

Report By:

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



**Report: Test and Balance
Date: 1/13/2020**

**PROJECT
FREDDY'S - MERRIAM, KS**

8817 Shawnee Mission PKWY
MERRIAM, KS 66202

Client

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

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Project: FREDDY'S - MERRIAM, KS

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DEFICIENCY LIST

Assigned Organization: National TAB

Status: Not Submitted

Asset:

PRIORITY (HIGH/LOW/INFO ONLY)	
HIGH	Diffuser 3-4 near the dishwasher is missing a damper. Needs to be installed and closed 100% for hood performance. Cardboard was temporarily installed during testing.
HIGH	RTU-2 is tripping off. Whenever OCP is energized at the roof the unit is tripping off. BCS is aware.
HIGH	RTU-1 Thermostast is blank. Thermostat went blank while adjusting parameters. BCS is aware.
HIGH	Griddle hood capture is approximately 70%. There is a lot of smoke loss when tested at the cooking surface of the griddles. Smoke is drifting towards the back doors. Recommend moving or capping the return grille that is highlighted and then installing a perforated diffuser in its place with 12" neck and balancing damper. Griddle is also not centered under the hood. There is 11" overhang on the side closest to the back door and 22" on the side closest to the front of house.
HIGH	There is smoke rollout on the fryer hood due to smoke getting trapped under the fry warmer. Recommend modified end panel and air device to the left of the hood.
HIGH	Humidity sensor wiring is not completed. There is currently only one twisted pair installed but there needs to be two. The controls contractor has the schematic and is working on resolving.
HIGH	There is no access to the hood control panel without taking down the ceiling grid. Recommend reworking the ceiling grid design so that there is access.

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.

Constant Volume RTU's with Lay-In Ceiling Diffusers

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 could not be tested because RTU-2 was not operational. 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 off. The results of these tests are included on the smoke test checklist and deficiency list.



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 - SENSOR ALARM ON RTU-1 THERMOSTAT
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 - OCP WIRE NOT LANDED AT THERMOSTAT. TEMPORARY JUMPERS INSTALLED
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?	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?	NO - GREASE DUCT NOT CENTERED UNDER FAN
Flex conduit is long enough so that fan can be completely tilted back?	YES
There is no major leakage around base of fan?	NO
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?	IF INSTALLED INTERNAL OF FAN. COULD NOT VERIFY. BUT AIRFLOW IS SUFFICIENT.
Unit free of noticeable noise and vibration?	YES
If there is a dish exhaust fan, is a back draft damper installed? (If no dish EF then put NA)	TOO CLOSE TO BASE OF FAN // RESOLVED
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?	NO // RESOLVED
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
Griddle is completely centered underneath hood?	YES
PSPs	
Are the dampers tightened down? (Round collars with a wingnut, not the rectangular dampers with the allen adjustment.)	YES
DOCUMENTATION	
Have trades/general contractor been notified about any issues and are they created on FaciliBuild?	YES
PICTURES TAKEN OF:	
All Issues	YES
Each Piece of equipment	YES
Each Hood	YES
Front of Store	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?	SOME MINOR DRAFTING IN THE DINING ROOM. DIVERTED AIR AS BEST AS POSSIBLE.
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	GRIDDLE, FRYERS
List smoke candle type used	45 SEC
Smoke test capture - Perimeter of hood	100%
Smoke test capture - Top of cooking surface	70% GRIDDLE, 90% FRYER
WITNESS	
Date test was completed	12/9/2019
TAB tech name / Firm	WILL TURNBOUGH / NATIONAL TAB
Site super name / Firm	NOT PRESENT
Owner representative name / Firm (if Applicable)	NOT PRESENT
Building pressure at front & back doors (All Systems On)	NOT TESTED - RTU-2 WAS NOT OPERATIONAL
ADDITIONAL	
Do actual net building airflow, design net building airflow, and pressure coincide? If not why? (All three should either be positive or negative)	N/A
Thermostats are programmed?	
Thermostats Schedules: Program all thermostats to following settings:	
All three thermostats have correct time/date? (if not set correctly)	Yes
Occupied Time: 8am-11:55pm	8am-11:45pm
Occupied Fan ON	Yes
Occupied cooling 74	NT
Occupied heating 68	NT
Unoccupied Time 11:55pm-8am	Yes
Unoccupied Fan Auto	Yes
Unoccupied cooling 79	NT
Unoccupied heating 63	NT



Set a Partial Screen Lock for Thermostats (i.e., make sure temperature is adjustable but not schedule)	No
Password is set to 999 for Partial Screen Lock?	No
RTU Economizers	
Note: These instructions are for Lennox units. There are similar settings for other OEMs. Call office for assistance if needed.	
Enthalpy is set to "D" for all three units	YES
"DCV Set" dials turned all the way to the left (counter clockwise)	YES
"DCV Max" dials turned all the way to the left (counter clockwise)	YES

Notes/Comments:

Changed parameter 222 to time of day to enable ECONOMIZER during occupied periods



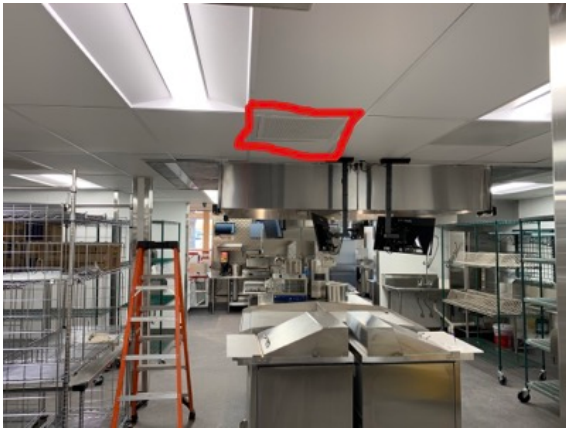
Diffuser 3-4 Is Missing Damper
Damper needs to be installed and closed 100%.
Diffuser is affecting hood culture



RTU-2 Tripping Off
Whenever OCP is energized at the roof the unit is tripping off



RTU1 Thermostat Is Blank
The thermostat went blank while adjusting parameters



Griddle Hood Capture About 70% Capture
There is a lot of smoke loss when tested at the cooking surface of the griddles. Smoke is drifting towards the back doors. Recommend moving or capping the return grille that is highlighted and then installing a perforated diffuser in its place with 12" neck and balancing damper.



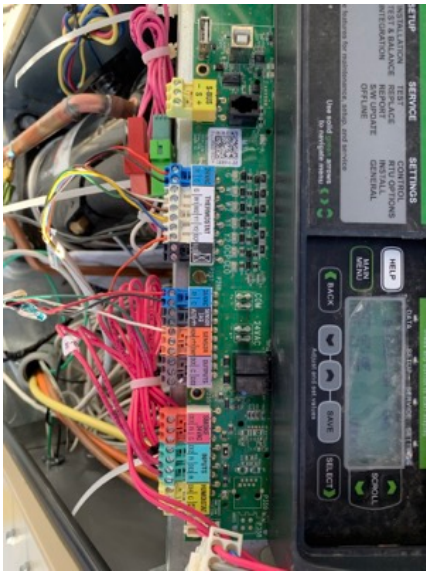
Griddle Hood Not Centered Over Equipment
11" overhang on side closest to back door and 22" on side closest to front of house. This is contributing to smoke rollout



Smoke Rollout On Fryer Hood
Slight rollout cases by smoke getting trapped under the fry warmer



Pre Wire Panel Is Not Accessible
Blocked by the ceiling grid. Ceiling grid needs to
be reinstalled to allow for removal of door



IN PROGRESS - Humidity Sensor Wiring Not
Correct
BCS is in the process of resolving

Will Turnbough
National TAB



Asset: RTU1

AREA: DINING

Unit Data		
	Design	Actual
MFG	LENNOX	LENNOX
Model Num	LGH	LGH092H4B
Serial Num	-	5619F09025
Type	RTU	RTU
Configuration	VERTICAL DISCHARGE	VERTICAL
Num OA Filters 1	-	2
OA Filter Size 1	-	16X24 NOMINAL
Num Final Filter 1	-	4
Final Filter Size 1	-	20X25X2
Num Final Filter 2	-	NA
Final Filter Size 2	-	NA

Test Data		
	Design	Actual
SF CFM	3000	3069
SF RPM	-	648
RA CFM	2497	2606
OA CFM	503	463
RL Voltage	-	212/214/215
RL Amperage	-	5.3/5.4/5.2
SF Rotation	-	CCW
RA Damper Position	-	59%
Min OA Damper Position	-	41%
Min OA Damper Type	-	BLADE ECON

Motor Data		
	Design	Actual
Motor MFG	-	NIDEC
Frame	-	184TZ
Horsepower	5.0	5
Motor Rpm	-	1765
Phase	3	3
Rated Voltage	208	208-230
Rated Amperage	-	13.8-13.0

Performance Data		
	Design	Actual
MA Plenum SP	-	-0.16"
Fan Suction SP	-	-0.29"
Fan Discharge SP	-	0.44
Total ESP	1.0"	0.60"
Fan Total SP	-	0.73"

Drive Data		
	Design	Actual
Motor Sheave Size	-	4.75"
Motor Bore Size	-	1.125"
Motor Sheave SetPt	-	2.5 TURNS
Fan Sheave Size	-	7.5"
Fan Sheave Bore	-	1"
Belt CL Distance	-	21.5"
Num of Belts	-	1
Belt Size	-	BX59
Belt Alignment	-	GOOD

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

Completed By: Will Turnbough on 12/09/2019

Notes: PROPORTIONALLY REDUCED DIFFUSERS TO REACH SCHEUDLED AIRFLOW OF 3000CFM (PREVIOUSLY 3200CFM)
 FAN PULLEY CHANGED FROM 7.5" TO 13" TO ACHEIVE DESIGN AIRFLOW.
 Return opening 35x13 = 3.16 ft sq
 INSTALLED DAMPERS COVER ONLY HALF OF OPENING DIFFUSER FACE AND ARE NOT GOOD FOR BALANCING. CLOSING DAMPERS CAUSED DRAFTING. ALL DAMPERS FULLY OPEN AND DEFLECTOR BLADES WERE ADJUSTED TO REDUCE DRAFTING AS MUCH AS POSSIBLE.



Asset: RTU2

AREA: DINING

Unit Data		
	Design	Actual
MFG	LENNOX	LENNOX
Model Num	LGH	LGH092H4B
Serial Num	-	5619F09027
Type	RTU	RTU
Configuration	VERTICAL DISCHARGE	VERTICAL
Num OA Filters 1	-	2
OA Filter Size 1	-	16X24 NOMINAL
Num Final Filter 1	-	4
Final Filter Size 1	-	20X25X2
Num Final Filter 2	-	NA
Final Filter Size 2	-	NA

Test Data		
	Design	Actual
SF CFM	3000	3288
SF RPM	-	NR
RA CFM	2497	2738
OA CFM	503	550
RL Voltage	-	214/214/215
RL Amperage	-	5.4/5.2/4.9
SF Rotation	-	CCW
RA Damper Position	-	59%
Min OA Damper Position	-	41%
Min OA Damper Type	-	BLADE ECON

Motor Data		
	Design	Actual
Motor MFG	-	NIDEC
Frame	-	184TZ
Horsepower	5.0	5
Motor Rpm	-	1765
Phase	3	3
Rated Voltage	208	208-230
Rated Amperage	-	13.8-13.0

Performance Data		
	Design	Actual
MA Plenum SP	-	-0.25"
Fan Suction SP	-	-0.35"
Fan Discharge SP	-	0.50"
Total ESP	1.0"	0.75"
Fan Total SP	-	0.85"

Drive Data		
	Design	Actual
Motor Sheave Size	-	4.75"
Motor Bore Size	-	1.125"
Motor Sheave SetPt	-	2.5 TURNS
Fan Sheave Size	-	7.5"
Fan Sheave Bore	-	1"
Belt CL Distance	-	21.5"
Num of Belts	-	1
Belt Size	-	BX59
Belt Alignment	-	GOOD

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

Completed By: Will Turnbough on 12/09/2019

Notes: PROPORIONALLY INCREASED DIFFUSERS 2 THROUGH 6 TO REACH SCHEDULED AIRFLOW OF 3000CFM (PREVIOUSLY 2850CFM)
 FAN PULLEY CHANGED FROM 7.5" TO 13" TO ACHEIVE DESIGN AIRFLOW.
 35x13 RETURN AIR OPENING
 INSTALLED DAMPERS COVER ONLY HALF OF OPENING DIFFUSER FACE AND ARE NOT GOOD FOR BALANCING. CLOSING DAMPERS CAUSED DRAFTING. ALL DAMPERS FULLY OPEN AND DEFLECTOR BLADES WERE ADJUSTED TO REDUCE DRAFTING AS MUCH AS POSSIBLE.



Asset: RTU3

AREA: KITCHEN

Unit Data		
	Design	Actual
MFG	LENNOX	LENNOX
Model Num	LGH	LGH150H4B
Serial Num	-	5619F09012
Type	RTU	RTU
Configuration	VERTICAL DISCHARGE	VERTICAL
Num OA Filters 1	-	2
OA Filter Size 1	-	16X24 NOMINAL
Num Final Filter 1	-	4
Final Filter Size 1	-	20X25X2
Num Final Filter 2	-	NA
Final Filter Size 2	-	NA

Test Data		
	Design	Actual
SF CFM	4500	4595
SF RPM	-	1058
RA CFM	3565	3639
OA CFM	935	956
RL Voltage	-	214/214/215
RL Amperage	-	11/11.3/10.6
SF Rotation	-	CCW
RA Damper Position	-	64%
Min OA Damper Position	-	46%
Min OA Damper Type	-	BLADE ECON

Motor Data		
	Design	Actual
Motor MFG	-	NIDEC MOTOR
Frame	-	184TZ
Horsepower	5.0	5
Motor Rpm	-	1765
Phase	3	3
Rated Voltage	208	208-230
Rated Amperage	-	13.8-13.0

Performance Data		
	Design	Actual
MA Plenum SP	-	-0.93"
Fan Suction SP	-	-1.24"
Fan Discharge SP	-	1.43"
Total ESP	1.0"	2.16"
Fan Total SP	-	2.67"

Drive Data		
	Design	Actual
Motor Sheave Size	-	4.75"
Motor Bore Size	-	1.125"
Motor Sheave SetPt	-	MAX
Fan Sheave Size	-	7.5"
Fan Sheave Bore	-	1"
Belt CL Distance	-	21.5"
Num of Belts	-	1
Belt Size	-	BX59
Belt Alignment	-	GOOD

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

Completed By: Will Turnbough on 12/09/2019

Notes:



Diffuser Supply (GRD)

RTU3 / KITCHEN

Asset	Area Served	Type	Size	DESIGN CFM	AK	CFM(1)	CFM(2)	FINAL CFM	% to design
SGRD1	CUSTARD	SD2	12"	400	1	453	437	394	98.5
SGRD2	CUSTARD	SD2	12"	400	1	252	440	386	96.5
SGRD3	DRIVE THRU	SD3	12"	425	1	453	529	428	100.7
SGRD4	DISHWASH	SD3	12"12"	425	1	358	430	467	109.9
SGRD5	OFFICE	SD4	8"	150	1	34	69	148	98.7
SGRD6	PREP	SD3	12"	400	1	580	403	406	101.5
SGRD7	UTILITY	SD2	12"	425	1	541	453	416	97.9
SGRD8	STORAGE	SD3	12"	425	1	730	449	461	108.5
SGRD9	PREP	SD3	12"	400	1	295	345	392	98.0
SGRD10	HD1A ACPSP	ACPSP	82X6	372	0.78KV=2.67 AK	315	419	402	108.1
SGRD11	HD1B ACPSP	ACPSP	82X6	372	0.78KV=2.67 AK	317	336	405	108.9
SGRD12	HD2 ACPSP	ACPSP	72X6	306	0.78KV=2.34 AK	184	197	290	94.8

Completed By: Will Turnbough on 12/09/2019

Asset	Area Served	Notes
SGRD4	DISHWASH	Diffuser 3-4 near the dishwasher is missing a damper. Needs to be installed and closed 100% for hood performance. Cardboard was temporarily installed during testing.
SGRD5	OFFICE	DAMPER FULLY OPEN. RECOMMEND INSTALLING 8". 6" IS INSTALLED.



Asset: MAU1

AREA: HD 1A, 1B, 2

Unit Data		
	Design	Actual
MFG	CAPTIVE-AIRE	CAPTIVE-AIRE
Model Num	A2-D.250-20D	A2-D.250-20D
Serial Num	-	3657065
Type	MAU	MUA
Configuration	VERTICAL DISCHARGE	VERTICAL DISCHARGE

Test Data		
	Design	Actual
CFM	2743	2625
SF RPM	1163	NR
Motor RPM	-	NR
RL Voltage	-	NR
RL Amperage	-	NR
Total ESP	0.50"	NR
Fan Discharge SP	-	NR

Motor Data		
	Design	Actual
Motor MFG	-	TECO
Frame	-	182T
Horsepower	1.50	1.5
Motor Rpm	-	1170
Phase	3	3
Voltage (rated)	208	230/460
Amperage (rated)	-	6.01/3.01
Service Factor	-	1.15

General		
	Design	Actual
Fan Rotation Correct	-	YES

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

Gas Heat		
	Design	Actual
Heater Operates (y/n)	-	YES
Flame Status (pass/fail)	-	PASS
Inlet Air Temp SetPt	-	55
Discharge Air Temp SetPt	-	60
Air Flow Switch SP Actual	-	0.390"

Completed By: Will Turnbough on 12/09/2019

Notes:



Asset: EF1

AREA: MENS RR

Unit Data		
	Design	Actual
MFG	COOK	TWIN CITY
Model Num	GC-164	NA
Serial Num	-	NA
Type	CENTRIFUGAL	CENTRIFUGAL
Configuration	CEILING	CEILING

Test Data		
	Design	Actual
CFM	150	172
Fan RPM	1300	DD
Fan Rotation	-	CW
Motor RPM	-	DD
System SetPt	-	SINGLE SPEED
RL Voltage	-	123
RL Amperage	-	0.53
Total ESP	0.25"	NR
Fan Inlet SP	-	ATM
Fan Discharge SP	-	NR

Motor Data		
	Design	Actual
Motor MFG	-	NA
Frame	-	NA
Horsepower	136W	NA
Motor Rpm	-	NA
Phase	1	1
Voltage (rated)	120	120
Amperage (rated)	-	1.3
Service Factor	-	NA

Completed By: Will Turnbough on 12/06/2019

Notes: LABELS NOT COMPLETELY ACCESSIBLE.



Asset: EF2

AREA: WOMENS RR

Unit Data		
	Design	Actual
MFG	COOK	TWIN CITY
Model Num	GC-164	NA
Serial Num	-	NA
Type	CENTRIFUGAL	CENTRIFUGAL
Configuration	CEILING	CEILING

Test Data		
	Design	Actual
CFM	150	177
Fan RPM	1300	DD
Fan Rotation	-	CW
Motor RPM	-	DD
System SetPt	-	SINGLE SPEED
RL Voltage	-	123
RL Amperage	-	0.58
Total ESP	0.25"	NR
Fan Inlet SP	-	ATM
Fan Discharge SP	-	NR

Motor Data		
	Design	Actual
Motor MFG	-	NA
Frame	-	NA
Horsepower	136W	NA
Motor Rpm	-	NA
Phase	1	1
Voltage (rated)	120	120
Amperage (rated)	-	1.3
Service Factor	-	NA

Completed By: Will Turnbough on 12/09/2019

Notes: LABELS NOT COMPLETELY ACCESSIBLE.



Asset: KEF1

AREA: HD1A-1B GRIDDLES

Unit Data		
	Design	Actual
MFG	CAPTIVE-AIRE	CAPTIVE-AIRE
Model Num	DU	DU180HFA
Serial Num	-	3657065
Type	CENTRIFUGAL	CENTRIFUGAL
Configuration	UPBLAST	UPBLAST

Test Data		
	Design	Actual
CFM	2584	2568
Fan RPM	1225	1246
Fan Rotation	-	CCW
Motor RPM	-	1246
System SetPt	-	63.9 HZ
RL Voltage	-	203/203/203
RL Amperage	-	6.1
Total ESP	1.40"	1.19"
Fan Inlet SP	-	-1.19"
Fan Discharge SP	-	ATM

Motor Data		
	Design	Actual
Motor MFG	-	TECO
Frame	-	182T
Horsepower	1.50	1.5
Motor Rpm	-	1170
Phase	3	3
Voltage (rated)	208	230/460
Amperage (rated)	-	6.01/3.01
Service Factor	-	1.15

Completed By: Will Turnbough on 12/09/2019

Notes:



Asset: KEF2

AREA: HD2 FRYERS

Unit Data		
	Design	Actual
MFG	CAPTIVE-AIRE	CAPTIVE-AIRE
Model Num	DU	DU50HFA
Serial Num	-	3657065
Type	CENTRIFUGAL	CENTRIFUGAL
Configuration	UPBLAST	UPBLAST

Test Data		
	Design	Actual
CFM	775	763
Fan RPM	1441	DD
Fan Rotation	-	CCW
Motor RPM	-	DD
System SetPt	-	LOW
RL Voltage	-	122
RL Amperage	-	8.69
Total ESP	1.25"	0.54"
Fan Inlet SP	-	-0.54"
Fan Discharge SP	-	ATM

Motor Data		
	Design	Actual
Motor MFG	-	HSSA
Frame	-	48Y
Horsepower	0.50	1/2
Motor Rpm	-	1625
Phase	1	1
Voltage (rated)	115	115
Amperage (rated)	-	5.6
Service Factor	-	1.0

Completed By: Will Turnbough on 12/09/2019

Notes:



Asset: KEF3

AREA: HD3 DISHWASHER

Unit Data		
	Design	Actual
MFG	CAPTIVE-AIRE	CAPTIVE-AIRE
Model Num	DU	DU30HFA
Serial Num	-	3657065
Type	CENTRIFUGAL	CENTRIFUGAL
Configuration	UPBLAST	UPBLAST

Test Data		
	Design	Actual
CFM	525	566
Fan RPM	1450	DD
Fan Rotation	-	CCW
Motor RPM	-	DD
System SetPt	-	LOW (74.9 V)
RL Voltage	-	122
RL Amperage	-	2.46
Total ESP	0.85"	0.22"
Fan Inlet SP	-	-0.22"
Fan Discharge SP	-	ATM

Motor Data		
	Design	Actual
Motor MFG	-	HSSA
Frame	-	48Y
Horsepower	0.25	1/4
Motor Rpm	-	1625
Phase	1	1
Voltage (rated)	115	115
Amperage (rated)	-	3.0
Service Factor	-	1.0

Completed By: Will Turnbough on 12/09/2019

Notes:

System/Unit: Kitchen Hood Type I

Asset: HD2

AREA: FRYERS

Unit Data		
	Design	Actual
MFG	CAPTIVE-AIRE	CAPTIVE-AIRE
Model Num	NA	5424 ND-2-ACPSP-F
Job / Serial Num	-	3657065
Type	TYPE I CANOPY	TYPE I CANOPY
Hood length	60	60
Hood Width	54	54
Supply Plenum Type	ACPSP	ACPSP
Supply Plenum Width	12	12
Supply Plenum Length	72	72

Test Data Exhaust		
	Design	Actual
Filter Type	CAPTRATE SOLO	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	-	152
Filter2 FPM	-	163
Filter3 FPM	-	154
Filter4 FPM	-	NA
Filter5 FPM	-	NA
Filter Ave FPM(corr)	-	157
CFM	775	763

Cooking Equipment		
	Design	Actual
Item 1	-	FRYERS
Item 2	-	NA

Test Data Supply		
	Design	Actual
AK factor	1	1
Total AK Area	6.0	6
Kv factor (Vel)	0.87	0.87
Num of Readings	-	6
Reading1 FPM	-	103
Reading2 FPM	-	120
Reading3 FPM	-	121
Reading4 FPM	-	119
Reading5 FPM	-	109
Reading6 FPM	-	105
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)	-	98
CFM	675	589

Performance Data		
	Design	Actual
Exh-Supply Net CFM	100	174
Smoke Generation Type	-	45 SEC SMOKE CANDLE
Cooking Equip Heat On	-	NO
Hood Capture %	-	90%
End Panels Installed (Y/N)	-	YES - QUARTER AND FULL

Completed By: Will Turnbough on 12/09/2019

Notes: There is smoke rollout on the fryer hood due to smoke getting trapped under the fry warmer. Recommend modified end panel and air device to the left of the hood.

System/Unit: Kitchen Hood Type I

Asset: HD-A1

AREA: GRIDDLE

Unit Data		
	Design	Actual
MFG	CAPTIVE-AIRE	CAPTIVE-AIRE
Model Num	NA	4824 ND-2-ACPSP-F
Job / Serial Num	-	3657065
Type	TYPE I CANOPY	TYPE I CANOPY
Hood length	82	82
Hood Width	48	48
Supply Plenum Type	ACPSP	ACPSP
Supply Plenum Width	14	14
Supply Plenum Length	82	82

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	8.10	8.10
Filter1 FPM	-	168
Filter2 FPM	-	156
Filter3 FPM	-	189
Filter4 FPM	-	172
Filter5 FPM	-	158
Filter Ave FPM(corr)	-	169
CFM	1292	1369

Cooking Equipment		
	Design	Actual
Item 1	-	GRIDDLE
Item 2	-	NA

Test Data Supply		
	Design	Actual
AK factor	1	1
Total AK Area	7.97	7.97
Kv factor (Vel)	0.90	0.90
Num of Readings	-	6
Reading1 FPM	-	120
Reading2 FPM	-	120
Reading3 FPM	-	129
Reading4 FPM	-	138
Reading5 FPM	-	128
Reading6 FPM	-	104
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)	-	111
CFM	1034	883

Performance Data		
	Design	Actual
Exh-Supply Net CFM	258	486
Smoke Generation Type	-	45 SEC
Cooking Equip Heat On	-	NO
Hood Capture %	-	70%
End Panels Installed (Y/N)	-	NA

Completed By: Will Turnbough on 12/09/2019

Notes: Griddle hood capture is approximately 70%. There is a lot of smoke loss when tested at the cooking surface of the griddles. Smoke is drifting towards the back doors. Recommend moving or capping the return grille that is highlighted and then installing a perforated diffuser in its place with 12" neck and balancing damper. Griddle is also not centered under the hood. There is 11" overhang on the side closest to the back door and 22" on the side closest to the front of house.

System/Unit: Kitchen Hood Type I

Asset: HD-B1

AREA: GRIDDLE

Unit Data		
	Design	Actual
MFG	CAPTIVE-AIRE	CAPTIVE-AIRE
Model Num	NA	4824 ND-2-ACPSP-F
Job / Serial Num	-	3657065
Type	TYPE I CANOPY	TYPE I CANOPY
Hood length	82	82
Hood Width	48	48
Supply Plenum Type	ACPSP	ACPSP
Supply Plenum Width	14	14
Supply Plenum Length	82	82

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	8.10	8.10
Filter1 FPM	-	143
Filter2 FPM	-	154
Filter3 FPM	-	154
Filter4 FPM	-	144
Filter5 FPM	-	145
Filter Ave FPM(corr)	-	148
CFM	1292	1199

Cooking Equipment		
	Design	Actual
Item 1	-	GRIDDLE
Item 2	-	NA

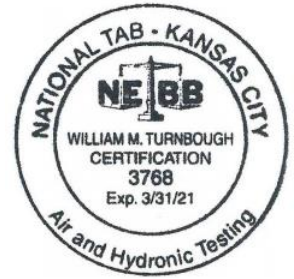
Test Data Supply		
	Design	Actual
AK factor	1	1
Total AK Area	7.97	7.97
Kv factor (Vel)	0.90	0.90
Num of Readings	-	6
Reading1 FPM	-	148
Reading2 FPM	-	136
Reading3 FPM	-	177
Reading4 FPM	-	166
Reading5 FPM	-	164
Reading6 FPM	-	174
Reading7 FPM	-	NA
Reading8 FPM	-	NA
Reading9 FPM	-	NA
Reading10 FPM	-	NA
Reading11 FPM	-	NA
Reading12 FPM	-	NA
Reading13 FPM	-	NA
Reading14 FPM	-	NA
Ave FPM(corr)	-	144
CFM	1034	1153

Performance Data		
	Design	Actual
Exh-Supply Net CFM	258	46
Smoke Generation Type	-	45 SEC SMOKE CANDLE
Cooking Equip Heat On	-	YES
Hood Capture %	-	90%
End Panels Installed (Y/N)	-	N/A

Completed By: Will Turnbough on 12/09/2019

Notes: Griddle hood capture is approximately 70%. There is a lot of smoke loss when tested at the cooking surface of the griddles. Smoke is drifting towards the back doors. Recommend moving or capping the return grille that is highlighted and then installing a perforated diffuser in its place with 12" neck and balancing damper. Griddle is also not centered under the hood. There is 11" overhang on the side closest to the back door and 22" on the side closest to the front of house.

System/Unit: Kitchen Hood Type II



Asset: HD3

AREA: DISHWASHER

Unit Data		
	Design	Actual
MFG	CAPTIVE-AIRE	CAPTIVE-AIRE
Model Num	4224 VHB-G	4224 VHB-G
Serial Num	-	3657065
Type	TYPE II CANOPY	TYPE II CANOPY
Hood length	42	42
Hood Width	42	42

Test Data		
	Design	Actual
Exhaust CFM	525	566

Completed By: Will Turnbough on 12/06/2019

Notes:

