Report By:

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

NATIONAL TAB

Comfort. Under control.

Report: Test, Adjust, & Balance

Date: 5/25/2022

PROJECT

05-16 CULVERS - SHELBYVILLE, IN

1930 NORTH MORRISTOWN RD

SHELBYVILLE, IN

Client

National TAB

Project: 05-16 CULVERS - SHELBYVILLE, IN

Table Of Contents

Comfort. Under control.

05-16 CULVERS - SHELBYVILLE, IN

Project Issue Information

Issue Name : HD-2 smoke capture

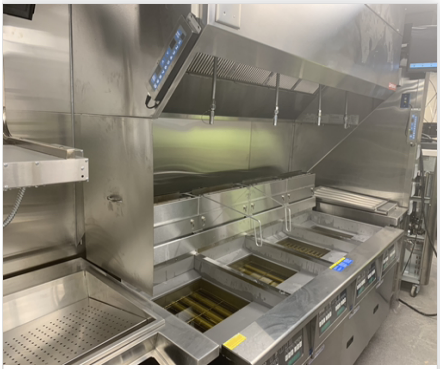
Description : Smoke capture is not 100%. I tested all diffusers for drafts and increased fan cfm to 110%. Only solution was to use end panel on the left side for 100% smoke capture

Created By : National TAB **Assigned To :** National TAB - Tyler Youells

Status : Open

Originated Date : 05/19/2022 - Tyler Youells - National TAB

Project Issue File Details



FuseIT3e6425ca431c4f6cbb971cfb4cf2e262.jpeg

Comfort. Under control.

05-16 CULVERS - SHELBYVILLE, IN

Project Issue Information

Issue Name : Kitchen DOAS economizer

Description : Per Tom with CAS the board is bad and sends a constant 10V signal to the motor preventing adjustment of the damper.

Created By : National TAB **Assigned To :** National TAB - Tyler Youells

Status : Open

Originated Date : 05/17/2022 - Tyler Youells - National TAB

Comfort. Under control.

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 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 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 engineer’s design flow.

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 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.

NATIONAL TAB

AIR BALANCE SCHEDULE

UNIT	AREA SERVED	HVAC SUPPLY		HVAC RETURN		HVAC OUTDOOR		OA %		HOOD MAKE-UP		HOOD EXHAUST		GENERAL EXH.	
		DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL
RTU-1	DINING	6150	6177	4400	4356	1750	1821	28.5%	29.5%						
RTU-2	KITCHEN	6150	6216	4450	4378	1700	1838	27.6%	29.6%						
PRV-1	RESTROOMS													375	378
PRV-2	HD1 GRIDDLE											1500	1497		
PRV-3	HD2 FRYER											1500	1628		
EF-1A	MOP ROOM													75	81
TOTALS		12300	12393	8850	8734	3450	3659			0	0	3000	3125	450	459

NET BUILDING AIRFLOW CALCULATION

TOTALS	DESIGN	ACTUAL
TOTAL OA	3450	3659
TOTAL EXHAUST	3450	3584
NET AIRFLOW	0	75

DOOR TESTED	BUILDING PRESSURE MEASUREMENTS (IN. H20)
FRONT	0.002
SIDE	0.0025
REAR	0.0042
AVERAGE	**0.0029**

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. ✓

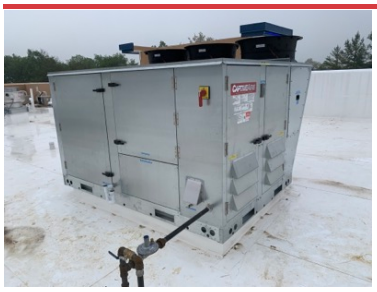
NOTES:

CULVERS SHELBYVILLE, IN

Thursday, May 19, 2022

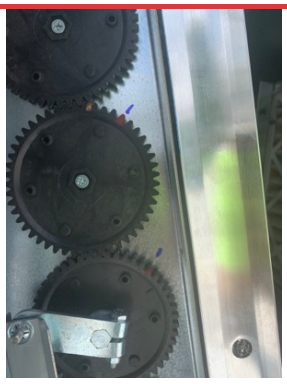
11 Remarks Identified

STOREFRONT

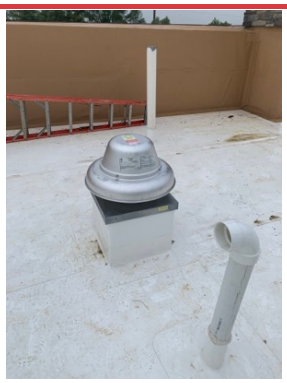


DOAS-1

DOAS-2

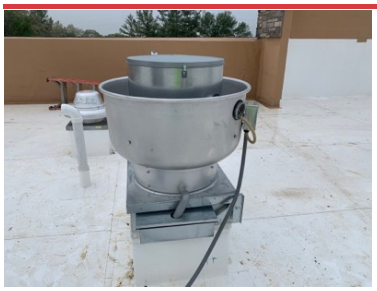


MARKED DAMPER POSITION



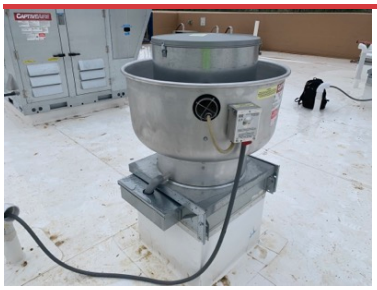
PRV-1

Serves restroom



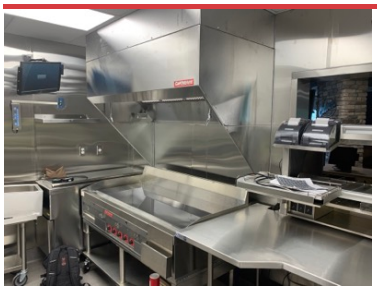
PRV-2

Serves Griddle hood

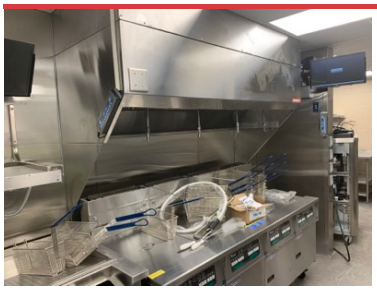


PRV-3

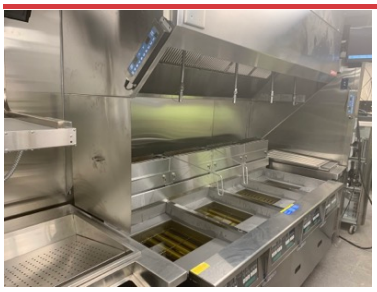
Serves Fryer hood



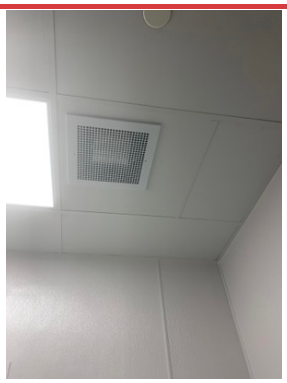
HD-1



HD-2



HD-2 MOCKED END PANEL



EF-1

Comfort. Under control.

05-16 CULVERS - SHELBYVILLE, IN

CheckList Information

Name :	TECH - STEP 1: 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
Perforated diffusers are installed on the cook line? (4-ways will disrupt hood capture)	Yes
All hood filters installed and accounted for?	Yes
Hoods are wired and have power?	Yes
Thermostats have power?	Yes
Have trades/general contractor been notified about any issues and are they created on FaciliBuild?	Yes, Mop sink fan is not installed, Resolved by MC and Electrician
On the cookline diffusers neck is there 18" (12" minimum) straight rigid duct run attached?	Yes

Notes/Comments :

Comfort. Under control.

05-16 CULVERS - SHELBYVILLE, IN

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?	No
Thermostat wire run from OCP on the RTU to the Ec terminal at the thermostat? If no, jumper can be installed from R to OCP temporarily. (The economizers will not open without OCP being energized.)	Yes
Motors are all operating below the FLA rating?	Yes
Are belts tight?	n/a
If direct drive unit is the speed controller working.	n/a
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?	n/a
Grease cup installed on hood fan?	No
Hinge kit installed installed on hood fan?	Yes
Lean grease rated fans 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
The hood exhaust fans are installed in correct positions and are not switched?	Yes
HOODS	
Kitchen equipment installed in proper places?	Yes
Can kitchen equipment be turned on for final smoke test?	Yes
Second stage Grease Grabber filters are installed on the griddle hood?	No
DOCUMENTATION	
Have trades/general contractor been notified about any issues and are they created on FaciliBuild?	Yes

Notes/Comments :

DOAS-2 Economizer not functional, CAS has a new control board ordered. NTAB to Manually adjust and mark damper position.

Comfort. Under control.

05-16 CULVERS - SHELBYVILLE, IN

CheckList Information

Name :	TECH - STEP 3: 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?	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.

05-16 CULVERS - SHELBYVILLE, IN

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 and Fryers were on
List smoke candle type used	45 sec smokes
Smoke test capture - Perimeter of hood	HOOD1 100%, HOOD 2 100%
Smoke test capture - Top of cooking surface	HOOD1 -100%, HOOD-2 90%. Hood 2 has some smoke loss out of the left side. NTAB increased exhuast rate to 110% of design and verified that diffusers were not causing a draft creating the smoke loss. The only solution was to hold up a mock end-panel that brought smoke capture to 100%.
WITNESS	
Date test was completed	05/19/2022
TAB tech name / Firm	Tyler/NTAB
Site super name / Firm	Troy/Mccon
Owner representative name / Firm (if Applicable)	n/a
Building pressure at front & back doors (All Systems On)	YES, 0.0029" AVG
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?	No

PRODIGY SETTINGS FOR RTU'S	
Parameter 65 set to 0	No
Parameter 78 set to 0	No
Parameter 105 set to 6	No
Parameter 156 set to 70 (Dining unit only)	No
Parameter 156 set to 65 (Kitchen Unit Only)	No
Parameter 170 set to 75 (Dining Unit Only)	No
Parameter 170 set to 70 (Kitchen Unit Only)	No
Parameter 131 set to the same % as OA minimum position?	No
Parameter 117 set to the same % as OA minimum position?	No

Notes/Comments :

CAS WILL INPUT THERMOSTAT SCHEDULES ON THEIR RETURN TRIP

National TAB

Project: 05-16 CULVERS - SHELBYVILLE, IN

System/Unit: AHU/RTU

Comfort. Under control.

Asset: RTU1 AREA:DINING

Unit Data		
	Design	**Actual**
MFG	LENNOX	CAPTIVE AIRE
Serial Num	-	5146053
Model Num	LGH-180-H4B	CASRTU3-I.400-24-20T
Type	-	DOAS
Configuration	-	VERTICAL
Num OA Filters 1	-	4
OA Filter Size 1	-	16X25X2
Num Final Filter 1	-	8
Final Filter Size 1	-	20X25X2
Num Final Filter 2	-	
Final Filter Size 2	-	

Motor Data		
	Design	**Actual**
Motor MFG	-	TECO
Frame	-	215T
Horsepower	-	10
Motor Rpm	-	1755
Phase	3	3
Rated Voltage	208/230	230
Rated Amperage	-	24.3

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

Test Data		
	Design	**Actual**
SF CFM	6150	6177
SF RPM	-	1638
RA CFM	4400	4356
OA CFM	1750	1821
RL Voltage	-	210 AVG
RL Amperage	-	20.8 AVG
SF Rotation	-	CCW
RA Damper Position	-	MECHANICAL LINKAGE
Min OA Damper Position	-	3.5V
Min OA Damper Type	-	ECONOMIZER
OA Enthalpy Setpt	-	
Brake Horse Power	-	

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.83"
Fan Suction SP	-	-2.58"
Fan Discharge SP	-	0.60"
Total ESP	-	1.43"
Fan Total SP	-	3.18"

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

Completed By: Tyler Youells

Notes:INCREASED OA BY +50CFM. TO OBTAIN POSITIVE BUILDING PRESSURE.

Comfort. Under control.

Diffuser Supply (GRD)

RTU1/DINING

Asset							
SGRD1	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**
	ENTRY VESTIBULE	SD3	8"	150	1	240	180
	FINAL CFM	**% to design**					
	154	102.7					
SGRD2	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**
	MENS RR	SD4	8"	150	1	252	143
	FINAL CFM	**% to design**					
	140	93.3					
SGRD3	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**
	WOMENS RR	SD4	8"	150	1	179	146
	FINAL CFM	**% to design**					
	158	105.3					
SGRD4	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**
	HALL	SD1	12"	450	1	230	456
	FINAL CFM	**% to design**					
	477	106.0					
SGRD5	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**
	DINING	SD1	8"	150	1	75	144
	FINAL CFM	**% to design**					
	155	103.3					
SGRD6	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**
	DINING	SD1	8"	150	1	89	160
	FINAL CFM	**% to design**					
	164	109.3					
SGRD7	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**
	DINING	SD1	8"	150	1	49	121
	FINAL CFM	**% to design**					
	136	90.7					
SGRD8	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**
	DINING	SD1	8"	150	1	52	146
	FINAL CFM	**% to design**					
	144	96.0					
SGRD9	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**
	DINING	SD1	8"	150	1	29	125
	FINAL CFM	**% to design**					
	135	90.0					
SGRD10	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**
	DINING	SD1	8"	150	1	80	130
	FINAL CFM	**% to design**					
	135	90.0					
SGRD11	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**
	DINING	SD1	8"	150	1	72	129
	FINAL CFM	**% to design**					
	138	92.0					
SGRD12	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**
	DINING	SD1	8"	150	1	220	106
	FINAL CFM	**% to design**					
	135	90.0					
SGRD13	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**
	DINING	SD1	8"	150	1	213	138
	FINAL CFM	**% to design**					
	149	99.3					
SGRD14	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**
	DINING	SD1	8"	150	1	180	174

	FINAL CFM	% to design					
	154	102.7					
SGRD15	Location	Type	Size	DESIGN CFM	AK	CFM(1)	CFM(2)
	DINING	SD1	8"	150	1	270	165
	FINAL CFM	% to design					
	137	91.3					
SGRD16	Location	Type	Size	DESIGN CFM	AK	CFM(1)	CFM(2)
	DINING	SD1	8"	150	1	220	177
	FINAL CFM	% to design					
	153	102.0					
SGRD17	Location	Type	Size	DESIGN CFM	AK	CFM(1)	CFM(2)
	DINING	SD1	8"	150	1	190	159
	FINAL CFM	% to design					
	165	110.0					
SGRD18	Location	Type	Size	DESIGN CFM	AK	CFM(1)	CFM(2)
	DINING	SD1	8"	150	1	188	155
	FINAL CFM	% to design					
	142	94.7					
SGRD19	Location	Type	Size	DESIGN CFM	AK	CFM(1)	CFM(2)
	DINING	SD1	8"	150	1	230	167
	FINAL CFM	% to design					
	143	95.3					
SGRD20	Location	Type	Size	DESIGN CFM	AK	CFM(1)	CFM(2)
	DRINKS & CONDITMENTS	SD1	10"	300	1	445	313
	FINAL CFM	% to design					
	313	104.3					
SGRD21	Location	Type	Size	DESIGN CFM	AK	CFM(1)	CFM(2)
	ENTRY	SD1	8"	150	1	71	145
	FINAL CFM	% to design					
	154	102.7					
SGRD22	Location	Type	Size	DESIGN CFM	AK	CFM(1)	CFM(2)
	CUSTOMER ORDER AREA	SD1	12"	450	1	220	480
	FINAL CFM	% to design					
	486	108.0					
SGRD23	Location	Type	Size	DESIGN CFM	AK	CFM(1)	CFM(2)
	CUSTOMER SERVICE	SD1	10"	350	1	251	343
	FINAL CFM	% to design					
	323	92.3					
SGRD24	Location	Type	Size	DESIGN CFM	AK	CFM(1)	CFM(2)
	CUSTOMER SERVICE	SD1	10"	350	1	261	373
	FINAL CFM	% to design					
	376	107.4					
SGRD25	Location	Type	Size	DESIGN CFM	AK	CFM(1)	CFM(2)
	CUSTOMER SERVICE	SD1	10"	350	1	220	331
	FINAL CFM	% to design					
	330	94.3					
SGRD26	Location	Type	Size	DESIGN CFM	AK	CFM(1)	CFM(2)
	CUSTOMER SERVICE	SD1	10"	350	1	264	342
	FINAL CFM	% to design					
	353	100.9					
SGRD27	Location	Type	Size	DESIGN CFM	AK	CFM(1)	CFM(2)
	DRIVE THRU	SD1	12"	500	1	612	507
	FINAL CFM	% to design					
	520	104.0					

	Location	Type	Size	DESIGN CFM	AK	CFM(1)	CFM(2)
SGRD28	OFFICE	SD1	10"	200	1	280	211
	FINAL CFM	**% to design**					
	205	102.5					

Completed By:Brianna Biggs on

Asset	Notes

National TAB

Project: 05-16 CULVERS - SHELBYVILLE, IN

System/Unit: AHU/RTU

Comfort. Under control.

Asset: RTU2 AREA:KITCHEN

Unit Data		
	Design	**Actual**
MFG	LENNOX	CAPTIVE AIRE
Serial Num	-	5146053
Model Num	LGH-210-H4B	CASRTU3-I.400-24-20T
Type	-	DOAS
Configuration	-	VERTICAL
Num OA Filters 1	-	4
OA Filter Size 1	-	16X25X2
Num Final Filter 1	-	8
Final Filter Size 1	-	20X25X2
Num Final Filter 2	-	
Final Filter Size 2	-	

Motor Data		
	Design	**Actual**
Motor MFG	-	TECO
Frame	-	215T
Horsepower	-	10
Motor Rpm	-	1755
Phase	3	3
Rated Voltage	208/230	230
Rated Amperage	-	24.3

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

Test Data		
	Design	**Actual**
SF CFM	6150	6216
SF RPM	-	1638
RA CFM	4450	4378
OA CFM	1700	1838
RL Voltage	-	209 AVG
RL Amperage	-	20.9 AVG
SF Rotation	-	CCW
RA Damper Position	-	MECHANICAL LINKAGE
Min OA Damper Position	-	MARKED
Min OA Damper Type	-	ECONOMIZER
OA Enthalpy Setpt	-	
Brake Horse Power	-	

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-1.02
Fan Suction SP	-	-2.67"
Fan Discharge SP	-	0.58"
Total ESP	-	1.60"
Fan Total SP	-	3.25"

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

Completed By: Tyler Youells

Notes:

Comfort. Under control.

Diffuser Supply (GRD)

RTU2/KITCHEN

Asset							
SGRD1	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**
	SUNDAE SERVICE	SD1	12"	600	1	267	
	FINAL CFM	**% to design**					
	542	90.3					
SGRD2	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**
	SUNDAER SERVIC E	SD1	12"	600	1	303	
	FINAL CFM	**% to design**					
	584	97.3					
SGRD3	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**
	COOKLINE	SD5	10"	200	1	235	
	FINAL CFM	**% to design**					
	201	100.5					
SGRD4	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**
	COOKLINE	SD5	10"	375	1	336	
	FINAL CFM	**% to design**					
	373	99.5					
SGRD5	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**
	FOOD PREP	SD5	12"	400	1	119	
	FINAL CFM	**% to design**					
	405	101.3					
SGRD6	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**
	FOOD PREP	SD5	12"	400	1	587	
	FINAL CFM	**% to design**					
	414	103.5					
SGRD7	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**
	COOKLINE	SD5	10"	250	1	347	
	FINAL CFM	**% to design**					
	246	98.4					
SGRD8	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**
	COOKLINE	SD5	10"	275	1	475	
	FINAL CFM	**% to design**					
	289	105.1					
SGRD9	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**
	TOILET	SD1	6"	75	1	113	
	FINAL CFM	**% to design**					
	71	94.7					
SGRD10	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**
	ALCOVE	SD5	8"	125	1	306	
	FINAL CFM	**% to design**					
	133	106.4					
SGRD11	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**
	FOOD PREP	SD5	12"	350	1	635	
	FINAL CFM	**% to design**					
	379	108.3					
SGRD12	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**
	DISHWASHING	SD5	12"	350	1	646	
	FINAL CFM	**% to design**					
	382	109.1					
SGRD13	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**
	DISHWASHING	SD5	12"	350	1	239	
	FINAL CFM	**% to design**					
	375	107.1					
SGRD14	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**
	UTILITY	SD1	12"	600	1	365	

	FINAL CFM	% to design					
	584	97.3					
SGRD15	Location	Type	Size	DESIGN CFM	AK	CFM(1)	CFM(2)
	DRY GOODS	SD1	12"	600	1	343	
	FINAL CFM	% to design					
	639	106.5					
SGRD16	Location	Type	Size	DESIGN CFM	AK	CFM(1)	CFM(2)
	DRY GOODS	S1D	12"	600	1	486	
	FINAL CFM	% to design					
	599	99.8					

Completed By:Brianna Biggs on

Asset	Notes

National TAB

Project: 05-16 CULVERS - SHELBYVILLE, IN

System/Unit: FAN - Exhaust

Comfort. Under control.

Asset: EF-A1 AREA:MOP ROOM

Unit Data		
	Design	**Actual**
MFG	ACCUREX	CAPTIVE AIRE
Model Num	XCR-B80	CFA 100CA
Serial Num	-	5414570
Type	CEILING	CEILING
Configuration	VERTICAL	HORIZONTAL

Motor Data		
	Design	**Actual**
Motor MFG	-	BROAN
Frame	-	NL
Horsepower	-	87W
Motor Rpm	900	NA
Phase	1	1
Voltage (rated)	115	115
Amperage (rated)	-	1.1
Service Factor	-	1

Test Data		
	Design	**Actual**
CFM	75	81
Fan RPM	885	NA
Fan Rotation	-	CORRECT
Motor RPM	-	NA
System SetPt	-	FULL SPEED
RL Voltage	-	120.1
RL Amperage	-	0.40
Total ESP	0.125"	
Fan Inlet SP	-	
Fan Discharge SP	-	

Completed By: Tyler Youells

Notes:

Asset	Notes

National TAB

Project: 05-16 CULVERS - SHELBYVILLE, IN

System/Unit: FAN - Exhaust

Comfort. Under control.

Asset: PRV1 AREA:RESTROOMS

Unit Data		
	Design	**Actual**
MFG	ACCUREX	CAPTIVE AIRE
Model Num	XRED - 095-D	DR12HFA
Serial Num	-	5146053
Type	DOWNBLAST	DOWNBLAST
Configuration	HORIZONTAL	VERTICAL

Motor Data		
	Design	**Actual**
Motor MFG	-	TELCO GREEN
Frame	-	NL
Horsepower	0.0667	0.25
Motor Rpm	1550	1800
Phase	1	1
Voltage (rated)	115	115
Amperage (rated)	-	2.9
Service Factor	-	1

Test Data		
	Design	**Actual**
CFM	375	378
Fan RPM	1479	864
Fan Rotation	-	CCW
Motor RPM	-	864
System SetPt	-	48%
RL Voltage	-	120.2
RL Amperage	-	0.63
Total ESP	0.5"	0.10”
Fan Inlet SP	-	-0.10”
Fan Discharge SP	-	ATM

Completed By: Tyler Youells

Notes:

National TAB

Project:05-16 CULVERS - SHELBYVILLE, IN

FAN - Exhaust

Comfort. Under control.

Diffuser Ret/Exh (GRD)

PRV1/RESTROOMS

Asset							
EGRD1	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**
	MENS RR	EG1	8X8	150	1	215	
	FINAL CFM	**% to design**					
	150	100.0					
EGRD2	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**
	WOMENS RR	EG1	8X8	150	1	225	
	FINAL CFM	**% to design**					
	154	102.7					
EGRD3	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**
	TOILET	EG1	8X8	75	1	232	
	FINAL CFM	**% to design**					
	74	98.7					

Completed By:Brianna Biggs on

Asset	Notes

National TAB

Project: 05-16 CULVERS - SHELBYVILLE, IN

System/Unit: FAN - Exhaust

Comfort. Under control.

Asset: PRV2 AREA:HD1 GRIDDLE

Unit Data		
	Design	**Actual**
MFG	ACCUREX	CAPTIVE AIRE
Model Num	XRUB-160XP-15	DU85HFA
Serial Num	-	5146053
Type	UPBLAST	UPBLAST
Configuration	VERTICAL	VERTICAL

Motor Data		
	Design	**Actual**
Motor MFG	-	HSSA
Frame	-	NL
Horsepower	1.5	0.75
Motor Rpm	1725	1725
Phase	3	3
Voltage (rated)	208	208
Amperage (rated)	-	2.6
Service Factor	-	1.15

Drive Data		
	Design	**Actual**
Motor Sheave Size	-	
Motor Bore Size	-	
Motor Sheave SetPt	-	
Fan Sheave Size	-	
Fan Sheave Bore	-	
Belt CL Distance	-	
Num of Belts	-	
Belt Size	-	

Test Data		
	Design	**Actual**
CFM	1500	1497
Fan RPM	2411	1093
Fan Rotation	-	CCW
Motor RPM	-	1093
RL Voltage	-	102.2/102.7/102.4
RL Amperage	-	1.9 AVG
Suction ESP	-	-0.70”
Discharge ESP	-	ATM
Total ESP	2.337"	0.70”

Completed By: Tyler Youells

Notes:FAN SPEED SETPOINT: 38HZ

Asset	Notes

National TAB

Project: 05-16 CULVERS - SHELBYVILLE, IN

System/Unit: FAN - Exhaust

Comfort. Under control.

Asset: PRV3 AREA:HD2 FRYER

Unit Data		
	Design	**Actual**
MFG	ACCUREX	CAPTIVE AIRE
Model Num	XRUB-140-7	DU85HFA
Serial Num	-	5146053
Type	-	UPBLAST
Configuration	-	VERTICAL

Motor Data		
	Design	**Actual**
Motor MFG	-	HSSA
Frame	-	NL
Horsepower	-	0.75
Motor Rpm	-	1725
Phase	-	34
Voltage (rated)	-	208
Amperage (rated)	-	2.6
Service Factor	-	1.15

Drive Data		
	Design	**Actual**
Motor Sheave Size	-	
Motor Bore Size	-	
Motor Sheave SetPt	-	
Fan Sheave Size	-	
Fan Sheave Bore	-	
Belt CL Distance	-	
Num of Belts	-	
Belt Size	-	

Test Data		
	Design	**Actual**
CFM	-	1628
Fan RPM	-	1147
Fan Rotation	-	CCW
Motor RPM	-	1147
RL Voltage	-	104.2/104.5/104.3
RL Amperage	-	2.1 AVG
Suction ESP	-	-0.72”
Discharge ESP	-	ATM
Total ESP	-	0.72”

Completed By: Tyler Youells

Notes:FAN SPEED SETPOINT: 39.9HZ

Asset	Notes

National TAB

Project: 05-16 CULVERS - SHELBYVILLE, IN

System/Unit: Kitchen Hood Type I

Comfort. Under control.

Asset: HD1 AREA:GRIDDLE

Unit Data		
	Design	**Actual**
MFG	ACCUREX	CAPTIVE AIRE
Model Num	XGEP-64-S	3347 BD-2
Job / Serial Num	-	5146053
Type	TYPE I LOW PROXIMITY	TYPE I LOW PROXIMITY
Hood length	64"	66"
Hood Width	23"	32"

Performance Data		
	Design	**Actual**
Smoke Generation Type	-	45 SEC SMOKE
Hood Capture %	-	100%
End Panels Installed (Y/N)	-	45 DEG PANELS

General		
	Design	**Actual**
Third Party Witness	-	TROY
Third Party Company	-	MCCON
Tech Witness	-	TYLER/NTAB

Test Data Exhaust		
	Design	**Actual**
Filter Type	GREASE GRABBER	CAPTRATE SOLO
Filter Size 1	16X16	16X16
Filter Size 2	-	
Filter Qty 1	4	4
Filter Qty 2	-	
Filter AK factor size 1	1.53	1.62
Filters AK factor size 2	-	
Filter Total AK Area	6.12	6.48
Filter1 FPM	-	223
Filter2 FPM	-	239
Filter3 FPM	-	228
Filter4 FPM	-	236
Filter5 FPM	-	
Filter6 FPM	-	
Filter7 FPM	-	
Filter8 FPM	-	
Filter9 FPM	-	
Filter10 FPM	-	
Filter11 FPM	-	
Filter12 FPM	-	
Filter Ave FPM(corr)	-	231
CFM	-	1497

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

Completed By: Tyler Youells

Notes:

Asset	Notes

National TAB

Project: 05-16 CULVERS - SHELBYVILLE, IN

System/Unit: Kitchen Hood Type I

Comfort. Under control.

Asset: HD2 AREA:FRYER

Unit Data		
	Design	**Actual**
MFG	ACCUREX	CAPTIVE AIRE
Model Num	XXEP-83-S	3347 BD-2
Job / Serial Num	-	5146053
Type	TYPE I LOW PROXIMITY	TYPE I LOW PROXIMITY
Hood length	83"	84"
Hood Width	23"	33"

Test Data Exhaust		
	Design	**Actual**
Filter Type	XTRACTOR	CAPTRATE SOLO
Filter Size 1	16X16	16X16
Filter Size 2	-	
Filter Qty 1	5	5
Filter Qty 2	-	
Filter AK factor size 1	1.53	1.62
Filters AK factor size 2	-	
Filter Total AK Area	7.65	8.1
Filter1 FPM	-	204
Filter2 FPM	-	199
Filter3 FPM	-	213
Filter4 FPM	-	197
Filter5 FPM	-	194
Filter6 FPM	-	
Filter7 FPM	-	
Filter8 FPM	-	
Filter9 FPM	-	
Filter10 FPM	-	
Filter11 FPM	-	
Filter12 FPM	-	
Filter Ave FPM(corr)	-	201
CFM	-	1628

Cooking Equipment		
	Design	**Actual**
Item 1	-	4 BAT FRYERS
Item 2	-	

Performance Data		
	Design	**Actual**
Smoke Generation Type	-	45 SEC SMOKE
Hood Capture %	-	90%
End Panels Installed (Y/N)	-	CORNER PANELS

General		
	Design	**Actual**
Third Party Witness	-	TROY
Third Party Company	-	MCCON
Tech Witness	-	TYLER/NTAB

Completed By: Tyler Youells

Notes:THERE IS SMOKE ESCAPING TO THE LEFT SIDE, NTAB VERIFIED ALL DIFFUSERS WERE CORRECT FLOW, ALL EQUIPMENT IS IN PLACE AND ON. INCREASED FAN TO 110% OF DESIGN. PUTTING A MOCK END PANEL INCREASED HOOD CAPTURE TO 100%.

Asset	Notes

STACK THERMOSTATS VERTICAL
COORDINATE LOCATION W/ P.O.S.
SYSTEM COMPONENTS

4" DRYER EXHAUST TO HOODED WALL CAP w/ BACKDRAFT DAMPER. PAINT WALL CAP TO MATCH EXTERIOR.

TRANSFER GRILLES CENTERED ABOVE DOOR, AND BETWEEN DOOR AND CEILING.

RTU-1 REMOTE SENSOR AT 56" AFF

RTU-2 REMOTE SENSOR AT 56" AFF

KEEP AREA CLEAR FOR ACCESS ABOVE CEILING TO SPACE OVER WALK-INS

DUMPSTER EN

DRIVE-THRU SERVICE 104
DRINKS & CONDIMENTS 102
ENTRY 103
SUNDAE SERVICE 111
PREP AREA 114
MOP ROOM 118
OFFICE 117
UTILITY ROOM 115
DINING 101
KITCHEN 112
DRY GOODS 113
DISHWASHING 116
CUSTOMER ORDER AREA 105
CUSTOMER SERVICE 110
HALL 109
WOMEN 108
MEN 107
ENTRY 106
TOILET 119
COOLER
FREEZER
PATIO

1-1 SD-1 6" NECK 150 CFM
1-2 SD-4 6" NECK 150 CFM
1-3 SD-4 8" NECK 150 CFM
1-4 SD-1 12" NECK 450 CFM
1-5 SD-1 8" NECK 150 CFM
1-6 SD-1 8" NECK 150 CFM
1-7 SD-1 8" NECK 150 CFM
1-8 SD-1 8" NECK 150 CFM
1-9 SD-1 8" NECK 150 CFM
1-10 SD-1 8" NECK 150 CFM
1-11 SD-1 8" NECK 150 CFM
1-12 SD-1 8" NECK 150 CFM
1-13 SD-1 8" NECK 150 CFM
1-14 SD-1 8" NECK 150 CFM
1-15 SD-1 8" NECK 150 CFM
1-16 SD-1 8" NECK 150 CFM
1-17 SD-1 8" NECK 150 CFM
1-18 SD-1 8" NECK 150 CFM
1-19 SD-1 8" NECK 150 CFM
1-20 SD-1 10" NECK 300 CFM
1-21 SD-1 8" NECK 150 CFM
1-22 SD-1 12" NECK 450 CFM
1-23 SD-1 10" NECK 350 CFM
1-24 SD-1 10" NECK 350 CFM
1-25 SD-1 10" NECK 350 CFM
1-26 SD-1 10" NECK 350 CFM
1-27 SD-1 12" NECK 500 CFM
1-28 SD-1 10" NECK 200 CFM

2-1 SD-1 12" NECK 600 CFM
2-2 SD-1 12" NECK 600 CFM
2-3 SD-5 10" NECK 200 CFM
2-4 SD-5 12" NECK 375 CFM
2-5 SD-5 12" NECK 400 CFM
2-6 SD-5 12" NECK 400 CFM
2-7 SD-5 10" NECK 250 CFM
2-8 SD-5 10" NECK 275 CFM
2-9 SD-1 6" NECK 75 CFM
2-10 SD-5 8" NECK 125 CFM
2-11 SD-5 12" NECK 350 CFM
2-12 SD-5 12" NECK 350 CFM
2-13 SD-5 12" NECK 350 CFM
2-14 SD-1 12" NECK 600 CFM
2-15 SD-1 12" NECK 600 CFM
2-16 SD-1 12" NECK 600 CFM

RG-1 22x22 NECK 1230 CFM
RG-1 22/22 NECK 615 CFM
EF-1A 75 CFM
(2)TG-1 16x16 NECK 200 CFM
TG-1 10x10 NECK 150 CFM
EG-1 150 CFM
EG-1 75 CFM
SD-3 8" NECK 150 CFM
SD-4 8" NECK 150 CFM
PRV-1
PRV-2
PRV-3
RTU-1 ON ROOF
RTU-2 ON ROOF
RTU-1 REMOTE SENSOR AT 56" AFF

PRV1-1
PRV1-2
PRV1-3

E5 HVAC PLAN

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

DRIVE-THRU
LEFT SIDE
FRONT
SEE SITE PLAN FOR NORTH ORIENTATION
REAR
RIGHT SIDE
MAIN ENTRY

NOTE: ALL DUCTWORK TO BE LOCATED IN TRUSS SPACE WHERE POSSIBLE. SEE FRAMING PLAN.