Report By:

National TAB
1329 E Kemper Rd, Ste 4210
Cincinnati, OH 45246

Report: **Test and Balance**
Date: **1/15/2021**

PROJECT

FREDDY'S - OVERLAND PARK, KS (BLUHAWK)

7831 W 159TH ST
OVERLAND PARK, KS 66223

Client

Freddy's Frozen Custard & Steakburgers (CORPORATE)
260 N Rock Rd
Suite 200
Wichita, KS 67206

National TAB

Project: FREDDY'S - OVERLAND PARK, KS (BLUHAWK)

Table Of Contents

REMARKS LIST

Assigned Organization: National TAB

Status: Not Submitted

Asset:

PRIORITY (HIGH/LOW/INFO ONLY)	
INFO ONLY	(3) Hood capture is 90%. Dampers to the ACPSP and PSP are not accessible. When the kitchen RTU was turned off the hood had 100%. The smoke want to rise into the fryer warmer on the left side of the hood. Then roll out. The high velocity from the ACPSP is disrupting the airflow pattern. A branch damper needs to be installed on the duct run to the hoods, so this airflow pattern can be modified to improve hood capture.
INFO ONLY	I PUT THE NOTE ABOVE HEAR SINCE IT WOULD NOT FIT IN THE REPORT.
INFO ONLY	
INFO ONLY	

Notes/Comments:

Project Summary

Preface
The summary below provides a quick understanding of how well your HVAC systems balanced in respect to the design criteria. The summary concludes with a quick understanding of your building environment and possible suggestions for each of your systems after testing has been performed. 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. Our focus is 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. Also, enclosed are pictures of building assets and items listed below that will provide your team with more insight

Facility Identification and TAB Requirements
The mechanical equipment to be tested, adjusted, and balanced includes: All Roof Top Units (RTU), All Exhaust Fans (EF), All Make Up Air Units (MUA), All Kitchen Hoods, and all associated air devices.

RTU's
Each of the RTU's were measured at their terminal devices utilizing a flow hood. The sum of these readings is equal to the total flow for that particular unit. The total flow of each RTU was then adjusted to +/-10% of the specified design. Each terminal diffuser was balanced to within +/-10% of the engineer's design volume utilizing the provided hand damper located at the takeoff of the main & branch trunk line(s). Any equipment that fell outside of this 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 +/-10% of the engineers design flow.
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 +/-10% of design criteria. Any EF's or MUA's that fell outside of this tolerance is noted throughout the report.

General Exhaust Fans
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 +/-10% of design. Each terminal device was balanced to within +/-10% 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 recorded at [X.XXX]" W.C. average. This pressure falls within the recommended tolerances by the International Mechanical Code of +0.02" W.C. to -0.02" W.C. The building is designed for a net positive pressure and this measurement coincides with that requirement.
The hood capture was tested at the perimeter of the hood and the cook top level with the equipment heat "on" and ___% capture was observed.

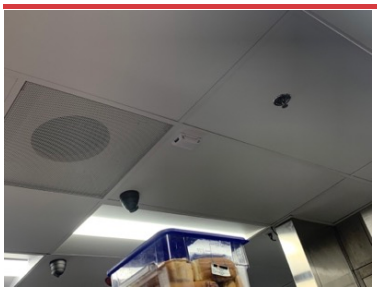
FREDDYS BLUHAWK KS

Stephon Fisher

Friday, December 18, 2020

Prepared For

12 Issues Identified



HOOD ROOM TEMPERATURE SENSOR

RTU-1 (DINING)

RTU-2 (KITCHEN)

MAU-1

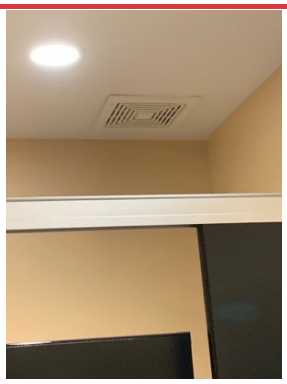
KEF-1 (GRIDDLE)

KEF-2 (FRYER)

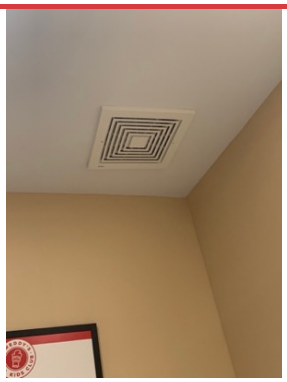
KEF-3 (DISHWASHER)

KEH-1 (GRIDDLE)

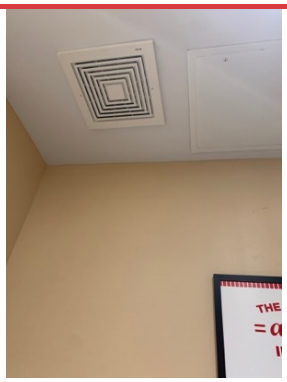
KEH-2 (FRYER)



EF-1 (WOMENS RR)



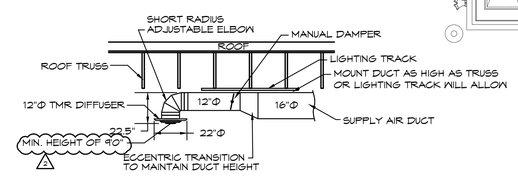
EF-2 (MENS RR)



EF-3 (FAMILY RR)

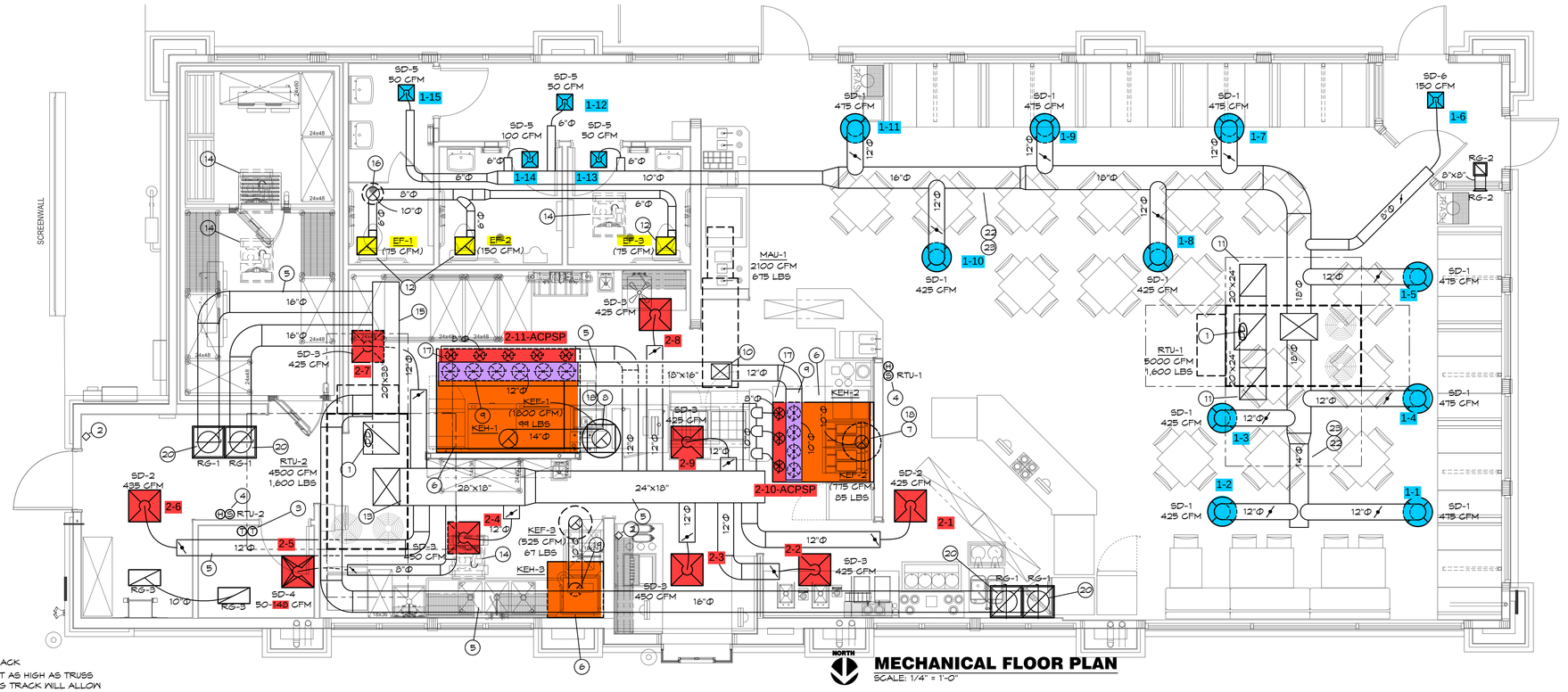
MECHANICAL SYMBOLS

- (SD) NEW SUPPLY DIFFUSER
- (RG) NEW RETURN AIR GRILLE
- EXHAUST GRILLE/FAN
- (SH) REMOTE TEMPERATURE/HUMIDITY SENSORS
- (T) THERMOSTAT, MOUNTED AT 48" AFF
- (SD) DUCT-MOUNTED SMOKE DETECTOR
- NEW DUCTWORK
- 32"x14" SIZE OF RECTANGULAR DUCT
- 6"Φ SIZE OF ROUND DUCT
- FLEXIBLE DUCTWORK
- (3) FLOOR PLAN NOTE DESIGNATION
- S.A. SUPPLY AIR
- R.A. RETURN AIR
- EXH. EXHAUST AIR
- TRANSITION IN DUCT SIZE
- ELBOW WITH TURNING VANES
- MANUAL VOLUME DAMPER
- MANUAL VOLUME DAMPER
- SUPPLY AIR DUCT UP/DOWN
- RETURN AIR DUCT UP/DOWN
- EXHAUST AIR DUCT UP/DOWN
- UP CHANGE IN ELEVATION UP (UP) DOWN (DN) IN DIRECTION OF FLOW
- RTU-1 SCHEDULED MECHANICAL EQUIPMENT



DINING ROOM DIFFUSER DETAIL

SCALE: NONE



NORTH

MECHANICAL FLOOR PLAN

SCALE: 1/4" = 1'-0"

MECHANICAL PLAN NOTES:

1. LOCATION OF DUCT MOUNTED SMOKE DETECTOR. PROVIDE REMOTE ENUNCIATOR AUDIO/VISUAL. VERIFY LOCATION WITH FIRE MARSHAL PRIOR TO INSTALLATION. REFER TO SPEC SHEET MP0 FOR ADDITIONAL INFORMATION.
2. LOCATION OF MANUAL PULL STATION. INSTALL PER THE MANFUACTURERS REQUIREMENTS.
3. LOCATION OF RTU THERMOSTATS. GC TO LABEL EACH THERMOSTAT.
4. LOCATION OF RTU TEMPERATURE/HUMIDITY SENSORS MOUNTED 7'-0" AFF.
5. ALL KITCHEN DUCTWORK IS INTENDED TO BE ROUTED THROUGH OR BETWEEN TRUSSES. COORDINATE EXACT ROUTING WITH TRUSSES DURING INSTALLATION.
6. EXHAUST HOOD PROVIDED BY OTHERS. INSTALLED BY THIS CONTRACTOR PER THE MANUFACTURERS INSTRUCTIONS.
7. TRANSITION AND CONNECT 10"Φ GREASE DUCT TO EXHAUST HOOD WITH AS SHOWN. ROUTE DUCT UP AND CONNECT TO EXHAUST FAN. OFFSET AS NECESSARY TO MISS ROOF STRUCTURE, AND TO MAINTAIN 10'-0" CLEARANCE FROM ALL OUTDOOR AIR INTAKES, AND 5'-0" FROM PARAPET WALLS. ALL GREASE DUCT IS TO BE INSTALLED WITH DUCT WRAP AS DETAILED AND PER THE MANUFACTURERS REQUIREMENTS FOR 0" CLEARANCE TO COMBUSTIBLES.
8. TRANSITION AND CONNECT 14"Φ GREASE DUCT TO COLLAR ON EXHAUST HOOD. ROUTE DUCT UP AND CONNECT TO EXHAUST FAN. OFFSET AS NECESSARY TO MISS ROOF STRUCTURE, AND TO MAINTAIN 10'-0" CLEARANCE FROM ALL OUTDOOR AIR INTAKES, AND 5'-0" FROM PARAPET WALLS. REFER TO DETAIL ON SHEET M2. ALL GREASE DUCT IS TO BE INSTALLED WITH DUCT WRAP AND ACCESS DOORS AS DETAILED AND PER THE MANUFACTURERS REQUIREMENTS FOR 0" CLEARANCE TO COMBUSTIBLES.
9. TRANSITION AND CONNECT MAKE-UP AIR DUCT TO EXHAUST HOOD SUPPLY PLENUM PER THE MANUFACTURERS REQUIREMENTS. SEE SHEET M3 FOR CONNECTION SIZE AND SUPPLY CFM.
10. ROUTE 12"x14" MAKE UP AIR SUPPLY DUCT DOWN FROM MUA-1. TRANSITION AND CONNECT TO 18"x16" SUPPLY DUCT. VERIFY THE EXACT SIZE AND LOCATION OF STRUCTURE BEFORE INSTALLING DUCTWORK.
11. RETURN AIR DUCT LOCATED BETWEEN ROOF TRUSSES. OPEN END OF DUCTWORK TURNED UP TOWARD STRUCTURE WITH A MINIMUM 8" CLEARANCE TO DECK.
12. SUPPORT EXHAUST FAN FROM STRUCTURE AS REQUIRED BY THE MANUFACTURER.
13. COORDINATE WITH STRUCTURAL TO BLOCK OUT JOISTS AS REQUIRED TO RUN DUCT THROUGH STRUCTURE.
14. MOUNT CONDENSING UNIT ON ROOF AS DETAILED AND AS REQUIRED BY THE MANUFACTURER. CONNECT REFRIGERANT PIPING AS REQUIRED BY THE MANUFACTURER. SEE ARCHITECTURAL PLANS FOR MOUNTING DETAIL.
15. RETURN DUCT TO BE ROUTED BETWEEN JOISTS, AS HIGH AS STRUCTURE WILL ALLOW.
16. ROUTE 10"Φ EXHAUST DUCT UP THROUGH ROOF TO ROOF CAP. MAINTAIN 10'-0" CLEARANCE TO ALL OUTDOOR AIR INTAKES.
17. TRANSITION AND CONNECT AIR CONDITIONING DUCT TO EXHAUST HOOD A/C SUPPLY PLENUM PER THE MANUFACTURERS REQUIREMENTS. SEE SHEET M3 FOR CONNECTION SIZE AND SUPPLY CFM.
18. INSTALL CAPTIVE AIRE WBE WINDBAND EXTENSION FOR KEF-1 AND KEF-2 PROVIDED BY KITCHEN EQUIPMENT SUPPLIER.
19. TRANSITION AND CONNECT 10"Φ ALUMINUM DUCT TO CONDENSATE HOOD. ROUTE DUCT UP AND CONNECT TO EXHAUST FAN. OFFSET AS NECESSARY TO MISS ROOF STRUCTURE, AND TO MAINTAIN 10'-0" CLEARANCE FROM ALL OUTDOOR AIR INTAKES AND 5' FROM PARAPET WALLS.
20. PROVIDE LOCKING QUADRANT DAMPER AND ROUND TO SQUARE TRANSITION FOR RETURN GRILL CONNECTION.
21. HOOD SHALL BE PROVIDED WITH FACTORY PRE-WIRE PACKAGE AND A PRE-ENGINEERD UL-300 FIRE SUPPRESSION SYSTEM. SEE HOOD DRAWINGS FOR DETAILS.
22. EXPOSED DUCTWORK SHALL BE OF PAINTLOCK CONSTRUCTION AND PAINTED PER THE DIRECTION OF ARCHITECT.
23. COORDINATE DUCT ROUTING WITH LIGHTING.

MECHANICAL GENERAL NOTES:

1. COORDINATE ALL WORK WITH OTHER TRADES AND EXISTING CONDITIONS AS REQUIRED TO PROPERLY INSTALL ALL SYSTEMS AS INTENDED, WITHIN THE CONFINES OF THE SPACES AVAILABLE, AND WITHOUT INTERFERENCES.
2. THIS CONTRACTOR SHALL PERFORM ALL WORK INDICATED AND/OR AS REQUIRED FOR THE PROPER INSTALLATION AND OPERATION OF THE MECHANICAL SYSTEMS.
3. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR EXACT LOCATIONS OF DIFFUSERS.
4. INSTALL ALL DUCT, PIPE, ETC. AS HIGH AS POSSIBLE.
5. DUCT SIZES SHOWN ARE ACTUAL SHEET METAL SIZES AND INCLUDE A 1/2 INCH ALLOWANCE FOR DUCT LINER WHERE APPLICABLE.
6. PROVIDE FLEXIBLE CONNECTION BETWEEN DUCTWORK AND ROOFTOP UNITS, EXHAUST FANS, AND OTHER MOTORIZED EQUIPMENT.
7. NO DUCT SHALL BE ROUTED OVER THE TOP OF ELECTRICAL PANELS.
8. ALL EXPOSED DUCT WORK SHALL BE PAINTED. REFER TO ARCHITECTURAL PLANS FOR DETAILS.

AIR BALANCE SCHEDULE

SUPPLY AIR UNIT	OUTSIDE AIRFLOW (CFM)	RETURN AIRFLOW (CFM)	SUPPLY AIRFLOW (CFM)	OA/SA %	EXHAUST AIR UNIT	EXHAUST AIRFLOW (CFM)
RTU-1	900	4100	5000	18.0%	KEF-1	1800
RTU-2	900	4100	5000	18.0%	KEF-2	775
					KEF-3	525
MUA-1	2100	0	2100	100.0%	EF-1, EF-2, EF-3	300
TOTAL	3,900	8,200	12,100	32.2%	TOTAL	3,400
					RESULTING BUILDING PRESSURIZATION	500 CFM

THE BUILDING HVAC SYSTEM SHALL BE BALANCED BY NATIONAL TAB HIRED BY THE OWNER.
CONTACT Dan Hertenstein - National TAB at: 816-215-1593 - DAN@NATIONALTAB.COM

THE RTU SUPPLY FANS SHALL OPERATE IN SINGLE ZONE VAV MODE WITH 2 STAGES OF FAN CONTROL. LOW SPEED SHALL BE USED DURING PERIODS OF LOW COOLING LOAD AND VENTILATION ONLY OPERATION PER 2018 IECC REQUIREMENTS.

THE ECONOMIZER DAMPERS SHALL HAVE TWO POSITIONS DEPENDENT ON THE FAN SPEED TO MAINTAIN CONSTANT OUTDOOR AIR VOLUME AND BUILDING PRESSURE. REFER TO THE BUILDING AIR BALANCE SCHEDULE ON SHEET M2.

THE UNIT SHALL HAVE ITS FRESH AIR HEATING OPTION ENABLED TO HEAT VENTILATION AIR TO A NEUTRAL VALUE DURING COLD WEATHER OPERATION. REFER TO THE MANUFACTURERS PROGRAMMING DOCUMENTATION FOR SETUP INSTRUCTIONS.

OUTDOOR AIR CALCULATIONS

UNIT	Area (sqft)	OCCUPANCY CLASSIFICATION	Occupant Density #/1000 sqft	People outdoor airflow rate in breathing zone, (Rp) cfm/person	Area outdoor airflow rate in breathing zone, (Ra) cfm/sqft	Exhaust airflow rate cfm/sqft	Breathing zone outdoor airflow (Vbz)	Zone air distribution effectiveness (Ez)	Zone outdoor airflow (cfm)
RTU-1 RTU-2	884	Dining rooms	70	7.5	0.18		623	0.8	779
	173	Corridors	0	0	0.06		10	0.8	13
								Total	792

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5/4/2020
ERIK S. KNUDSEN LICENSED 17936 KANSAS PROFESSIONAL ENGINEER

BC PROJECT #: 19822
KANSAS PE COA #E-359

Freddy's Bluhawk

New Restaurant

Freddy's Frozen Custard & Steakburgers
7831 W. 159th Street
Overland Park, Kansas 66223

#	Revisions:
2	Addendum #2 5/5/2020

Project #: 190802-01

Construction Documents

30 March 2020

M-1

TECH - STEP 1: INITIAL WALKTHROUGH

Assigned Organization: National TAB

Status: Not Submitted

Asset:

INITIAL SITE WALKTHROUGH	
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?	Yes

Notes/Comments:

TECH - STEP 2: UNIT DATA AND EVAL

Assigned Organization: National TAB

Status: Not Submitted

Asset:

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?	NA
Free cooling enthalpy set point set for lowest setting (Typically "D")	NA
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
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, unable to visual see due to hard ceiling, but fans have good flow.
Unit free of noticeable noise and vibration?	Yes
MUA	
Rotation is correct?	Yes

Gas piping is installed and valves are in on position?	Yes
Heater tested and is functional?	Yes
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:

TECH - STEP 3: TEST, ADJUST AND BALANCE

Assigned Organization: National TAB

Status: Not Submitted

Asset:

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:

TECH - STEP 4: FINAL TESTS

Assigned Organization: National TAB

Status: Not Submitted

Asset:

FINAL TESTS	
HOOD CAPTURE TEST	
List equipment turned on for testing	All
List smoke candle type used	45 Second Smoke candle on Fryer and steam on Griddle
Smoke test capture - Perimeter of hood	100%
Smoke test capture - Top of cooking surface	Fryer: 90% Griddle 95%
WITNESS	
Date test was completed	12/18/2020
TAB tech name / Firm	Greg O'Day / National TAB
Site super name / Firm	NA
Owner representative name / Firm (if Applicable)	Briely / Store Manager
Building pressure at front & back doors (All Systems On)	Side: 0.01"
ADDITIONAL	
Do actual net building airflow, design net building airflow, and pressure coincide? If not why? (All three should either be positive or negative)	Yes
Thermostats are programmed?	Yes

Notes/Comments:

To windy to measure building on the front and back door

TECH - STEP 5: FINAL DOCUMENTATION

Assigned Organization: National TAB

Status: Not Submitted

Asset:

FINAL DOCUMENTATION	
Marked Data capture complete for all assets?	Yes
Picture file sent to processing team or uploaded?	Yes, Stepon sending them to jenn
Balance schedule complete and uploaded?	Yes
Prelim report generated and reviewed?	Yes
Video of smoke test uploaded to sharefile or sent to Taylor?	Yes, Sharefile

Notes/Comments:

System/Unit: RTU

Asset: RTU1 AREA: DINING

Unit Data		
	Design	**Actual**
MFG	LENNOX	LENNOX
Model Num	LGH150H4B	LGH150H4B
Serial Num	-	5620H03804
Type	RTU	RTU
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	2
OA Filter Size 1	-	23X14.25
Num Final Filter 1	-	4
Final Filter Size 1	-	20X25X2
Num Final Filter 2	-	NA
Final Filter Size 2	-	NA

Motor Data		
	Design	**Actual**
Motor MFG	-	US MOTORS
Frame	-	184TZ
Horsepower	5	5.00
Motor Rpm	-	1765
Phase	3	3
Rated Voltage	208	208-230
Rated Amperage	-	13.80-13

Drive Data		
	Design	**Actual**
Motor Sheave Size	-	1VP50
Motor Bore Size	-	1 1/8
Motor Sheave SetPt	-	5 TURNS OUT
Fan Sheave Size	-	6
Fan Sheave Bore	-	1”
Belt CL Distance	-	21
Num of Belts	-	1
Belt Size	-	BX57
Belt Alignment	-	Y

Test Data		
	Design	**Actual**
SF CFM	5000	5396
SF RPM	-	1092
RA CFM	4100	4545
OA CFM	900	850
RL Voltage	-	213/214/213
RL Amperage	-	12.1/11.6/11.5
SF Rotation	-	CCW
RA Damper Position	-	72%
Min OA Damper Position	-	28%
Min OA Damper Type	-	ECONOMIZER

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.78”
Fan Suction SP	-	-1.20”
Fan Discharge SP	-	1.14”
Total ESP	1.00"	1.92”
Fan Total SP	-	2.34

General		
	Design	**Actual**
Fan Rotation Correct	-	YES
Unit Filters Clean	-	YES
Condensate Drain Installed	-	(2)

Completed By: Greg O'Day on 12/18/2020

Notes: Initial 1157 rpm
(1)The unit was balanced to total flow and to ensure no drafting. Diffusers 1-7 and 1-5 caused the unit to be unable to get each diffuser within design.
(2) Condensate drain has no p-trap

System/Unit: RTU

Diffuser Supply (GRD)

RTU1 / DINING

Asset	Area Served	Type	Size	DESIGN CFM	AK	CFM(1)	CFM(2)	FINAL CFM	% to design
SGRD1	DINING	SD-1	12	475	1	610	223	505	106.3
SGRD2	DINING	SD-1	12	425	1	619	393	438	103.1
SGRD3	DINING	SD-1	12	425	1	467	198	551	129.6
SGRD4	DINING	SD-1	12	475	1	797	720	530	111.6
SGRD5	DINING	SD-1	12	475	1	187	116	166	34.9
SGRD6	VESTIBULE	SD-6	8	150	1	94	88	125	83.3
SGRD7	DINING	SD-1	12	475	1	280	266	389	81.9
SGRD8	DINING	SD-1	12	425	1	431	429	542	127.5
SGRD9	DINING	SD-1	12	475	1	478	480	665	140.0
SGRD10	DINING	SD-1	12	425	1	547	528	711	167.3
SGRD11	DINING	SD-1	12	475	1	512	555	506	106.5
SGRD12	KITCHEN	SD-5	6	50	1	123	118	48	96.0
SGRD13	KITCHEN	SD-5	6	50	1	118	123	50	100.0
SGRD14	KITCHEN	SD-5	6	100	1	143	116	96	96.0
SGRD15	KITCHEN	SD-5	6	50	1	148	129	47	94.0

Completed By: Stephon Fisher on

Asset	Area Served	Notes
SGRD5	DINING	The takeoff is right next to the drop off the unit. The turbulence created from the drop cause the air to bypass the diffuser.
SGRD7	DINING	The takeoff is right after a 90deg turn and the turbulence created by the 90 turn causes the air to bypass the diffuser.

System/Unit: RTU

Asset: RTU2 AREA: KITCHEN

Unit Data

	Design	Actual
MFG	LENNOX	LENNOX
Model Num	LGH150H4B	LGH150H4B
Serial Num	-	5620H03802
Type	RTU	RTU
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	2
OA Filter Size 1	-	23X14.25
Num Final Filter 1	-	4
Final Filter Size 1	-	20X25X2
Num Final Filter 2	-	NA
Final Filter Size 2	-	NA

Motor Data

	Design	Actual
Motor MFG	-	US MOTORS
Frame	-	184TZ
Horsepower	5	5
Motor Rpm	-	1765
Phase	3	3
Rated Voltage	208	208-230
Rated Amperage	-	13.8-13.0

Drive Data

	Design	Actual
Motor Sheave Size	-	4.5
Motor Bore Size	-	1 1/8”
Motor Sheave SetPt	-	4.15"
Fan Sheave Size	-	6”
Fan Sheave Bore	-	1”
Belt CL Distance	-	21
Num of Belts	-	1
Belt Size	-	BX57
Belt Alignment	-	Y

Test Data

	Design	Actual
SF CFM	4500	4702
SF RPM	-	1211
RA CFM	3600	3888
OA CFM	900	814
RL Voltage	-	214/215/213
RL Amperage	-	10.4/10.0/9.8
SF Rotation	-	CCW
RA Damper Position	-	75%
Min OA Damper Position	-	25%
Min OA Damper Type	-	ECONOMIZER

Performance Data

	Design	Actual
MA Plenum SP	-	-0.73”
Fan Suction SP	-	-1.08”
Fan Discharge SP	-	1.03”
Total ESP	1.00"	1.76”
Fan Total SP	-	2.11”

General

	Design	Actual
Fan Rotation Correct	-	YES
Unit Filters Clean	-	YES
Condensate Drain Installed	-	(2)

Completed By: Greg O'Day on 12/18/2020

Notes: (1) The unit was balance to total flow, hood capture, and comfort. The diffuser that are below design was caused by restrictions in the duct work. They had one or multiple of the following issues: 90 deg turn after takeoff, flex is partial smash trying to go around obstructions, to long of a duct run, to many turns to go around obstructions, and/or flex duct coming into the top of the diffuser at a bad angle.
(2) Condensate drain has no p-trap

System/Unit: RTU

Diffuser Supply (GRD)

RTU2 / KITCHEN

Asset	Area Served	Type	Size	DESIGN CFM	AK	CFM(1)	CFM(2)	FINAL CFM	% to design
SGRD1	KITCHEN	SD-2	12	425	1	794	697	453	106.6
SGRD2	KITCHEN	SD-3	12	425	1	741	626	472	111.1
SGRD3	KITCHEN	SD-3	12	450	1	613	528	492	109.3
SGRD4	KITCHEN	SD-3	12	450	1	556	465	444	98.7
SGRD5	OFFICE	SD-4	8	148	1	202	175	150	101.4
SGRD6	KITCHEN	SD-2	12	435	1	260	271	336	77.2
SGRD7	KITCHEN	SD-3	12	425	1	62	82	252	59.3
SGRD8	KITCHEN	SD-3	12	425	1	600	515	481	113.2
SGRD9	KITCHEN	SD-3	12	425	1	533	487	469	110.4
SGRD10	FRYER ACPSP	PSP	6X60 (2.5)	309	0.78	274	292	497	160.8
SGRD11	GRIDDLE ACPSP	PSP	6X108 (4.5)	505	0.78	435	435	656	129.9

Completed By: Greg O'Day on 12/17/2020

Asset	Area Served	Notes

System/Unit: FAN - Supply

Asset: MAU1 AREA: KITCHEN

Unit Data		
	Design	**Actual**
MFG	CAPTIVE-AIRE	CAPTIVE-AIRE
Model Num	A1-D.250-15D	A1-D.250-15D
Serial Num	-	4228059
Type	MUA	MUA
Configuration	DD	DD

Motor Data		
	Design	**Actual**
Motor MFG	-	WESTINGHOUSE
Frame	-	145T
Horsepower	2.0	2.0
Motor Rpm	2006	1740
Phase	3	3
Voltage (rated)	208	230/460
Amperage (rated)	-	6.48/2.74
Service Factor	-	1.15

Gas Heat		
	Design	**Actual**
Heater Operates (y/n)	-	YES
Flame Status (pass/fail)	-	PASS
Inlet Air Temp SetPt	55	55
Discharge Air Temp SetPt	60	60
Air Flow Switch SP Actual	-	0.38”

Test Data		
	Design	**Actual**
CFM	1900	1955
SF RPM	2006	1746
Motor RPM	-	1746
SF System SetPt	-	60.2 HZ
RL Voltage	-	238 VFD
RL Amperage	-	3.9 VFD
Total ESP	0.50"	NA
Fan Discharge SP	-	NA

General		
	Design	**Actual**
Fan Rotation Correct	-	YES

Completed By: Greg O'Day on 12/18/2020

Notes:

System/Unit: FAN - Exhaust

Asset: EF1 AREA: RESTROOM

Unit Data		
	Design	**Actual**
MFG	COOK	COOK
Model Num	GC-146	GC-146
Serial Num	-	(1)

Test Data		
	Design	**Actual**
CFM	75	72

Motor Data		
	Design	**Actual**
Motor MFG	-	(1)
Horsepower	30.3W	(1)
Motor Rpm	900	(1)
Phase	1	(1)
Voltage (rated)	120	(1)
Amperage (rated)	-	(1)

Completed By: Greg O'Day on 12/18/2020

Notes: (1) Unable to access motor/unit label.
(2) Single Speed.

System/Unit: FAN - Exhaust

Asset: EF2 AREA: RESTROOM

Unit Data		
	Design	**Actual**
MFG	COOK	COOK
Model Num	GC-146	GC-168
Serial Num	-	(1)

Test Data		
	Design	**Actual**
CFM	150	171

Motor Data		
	Design	**Actual**
Motor MFG	-	(1)
Horsepower	50.4W	(1)
Motor Rpm	900	(1)
Phase	1	(1)
Voltage (rated)	120	(1)
Amperage (rated)	-	(1)

Completed By: Greg O'Day on 12/18/2020

Notes: (1) Unable to access motor/unit label.
(2) Single Speed.

System/Unit: FAN - Exhaust

Asset: EF3 AREA: RESTROOM

Unit Data		
	Design	**Actual**
MFG	COOK	COOK
Model Num	GC-146	GC-146
Serial Num	-	(1)

Test Data		
	Design	**Actual**
CFM	75	74

Motor Data		
	Design	**Actual**
Motor MFG	-	(1)
Horsepower	30.3W	(1)
Motor Rpm	900	(1)
Phase	1	(1)
Voltage (rated)	120	(1)
Amperage (rated)	-	(1)

Completed By: Greg O'Day on 12/18/2020

Notes: (1) Unable to access motor/unit label.
(2) Single Speed.

System/Unit: FAN - Exhaust

Asset: KEF1 AREA: GRIDDLE

Unit Data		
	Design	**Actual**
MFG	CAPTIVE-AIRE	CAPTIVE-AIRE
Model Num	DU85HFA	DU85HFA
Serial Num	-	4228050
Type	UPBLAST	UPBLAST
Configuration	VERTICAL DISCHARGE	VERTICAL

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

Test Data		
	Design	**Actual**
CFM	1600	1570
Fan RPM	1411	1350
Fan Rotation	-	CCW
Motor RPM	-	1350
System SetPt	-	75%
RL Voltage	-	215
RL Amperage	-	5.7
Total ESP	1.20"	1.50”
Fan Inlet SP	-	-1.50"
Fan Discharge SP	-	ATM

Completed By: Greg O'Day on 12/18/2020

Notes:

System/Unit: FAN - Exhaust

Asset: KEF2 AREA: FRYER

Unit Data		
	Design	**Actual**
MFG	CAPTIVE-AIRE	CAPTIVE-AIRE
Model Num	DU50HFA	DU50HFA
Serial Num	-	4228050
Type	UPBLAST	UPBLAST
Configuration	VERTICAL DISCHARGE	VERTICAL

Motor Data		
	Design	**Actual**
Motor MFG	-	NEMA
Frame	-	NL
Horsepower	0.5	0.5
Motor Rpm	-	1800
Phase	1	1
Voltage (rated)	115	115
Amperage (rated)	-	6.3
Service Factor	-	NL

Test Data		
	Design	**Actual**
CFM	775	805
Fan RPM	1532	1008
Fan Rotation	-	CCW
Motor RPM	-	1008
System SetPt	-	56%
RL Voltage	-	124
RL Amperage	-	2.0
Total ESP	1.250"	0.72”
Fan Inlet SP	-	-0.72”
Fan Discharge SP	-	ATM

Completed By: Greg O'Day on 12/18/2020

Notes:

System/Unit: FAN - Exhaust

Asset: KEF3 AREA: DISH HOOD

Unit Data		
	Design	**Actual**
MFG	CAPTIVE-AIRE	CAPTIVE-AIRE
Model Num	DU33HFA	DU33HFA
Serial Num	-	4228050
Type	UPBLAST	UPBLAST
Configuration	VERTICAL DISCHARGE	VERTICAL

Motor Data		
	Design	**Actual**
Motor MFG	-	NEMA
Frame	-	NL
Horsepower	0.33	0.33
Motor Rpm	-	1800
Phase	1	1
Voltage (rated)	115	115
Amperage (rated)	-	4.3
Service Factor	-	NL

Test Data		
	Design	**Actual**
CFM	525	524
Fan RPM	1350	1037
Fan Rotation	-	CCW
Motor RPM	-	1037
System SetPt	-	55%
RL Voltage	-	124
RL Amperage	-	1.0
Total ESP	0.60"	0.21”
Fan Inlet SP	-	-0.21"
Fan Discharge SP	-	ATM

Completed By: Greg O'Day on 12/18/2020

Notes:

National TAB

Project: FREDDY'S - OVERLAND PARK, KS (BLUHAWK)

System/Unit: Kitchen Hood Type I

Asset: KEH1 AREA: GRIDDLE

Unit Data		
	Design	**Actual**
MFG	CAPTVE-AIRE	CAPTIVE-AIRE
Model Num	5424 ND-2-ACPSP-F	5424 ND-2-ACPSP-F
Job / Serial Num	-	4228050
Type	TYPE I CANOPY	TYPE I CANOPY
Hood length	96	96
Hood Width	54	54
Supply Plenum Type	ACPSP	ACPSP
Supply Plenum Width	14	14
Supply Plenum Length	108	108

Test Data Exhaust		
	Design	**Actual**
Filter Type	CAPTRATE SOLO	CAPTRATE SOLO
Filter Size 1	16X16	16X16
Filter Size 2	-	NA
Filter Qty 1	5	5
Filter Qty 2	-	NA
Filter AK factor size 1	1.62	1.62
Filters AK factor size 2	-	NA
Filter Total AK Area	8.1	8.1
Filter1 FPM	-	181
Filter2 FPM	-	207
Filter3 FPM	-	214
Filter4 FPM	-	196
Filter5 FPM	-	171
Filter6 FPM	-	NA
Filter7 FPM	-	NA
Filter8 FPM	-	NA
Filter9 FPM	-	NA
Filter10 FPM	-	NA
Filter11 FPM	-	NA
Filter12 FPM	-	NA
Filter Ave FPM(corr)	-	193
CFM	1600	1570

Cooking Equipment		
	Design	**Actual**
Item 1	-	GRIDDLE
Item 2	-	NA
Item 3	-	NA
Item 4	-	NA
Item 5	-	NA

Test Data Supply		
	Design	**Actual**
AK factor	1	1
Total AK Area	10.5	10.5
Kv factor (Vel)	0.89	0.89
Num of Readings	-	10
Reading1 FPM	-	132
Reading2 FPM	-	155
Reading3 FPM	-	142
Reading4 FPM	-	147
Reading5 FPM	-	149
Reading6 FPM	-	151
Reading7 FPM	-	165
Reading8 FPM	-	162
Reading9 FPM	-	175
Reading10 FPM	-	167
Reading11 FPM	-	NA
Reading12 FPM	-	NA
Reading13 FPM	-	NA
Reading14 FPM	-	NA
Ave FPM(corr)	-	137
CFM	1280	1439

Performance Data		
	Design	**Actual**
Exh-Supply Net CFM	320	131
Smoke Generation Type	-	STEAM
Cooking Equip Heat On	-	YES
Hood Capture %	-	(1)
End Panels Installed (Y/N)	-	(2)
Space Offset Temp Riser 1	-	15
Space Offset Temp Riser 2	-	NA
Riser Temp F (idle) Riser 1	-	89
Riser Temp F (idle) Riser 2	-	NA
Ambient Room Temp	-	84

General		
	Design	**Actual**
Third Party Witness	-	BRILEY
Third Party Company	-	STORE MANAGER
Tech Witness	-	GREG ODAY
Tech Company	-	NATIONAL TAB

System/Unit: Kitchen Hood Type I

Completed By: Greg O'Day on 12/18/2020

Notes: (1) The right quarter end panel was removed and the monitor for orders was put in place. The monitor is half way in the hood.
(2) If the quarter end panel was installed their would be 100% hood capture. it currently at 95-98% hood capture.

National TAB

Project: FREDDY'S - OVERLAND PARK, KS (BLUHAWK)

System/Unit: Kitchen Hood Type I

Asset: KEH2 AREA: FRY

Unit Data

	Design	Actual
MFG	CAPTVE-AIRE	CAPTIVE-AIRE
Model Num	5424 ND-2-ACPSP-F	5424 ND-2-ACPSP-F
Job / Serial Num	-	4228050
Type	TYPE I CANOPY	TYPE 1 CANOPY
Hood length	60	60
Hood Width	54	54
Supply Plenum Type	ACPSP	ACPSP
Supply Plenum Width	12	12
Supply Plenum Length	60	60

Test Data Exhaust

	Design	Actual
Filter Type	CAPTRATE SOLO	CAPTRATE SOLO
Filter Size 1	16X16	16X16
Filter Size 2	-	NA
Filter Qty 1	3	3
Filter Qty 2	-	NA
Filter AK factor size 1	1.62	1.62
Filters AK factor size 2	-	NA
Filter Total AK Area	4.86	4.86
Filter1 FPM	-	166
Filter2 FPM	-	172
Filter3 FPM	-	159
Filter4 FPM	-	NA
Filter5 FPM	-	NA
Filter6 FPM	-	NA
Filter7 FPM	-	NA
Filter8 FPM	-	NA
Filter9 FPM	-	NA
Filter10 FPM	-	NA
Filter11 FPM	-	NA
Filter12 FPM	-	NA
Filter Ave FPM(corr)	-	166
CFM	775	805

Cooking Equipment

	Design	Actual
Item 1	-	FRYER
Item 2	-	NA
Item 3	-	NA
Item 4	-	NA
Item 5	-	NA

Test Data Supply

	Design	Actual
AK factor	1	1
Total AK Area	5	5
Kv factor (Vel)	0.87	0.87
Num of Readings	-	6
Reading1 FPM	-	123
Reading2 FPM	-	128
Reading3 FPM	-	117
Reading4 FPM	-	125
Reading5 FPM	-	109
Reading6 FPM	-	110
Reading7 FPM	-	NA
Reading8 FPM	-	NA
Reading9 FPM	-	NA
Reading10 FPM	-	NA
Reading11 FPM	-	NA
Reading12 FPM	-	NA
Reading13 FPM	-	NA
Reading14 FPM	-	NA
Ave FPM(corr)	-	102
CFM	620	516

Performance Data

	Design	Actual
Exh-Supply Net CFM	155	289
Smoke Generation Type	-	45 SEC SMOKE CANDLE
Cooking Equip Heat On	-	YES
Hood Capture %	-	
End Panels Installed (Y/N)	-	YES
Space Offset Temp Riser 1	-	15
Space Offset Temp Riser 2	-	NA
Riser Temp F (idle) Riser 1	-	89
Riser Temp F (idle) Riser 2	-	NA
Ambient Room Temp	-	84

General

	Design	Actual
Third Party Witness	-	BRIELY
Third Party Company	-	STORE MANAGER
Tech Witness	-	GREG O'DAY
Tech Company	-	NATIONAL TAB

System/Unit: Kitchen Hood Type I

Completed By: Stephon Fisher on

Notes: (1) Hood room temperature sensor installed on the ceiling next to a diffuser. It needs to be moved next to the RTU-2 (Kitchen) temperature sensor.
(3) Hood capture is 90%. See notes in Remarks section of the report.

System/Unit: Kitchen Hood Type II

Asset: KEH3 AREA: DISH

Unit Data		
	Design	**Actual**
MFG	CAPTIVE-AIRE	CAPTIVE-AIRE
Model Num	4224 VHB-G	4224 VHB-G
Serial Num	-	4228050
Type	TYPE II CANOPY	TYPE II CANOPY
Hood length	42	42
Hood Width	-	42

Test Data		
	Design	**Actual**
Exhaust CFM	525	524

Completed By: Greg O'Day on 12/18/2020

Notes: