N/A
Hinge kit installed installed on hood fan?	N/A

Lean fan back. Is grease duct installation adequate and is duct ran all the way to the base of the fan?	N/A
Flex conduit is long enough so that fan can be completely tilted back?	N/A
There is no major leakage around base of fan?	NO LEAKS FOUND AROUND THE PCU
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?	N/A
Unit free of noticeable noise and vibration?	YES
MUA	
Rotation is correct?	YES
Gas piping is installed and valves are in on position?	N/A
Heater tested and is functional?	N/A
Internal motorized damper is fully opening?	YES
Motor is operating below the FLA rating?	YES
Unit free of noticeable noise and vibration?	YES
HOODS	
Kitchen equipment installed in proper places?	YES
Can kitchen equipment be turned on for final smoke test?	YES
DOCUMENTATION	
Have trades/general contractor been notified about any issues and are they created on FaciliBuild?	YES

Notes/Comments :

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06-13 BLUE SUSHI - NASHVILLE, TN

CheckList Information

Name :	TECH - STEP 4: 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?	AHU-1 upstairs section is higher on flow and the office and storage area is cooler than rest of spaces. Noted with rich issues for AHU-3 and extremely low supply flow to the space.
Is the space free of ventilation noise?	Yes
If deviations from design were necessary to resolve 1-3 what were they? Otherwise put "NA".	n/a

Notes/Comments :

National TAB

Project: 06-13 BLUE SUSHI - NASHVILLE, TN

System/Unit: AHU/RTU

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Asset: AH1 AREA:KITCHEN

Unit Data		
	Design	**Actual**
MFG	INDEECO	TRANE
Serial Num	-	H21H87298
Model Num	OPEN COIL	BCHD072E1M0A1F04Z
Type	AHU	AHU
Configuration	VERTICAL	HORIZONTAL
Num Final Filter 1	-	2
Final Filter Size 1	-	20X20X1

Motor Data		
	Design	**Actual**
Motor MFG	-	NA
Frame	-	NA
Horsepower	-	1
Motor Rpm	-	1500
Phase	3	1
Rated Voltage	460	208
Rated Amperage	-	4.6

Drive Data		
	Design	**Actual**

Electrical		
	Design	**Actual**

Test Data		
	Design	**Actual**
SF CFM	2400	2288
SF RPM	-	1036
RA CFM	1800	-
OA CFM	600	-
RL Voltage	-	211.2
RL Amperage	-	4.2
SF Rotation	-	CORRECT
RA Damper Position	-	MECHANICAL LINKAGE
Min OA Damper Position	-	APROX. 1"
Min OA Damper Type	-	LINKED RETURN OA DAMPER

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.55"
Fan Suction SP	-	-1.13"
Fan Discharge SP	-	0.41"
Total ESP	-	0.96"
OA Temp (db/wb)	-	84.2/74.2
RA Temp (db/wb)	-	74/64
SA Temp (db/wb)	-	58.9/54.4

General		
	Design	**Actual**
Fan Rotation Correct	-	YES
Unit Filters Clean	-	NO

Completed By: Tyler Youells

Notes:PRIOR TO FAN INCREASE: (1006RPM-1037RPM) TRAVERSE OF RETURN DUCT: 14X16 AVG 1108FPM 1723CFM 1168CFM FOR THREE DIFFUSERS IN DINING 185CFM FOR DIFFUSER BY ICE MACHINE 867CFM FOR UPSTAIRS MA TEMP:74.2DB/63.8WB EW: 43F LW:54F OA DUCT TRAVERSE SERVING AHU-1/2: 346 FPM AVG 14X16" DUCT (538 CFM TOTAL). UNABLE TO ISOLATE INDIVIDUAL DUCTS.

Asset	Notes

National TAB

Project: 06-13 BLUE SUSHI - NASHVILLE, TN

System/Unit: AHU/RTU

Comfort. Under control.

Asset: AH2 AREA:KITCHEN

Unit Data		
	Design	**Actual**
MFG	INDEECO	TRANE
Serial Num	-	H21H87299
Model Num	OPEN COIL	BCHDO72E1M0A1F04Z
Type	AHU	AHU
Configuration	VERTICAL	HORIZONTAL
Num Final Filter 1	-	2
Final Filter Size 1	-	20X20X1

Motor Data		
	Design	**Actual**
Motor MFG	-	NA
Frame	-	NA
Horsepower	-	1
Motor Rpm	-	1500
Phase	3	1
Rated Voltage	460	208
Rated Amperage	-	4.6

Drive Data		
	Design	**Actual**

Electrical		
	Design	**Actual**

Test Data		
	Design	**Actual**
SF CFM	2400	2176
SF RPM	-	1026
RA CFM	1800	--
OA CFM	600	--
RL Voltage	-	212.4
RL Amperage	-	4.19
SF Rotation	-	CORRECT
RA Damper Position	-	MECHANICAL LINKAGE
Min OA Damper Position	-	APROX. 1"
Min OA Damper Type	-	MOTORIZED DAMPER

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.45"
Fan Suction SP	-	-1.26"
Fan Discharge SP	-	0.33"
Total ESP	-	0.78"
OA Temp (db/wb)	-	84.2/74.2
RA Temp (db/wb)	-	73.9/64.2
SA Temp (db/wb)	-	60.3/55.6

General		
	Design	**Actual**
Fan Rotation Correct	-	YES
Unit Filters Clean	-	NO

Completed By: Tyler Youells

Notes:[1] FAN SPEED WAS INCREASED TO 1026 RPM FROM 1006RPM OA DUCT TRAVERSE SERVING AHU-1/2: 346 FPM AVG 14X16" DUCT (538 CFM TOTAL). UNABLE TO ISOLATE INDIVIDUAL DUCTS. MA TEMP: 76.9DB/65.9WB EW:43F LW:54F

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Project:06-13 BLUE SUSHI - NASHVILLE, TN

AHU/RTU

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Diffuser Supply (GRD)

AH2/KITCHEN

Asset							
SGRD1	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**
	FOOD PREP	CD3	8"	200	1	180	
	FINAL CFM	**% to design**					
	184	92.0					
SGRD2	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**
	FOOD PREP	CD3	8"	200	1	216	
	FINAL CFM	**% to design**					
	220	110.0					
SGRD3	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**
	FOOD PREP	CD3	8"	200	1	217	
	FINAL CFM	**% to design**					
	221	110.5					
SGRD4	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**
	COOKLINE	CD1	8"	200	1	256	
	FINAL CFM	**% to design**					
	261	130.5					
SGRD5	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**
	COOKLINE	CD1	8"	200	1	317	
	FINAL CFM	**% to design**					
	323	161.5					
SGRD6	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**
	FOOD PREP	CD1	8"	200	1	100	
	FINAL CFM	**% to design**					
	102	51.0					
SGRD7	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**
	HOOD1	ACPSP	8"	791	4.75	850	
	FINAL CFM	**% to design**					
	867	109.6					
SGRD8	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**
	MEZZANINE	SR3	18/10				
	FINAL CFM	**% to design**					
		-					
SGRD9	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**
	MEZZANINE	SR3	12/6				
	FINAL CFM	**% to design**					
		-					

Completed By:Brianna Biggs on

Asset	Notes

National TAB

Project: 06-13 BLUE SUSHI - NASHVILLE, TN

System/Unit: AHU/RTU

Comfort. Under control.

Asset: AH3 AREA:DINING

Unit Data		
	Design	**Actual**
MFG	INDEECO	TRANE
Serial Num	-	H21H87300
Model Num	OPEN COIL	BCHD072E1M0A1F042
Type	AHU	AHU
Configuration	VERTICAL	HORIZONTAL
Num Final Filter 1	-	2
Final Filter Size 1	-	20X20X1

Motor Data		
	Design	**Actual**
Motor MFG	-	NA
Frame	-	NA
Horsepower	-	1
Motor Rpm	-	1500
Phase	3	1
Rated Voltage	460	208
Rated Amperage	-	4.6

Drive Data		
	Design	**Actual**

Electrical		
	Design	**Actual**

Test Data		
	Design	**Actual**
SF CFM	2400	545
SF RPM	-	NA
RA CFM	1800	1805
OA CFM	600	-
RL Voltage	-	NA
RL Amperage	-	NA
SF Rotation	-	NA
RA Damper Position	-	MECHANICAL LINKAGE
Min OA Damper Position	-	NOT ACCESSIBLE
Min OA Damper Type	-	MOTORIZED DAMPER

Performance Data		
	Design	**Actual**
MA Plenum SP	-	NA
Fan Suction SP	-	NA
Fan Discharge SP	-	NA
Total ESP	-	NA
OA Temp (db/wb)	-	NA
RA Temp (db/wb)	-	NA
SA Temp (db/wb)	-	NA

General		
	Design	**Actual**
Fan Rotation Correct	-	NA
Unit Filters Clean	-	NA

Completed By: Tyler Youells

Notes:[1] TRAVERSED SUPPLY: 18" FPM AVG: 544CFM [2] READ RETURN GRILLE WITH VELGRID: 3.4FT^T FPM:530AVG CFM:1805CFM UNIT IS NOT ACCESSIBLE TO COLLECT FURTHER DATA

Asset	Notes

National TAB

Project: 06-13 BLUE SUSHI - NASHVILLE, TN

System/Unit: AHU/RTU

Comfort. Under control.

Asset: AH4 AREA:DINING

Unit Data		
	Design	**Actual**
MFG	INDEECO	TRANE
Serial Num	-	H21H87301
Model Num	OPEN COIL	BCHD072E1MOA1F04Z
Type	AHU	AHU
Configuration	VERTICAL	HORIZONTAL
Num Final Filter 1	-	2
Final Filter Size 1	-	20X20X1

Motor Data		
	Design	**Actual**
Motor MFG	-	NA
Frame	-	NA
Horsepower	-	1
Motor Rpm	-	1500
Phase	3	1
Rated Voltage	460	208
Rated Amperage	-	4.6

Drive Data		
	Design	**Actual**

Electrical		
	Design	**Actual**

Test Data		
	Design	**Actual**
SF CFM	2400	2315
SF RPM	-	1033
RA CFM	1800	-
OA CFM	600	-
RL Voltage	-	212.4
RL Amperage	-	4.2
SF Rotation	-	CORRECT
RA Damper Position	-	MECHANICAL LINKAGE
Min OA Damper Position	-	APROX 1"
Min OA Damper Type	-	MOTORIZED DAMPER

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.28"
Fan Suction SP	-	-1.08"
Fan Discharge SP	-	0.42"
Total ESP	-	0.70"
OA Temp (db/wb)	-	94.6/55.2
RA Temp (db/wb)	-	75.1/46.4
SA Temp (db/wb)	-	60.3/57.3

General		
	Design	**Actual**
Fan Rotation Correct	-	YES
Unit Filters Clean	-	NO

Completed By: Tyler Youells

Notes:PRIOR TO FAN INCREASE: (1006RPM-1036RPM) 2040 CFM IN DINING. 216CFM COMBINED IN RESTROOM MA TEMP: 80.3DB/70.1WB EW:44F LW:54DEG

Asset	Notes

National TAB

Project: 06-13 BLUE SUSHI - NASHVILLE, TN

System/Unit: FAN - Exhaust

Comfort. Under control.

Asset: EF1 AREA:HOOD 2 DISH

Unit Data		
	Design	**Actual**
MFG	CAPTIVE-AIRE	CAPTIVE-AIRE
Model Num	SIF13DD	SIF13DD
Serial Num	-	5100510
Type	DOWNBLAST	INLINE
Configuration	HORIZONTAL	HORIZONTAL

Motor Data		
	Design	**Actual**
Motor MFG	-	INTERTEK
Frame	-	NL
Horsepower	0.5	0.75
Motor Rpm	-	1800
Phase	1	1
Voltage (rated)	120	120
Amperage (rated)	-	8.9
Service Factor	-	1

Test Data		
	Design	**Actual**
CFM	1200	1090
Fan RPM	-	1800
Fan Rotation	-	CCW
Motor RPM	-	1800
System SetPt	-	100%
RL Voltage	-	118
RL Amperage	-	9.0
Total ESP	0.50"	NA
Fan Inlet SP	-	NA
Fan Discharge SP	-	NA

Completed By: Tyler Youells

Notes:

Asset	Notes

National TAB

Project: 06-13 BLUE SUSHI - NASHVILLE, TN

System/Unit: FAN - Exhaust

Comfort. Under control.

Asset: EF2 AREA:RESTROOMS

Unit Data		
	Design	**Actual**
MFG	CAPTIVE-AIRE	GREENHECK
Model Num	SIF11DD	SQ-93-VG-4-X
Serial Num	-	19052875
Type	DOWNBLAST	INLINE
Configuration	HORIZONTAL	HORIZONTAL

Motor Data		
	Design	**Actual**
Motor MFG	-	GREENHECK
Frame	-	NL
Horsepower	0.33	0.125
Motor Rpm	-	1550
Phase	1	1
Voltage (rated)	120	115
Amperage (rated)	-	2.6
Service Factor	-	1

Test Data		
	Design	**Actual**
CFM	300	265
Fan RPM	-	NA
Fan Rotation	-	CCW
Motor RPM	-	NA
System SetPt	-	6-7
RL Voltage	-	116.1
RL Amperage	-	1.34
Total ESP	0.80"	0.51"
Fan Inlet SP	-	-0.30"
Fan Discharge SP	-	0.21"

Completed By: Tyler Youells

Notes:

Asset	Notes

National TAB

Project: 06-13 BLUE SUSHI - NASHVILLE, TN

System/Unit: FAN - Exhaust

Comfort. Under control.

Asset: PCU1 AREA:HOOD 1

Unit Data		
	Design	**Actual**
MFG	CAPTIVE-AIRE	CAPTIVE-AIRE
Model Num	KB18-INLINE	KB18-INLINE
Serial Num	-	5100510
Type	UPBLAST	INLINE
Configuration	INLINE	HORIZONTAL

Test Data		
	Design	**Actual**
CFM	2600	1581
Fan RPM	-	1813
Fan Rotation	-	CORRECT
Motor RPM	-	3675
RL Voltage	-	201/203/201
RL Amperage	-	10.6 AVG

Motor Data		
	Design	**Actual**
Motor MFG	-	MARATHON
Frame	-	184TC
Horsepower	5	5
Motor Rpm	-	3500
Phase	3	3
Voltage (rated)	480	208
Amperage (rated)	-	13.6
Service Factor	-	1.15

Drive Data		
	Design	**Actual**
Motor Sheave Size	-	2VP60
Motor Bore Size	-	1.125"
Motor Sheave SetPt	-	APROX 2 OUT
Fan Sheave Size	-	2BK110H
Fan Sheave Bore	-	1.5"
Belt CL Distance	-	29.5"
Num of Belts	-	2
Belt Size	-	BX76

Completed By: Tyler Youells

Notes:ONE BELT HAS COME OFF DUE TO LOOSE INNER MOTOR SHEAVE. PCU NOT TO DESIGN FLOW DUE TO RESTRICTION IN GREASE DUCT NEAR THE LOUVER

Asset	Notes

National TAB

Project: 06-13 BLUE SUSHI - NASHVILLE, TN

System/Unit: Kitchen Hood Type I

Comfort. Under control.

Asset: HD1 AREA:

Unit Data		
	Design	**Actual**
MFG	CAPTIVE-AIRE	CAPTIVE-AIRE
Model Num	5430 ND-2-ACPSP-F	5430 ND-2-ACPSP-F
Job / Serial Num	-	5100510
Type	TYPE I LOW PROXIMITY	TYPE I CANOPY
Hood length	138"	138"
Hood Width	54"	54"
Supply Plenum Type	-	ACPSP
Supply Plenum Width	22"	12"
Supply Plenum Length	150"	150"

Test Data Exhaust		
	Design	**Actual**
Filter Type	CAPTRATE SOLO	CAPTRATE SOLO
Filter Size 1	20X16	20X16
Filter Qty 1	8	8
Filter AK factor size 1	2.08	2.08
Filter Total AK Area	16.64	16.64
Filter1 FPM	-	95
Filter2 FPM	-	98
Filter3 FPM	-	100
Filter4 FPM	-	105
Filter5 FPM	-	102
Filter6 FPM	-	94
Filter7 FPM	-	90
Filter8 FPM	-	76
Filter Ave FPM(corr)	-	95
CFM	2600	1581

Cooking Equipment		
	Design	**Actual**
Item 1	-	FRYER
Item 2	-	DOUBLE FRYER
Item 3	-	BURNER STOVE

Test Data Supply		
	Design	**Actual**
Total AK Area	22.91	10.875
Kv factor (Vel)	0.87"	0.87
Num of Readings	-	12
Reading1 FPM	-	153
Reading2 FPM	-	141
Reading3 FPM	-	127
Reading4 FPM	-	152
Reading5 FPM	-	157
Reading6 FPM	-	141
Reading7 FPM	-	124
Reading8 FPM	-	106
Reading9 FPM	-	201
Reading10 FPM	-	183
Reading11 FPM	-	205
Reading12 FPM	-	159
Ave FPM(corr)	-	154
CFM	1600	1674

Performance Data		
	Design	**Actual**
Exh-Supply Net CFM	1000	-93
Smoke Generation Type	-	COOKING AFFLUENT
Cooking Equip Heat On	-	YES
Hood Capture %	-	75%
End Panels Installed (Y/N)	-	YES BUT NOT FULLY SEALED TO HOOD
Space Offset Temp Riser 1	-	11 DEG
Riser Temp F (idle) Riser 1	-	WHILE COOKING-83F
Ambient Room Temp	-	74F

General		
	Design	**Actual**
Third Party Witness	-	RICH
Third Party Company	-	NATIOANL ENGINEERING
Tech Witness	-	TYLER

Completed By: Tyler Youells

Notes:

Asset	Notes

National TAB

Project: 06-13 BLUE SUSHI - NASHVILLE, TN

System/Unit: Kitchen Hood Type II

Comfort. Under control.

Asset: HD(Type2)1 AREA:

Unit Data		
	Design	**Actual**
MFG	CAPTIVE-AIRE	CAPTIVE-AIRE
Model Num	4830 VHB-G	4830 VHB-G
Serial Num	-	5100510
Type	TYPE II LOW PROXIMITY	TYPE II CANOPY
Hood length	96"	96"
Hood Width	48"	48"

Test Data		
	Design	**Actual**
Exhaust CFM	1200	1090

Completed By: Tyler Youells

Notes:

Asset	Notes