Report By:
National TAB
1126 Swift Street
Kansas City,MO 64116

NATIONAL TAB

Comfort. Under control.

Report: TAB REPORT
Function: Test, Adjust, & Balance
Date: 02/23/2023

PROJECT

02-20-23 SHAKE SHACK #1426 RANCHO CUCAMONG, CA (TAB, IAQ)

12456 NORTH MAINSTREET

RANCHO CUCAMONG, CA 91739

Client

(SMC) Shrader & Martinez Construction USA LLC
160 DRY CREEK RD

SEDONA, AZ 86336

CERTIFICATION

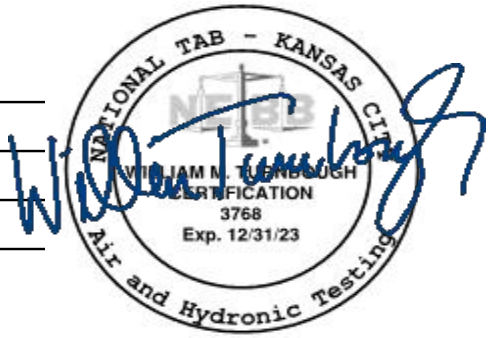
PROJECT: SHAKE SHACK #1426 RANCHO CUCAMONG, CA

The data presented in this report is a record of system measurements and final adjustments that have been obtained in accordance with the current edition of the NEBB Procedural Standard for Testing, Adjusting and Balancing of Environmental Systems. The measurements shown, and the information given, in this report are certified to be accurate and complete, at the time and date information was gathered. Any variances from design quantities, which exceed NEBB tolerances, are noted in the TAB report project summary.

NEBB TAB FIRM: National TAB - Kansas City
REGISTRATION NO: 3768
CERTIFIED BY: Will Turnbough
DATE: 1/3/2023

Submitted and Certified by:

NEBB TAB FIRM: National TAB - Kansas City
TAB PROFESSIONAL: Will Turnbough
REGISTRATION NO: CP-24289
CERTIFICATION EXP: 12/31/2023



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Project: 02-20-23 SHAKE SHACK #1426 RANCHO CUCAMONG, CA (TAB, IAQ)

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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.

FCU's w/ Diffusers

Each of the FCU'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 FCU was then adjusted to within tolerance of the specified design. Each terminal diffuser was balanced to within tolerance 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 within tolerance of the design flow. . Any EF's that fell outside of this tolerance is noted throughout the report.

MUA (Make Up Air Unit) w/ PSP

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 design tolerance. Any MUA's that fell outside of this tolerance is noted throughout the report.

General Exhaust Fans w/ Grilles

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.

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AIR BALANCE SCHEDULE

UNIT	AREA SERVED	HVAC SUPPLY		HVAC RETURN		HVAC OUTDOOR		OA %		HOOD MAKE-UP		HOOD EXHAUST		GENERAL EXH.	
		DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL
FC-1	DINING	2235	2277	1755	1790	480	487	21.5%	21.4%						
FC-2	BACK OF HOUS	1400	1365	1250	1220	150	145	10.7%	10.6%						
FC-3	KITCHEN	2235	2193	1985	1934	250	259	11.2%	11.8%						
MUA-1	KITCHEN									2205	2194				
KEF-1	HOODS											2756	2760		
EF-1	RESTROOM													250	248
TOTALS		5870	5835	4990	4944	880	891			2205	2194	2756	2760	250	248

NET BUILDING AIRFLOW CALCULATION

TOTALS	DESIGN	ACTUAL
TOTAL OA	3085	3085
TOTAL EXHAUST	3006	3008
NET AIRFLOW	79	77

DOOR TESTED	BUILDING PRESSURE MEASUREMENTS (IN. H20)
FRONT	0.0093
SIDE	-
REAR	0.0043
AVERAGE	**0.0068**

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. ✔

KITCHEN PRESSURIZATION (MUST BE NEGATIVE)

TOTALS	DESIGN	ACTUAL
TOTAL KITCHEN OA	2205	2194
TOTAL KITCHEN EXHAUST	3006	2760
NET AIRFLOW	-801	-566

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CheckList Information

Name :	SITE PICTURES	**Status :**	NotSubmitted
Assigned Organization :	National TAB	**Asset :**	
Requesting Organization :	National TAB		

CheckList Item Details

STORE FRONT

20230222_122643.jpg

FC-1

20230222_115912.jpg

FC-2

20230222_120219.jpg

FC-3

20230222_120208.jpg

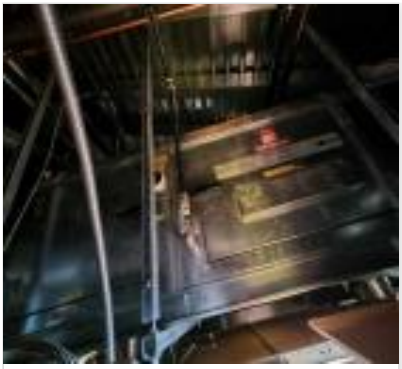
KEF 1

20230221_084403.jpg

EF-1

20230221_084351.jpg

MAU-1



20230222_120423.jpg

KEH-1

20230222_115920.jpg

KEH-2

20230222_115924.jpg

Notes/Comments :

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02-20-23 SHAKE SHACK #1426 RANCHO CUCAMONG, CA (TAB, IAQ)

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

Review Plan Review Checklist, has it been signed off and meets our standards to start balancing? If not contact processor to ensure job is ready.	YES
All diffusers and grilles are installed and match design?	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 :

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02-20-23 SHAKE SHACK #1426 RANCHO CUCAMONG, CA (TAB, IAQ)

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?	N/A
DCV Max damper opening position is set to minimum?	N/A
Free cooling enthalpy set point set for lowest setting (Typically "D")	N/A
Motors are all operating below the FLA rating?	YES
Are belts tight?	N/A
If direct drive unit is the speed controller working.	YES
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?	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
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?	NA
Internal motorized damper is fully opening?	YES
Motor is operating below the FLA rating?	YES
Unit free of noticeable noise and vibration?	NO, UNIT IS IN CEILING AND IS VERY LOUD IN SPACE.
HOODS	
Kitchen equipment installed in proper places?	YES
Can kitchen equipment be turned on for final smoke test?	NO
DOCUMENTATION	YES
Have trades/general contractor been notified about any issues and are they created on FaciliBuild?	YES

Notes/Comments :

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02-20-23 SHAKE SHACK #1426 RANCHO CUCAMONG, CA (TAB, IAQ)

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:

Are total flows for all equipment within +/-5% per Shake Shack standard? If not explanation is required	YES
Is space free of drafting?	YES
Is space comfortable in all areas?	YES
Is the space free of ventilation noise?	NO, MUA IS ABOVE CEILING AND VERY LOUD.
If deviations from design were necessary to resolve 1-3 what were they? Otherwise put "NA".	N/A

Notes/Comments :

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02-20-23 SHAKE SHACK #1426 RANCHO CUCAMONG, CA (TAB, IAQ)

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	NONE
List smoke candle type used	45 SECONDS
Smoke test capture - Perimeter of hood	100%
Smoke test capture - Top of cooking surface	100%
WITNESS	
Date test was completed	02/22/2023
TAB tech name / Firm	ZACK / NATIONAL TAB
Site super name / Firm	CHUCK / SHRADERMARTINEZ
Owner representative name / Firm (if Applicable)	N/A
Video taken of the smoke test?	YES
Building pressure at front & back doors (All Systems On)	0.0068"
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
Is the kitchen negative to the dining (use balance schedule sheet for calculation)?	YES

Thermostats are programmed?	YES

Notes/Comments :

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Project: 02-20-23 SHAKE SHACK #1426 RANCHO CUCAMONG, CA (TAB, IAQ)

System/Unit: AHU/RTU

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Asset: FC1 AREA:DINING AREA

Unit Data		
	Design	**Actual**
MFG	CARRIER/TOSHIBA	CARRIER/TOSHIBA
Serial Num	-	22600007
Model Num	MMD-AP0726HPUL	MMD-AP0721HP-UL1
Type	RTU	FCU
Configuration	VERTICAL	HORIZONTAL
Num OA Filters 1	-	N/A
OA Filter Size 1	-	N/A
Num Final Filter 1	-	2
Final Filter Size 1	-	18X25X2

Motor Data		
	Design	**Actual**
Phase	1	1
Rated Voltage	208	115
Rated Amperage	-	4.6

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

Test Data		
	Design	**Actual**
SF CFM	2235	2277
RA CFM	1755	1790
OA CFM	480	487
RL Voltage	-	120
RL Amperage	-	2.7
SF Rotation	-	CCW
Min OA Damper Position	-	90%
Min OA Damper Type	-	MANUAL

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.24"
Fan Suction SP	-	-0.69"
Fan Discharge SP	-	0.14"
Total ESP	1.0	0.38"
Fan Total SP	-	0.83"

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

Completed By: Zack Eismin

Notes:

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Diffuser Supply (GRD)

FC1/DINING AREA

Asset									
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**	**FINAL CFM**	**% to design**
SGRD1	DINING	SG1	10"X8"	335	1.40	251	339	339	101.2
SGRD2	DINING	SG1	10"X8"	335	1.40	390	350	350	104.5
SGRD3	DINING	SG1	10"X8"	335	1.40	378	341	341	101.8
SGRD4	DINING	SG1	10"X8"	335	1.40	302	334	334	99.7
SGRD5	DINING	SG1	10"X8"	335	1.40	414	345	345	103.0
SGRD6	DINING	SG1	10"X8"	335	1.40	343	341	341	101.8
SGRD7	RESTROOM	CD2	8"	115	1	119	117	117	101.7
SGRD8	RESTROOM	CD2	8"	115	1	109	110	110	95.7

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Project: 02-20-23 SHAKE SHACK #1426 RANCHO CUCAMONG, CA (TAB, IAQ)

System/Unit: AHU/RTU

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Asset: FC2 AREA:BACK OF HOUSE

Unit Data		
	Design	**Actual**
MFG	CARRIER/TOSHIBA	CARRIER/TOSHIBA
Serial Num	-	12200007
Model Num	MMD-AP0546HPUL	MMD-AP0546BHPUL
Type	RTU	FCU
Configuration	VERTICAL	HORIZONTAL
Num Final Filter 1	-	2
Final Filter Size 1	-	18X25X2

Motor Data		
	Design	**Actual**
Phase	1	1
Rated Voltage	208	120
Rated Amperage	-	2.85

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

Test Data		
	Design	**Actual**
SF CFM	1400	1365
RA CFM	1250	1220
OA CFM	150	145
RL Voltage	-	120
RL Amperage	-	2.1
SF Rotation	-	CCW
Min OA Damper Position	-	100%
Min OA Damper Type	-	MANUAL

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.11"
Fan Suction SP	-	-0.36"
Fan Discharge SP	-	0.15"
Total ESP	1.0	0.26"
Fan Total SP	-	0.51"

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

Completed By: Zack Eismin

Notes:

Diffuser Supply (GRD)

FC2/BACK OF HOUSE

Asset									
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**	**FINAL CFM**	**% to design**
SGRD1	CUSTARD RM.	CD1	10"	350	1	323	339	339	96.9
SGRD2	BOH	CD1	12"	525	1	487	511	511	97.3
SGRD3	BOH	CD1	12"	525	1	560	514	514	97.9

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Project: 02-20-23 SHAKE SHACK #1426 RANCHO CUCAMONG, CA (TAB, IAQ)

System/Unit: AHU/RTU

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Asset: FC3 AREA:OPEN KITCHEN

Unit Data		
	Design	**Actual**
MFG	CARRIER/TOSHIBA	CARRIER/TOSHIBA
Serial Num	-	22100018
Model Num	MMD-AP0726HPUL	MMD-AP0721HPUL
Type	RTU	FCU
Configuration	VERTICAL	HORIZONTAL
Num Final Filter 1	-	2
Final Filter Size 1	-	18X25X2

Motor Data		
	Design	**Actual**
Phase	1	1
Rated Voltage	208	120
Rated Amperage	-	4.6

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

Test Data		
	Design	**Actual**
SF CFM	2235	2193
RA CFM	1985	1934
OA CFM	250	259
RL Voltage	-	120
RL Amperage	-	2.9
SF Rotation	-	CCW
Min OA Damper Position	-	100%
Min OA Damper Type	-	MANUAL

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.14"
Fan Suction SP	-	-0.76"
Fan Discharge SP	-	0.22"
Total ESP	1.0	0.36"
Fan Total SP	-	0.98"

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

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Notes:

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Project:02-20-23 SHAKE SHACK #1426 RANCHO CUCAMONG, CA (TAB, IAQ)

AHU/RTU

Comfort. Under control.

Diffuser Supply (GRD)

FC3/OPEN KITCHEN

Asset									
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**	**FINAL CFM**	**% to design**
SGRD1	KITCHEN	CD1	NA	475	1	454	461	461	97.1
SGRD2	KITCHEN	CD1	NA	480	1	477	469	469	97.7
SGRD3	KITCHEN	CD1	NA	480	1	499	471	471	98.1
SGRD4	AC-PSP	NA	NA	800	5.72	791	792	792	99.0

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Project: 02-20-23 SHAKE SHACK #1426 RANCHO CUCAMONG, CA (TAB, IAQ)

System/Unit: FAN - Exhaust

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Asset: EF1 AREA:RESTROOM

Unit Data		
	Design	**Actual**
MFG	GREENHECK	COOK
Model Num	G-070-VG	90ACEH90C17DEC
Serial Num	-	138SJ64443
Type	DOWNBLAST	DOWNBLAST
Configuration	VERTICAL	VERTICAL

Motor Data		
	Design	**Actual**
Motor MFG	-	NL
Frame	-	NL
Horsepower	1/15	0.167
Motor Rpm	-	1725
Phase	1	1
Voltage (rated)	115	115

Test Data		
	Design	**Actual**
CFM	250	248
Fan RPM	1483	NA
Fan Rotation	-	CCW
System SetPt	-	100%
Total ESP	0.25"	0.17"
Fan Inlet SP	-	-0.17"
Fan Discharge SP	-	ATM

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Project:02-20-23 SHAKE SHACK #1426 RANCHO CUCAMONG, CA (TAB, IAQ)

FAN - Exhaust

Comfort. Under control.

Diffuser Ret/Exh (GRD)

EF1/RESTROOM

Asset									
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**	**FINAL CFM**	**% to design**
EGRD1	RESTROOM	EG1	8"	125	1	121	121	121	96.8
EGRD2	RESTROOM	EG1	8"	125	1	127	127	127	101.6

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Project: 02-20-23 SHAKE SHACK #1426 RANCHO CUCAMONG, CA (TAB, IAQ)

System/Unit: FAN - Exhaust

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Asset: KEF1 AREA:KITCHEN HOOD

Unit Data		
	Design	**Actual**
MFG	CAPTIVEAIRE	CAPTIVEAIRE
Model Num	DU180HFA	DU180HFA
Serial Num	-	5376350
Type	UPBLAST	UPBLAST
Configuration	VERTICAL	VERTICAL

Motor Data		
	Design	**Actual**
Motor MFG	-	NEMA
Frame	-	182T
Horsepower	3.0	3
Motor Rpm	-	1755
Phase	3	3
Voltage (rated)	460	230/460
Amperage (rated)	-	8.6/4.3
Service Factor	-	1.15

Test Data		
	Design	**Actual**
CFM	2756	2760
Fan RPM	1426	1424
Fan Rotation	-	CCW
Motor RPM	-	1424
System SetPt	-	36.8HZ
RL Voltage	-	481/480/478
RL Amperage	-	19./2.2/2.1
Total ESP	2.0	0.81"
Fan Inlet SP	-	-0.81"
Fan Discharge SP	-	ATM

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Project: 02-20-23 SHAKE SHACK #1426 RANCHO CUCAMONG, CA (TAB, IAQ)

System/Unit: FAN - Supply

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Asset: MUA1 AREA:

Unit Data		
	Design	**Actual**
MFG	CAPTIVEAIRE	CAPTIVEAIRE
Model Num	A1-D.250-16Z	A1-D.250-16Z
Serial Num	-	5376350
Type	MUA	MUA
Configuration	HORIZONTAL	HORIZONTAL

Motor Data		
	Design	**Actual**
Horsepower	3.4	3.4
Motor Rpm	-	3000
Phase	3	3
Voltage (rated)	460	460
Amperage (rated)	-	3.3
Service Factor	-	1.15

Gas Heat		
	Design	**Actual**
Inlet Air Temp SetPt	55	55
Discharge Air Temp SetPt	60	60
Air Flow Switch SP Actual	-	0.46"

Test Data		
	Design	**Actual**
CFM	2205	2194
SF RPM	2777	3000
Motor RPM	-	3000
SF System SetPt	-	100%
RL Voltage	-	481/481/482
RL Amperage	-	2.2/2.2/2.3

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

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Project: 02-20-23 SHAKE SHACK #1426 RANCHO CUCAMONG, CA (TAB, IAQ)

System/Unit: Kitchen Hood Type I

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Asset: KEH1 AREA:

Unit Data		
	Design	**Actual**
MFG	CAPTIVEAIRE	CAPTIVEAIRE
Model Num	5430ND2-ACPSP-F	5430ND-2
Job / Serial Num	-	5376350
Type	TYPE I	TYPE I
Hood length	95"	95"
Hood Width	54	54"
Supply Plenum Type	-	PERFORATED
Supply Plenum Width	107	107
Supply Plenum Length	22	22

Test Data Exhaust		
	Design	**Actual**
Filter Type	CAPTRATE SOLO	CAPTRATE SOLO
Filter Size 1	16X20	16X20
Filter Qty 1	5	5
Filter AK factor size 1	2.08	2.08
Filter Total AK Area	10.4	10.4
Filter1 FPM	-	130
Filter2 FPM	-	136
Filter3 FPM	-	137
Filter4 FPM	-	111
Filter5 FPM	-	125
Filter Ave FPM(corr)	-	127
CFM	1385	1329

Cooking Equipment		
	Design	**Actual**
Item 1	-	FLAT TOP GRILL

Hood Dedicated Make-Up Air		
	Design	**Actual**
Total AK Area	8	8
Kv factor (Vel)	0.87	0.87
Num of Readings	-	8
Reading1 FPM	-	138
Reading2 FPM	-	167
Reading3 FPM	-	157
Reading4 FPM	-	135
Reading5 FPM	-	157
Reading6 FPM	-	145
Reading7 FPM	-	169
Reading8 FPM	-	142
Ave FPM(corr)	-	151
CFM	1108	1053

Completed By: Zack Eismin

Notes: HOOD EXHAUST RISER VELOCITY= 665ft/m

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Project: 02-20-23 SHAKE SHACK #1426 RANCHO CUCAMONG, CA (TAB, IAQ)

System/Unit: Kitchen Hood Type I

Comfort. Under control.

Asset: KEH2 AREA:

Unit Data		
	Design	**Actual**
MFG	CAPTIVEAIRE	CAPTIVEAIRE
Model Num	5430ND2-ACPSP-F	5430ND2
Job / Serial Num	-	5376350
Type	TYPE I	TYPE I
Hood length	94"'	94"
Hood Width	54"	54"
Supply Plenum Type	-	PERFORATED
Supply Plenum Width	22"	22"
Supply Plenum Length	95'	95"

Test Data Exhaust		
	Design	**Actual**
Filter Type	CAPTRATE SOLO	CAPTRATE SOLO
Filter Size 1	16X20	16X20
Filter Qty 1	5	5
Filter AK factor size 1	2.08	2.08
Filter Total AK Area	10.4	10.4
Filter1 FPM	-	135
Filter2 FPM	-	152
Filter3 FPM	-	130
Filter4 FPM	-	129
Filter5 FPM	-	139
Filter Ave FPM(corr)	-	137
CFM	1371	1431

Cooking Equipment		
	Design	**Actual**
Item 1	-	FRYER

Hood Dedicated Make-Up Air		
	Design	**Actual**
Total AK Area	8	8
Kv factor (Vel)	0.87	0.87
Num of Readings	-	8
Reading1 FPM	-	171
Reading2 FPM	-	163
Reading3 FPM	-	152
Reading4 FPM	-	178
Reading5 FPM	-	158
Reading6 FPM	-	131
Reading7 FPM	-	181
Reading8 FPM	-	191
Ave FPM(corr)	-	164
CFM	1097	1141

Completed By: Zack Eismin

Notes: HOOD EXHAUST RISER VELOCITY= 716ft/m

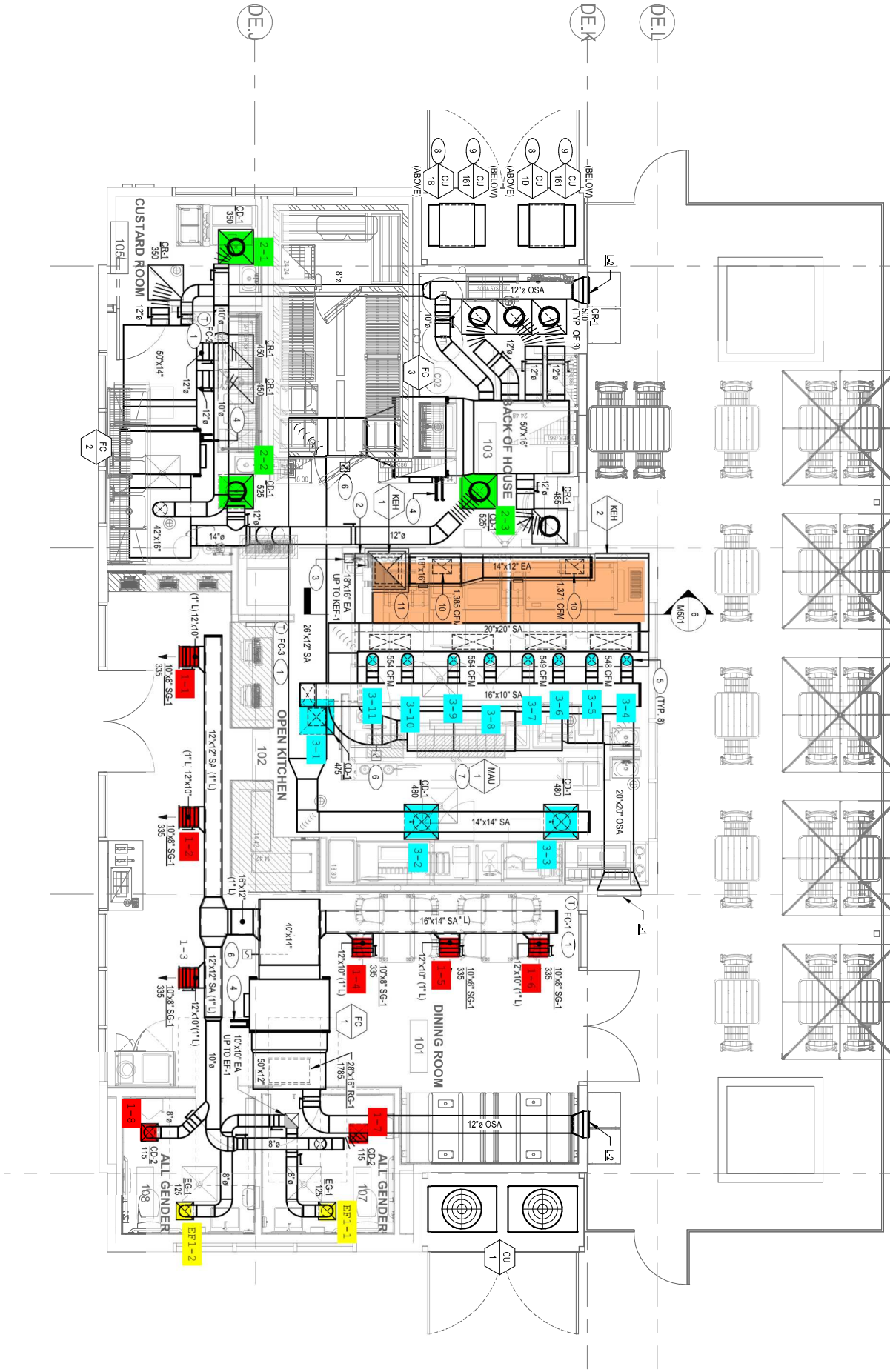
Abbreviation List

A = Area (ft^2)	S.F. = Service Factor
AHU = Air Handling Unit	SF = Supply Fan
A_k = Effective Area	SP = Static Pressure
BHP = Brake Horsepower (IP) HP	SR = Supply Register
Btu = British Thermal Unit	T = Temperature
Btu/h = Btuh = BTUH = BTU/Hour	T_{ma} = Mixed Air Temperature
CL = Center Distance (used in belt formula)	T_{oa} = Outside Air Temperature
CD = Ceiling Diffuser	T_{ra} = Return Air Temperature
CF = Correction Factor	H = Head (in wc, ft wc, psi)
CFM = Volumetric Flow: Cubic Feet Per Minute	h = Enthalpy
CO2 = Carbon Dioxide	HP = Horsepower
CO = Carbon Monoxide	hr = Hour
C_v = Flow Constant	K_v = Flow constant (SI)
d = Diameter (in.) IP	kW = Kilowatt = 1000 Watts
Δ = Difference or Change (Final - Initial)	LAT = Leaving Air Temperature
DB = Dry Bulb	lb = Pounds
EA = Exhaust Air	LWT = Leaving Water Temperature
EAT = Entering Air Temperature	ma = Mixed Air
EF = Exhaust Fan	MIN = Minimum
Eff = Efficiency	MAX = Maximum
EG = Exhaust Grille	N/A = Not Applicable
ESP = External Static Pressure	NA = No Access
EWT = Entering Water Temperature	NL = Not Listed
°F = Degrees Fahrenheit, °F	NPSHA = Net Positive Suction Head Available
FPB = Fan Powered Box	NS = Not Specified
FLA = Full Load Amps	OA = Outside Air
fpm = Feet per Minute (fpm)	OAT = Outside Air Temperature
ft = Foot	PD = Sheave Pitch Diameter
gal = Gallons	P.D. = Pressure Drop
GPM = Gallons Per Minute (GPM)	PF = Power Factor
h = Enthalpy (BTU/lb dry air)	SG = Supply Grille
P = Pressure	SR = Supply Register
ppm = parts per million	TP = Total Pressure
psi = Pounds Per Square Inch	T_{ra} = Return Air Temperature
psid = PSI Differential	TS = Tip Speed (fpm) IP, (m/s) SI
r = Radius (in)	TSP = Total Static Pressure
% $_{ra}$ = % of Return Air	V = Velocity
RA = Return Air	VAV = Variable Air Volume
RAT = Return Air Temperature	VD = Volume Damper
RF = Return Fan	VFD = Variable Frequency Drive
RG = Return Grille	W = Watt
RH = Relative Humidity	WB = Wet Bulb
RPM = Revolutions Per Minute	wg = wc = water gauge = water column
RTU = Roof Top Unit	WHP = Water Horsepower (IP)
SA = Supply Air	ω = Humidity Ratio

National TAB

Testing, Adjusting, and Balancing Equipment

Function		Range	Minimum Accuracy	Instrument Information	Calibration Date	Date Due
AIR	AIR PRESSURE	0 in wg to 10 in wg	2% +/- 0.001 in wg	TSI EBT731 EBT732117009	8/12/2022	8/12/2023
	AIR VELOCITY INSTRUMENT	50 fpm to 3900 fpm	+/- 5 % +/- 7 fpm	Evergreen Telemetry CH-15D 1600185	5/20/2022	5/20/2023
	DIRECT HOOD READING	100 cfm to 2000 cfm	+/- 5 % +/- 7 cfm	Evergreen Telemetry CH-15D 1600185	5/20/2022	5/20/2023
TEMPERATURE	AIR METER	-20 F to 240 F	+/- .5 % 2 F	Cooper SRH77A S/N 100516003	8/12/2022	8/12/2023
	AIR PROBE	-20 F to 240 F	+/- .5 % 2 F	Cooper SRH77A S/N 100516003	8/12/2022	8/12/2023
	IMMERSION METER	-20 F to 240 F	+/- .5 % 2 F	Cooper SRH77A S/N 100516003	8/12/2022	8/12/2023
	IMMERSION PROBE	-20 F to 240 F	+/- .5 % 2 F	Cooper SRH77A S/N 100516003	8/12/2022	8/12/2023
	CONTACT METER	-20 F to 240 F	+/- .5 % 2 F	Cooper SRH77A S/N 100516003	8/12/2022	8/12/2023
	CONTACT PROBE	-20 F to 240 F	+/- .5 % 2 F	Cooper SRH77A S/N 100516003	8/12/2022	8/12/2023
HUMIDITY	HUMIDITY PROBE	10 % RH to 90 % RH	3% of reading	Cooper SRH77A S/N 100516003	8/12/2022	8/12/2023
ELECTRICAL	VOLTAGE MEASUREMENT	0 VAC to 600 VAC	2 % reading +/- 5 digits	Fluke 323 S/N 35491023WS	8/11/2022	8/11/2023
	AMPERAGE MEASUREMENT	0 Amperers to 100 Amperes	2 % reading +/- 5 digits	Fluke 323 S/N 35491023WS	8/11/2022	8/11/2023
ROTATION	ROTATION MEASUREMENT	60 rpm to 5000 rpm	2 % reading 2 rpm	Shimpo DT 207Lp S/N D1690029R	8/11/2022	8/11/2023
HYDRONIC	PRESSURE MEASUREMENT	-30 in Hg to 200 psi	±2% of reading +/- 1 psi	Hydronic Manometer - Dwyer 490W-6-HKIT S/N: 359515093207912	8/12/2022	8/12/2023
	DIFFERENTIAL PRESSURE MEASUREMENT	0 psi - 80 psi	±2% of reading +/- 1 psi	Hydronic Manometer - Dwyer 490W-6-HKIT S/N: 359515093207912	8/12/2022	8/12/2023



Certification

WILLIAM MORSE TURNBOUGH

HAS MET ALL REQUIREMENTS FOR NEBB CERTIFIED PROFESSIONAL STATUS IN THE FOLLOWING DISCIPLINE

Testing, Adjusting and Balancing of Environmental Systems

This Certificate, as well as individual affiliation with a NEBB Certified Firm and associated NEBB Certification Stamp are REQUIRED to provide a NEBB Certified Report. Participation in the NEBB Quality Assurance Program requires the Certificant be affiliated with a NEBB Certified Firm

CP-24289

NEBB Certification Number

December 31, 2023

Expiration Date

NEBB President

NEBB President-Elect