Report By:

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

Report: TAB REPORT

Function: Test, Adjust, & Balance

Date: 12/10/2024

Completed By: National TAB

PROJECT

12-09-24 CULVERS PRINCETON, MN

200 19th Ave N

Princeton , MN 55371

Client

Captive-Aire Region #60

National TAB

Project: 12-09-24 CULVERS PRINCETON, MN

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Project Summary

The summary below provides a quick understanding of our scope of work and general testing procedures. Enclosed in the report is further detail about your building performance including recommendations, asset data, and pictures. Our focus is to work with the trades to remedy any issues or deficiencies during the actual field balancing and not after the balancing has occurred to achieve a positive environment and outcome. The level of success is determined by the availability of the trades, possible parts needed, or time constraints.

RTU's (Roof Top Units)
Each of the RTU's were measured at their terminal devices or via traverse to establish a total flow for that unit. Each RTU was adjusted to within tolerance of the engineer's design flow. Each outlet was then adjusted to within tolerance of the design flow. Outside air was measured by reading the intake air opening with a velocity grid and multiplying by the free area. The outside air damper was adjusted until the airflow was within the design requirements. Any equipment that fell outside of that tolerance is noted throughout the report.

Kitchen Exhaust Hood & Associated Fans
Each kitchen exhaust fan was measured at the hood filter bay utilizing a velocity matrix and a manufacturer's correction factor. Each filter velocity is multiplied by the manufacturer's corrected area. The sum of these readings equals the total flow of the exhaust fans. The total flow of the exhaust was then adjusted to within tolerance of the design flow.

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 tolerance of design. Each terminal device was balanced to within tolerance of the design volume using the installed volume dampers. Any equipment that fell outside of this tolerance is noted throughout the report.

Final Building Tests
After completing the test and balance the final building pressure was measured. It was confirmed that the building pressure fell within acceptable tolerances of -0.02" wc to +0.02" wc and that the pressure measurement coincides with the actual and design net airflow. Any deviations from these standards are noted throughout the report.
The hood capture was tested at the perimeter of the hood and the cook top level with the equipment heat on to ensure satisfactory hood capture and containment.

Issue List

- PRV-2: Electrical Conduit Length
- RTU-2: Diffuser / Return Locations

12-09-24 CULVERS PRINCETON, MN

Project Issue Information

Issue Name : PRV-2: Electrical Conduit Length

Description : When fan is leaned back, electrical conduit is completely tight and prevents fan from fully Leaning back. This will likely lead to damage when fans are cleaned. Recommend conduit is lengthened.

Created By : National TAB

Assigned To : National TAB - Dan Hertenstein

Status : Open

Priority : Medium

Asset Tag :

Originated Date : 12/09/2024 - Michael McDonnell - National TAB

Project Issue File Details

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Project Issue Information

Issue Name : RTU-2: Diffuser / Return Locations

Description : Cookline Diffuser 1-7 is not in correct position per plans. It's important cookline diffusers are installed per plan for hood capture. Additionally, a return is out of location and positioned immediately to right of hood. Recommend diffusers and grilles are installed per plan.

Created By : National TAB

Assigned To : National TAB - Dan Hertenstein

Status : Open

Priority : Medium

Asset Tag :

Originated Date : 12/09/2024 - Michael McDonnell - National TAB

Project Issue File Details

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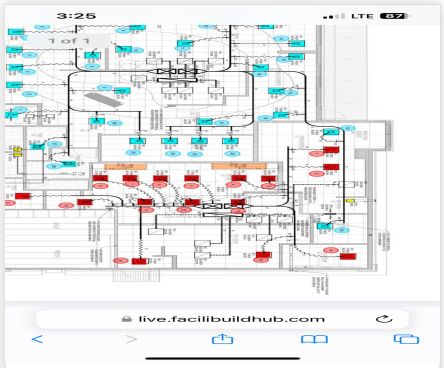

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- Open BALANCE_SCHEDULE_LARGE_JOBS.xlsx

CheckList List

- 01: RTUs/AHUs
- 02.EXHAUST FANS
- 03.HOOD 1
- 04.HOOD 2
- 05.FINAL TEST

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CheckList Information

Name :	01: RTUs/AHUs	**Status :**	Not Completed
Assigned Organization :	National TAB	**Asset :**	
Requesting Organization :	National TAB		
Created Date :	12/05/2024 - Wale Odofin - National TAB		

CheckList Item Details

RTU's/AHU's

Thermostats installed and have power?	Pass
Comment:	
All diffusers and grilles are installed and match design?	Pass
Comment: Locations do not match design on the cookline, see ISSUE.	
Cookline diffusers have at 12-18" of straight duct out of the top of the diffusers and a rigid 90 degree fitting?	Pass
Comment:	
Economizers are assembled and functional?	Pass
Comment:	
Motors are all operating below the FLA rating?	Pass
Comment:	
Are belts tight?	N/A
Comment:	
If direct drive unit is the speed controller working?	Pass

Comment:

Is gas piping installed and valves turned on?	Pass

Comment:

Unit free of noticeable noise and vibration	Pass

Comment:

Notes/Comments :

[1] OA damper positions lower than typical.

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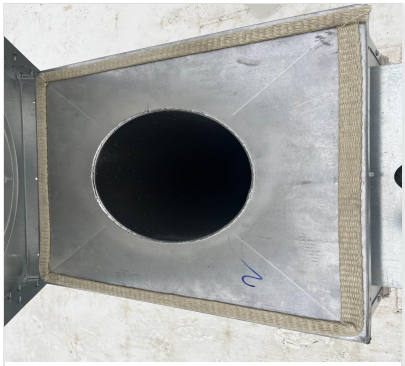
CheckList Information

Name :	02.EXHAUST FANS	**Status :**	Not Completed
Assigned Organization :	National TAB	**Asset :**	
Requesting Organization :	National TAB		
Created Date :	12/05/2024 - Wale Odofin - National TAB		

CheckList Item Details

EF's

Rotation is correct?	Pass
Comment:	
Belts are tight?	N/A
Comment: Fans are direct drive.	
Hinge kit installed installed on hood fan?	Pass
Comment:	
Lean fan back. Is grease duct installation adequate and is duct ran all the way to the base of the fan?	Pass
Comment:	



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Flex conduit is long enough so that fan can be completely tilted back?	Fail
Comment: PRV-3 (griddle) conduit needs to be lengthened, see issue.	
There is no major leakage around base of fan?	Pass
Comment:	
Is the motor operating below the motor FLA rating?	Pass
Comment:	
For restroom fan(s) is the back draft damper installed and can it fully open?	Pass
Comment:	

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Unit free of noticeable noise and vibration?	Pass

Comment:

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CheckList Information

Name :	03.HOOD 1	**Status :**	Not Completed
Assigned Organization :	National TAB	**Asset :**	
Requesting Organization :	National TAB		
Created Date :	12/05/2024 - Wale Odofin - National TAB		

CheckList Item Details

HD-1

Is the hood powered and free of alarms?	Pass
Comment:	
Does hood label match submittal?	Pass
Comment:	
Do hood dimensions match submittal?	Pass
Comment:	
Is the hood hung Level?	Pass
Comment:	
Are hood lights installed and are they powered?	Pass
Comment:	
Are temperature Sensors installed?	Pass
Comment:	
Are the correct number and size of filters installed, and are they installed correctly?	Pass

Comment:

Is the grease cup installed?	Pass

Comment:

Document any other issues or discrepancies.

Comment:

none

HOOD CAPTURE TEST

List equipment turned on for testing:

Comment:

Fryer

Smoke Test Capture - Perimeter of Hood

Comment:

100%

Smoke Test Capture - Top of Cooking Surface

Comment:

100%

List smoke candle used:

Comment:

45 second smoke emitter

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CheckList Information

Name :	04.HOOD 2	**Status :**	Not Completed
Assigned Organization :	National TAB	**Asset :**	
Requesting Organization :	National TAB		
Created Date :	12/05/2024 - Wale Odofin - National TAB		

CheckList Item Details

HD-2

Is the hood powered and free of alarms?	Pass
Comment:	
Does hood label match submittal?	Pass
Comment:	
Do hood dimensions match submittal?	Pass
Comment:	
Is the hood hung Level?	Pass
Comment:	
Are hood lights installed and are they powered?	Pass
Comment:	
Are temperature Sensors installed?	Pass
Comment:	
Are the correct number and size of filters installed, and are they installed correctly?	Pass

Comment:

Is the grease cup installed?	Pass

Comment:

Document any other issues or discrepancies.

Comment:

None

HOOD CAPTURE TEST

List equipment turned on for testing:

Comment:

Griddle

Smoke Test Capture - Perimeter of Hood

Comment:

100%

Smoke Test Capture - Top of Cooking Surface

Comment:

100%

List smoke candle used:

Comment:

45 second smoke emitter

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CheckList Information

Name :	05.FINAL TEST	**Status :**	Not Completed
Assigned Organization :	National TAB	**Asset :**	
Requesting Organization :	National TAB		
Created Date :	12/05/2024 - Wale Odofin - National TAB		

CheckList Item Details

FINAL CHECKS

When hoods are turned off, verify the economizers shut	Pass
Comment:	
When hoods are turned on, verify the economizers open to the minimum position	Pass
Comment:	
Is space free of drafting?	Pass
Comment:	
Is space comfortable in all areas?	Pass
Comment:	
Is the space free of ventilation noise?	Pass
Comment:	

HOOD CAPTURE TEST

List kitchen equipment turned on for testing	
Comment:	
Fryer / Griddle	

List smoke candle type used

Comment:

45 second smoke emitter

Smoke test capture % - Perimeter of hood

Comment:

100%

Smoke test capture % - Top of cooking surface

Comment:

100%

WITNESS

Date test was completed 12/10/2024

Comment:

TAB tech name / Firm

Comment:

Michael McDonnell / National TAB

Site super name / Firm

Comment:

Justin / McCon

Owner representative name / Firm (if Applicable)

Comment:

NA

BUILDING PRESSURE

Do actual net building airflow, design net building airflow, and pressure coincide? If not why? (All three should either be positive or negative)

Comment:

0.007"

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Project: 12-09-24 CULVERS PRINCETON, MN

System/Unit: AHU/RTU

Asset: RTU1 AREA:DINIING

Unit Data		
	Design	**Actual**
MFG	CAPTIVEAIRE	CAPTIVEAIRE
Serial Num	-	6938827
Model Num	CAS-HVAC1.400-24-20T	CAS-HVAC1.400-24-20T
Type	RTU	DOAS
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	4
OA Filter Size 1	-	
Num Final Filter 1	-	8
Final Filter Size 1	-	

Motor Data		
	Design	**Actual**
Motor MFG	-	TECO WESTINGHOUSE
Frame	-	215T
Horsepower	-	10.0
Motor Rpm	-	1755
Phase	3	3
Rated Voltage	208	230
Rated Amperage	-	24.3

Test Data		
	Design	**Actual**
SF CFM	6150	6167
SF RPM	-	1641
RA CFM	4400	
OA CFM	1750	
RL Voltage	-	183V @VFD
RL Amperage	-	22.6 @VFD
SF Rotation	-	CCW, CORRECT
SF System SetPt	-	56.1 HZ
RA Damper Position	-	MECHANICALLY LINKED
Min OA Damper Position	-	
Min OA Damper Type	-	ECONOMIZER

Performance Data		
	Design	**Actual**
MA Plenum SP	-	
Fan Suction SP	-	
Fan Discharge SP	-	
Total ESP	0.75"	
Fan Total SP	-	

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

Unit Data - PHOTO LOG

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AHU/RTU

Diffuser Supply (GRD)

RTU1/DINIING

Asset									
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**	**FINAL CFM**	**% to design**
SGRD1	ENTRY	SD3	8"	150	1.0	318	166	163	108.7
SGRD2	DINING	SD1	8"	150	1.0	263	188	161	107.3
SGRD3	DINING	SD1	8"	150	1.0	220	134	138	92.0
SGRD4	DINING	SD1	8"	150	1.0	166	109	139	92.7
SGRD5	DINING	SD1	8"	150	1.0	157	140	161	107.3
SGRD6	DINING	SD1	8"	150	1.0	60	183	164	109.3
SGRD7	DINING	SD1	8"	150	1.0	177	149	154	102.7
SGRD8	DINING	SD1	8"	150	1.0	143	175	160	106.7
SGRD9	DINING	SD1	8"	150	1.0	145	169	165	110.0
SGRD10	DINING	SD1	8"	150	1.0	196	185	163	108.7
SGRD11	DINING	SD1	8"	150	1.0	276	354	139	92.7
SGRD12	DINING	SD1	8"	150	1.0	164	279	159	106.0
SGRD13	DINING	SD1	8"	150	1.0	200	297	165	110.0
SGRD14	DINING	SD1	8"	150	1.0	249	320	147	98.0
SGRD15	DINING	SD1	8"	150	1.0	207	261	140	93.3
SGRD16	DINING	SD1	8"	150	1.0	154	238	157	104.7
SGRD17	DRINKS	SD1	10"	300	1.0	187	294	318	106.0
SGRD18	ENTRY	SD1	8"	150	1.0	110	175	139	92.7
SGRD19	SUNDAE	SD1	12"	500	1.0	224	344	455	91.0
SGRD20	OFFICE	SD1	10"	200	1.0	90	431	184	92.0
SGRD21	CUST.ORD	SD1	12"	450	1.0	277	318	438	97.3
SGRD22	CUST. SERV	SD1	10"	350	1.0	200	302	354	101.1
SGRD23	CUST. SERV	SD1	10"	350	1.0	199	320	345	98.6
SGRD24	CUST. SERV	SD1	10"	350	1.0	216	384	366	104.6
SGRD25	CUST. SERV	SD1	10"	350	1.0	405	562	356	101.7
SGRD26	HALL	SD1	12"	450	1.0	354	146	458	101.8
SGRD27	RR	SD4	8"	150	1.0	102	135	138	92.0
SGRD28	RR	SD4	8"	150	1.0		154	141	94.0
Total				6150		5459	6912	6167	100.28%

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Project: 12-09-24 CULVERS PRINCETON, MN

System/Unit: AHU/RTU

Asset: RTU2 AREA:KITCHEN

Unit Data		
	Design	**Actual**
MFG	CAPTIVEAIRE	CAPTIVEAIRE
Serial Num	-	6938827
Model Num	CAS-HVAC1.300-24-20T	CAS-HVAC1.300-24-20T
Type	RTU	DOAS
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	4
OA Filter Size 1	-	16X25X2
Num Final Filter 1	-	8
Final Filter Size 1	-	20X25X2

Motor Data		
	Design	**Actual**
Motor MFG	-	TECO WESTINGHOUSE
Frame	-	215T
Horsepower	-	10.0
Motor Rpm	-	1755
Phase	3	3
Rated Voltage	208	230
Rated Amperage	-	24.3

Test Data		
	Design	**Actual**
SF CFM	6150	
SF RPM	-	
RA CFM	4450	
OA CFM	1700	
RL Voltage	-	
RL Amperage	-	
SF Rotation	-	
SF System SetPt	-	
RA Damper Position	-	
Min OA Damper Position	-	
Min OA Damper Type	-	
OA Enthalpy Setpt	-	

Performance Data		
	Design	**Actual**
MA Plenum SP	-	
Fan Suction SP	-	
Fan Discharge SP	-	
Total ESP	0.75"	
Fan Total SP	-	

General	
	Actual
Fan Rotation Correct	
Unit Filters Clean	
Condensate Drain Installed	

Unit Data - PHOTO LOG

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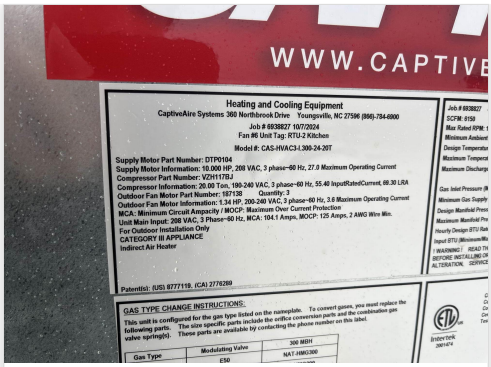

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Project:12-09-24 CULVERS PRINCETON, MN

AHU/RTU

Diffuser Supply (GRD)

RTU2/KITCHEN

Asset									
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**	**FINAL CFM**	**% to design**
SGRD1	SUNDAE	SD1	12"	600	1.0	432			-
SGRD2	SUNDAE	SD1	12"	600	1.0	397			-
SGRD3	KITCHEN	SD5	12"	200	1.0	159			-
SGRD4	KITCHEN	SD5	12"	375	1.0	383			-
SGRD5	KITCHEN	SD5	12"	400	1.0	429			-
SGRD6	KITCHEN	SD5	12"	400	1.0	345			-
SGRD7	KITCHEN	SD5	10"	250	1.0	361			-
SGRD8	KITCHEN	SD5	10"	275	1.0	434			-
SGRD9	TOILET	SD1	6"	75	1.0	128			-
SGRD10	HALL	SD5	8"	125	1.0	196			-
SGRD11	KITCHEN	SD5	12"	350	1.0	752			-
SGRD12	KITCHEN	SD5	12"	350	1.0	515			-
SGRD13	KITCHEN	SD5	12"	350	1.0	60			-
SGRD14	UTILITY RM.	SD1	12"	600	1.0	635			-
SGRD15	DRY GOODS	SD1	12"	600	1.0	335			-
SGRD16	DRY GOODS	SD1	12"	600	1.0	460			-
Total				6150		6021	0	0	0%

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Project: 12-09-24 CULVERS PRINCETON, MN

System/Unit: FAN - Exhaust

Asset: EFA1 AREA:

Unit Data		
	Design	**Actual**
MFG	CAPTIVEAIRE	CAPTIVEAIRE
Model Num	CFA 100CA	CFA 100CA
Serial Num	-	6938827
Type	CEILING	CEILING
Configuration	VERTICAL	VERTICAL

Motor Data		
	Design	**Actual**
Motor MFG	-	BROAN
Horsepower	-	0.116
Motor Rpm	-	640
Phase	1	1
Voltage (rated)	115	115
Amperage (rated)	-	1.1

Test Data		
	Design	**Actual**
CFM	75	81
Fan RPM	493	DD
Fan Rotation	-	CCW, CORRECT
Motor RPM	-	DD
System SetPt	-	SINGLE SPEED

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System/Unit: FAN - Exhaust

Asset: PRV1 AREA:

Unit Data		
	Design	**Actual**
MFG	CAPTIVEAIRE	CAPTIVEAIRE
Model Num	DR12HFA	DR12HFA
Serial Num	-	693
Type	DOWNBLAST	DOWNBLAST
Configuration	VERTICAL	VERTICAL

Motor Data		
	Design	**Actual**
Motor MFG	-	TELCO GREEN
Horsepower	-	0.25
Motor Rpm	-	1800
Phase	1	1
Voltage (rated)	115	115
Amperage (rated)	-	2.9

Test Data		
	Design	**Actual**
CFM	375	372
Fan RPM	1369	988
Fan Rotation	-	CCW, CORRECT
Motor RPM	-	988
System SetPt	-	46%
RL Voltage	-	NR [1]
RL Amperage	-	NR [1]
Total ESP	0.50"	0.18"
Fan Inlet SP	-	-0.18"
Fan Discharge SP	-	ATM

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Unit Data - PHOTO LOG

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FAN - Exhaust

Diffuser Ret/Exh (GRD)

PRV1/

Asset									
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**	**FINAL CFM**	**% to design**
EGRD1	M RR	EG1	8X8	150	1.0	195	143	147	98.0
EGRD2	W RR	EG1	8X8	150	1.0	234	180	144	96.0
EGRD3	TOILET	EG1	8X8	75	1.0	250	110	81	108.0
Total				375		679	433	372	99.2%

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Project: 12-09-24 CULVERS PRINCETON, MN

System/Unit: FAN - Exhaust

Asset: PRV2 AREA:HD-1 FRYER

Unit Data		
	Design	**Actual**
MFG	CAPTIVEAIRE	CAPTIVEAIRE
Model Num	CFA 100CA	DU85HFA
Serial Num	-	6938827
Type	UPBLAST	UPBLAST
Configuration	VERTICAL	VERTICAL

Motor Data		
	Design	**Actual**
Motor MFG	-	TELCO GREEN
Horsepower	-	1.0
Motor Rpm	-	1800
Phase	1	1
Voltage (rated)	115	115
Amperage (rated)	-	11.6

Test Data		
	Design	**Actual**
CFM	1500	1559
Fan RPM	1406	1176
Fan Rotation	-	CCW, CORRECT
Motor RPM	-	1176
System SetPt	-	59%
RL Voltage	-	117
RL Amperage	-	3.4
Total ESP	1.412	0.81"
Fan Inlet SP	-	-0.81"
Fan Discharge SP	-	ATM

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Unit Data - PHOTO LOG

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Project: 12-09-24 CULVERS PRINCETON, MN

System/Unit: FAN - Exhaust

Asset: PRV3 AREA:

Unit Data		
	Design	**Actual**
MFG	CAPTIVEAIRE	CAPTIVEAIRE
Model Num	CFA 100CA	DU85HFA
Serial Num	-	6938827
Type	UPBLAST	UPBLAST
Configuration	VERTICAL	VERTICAL

Motor Data		
	Design	**Actual**
Motor MFG	-	TELCO GREEN
Horsepower	-	1.0
Motor Rpm	-	1800
Phase	1	1
Voltage (rated)	115	115
Amperage (rated)	-	11.6

Test Data		
	Design	**Actual**
CFM	1500	1542
Fan RPM	1348	1238
Fan Rotation	-	CCW, CORRECT
Motor RPM	-	1238
System SetPt	-	62%
RL Voltage	-	117
RL Amperage	-	3.5
Total ESP	1.25"	1.04"
Fan Inlet SP	-	-1.04"
Fan Discharge SP	-	ATM

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Unit Data - PHOTO LOG

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Project: 12-09-24 CULVERS PRINCETON, MN

System/Unit: Kitchen Hood Type I

Asset: HD1 AREA:

Unit Data		
	Design	**Actual**
MFG	CAPTIVEAIRE	CAPTIVEAIRE
Model Num	3347BD-2	3347BD-2
Job / Serial Num	-	7095328
Type	TYPE I	TYPE I
Hood length	84"	84"
Hood Width	33"	33"

Test Data Exhaust		
	Design	**Actual**
Filter Type	SOLO FILTER	SOLO FILTER
Filter Size 1	16X16	16X16
Filter Qty 1	5	5
Filter AK factor size 1	1.53	1.53
Filter Total AK Area	7.65	7.65
Filter1 FPM	-	208
Filter2 FPM	-	210
Filter3 FPM	-	195
Filter4 FPM	-	200
Filter5 FPM	-	206
Filter Ave FPM(corr)	-	203.80
CFM	1500	1559

Cooking Equipment	
	Actual
Item 1	FRYER

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Unit Data - PHOTO LOG

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National TAB

Project: 12-09-24 CULVERS PRINCETON, MN

System/Unit: Kitchen Hood Type I

Asset: HD2 AREA:

Unit Data		
	Design	**Actual**
MFG	CAPTIVEAIRE	CAPTIVEAIRE
Model Num	3347BD-2	3347BD-2
Job / Serial Num	-	6938827
Type	TYPE I	TYPE I
Hood length	66"	66"
Hood Width	33"	33"

Test Data Exhaust		
	Design	**Actual**
Filter Type	SOLO FILTER	SOLO FILTER
Filter Size 1	16X16	16X16
Filter Qty 1	4	4
Filter AK factor size 1	1.53	1.53
Filter Total AK Area	6.12	6.12
Filter1 FPM	-	253
Filter2 FPM	-	243
Filter3 FPM	-	257
Filter4 FPM	-	255
Filter Ave FPM(corr)	-	252
CFM	1500	1542

Cooking Equipment	
	Actual
Item 1	GRIDDLE

Completed By: Michael McDonnell on 12/10/2024

Unit Data - PHOTO LOG

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