Shake Shack

Store #1377 | Alderwood Mall
18800 Alderwood Wall Pkwy, Lynnwood, WA 98037

Submission of

Preliminary Test, Adjust and Balance Report

August 6, 2023

Architect:	Zebra Architecture, PLLC 14614 N Kierland Blvd, Ste N300, Scottsdale, AZ 85254
Engineer:	Henderson Engineers 8345 Lenexa Dr, Ste 300, Lenexa, KS 66214
General Contractor:	Wilcox Construction 2450 Lakeside Pkwy, Flower Mound, TX 75002
Mechanical Contractor:	Not Provided
TAB Management:	National TAB 9471 Sutton Place, Hamilton, OH 45011
NEBB Certified TAB Firm:	United Test & Balance, Inc. 7013 Flagler Rd, Nordland, WA 98358
NEBB Certification Number:	3753

Air Balance Summary

PROJECT: Shake Shack #1377
LOCATION: Lynnwood, WA
PROJECT #: 23290

DATE: 8/6/2023
CONTACT: Steve Burns

SYSTEM/UNIT: Air Balance Summary

Unit Design Data	
Design O/A + MUA CFM	3500
Design Exhaust CFM	3100
Design CFM Difference	400
Designed Pos or Neg	Positive

Test Data	
Actual O/A + MUA CFM	3651
Actual Exhaust CFM	3136
Actual CFM Difference	515
Building Set	Positive

Building	
Front Door DP (in wg)	0.0100
Back Door DP (in wg)	0.0200
Side Door 1 DP (in wg)	0.0100
Side Door 2 DP (in wg)	0.0200
Wind Conditions	Mild Winds

Air Balance Summary Equipment Summary

System/Unit	SA Des (CFM)	RA Des (CFM)	OA Des (CFM)	EA Des (CFM)	SA Act (CFM)	RA Act (CFM)	OA Act (CFM)	EA Act (CFM)
EF-01	0	0	0	300	0	0	0	310
KEF-01	0	0	0	700	0	0	0	713
KEF-02	0	0	0	700	0	0	0	699
KEF-03	0	0	0	700	0	0	0	707
KEF-04	0	0	0	700	0	0	0	707
REF-01 *	0	0	0	*2600	0	0	0	*1505
RTU-01	3100	2100	1000	0	3137	2086	1051	0
RTU-02	4700	2200	2500	0	4869	2269	2600	0
Totals:	-	-	**3500**	**3100**	-	-	**3651**	**3136**

Log: Air Balance Summary/REF-01 Fan is only for relief during economizer.

Report Certification

PROJECT: Shake Shack #1377
LOCATION: Lynnwood, WA
PROJECT #: 23290

Certification

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.

Submitted & Certified By

Firm Name

United Test & Balance, Inc.

NEBB Certification Number

3753

Expiration Date

12/31/2023

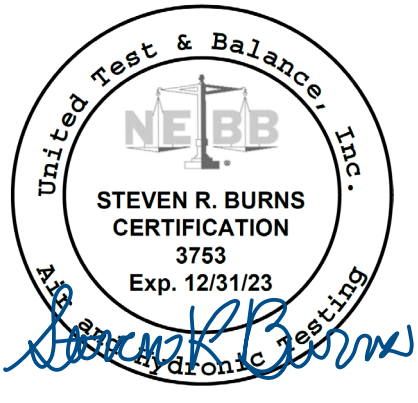
Certification Date

August 6, 2023

Signed & Sealed By

Certifying NEBB Certified TAB Professional

Steven Burns



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LOCATION: Lynnwood, WA
PROJECT #: 23290

DATE: 8/6/2023
CONTACT: Steve Burns

Report Summary/Remarks

PROJECT: Shake Shack #1377
LOCATION: Lynnwood, WA
PROJECT #: 23290

DATE: 8/6/2023
CONTACT: Steve Burns

Scope of Work

Includes

The Test and Balance (TAB) scope of work consist of 2 Rooftop Units (RTU), 1 Exhaust Fan (EF), 1 Relief Fan (REF), 4 Kitchen Exhaust Fans (KEF), and the associated inlets/outlets/hoods.

System Posturing & Remarks

Air Apparatus

The RTUs were set for design airflow and the associated supply outlets were balanced in full cooling demand. After the distribution systems were complete, the outside air value was measured and set. The Outside Air CFM was directly measured as noted. The Return Air CFM was derived from subtracting Outside Air CFM from Total Supply Air CFM. There was no access to the unit discharge in order to obtain a duct traverse. Total CFM was derived by the sum of the Outlet measurements. All final TAB settings and performance measurements were completed and data was recorded on to the appropriate test report forms.

Exhaust Fans

The exhaust fans were energized, measured and set for total airflow. The associated inlets were balanced as noted in this report. Total CFM was derived as noted on the individual test pages. Final settings and performance measurements were completed and data recorded on to the appropriate test report forms.

General Remarks

Remark 1

REF-01 is operating at 58% of design on high speed. There is flex on the inlet of the fan that is kinked, restricting the airflow.

Comment Log

The following page lists all project comments and issues. All items described and listed on the following Equipment Comment Log have been previously forwarded for resolution and have been accepted as reported.

Project Issue Report

PROJECT: Shake Shack #1377
LOCATION: Lynnwood, WA
PROJECT #: 23290

DATE: 8/6/2023
CONTACT: Steve Burns

Issue ID:	0003	Status:	Open	Issue Priority:	
Equipment:	REF-01				Created Date: 06-Aug-23
Issue Description:					
Fan is operating at 58% of design on high speed. There is flex on the inlet of the fan that is kinked, restricting the airflow.					
Issue Type:	Installation				
Role Assignment:	Mechanical Contractor				
Comments / Signature:					

Issue ID:	0002	Status:	Open	Issue Priority:	
Equipment:	REF-01				Created Date: 06-Aug-23
Issue Description:					
The REF is to operate when the DOAS go into economizer. There is currently no controls and the REF runs continuously.					
Issue Type:	Installation				
Role Assignment:	Mechanical Contractor				
Comments / Signature:					

Issue ID:	0001	Status:	Open	Issue Priority:	
Equipment:	RTU-01				Created Date: 06-Aug-23
Issue Description:					
There are no condensate P-Traps installed on the CaptiveAire DOAS. This is preventing the water from escaping. TYPICAL BOTH RTUs					
Issue Type:	Installation				
Role Assignment:	Mechanical Contractor				
Comments / Signature:					

Air Apparatus

PROJECT: Shake Shack #1377
LOCATION: Lynnwood, WA
PROJECT #: 23290

DATE: 8/6/2023
CONTACT: Steve Burns

SYSTEM/UNIT: RTU-01

Tested By: Jorge Acosta
Date: 8/4/2023

Design Airflow (CFM)	
Design Total	3100
Design Grille Total	3100
Design Return	2100
Design Min O/A	1000

Unit Design Data	
Submittal Make	CaptiveAire
Submittal Model #	CASRTU2-I.200-18-8T-DOAS
Submittal Airflow	-
Sched./Sub. Volts	208
Sched./Sub. Phase	3
Sched./Sub. HP	3
Submittal BHP	Not Provided
Filter MERV Rating (Sched/Sub)	8

Design Static Pressures (in wg)	
Design Ext SP	1.72
Submittal Total SP	Not Listed
Submittal Clg Coil Δ SP	-

Filter Data	
Condition	Clean
Filter Type	Pleated
MERV Rating	4
Filter Size Set 1 (in)	16x20x2
# Filters Set 1	8
Filter Size Set 2 (in)	16x20x2
# Filters Set 2	4

Motor Nameplate Data	
Motor Make	TECO Westinhouse
Motor Frame	182T
Motor HP	3.00
Motor RPM	1755
Motor Volts	230
Motor Phase	3

Final Airflow (CFM)	
Actual Total CFM	3143
Actual Grille Total CFM	3143
Actual Return Air CFM	2092
Actual Min O/A CFM	1051
Fan CFM Test Method	Supply Outlet Total
OA Method/Instrument	Face Velocity / RVA
OA Ak (sq ft)	-
OA Damper Position	38% Open
RA Damper Position	62% Open

Unit Data	
Make (tag)	Captive Aire
Model # (tag)	CASRTU2-I.200-18-8T
Serial # (tag)	5592558
Location	Rooftop
Unit Discharge	Down
Cooling Coil Location	Drawthrough
Coil Area (sq ft)	8.7
Clg Coil Vel (FPM)	361
Fan Service	Supply
Fan Type	Centrif Air Foil
Fan Discharge	Horizonal
Fan Arrangement	SWSI

Fan Design Data	
Submittal Motor RPM	Not Listed
Submittal Fan RPM	-

Fan Data	
Actual Fan RPM/Speed	Not Accessible
Actual Motor RPM	-

Electrical Data	
Measurement Method	V/A Meter
Motor Volts 1	206
Motor Volts 2	206

Air Apparatus

PROJECT: Shake Shack #1377
LOCATION: Lynnwood, WA
PROJECT #: 23290

DATE: 8/6/2023
CONTACT: Steve Burns

SYSTEM/UNIT: RTU-01

Tested By: Jorge Acosta
Date: 8/4/2023

Motor Nameplate Data	
Motor Amps	8.6
Motor S.F.	1.15
Motor % PF	89.5
Motor % Eff.	91
Other Motor Data	-

Drive Data	
Drive Type	Direct Drive
Sheave Type	-
Fan Sheave Make	-
Fan Shv Mod# or Size (in)	-
Fan Sheave Bore (in)	-
Motor Sheave Make	-
Mtr Shv Mod# or Size (in)	-
Motor Sheave Bore (in)	-
VP Range	-
Center Distance (in)	-
No of Belts	-
Belt Make	-
Belt Size	-
Other Data	-

Electrical Data	
Motor Volts 3	206
Motor Amps 1	8.6
Motor Amps 2	9.4
Motor Amps 3	9.2
Operating HZ	67.00
Approx. BHP	2.7
Corr. Nameplate Amps	9.6
Starter Data	Internal to VFD
VFD Reference	Not Applicable

Make (tag) Photo:

Name: RTU-01 Name Plate.jpg
Captured: 8/4/2023 1:07 PM
Caption:

Log:

RTU-01	8/6/2023	William Clayton	There are no condensate P-Traps installed on the CaptiveAire DOAS. This is preventing the water from escaping. TYPICAL BOTH RTUs

Air Apparatus

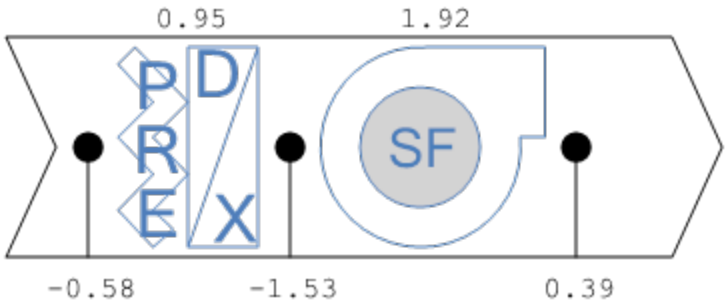
PROJECT: Shake Shack #1377
LOCATION: Lynnwood, WA
PROJECT #: 23290

DATE: 8/6/2023
CONTACT: Steve Burns

SYSTEM/UNIT: RTU-01/Static Profile

Tested By: Jorge Acosta
Date: 8/4/2023

Static Pressure Profile



RTU-01 Supply Outlet Summary

System/Unit	Area Served	Type	Size / Area (in)	Design CFM	Prelim CFM	Final CFM	% Final	Instrument	Ak	Open (sq ft)	Final FPM
S-01	100 Order	SW	12/8	400	311	401	100	RVA	0.400	0.500	1003
S-02	100 Order	SW	12/6	330	280	323	98	RVA	0.400	0.500	808
S-03	101 Dining	SW	12/8	400	292	408	102	RVA	0.400	0.500	1020
S-04	101 Dining	SW	12/6	340	250	373	110	RVA	0.400	0.500	933
S-05	101 Dining	SW	12/8	400	256	408	102	RVA	0.400	0.500	1020
S-06	101 Dining	SW	12/6	340	219	333	98	RVA	0.400	0.500	833
S-07	101 Dining	SW	12/6	340	235	343	101	RVA	0.400	0.500	858
S-08	101 Dining	SW	12/8	400	266	402	101	RVA	0.400	0.500	1005
S-09	106 B Mens RR	CD	6	75	85	76	101	Capture Hood	1.000	1.000	76
S-10	106 A Womens RR	CD	6	75	87	76	101	Capture Hood	1.000	1.000	76
	Totals:	-	-	**3100**	**2281**	**3143**	**101**	-	-	-	-

Air Apparatus

PROJECT: Shake Shack #1377
LOCATION: Lynnwood, WA
PROJECT #: 23290

DATE: 8/6/2023
CONTACT: Steve Burns

SYSTEM/UNIT: RTU-02

Tested By: Jorge Acosta
Date: 8/4/2023

Design Airflow (CFM)	
Design Total	4500
Design Grille Total	4700
Design Return	2200
Design Min O/A	2500

Unit Design Data	
Submittal Make	CaptiveAire
Submittal Model #	CASRTU3-I.400-24-20T-DOAS
Submittal Airflow	-
Sched./Sub. Volts	208
Sched./Sub. Phase	3
Sched./Sub. HP	7.5
Submittal BHP	Not Provided
Filter MERV Rating (Sched/Sub)	8

Design Static Pressures (in wg)	
Design Ext SP	1
Submittal Total SP	Not Listed
Submittal Clg Coil Δ SP	-

Filter Data	
Condition	Clean
Filter Type	Pleated
MERV Rating	8
Filter Size Set 1 (in)	20x25x2
# Filters Set 1	4
Filter Size Set 2 (in)	20x25x2
# Filters Set 2	-4

Motor Nameplate Data	
Motor Make	TECO Westinhouse
Motor Frame	213T
Motor HP	7.50
Motor RPM	1755
Motor Volts	230
Motor Phase	3

Final Airflow (CFM)	
Actual Total CFM	4869
Actual Grille Total CFM	4869
Actual Return Air CFM	2269
Actual Min O/A CFM	2600
Fan CFM Test Method	Supply Outlet Total
OA Method/Instrument	Face Velocity / RVA
OA Ak (sq ft)	-
OA Damper Position	50% Open
RA Damper Position	50% Open

Unit Data	
Make (tag)	Captive Aire
Model # (tag)	CASRTU3-I.400-24-20T
Serial # (tag)	5592558
Location	Rooftop
Unit Discharge	Down
Cooling Coil Location	Drawthrough
Coil Area (sq ft)	13.5
Clg Coil Vel (FPM)	361
Fan Service	Supply
Fan Type	Centrif Air Foil
Fan Discharge	Horizonal
Fan Arrangement	SWSI

Fan Design Data	
Submittal Motor RPM	Not Listed
Submittal Fan RPM	-

Fan Data	
Actual Fan RPM/Speed	Not Accessible
Actual Motor RPM	-

Electrical Data	
Measurement Method	V/A Meter
Motor Volts 1	205
Motor Volts 2	205

Air Apparatus

PROJECT: Shake Shack #1377
LOCATION: Lynnwood, WA
PROJECT #: 23290

DATE: 8/6/2023
CONTACT: Steve Burns

SYSTEM/UNIT: RTU-02

Tested By: Jorge Acosta
Date: 8/4/2023

Motor Nameplate Data	
Motor Amps	19.1
Motor S.F.	1.15
Motor % PF	89.5
Motor % Eff.	91
Other Motor Data	-

Drive Data	
Drive Type	Direct Drive
Sheave Type	-
Fan Sheave Make	-
Fan Shv Mod# or Size (in)	-
Fan Sheave Bore (in)	-
Motor Sheave Make	-
Mtr Shv Mod# or Size (in)	-
Motor Sheave Bore (in)	-
VP Range	-
Center Distance (in)	-
No of Belts	-
Belt Make	-
Belt Size	-
Other Data	-

Electrical Data	
Motor Volts 3	295
Motor Amps 1	17.1
Motor Amps 2	17.1
Motor Amps 3	17.2
Operating HZ	42.00
Approx. BHP	6.0
Corr. Nameplate Amps	21.4
Starter Data	Internal to VFD
VFD Reference	Not Applicable

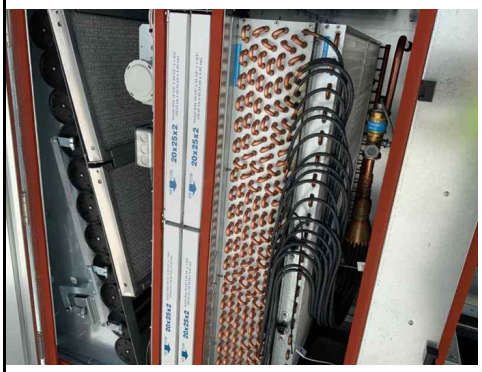
Submittal Model # Photo:

Name: Submittal Model #.jpg
Captured: 8/3/2023 12:00 PM
Caption:

SYSTEM/UNIT: RTU-02

Tested By: Jorge Acosta
Date: 8/4/2023

Condition Photo:



Name: Condition.jpg
Captured: 8/3/2023 12:05 PM
Caption: RTU-02. New Filters

Motor Make Photo:

Name: Motor Make.jpg
Captured: 8/3/2023 12:10 PM
Caption:

SYSTEM/UNIT: RTU-02

Tested By: Jorge Acosta
Date: 8/4/2023

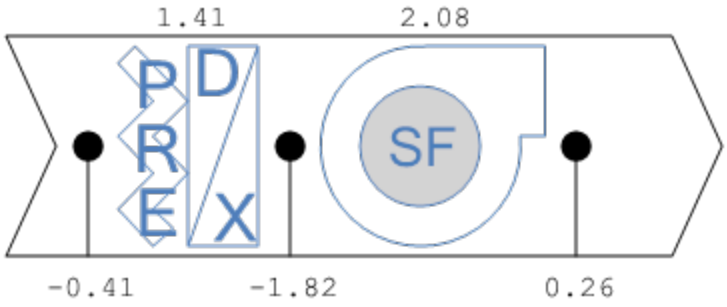
Model # (tag) Photo:

Name: Model # (tag).jpg
Captured: 8/3/2023 12:01 PM
Caption: RTU-02

SYSTEM/UNIT: RTU-02/Static Profile

Tested By: Jorge Acosta
Date: 8/4/2023

Static Pressure Profile



Air Apparatus

PROJECT: Shake Shack #1377
LOCATION: Lynnwood, WA
PROJECT #: 23290

DATE: 8/6/2023
CONTACT: Steve Burns

RTU-02 Supply Outlet Summary

System/Unit	Area Served	Type	Size / Area (in)	Design CFM	Prelim CFM	Final CFM	% Final	Instrument	Ak	Open (sq ft)	Final FPM
S-01	105 Open Kitchen	CD	12	580	624	580	100	Capture Hood	1.000	1.000	580
S-02	105 Open Kitchen	CD	12	580	607	590	102	Capture Hood	1.000	1.000	590
S-03	105 Open Kitchen	CD	12	580	549	600	103	Capture Hood	1.000	1.000	600
S-04	105 Open Kitchen	CD	12	600	513	629	105	Capture Hood	1.000	1.000	629
S-05	105 Open Kitchen	CD	12	600	506	619	103	Capture Hood	1.000	1.000	619
S-06	103 Back Kitchen	CD	12	600	373	645	108	Capture Hood	1.000	1.000	645
S-07	103 Back Kitchen	CD	12	580	497	620	107	Capture Hood	1.000	1.000	620
S-08	103 Back Kitchen	CD	12	580	667	586	101	Capture Hood	1.000	1.000	586
	Totals:	**-**	**-**	**4700**	**4336**	**4869**	**104**	**-**	**-**	**-**	**-**

Fan

PROJECT: Shake Shack #1377
LOCATION: Lynnwood, WA
PROJECT #: 23290

DATE: 8/6/2023
CONTACT: Steve Burns

SYSTEM/UNIT: EF-01

Tested By: Jorge Acosta
Date: 8/4/2023

Design Airflow (CFM)	
Design Airflow	300
Design Grille Airflow	300

Unit Design Data	
Submittal Make	Not Provided
Submittal Model #	-
Submittal Airflow	-
Sched./Sub. Volts	120
Sched./Sub. Phase	1
Sched./Sub. HP	1/8
Submittal BHP	Not Provided

Design Static Pressures (in wg)	
Design External SP	0.5
Submittal Total SP	Not Provided

Motor Nameplate Data	
Motor Make (tag)	McMillan
Motor Frame (tag)	Not Listed
Motor HP (tag)	1/8
Motor RPM (tag)	1550
Motor Volts (tag)	120
Motor Phase (tag)	1
Motor Amps (tag)	1.6
Motor S.F. (tag)	1
Mtr % PF (tag)	Not Listed
Mtr % Eff. (tag)	-
Other Motor Data	-

Drive Data	
Drive Type	Direct Drive
Sheave Type	-
Fan Sheave Make	-
Fan Shv Mod# or Size (in)	-
Fan Sheave Bore (in.)	-
Motor Sheave Make	-

Final Airflow (CFM)	
Actual Airflow	310
Actual Grille Airflow	310
Fan CFM Test Method	Inlet Total
Test Method Ak (sq ft)	Not Applicable

Unit Data	
Make (tag)	Greenheck
Model # (tag)	G-095-D-8-1-17-X
Serial # (tag)	21486421
Unit Location	Roof
Unit Discharge	Downward
Fan Service	Exhaust
Fan Type	Centrifugal
Fan Discharge	Downblast
Fan Arrangement	SWSI

Fan Design Data	
Submittal Motor RPM	Not Provided
Submittal Fan RPM	-

Fan Data	
Actual Fan RPM/Speed	High Speed
Actual Motor RPM	Not Accessible
Speed Cont. Position	-

Electrical Data	
Measurement Method	V/A Meter
Motor Volts 1	118
Motor Volts 2	-
Motor Volts 3	-
Motor Amps 1	1.6
Motor Amps 2	-
Motor Amps 3	-
Operating HZ	60.0
Starter Data	Internal to ECM
Approx. BHP	0.12

Fan

PROJECT: Shake Shack #1377
LOCATION: Lynnwood, WA
PROJECT #: 23290

DATE: 8/6/2023
CONTACT: Steve Burns

SYSTEM/UNIT: EF-01

Tested By: Jorge Acosta
Date: 8/4/2023

Drive Data	
Mtr Shv Mod# or Size (in)	-
Motor Sheave Bore (in.)	-
VP Range	-
Center Distance (in.)	-
No of Belts	-
Belt Make	-
Belt Size	-
Other Data	-

Electrical Data	
Corr. Nameplate Amps	1.6

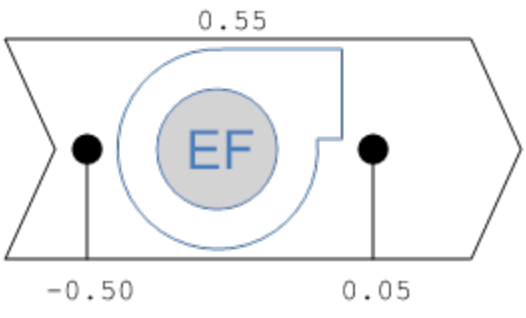
Motor Make (tag) Photo:

Name: Motor Make (tag).jpg
Captured: 8/3/2023 1:17 PM
Caption: EF-01

SYSTEM/UNIT: EF-01/Static Profile

Tested By: Steve Burns
Date: 8/4/2023

Static Pressure Profile



Fan

PROJECT: Shake Shack #1377
LOCATION: Lynnwood, WA
PROJECT #: 23290

DATE: 8/6/2023
CONTACT: Steve Burns

EF-01 Exhaust Inlet Summary

System/Unit	Area Served	Type	Size / Area (in)	Design CFM	Prelim CFM	Final CFM	% Final	Instrument	Ak	Open (sq ft)	Final FPM
E-01	106 B Mens RR	CD	8/8	150	315	160	107	Capture Hood	1.000	1.000	160
E-02	106 A Womens RR	CD	8/8	150	288	150	100	Capture Hood	1.000	1.000	150
	Totals:	-	-	**300**	**603**	**310**	**103**	-	-	-	-

Fan

PROJECT: Shake Shack #1377
LOCATION: Lynnwood, WA
PROJECT #: 23290

DATE: 8/6/2023
CONTACT: Steve Burns

SYSTEM/UNIT: KEF-01

Tested By: Jorge Acosta
Date: 8/4/2023

Design Airflow (CFM)	
Design Airflow	700
Design Grille Airflow	Not Applicable

Unit Design Data	
Submittal Make	CaptiveAire
Submittal Model #	DU33HFA
Submittal Airflow	700
Sched./Sub. Volts	115
Sched./Sub. Phase	1
Sched./Sub. HP	.33
Submittal BHP	.2770

Design Static Pressures (in wg)	
Design External SP	1.0
Submittal Total SP	1.00

Motor Nameplate Data	
Motor Make (tag)	Talco Green
Motor Frame (tag)	Not Listed
Motor HP (tag)	0.5
Motor RPM (tag)	1800
Motor Volts (tag)	115
Motor Phase (tag)	1
Motor Amps (tag)	6.3
Motor S.F. (tag)	Not Listed
Mtr % PF (tag)	-
Mtr % Eff. (tag)	-
Other Motor Data	-

Drive Data	
Drive Type	Direct Drive
Sheave Type	-
Fan Sheave Make	-
Fan Shv Mod# or Size (in)	-
Fan Sheave Bore (in.)	-
Motor Sheave Make	-
Mtr Shv Mod# or Size (in)	-
Motor Sheave Bore (in.)	-
VP Range	-
Center Distance (in.)	-
No of Belts	-
Belt Make	-
Belt Size	-
Other Data	-

Final Airflow (CFM)	
Actual Airflow	713
Actual Grille Airflow	Not Applicable
Fan CFM Test Method	See Kitchen Hood Sheet
Test Method Ak (sq ft)	Not Applicable

Unit Data	
Make (tag)	CaptiveAire
Model # (tag)	DU50HFA
Serial # (tag)	5787990
Unit Location	Roof
Unit Discharge	Upward
Fan Service	Exhaust
Fan Type	Centrifugal
Fan Discharge	Upblast
Fan Arrangement	SWSI

Fan Design Data	
Submittal Motor RPM	Not Listed
Submittal Fan RPM	1659

Fan Data	
Actual Fan RPM/Speed	49%
Actual Motor RPM	Not Accessible
Speed Cont. Position	Not Applicable

Electrical Data	
Measurement Method	V/A Meter
Motor Volts 1	118
Motor Volts 2	-
Motor Volts 3	-
Motor Amps 1	3.8
Motor Amps 2	-
Motor Amps 3	-
Operating HZ	60.0
Starter Data	Internal to ECM
Approx. BHP	0.31
Corr. Nameplate Amps	6.1

Fan

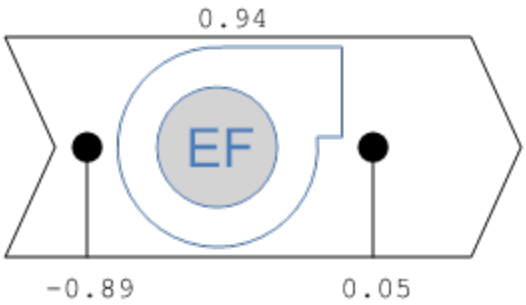
PROJECT: Shake Shack #1377
LOCATION: Lynnwood, WA
PROJECT #: 23290

DATE: 8/6/2023
CONTACT: Steve Burns

SYSTEM/UNIT: KEF-01/Static Profile

Tested By: Jorge Acosta
Date: 8/4/2023

Static Pressure Profile



Fan

PROJECT: Shake Shack #1377
LOCATION: Lynnwood, WA
PROJECT #: 23290

DATE: 8/6/2023
CONTACT: Steve Burns

SYSTEM/UNIT: KEF-01/Hood-01

Tested By: Jorge Acosta
Date: 8/4/2023

Design Airflow (CFM)	
Design Exhaust CFM	700
Halton Design SP	Not Applicable

Final Airflow (CFM)	
Actual Exhaust CFM	713
Halton Actual SP	Not Applicable

Kitchen Hood Information	
Service	Fryer
Manufacturer	CaptiveAire
Model Number	3650 BD-2
Serial Number	5787990
Test Method	Filter Velocity

KEF-01/Hood-01 Exhaust Filter Summary

System/Unit	Size	Type	Ak	Reading 2	Reading 1	FPM	Instrument	CFM
Filter-01	16x20	Baffle	2.08		165	165	Velgrid	0
Filter-02	16x20	Baffle	2.08		178	178	Velgrid	370
Totals:	-	-	-	-	-	-	-	**370**

Fan

PROJECT: Shake Shack #1377
LOCATION: Lynnwood, WA
PROJECT #: 23290

DATE: 8/6/2023
CONTACT: Steve Burns

SYSTEM/UNIT: KEF-02

Tested By: Jorge Acosta
Date: 8/4/2023

Design Airflow (CFM)	
Design Airflow	700
Design Grille Airflow	Not Applicable

Unit Design Data	
Submittal Make	CaptiveAire
Submittal Model #	DU33HFA
Submittal Airflow	700
Sched./Sub. Volts	115
Sched./Sub. Phase	1
Sched./Sub. HP	0.33
Submittal BHP	0.2780

Design Static Pressures (in wg)	
Design External SP	1.00
Submittal Total SP	1.00

Motor Nameplate Data	
Motor Make (tag)	Talco Green
Motor Frame (tag)	Not Listed
Motor HP (tag)	0.5
Motor RPM (tag)	1800
Motor Volts (tag)	115
Motor Phase (tag)	1
Motor Amps (tag)	6.3
Motor S.F. (tag)	Not Listed
Mtr % PF (tag)	-
Mtr % Eff. (tag)	-
Other Motor Data	-

Drive Data	
Drive Type	Direct Drive
Sheave Type	-
Fan Sheave Make	-
Fan Shv Mod# or Size (in)	-
Fan Sheave Bore (in.)	-
Motor Sheave Make	-
Mtr Shv Mod# or Size (in)	-
Motor Sheave Bore (in.)	-
VP Range	-
Center Distance (in.)	-
No of Belts	-
Belt Make	-
Belt Size	-
Other Data	-

Final Airflow (CFM)	
Actual Airflow	699
Actual Grille Airflow	Not Applicable
Fan CFM Test Method	See Kitchen Hood Sheet
Test Method Ak (sq ft)	Not Applicable

Unit Data	
Make (tag)	CaptiveAire
Model # (tag)	DU50HFA
Serial # (tag)	5787990
Unit Location	Roof
Unit Discharge	Upward
Fan Service	Exhaust
Fan Type	Centrifugal
Fan Discharge	Upblast
Fan Arrangement	SWSI

Fan Design Data	
Submittal Motor RPM	Not Listed
Submittal Fan RPM	1659

Fan Data	
Actual Fan RPM/Speed	49%
Actual Motor RPM	Not Accessible
Speed Cont. Position	Not Applicable

Electrical Data	
Measurement Method	V/A Meter
Motor Volts 1	118
Motor Volts 2	-
Motor Volts 3	-
Motor Amps 1	3.8
Motor Amps 2	-
Motor Amps 3	-
Operating HZ	60.0
Starter Data	Internal to ECM
Approx. BHP	0.31
Corr. Nameplate Amps	6.1

Fan

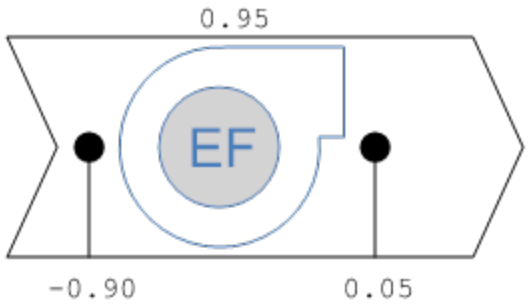
PROJECT: Shake Shack #1377
LOCATION: Lynnwood, WA
PROJECT #: 23290

DATE: 8/6/2023
CONTACT: Steve Burns

SYSTEM/UNIT: KEF-02/Static Profile

Tested By: Steve Burns
Date: 8/4/2023

Static Pressure Profile



Fan

PROJECT: Shake Shack #1377
LOCATION: Lynnwood, WA
PROJECT #: 23290

DATE: 8/6/2023
CONTACT: Steve Burns

SYSTEM/UNIT: KEF-02/Hood-02

Tested By: Jorge Acosta
Date: 8/4/2023

Design Airflow (CFM)	
Design Exhaust CFM	700
Halton Design SP	Not Applicable

Final Airflow (CFM)	
Actual Exhaust CFM	699
Halton Actual SP	Not Applicable

Kitchen Hood Information	
Service	Fryer
Manufacturer	CaptiveAire
Model Number	3650 BD-2
Serial Number	5787990
Test Method	Filter Velocity

KEF-02/Hood-02 Exhaust Filter Summary

System/Unit	Size	Type	Ak	Reading 2	Reading 1	FPM	Instrument	CFM
Filter-01	16x20	Baffle	2.08		164	164	Vevlgrid	341
Filter-02	16x20	Baffle	2.08		172	172	Vevlgrid	358
Totals:	-	-	-	-	-	-	-	**699**

Fan

PROJECT: Shake Shack #1377
LOCATION: Lynnwood, WA
PROJECT #: 23290

DATE: 8/6/2023
CONTACT: Steve Burns

SYSTEM/UNIT: KEF-03

Tested By: Jorge Acosta
Date: 8/4/2023

Design Airflow (CFM)	
Design Airflow	700
Design Grille Airflow	Not Applicable

Unit Design Data	
Submittal Make	CaptiveAire
Submittal Model #	DU33HFA
Submittal Airflow	700
Sched./Sub. Volts	115
Sched./Sub. Phase	1
Sched./Sub. HP	0.33
Submittal BHP	0.277

Design Static Pressures (in wg)	
Design External SP	1.00
Submittal Total SP	1.00

Motor Nameplate Data	
Motor Make (tag)	Talco Green
Motor Frame (tag)	Not Listed
Motor HP (tag)	0.5
Motor RPM (tag)	1800
Motor Volts (tag)	115
Motor Phase (tag)	1
Motor Amps (tag)	6.3
Motor S.F. (tag)	Not Listed
Mtr % PF (tag)	-
Mtr % Eff. (tag)	-
Other Motor Data	-

Drive Data	
Drive Type	Direct Drive
Sheave Type	-
Fan Sheave Make	-
Fan Shv Mod# or Size (in)	-
Fan Sheave Bore (in.)	-
Motor Sheave Make	-
Mtr Shv Mod# or Size (in)	-
Motor Sheave Bore (in.)	-
VP Range	-
Center Distance (in.)	-
No of Belts	-
Belt Make	-
Belt Size	-
Other Data	-

Final Airflow (CFM)	
Actual Airflow	707
Actual Grille Airflow	Not Applicable
Fan CFM Test Method	See Kitchen Hood Sheet
Test Method Ak (sq ft)	Not Applicable

Unit Data	
Make (tag)	CaptiveAire
Model # (tag)	DU50HFA
Serial # (tag)	5787990
Unit Location	Roof
Unit Discharge	Upward
Fan Service	Exhaust
Fan Type	Centrifugal
Fan Discharge	Upblast
Fan Arrangement	SWSI

Fan Design Data	
Submittal Motor RPM	Not Listed
Submittal Fan RPM	1659

Fan Data	
Actual Fan RPM/Speed	51%
Actual Motor RPM	Not Accessible
Speed Cont. Position	Not Applicable

Electrical Data	
Measurement Method	V/A Meter
Motor Volts 1	118
Motor Volts 2	-
Motor Volts 3	-
Motor Amps 1	3.8
Motor Amps 2	-
Motor Amps 3	-
Operating HZ	60.0
Starter Data	Internal to ECM
Approx. BHP	0.31
Corr. Nameplate Amps	6.1

Fan

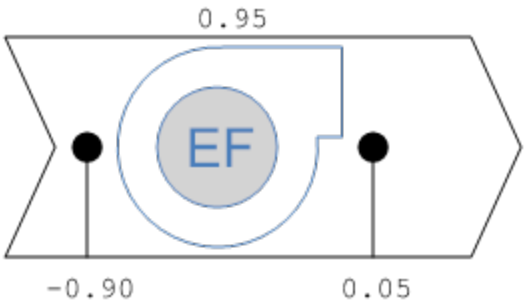
PROJECT: Shake Shack #1377
LOCATION: Lynnwood, WA
PROJECT #: 23290

DATE: 8/6/2023
CONTACT: Steve Burns

SYSTEM/UNIT: KEF-03/Static Profile

Tested By: Jorge Acosta
Date: 8/4/2023

Static Pressure Profile



Fan

PROJECT: Shake Shack #1377
LOCATION: Lynnwood, WA
PROJECT #: 23290

DATE: 8/6/2023
CONTACT: Steve Burns

SYSTEM/UNIT: KEF-03/Hood-03

Tested By: Jorge Acosta
Date: 8/4/2023

Design Airflow (CFM)	
Design Exhaust CFM	700
Halton Design SP	Not Applicable

Final Airflow (CFM)	
Actual Exhaust CFM	707
Halton Actual SP	Not Applicable

Kitchen Hood Information	
Service	Fryer
Manufacturer	CaptiveAire
Model Number	3650 BD-2
Serial Number	5787990
Test Method	Filter Velocity

KEF-03/Hood-03 Exhaust Filter Summary

System/Unit	Size	Type	Ak	Reading 2	Reading 1	FPM	Instrument	CFM
Filter-01	16x20	Baffle	2.08		166	166	Vevlgrid	345
Filter-02	16x20	Baffle	2.08		174	174	Vevlgrid	362
Totals:	-	-	-	-	-	-	-	**707**

Fan

PROJECT: Shake Shack #1377
LOCATION: Lynnwood, WA
PROJECT #: 23290

DATE: 8/6/2023
CONTACT: Steve Burns

SYSTEM/UNIT: KEF-04

Tested By: Jorge Acosta
Date: 8/4/2023

Design Airflow (CFM)	
Design Airflow	700
Design Grille Airflow	Not Applicable

Unit Design Data	
Submittal Make	CaptiveAire
Submittal Model #	DU33HFA
Submittal Airflow	700
Sched./Sub. Volts	115
Sched./Sub. Phase	1
Sched./Sub. HP	0.33
Submittal BHP	0.277

Design Static Pressures (in wg)	
Design External SP	1.00
Submittal Total SP	1.00

Motor Nameplate Data	
Motor Make (tag)	Talco Green
Motor Frame (tag)	Not Listed
Motor HP (tag)	0.5
Motor RPM (tag)	1800
Motor Volts (tag)	115
Motor Phase (tag)	1
Motor Amps (tag)	6.3
Motor S.F. (tag)	Not Listed
Mtr % PF (tag)	-
Mtr % Eff. (tag)	-
Other Motor Data	-

Drive Data	
Drive Type	Direct Drive
Sheave Type	-
Fan Sheave Make	-
Fan Shv Mod# or Size (in)	-
Fan Sheave Bore (in.)	-
Motor Sheave Make	-
Mtr Shv Mod# or Size (in)	-
Motor Sheave Bore (in.)	-
VP Range	-
Center Distance (in.)	-
No of Belts	-
Belt Make	-
Belt Size	-
Other Data	-

Final Airflow (CFM)	
Actual Airflow	707
Actual Grille Airflow	Not Applicable
Fan CFM Test Method	See Kitchen Hood Sheet
Test Method Ak (sq ft)	Not Applicable

Unit Data	
Make (tag)	CaptiveAire
Model # (tag)	DU50HFA
Serial # (tag)	5787990
Unit Location	Roof
Unit Discharge	Upward
Fan Service	Exhaust
Fan Type	Centrifugal
Fan Discharge	Upblast
Fan Arrangement	SWSI

Fan Design Data	
Submittal Motor RPM	Not Listed
Submittal Fan RPM	1659

Fan Data	
Actual Fan RPM/Speed	51%
Actual Motor RPM	Not Accessible
Speed Cont. Position	Not Applicable

Electrical Data	
Measurement Method	V/A Meter
Motor Volts 1	118
Motor Volts 2	-
Motor Volts 3	-
Motor Amps 1	3.8
Motor Amps 2	-
Motor Amps 3	-
Operating HZ	60.0
Starter Data	Internal to ECM
Approx. BHP	0.31
Corr. Nameplate Amps	6.1

Fan

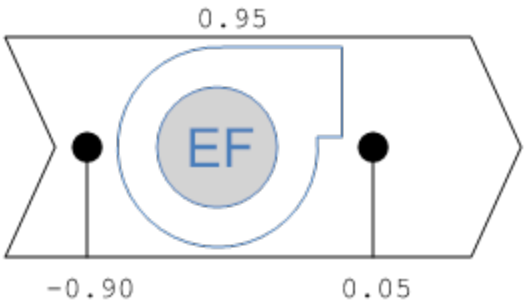
PROJECT: Shake Shack #1377
LOCATION: Lynnwood, WA
PROJECT #: 23290

DATE: 8/6/2023
CONTACT: Steve Burns

SYSTEM/UNIT: KEF-04/Static Profile

Tested By: Steve Burns
Date: 8/4/2023

Static Pressure Profile



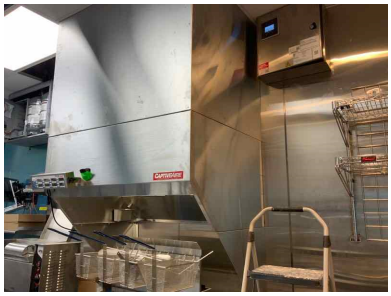
Fan

PROJECT: Shake Shack #1377
LOCATION: Lynnwood, WA
PROJECT #: 23290

DATE: 8/6/2023
CONTACT: Steve Burns

SYSTEM/UNIT: KEF-04/Hood-04

Tested By: Jorge Acosta
Date: 8/4/2023



Design Airflow (CFM)	
Design Exhaust CFM	700
Halton Design SP	Not Applicable

Final Airflow (CFM)	
Actual Exhaust CFM	707
Halton Actual SP	Not Applicable

Kitchen Hood Information	
Service	Fryer
Manufacturer	CaptiveAire
Model Number	3650 BD-2
Serial Number	5787990
Test Method	Filter Velocity

KEF-04/Hood-04 Exhaust Filter Summary

System/Unit	Size	Type	Ak	Reading 2	Reading 1	FPM	Instrument	CFM
Filter-01	16x20	Baffle	2.08		174	174	Vevlgrid	362
Filter-02	16x20	Baffle	2.08		166	166	Vevlgrid	345
Totals:	-	-	-	-	-	-	-	**707**

Fan

PROJECT: Shake Shack #1377
LOCATION: Lynnwood, WA
PROJECT #: 23290

DATE: 8/6/2023
CONTACT: Steve Burns

SYSTEM/UNIT: REF-01

Tested By: Jorge Acosta
Date: 8/4/2023

Design Airflow (CFM)	
Design Airflow	2600
Design Grille Airflow	2600

Unit Design Data	
Submittal Make	Not Provided
Submittal Model #	-
Submittal Airflow	-
Sched./Sub. Volts	120
Sched./Sub. Phase	1
Sched./Sub. HP	1/2
Submittal BHP	Not Provided

Design Static Pressures (in wg)	
Design External SP	0.5
Submittal Total SP	Not Provided

Motor Nameplate Data	
Motor Make (tag)	Vari-Green
Motor Frame (tag)	Not Listed
Motor HP (tag)	3/4
Motor RPM (tag)	1725
Motor Volts (tag)	115
Motor Phase (tag)	1
Motor Amps (tag)	8.8
Motor S.F. (tag)	Not Listed
Mtr % PF (tag)	-
Mtr % Eff. (tag)	-
Other Motor Data	-

Drive Data	
Drive Type	Direct Drive
Sheave Type	-
Fan Sheave Make	-
Fan Shv Mod# or Size (in)	-
Fan Sheave Bore (in.)	-
Motor Sheave Make	-

Final Airflow (CFM)	
Actual Airflow	1505
Actual Grille Airflow	1505
Fan CFM Test Method	Inlet Total
Test Method Ak (sq ft)	Not Applicable

Unit Data	
Make (tag)	Greenheck
Model # (tag)	G-180-7-VG-1-30-X
Serial # (tag)	21818129
Unit Location	Roof
Unit Discharge	Downward
Fan Service	Exhaust
Fan Type	Centrifugal
Fan Discharge	Downblast
Fan Arrangement	SWSI

Fan Design Data	
Submittal Motor RPM	Not Provided
Submittal Fan RPM	-

Fan Data	
Actual Fan RPM/Speed	1800
Actual Motor RPM	1800
Speed Cont. Position	10.0

Electrical Data	
Measurement Method	V/A Meter
Motor Volts 1	118
Motor Volts 2	-
Motor Volts 3	-
Motor Amps 1	5.5
Motor Amps 2	-
Motor Amps 3	-
Operating HZ	60.0
Starter Data	Internal to ECM
Approx. BHP	0.48

Fan

PROJECT: Shake Shack #1377
LOCATION: Lynnwood, WA
PROJECT #: 23290

DATE: 8/6/2023
CONTACT: Steve Burns

SYSTEM/UNIT: REF-01

Tested By: Jorge Acosta
Date: 8/4/2023

Drive Data	
Mtr Shv Mod# or Size (in)	-
Motor Sheave Bore (in.)	-
VP Range	-
Center Distance (in.)	-
No of Belts	-
Belt Make	-
Belt Size	-
Other Data	-

Electrical Data	
Corr. Nameplate Amps	8.6

Motor Make (tag) Photo:

Name: Motor Make (tag).jpg
Captured: 8/3/2023 1:20 PM
Caption: REF-01

Make (tag) Photo:

Name: Make (tag).jpg
Captured: 8/3/2023 1:12 PM
Caption: REF-01

Log:

REF-01	8/6/2023	William Clayton	The REF is to operate when the DOAS go into economizer. There is currently no controls and the REF runs continuously.
REF-01	8/6/2023	William Clayton	Fan is operating at 58% of design on high speed. There is flex on the inlet of the fan that is kinked, restricting the airflow.

Fan

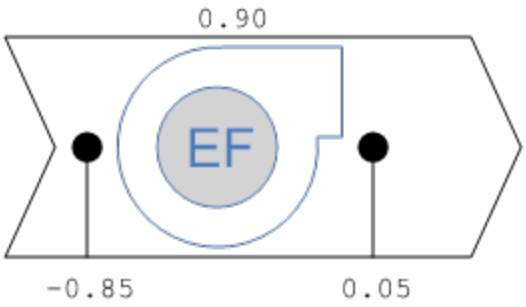
PROJECT: Shake Shack #1377
LOCATION: Lynnwood, WA
PROJECT #: 23290

DATE: 8/6/2023
CONTACT: Steve Burns

SYSTEM/UNIT: REF-01/Static Profile

Tested By: Steve Burns
Date: 8/3/2023

Static Pressure Profile



REF-01 Exhaust Inlet Summary

System/Unit	Area Served	Type	Size / Area (in)	Design CFM	Prelim CFM	Final CFM	% Final	Instrument	Ak	Open (sq ft)	Final FPM
E-01	103 Back Kitchen	CD	22/22	2600	1505	1505	58	Capture Hood	1.000	1.000	1505
	Totals:	**-**	**-**	**2600**	**1505**	**1505**	**58**	**-**	**-**	**-**	**-**

Mini Split System

PROJECT: Shake Shack #1377
LOCATION: Lynnwood, WA
PROJECT #: 23290

DATE: 8/6/2023
CONTACT: Steve Burns

SYSTEM/UNIT: FCU-01

Tested By: Jorge Acosta
Date: 8/4/2023

Design Airflow (CFM)	
Design Total CFM (Sched)	420
Submittal Total CFM (Submittal)	Not Provided
Design Grille CFM	420
Design Return CFM	380
Design Min O/A	40

Unit Design Data	
Make (Submittal)	Not Provided
Model # (Submittal)	Not Provided
Volts (Sched/Sub)	208
Phase (Sched/Sub)	1
HP (Sched/Sub)	0.061
BHP (Submittal)	Not Provided
Filter MERV Rating (Sched/Sub)	Not Listed

Design Static Pressures (in wg)	
External SP (Sched/Subs)	0.03
Total SP (Submittal)	Not Provided
Clg Coil Δ SP (Submittal)	Not Provided

Filter Data	
Condition	Clean
Filter Type	Washable
MERV Rating	N/A
Filter Size	15X15
# Filters	1

Motor Nameplate Data	
Motor Type	Embedded
Motor Volts (tag)	208
Motor Phase (tag)	1
Motor Amps (tag)	1.65
Other Motor Data	-

Drive Data	
Drive Type	Direct Drive / Embedded

Final Airflow (CFM)	
Actual Total CFM	417
Total CFM Test Method	Return+OA
Actual Grille Total	417
Actual Return Air	381
Actual Min O/A	36
OA Damper Position	Not Applicable

Unit Data	
Make (tag)	Carrier
Model # (tag)	40MBCQ18-3
Serial # (tag)	0823V30508
Location	Ceiling
Unit Discharge	Horizontal
Cooling Coil Location	Unit/Drawthru
Coil Area (sq ft)	Not Accessible
Clg Coil Vel (FPM)	Not Accessible

Fan Design Data	
Fan RPM (Submittal)	Not Provided
Motor RPM (Submittal)	Not Provided

Fan Data	
Service	Supply
Type	Centrifugal (FC)
Fan Discharge	Horizontal
Arrangement	SWSI
Fan Speed	High

Electrical Data	
Measurement Method	V/A Meter
Motor Volts T1-T2	210
Motor Amps T1	1.3

Mini Split System

PROJECT: Shake Shack #1377
LOCATION: Lynnwood, WA
PROJECT #: 23290

DATE: 8/6/2023
CONTACT: Steve Burns

FCU-01 Return Inlet Summary

System/Unit	Type	Size / Area (in)	Design CFM	Prelim CFM	Final CFM	% Final	Instrument	Ak	Open (sq ft)	Final FPM
R-01	RG	14/14	380	381	381	100	Velgrid	1.090	1.360	350
Totals:	**-**	**-**	**380**	**381**	**381**	**100**	**-**	**-**	**-**	**-**

Mini Split System

PROJECT: Shake Shack #1377
LOCATION: Lynnwood, WA
PROJECT #: 23290

DATE: 8/6/2023
CONTACT: Steve Burns

SYSTEM/UNIT: FCU-01/OA Traverse

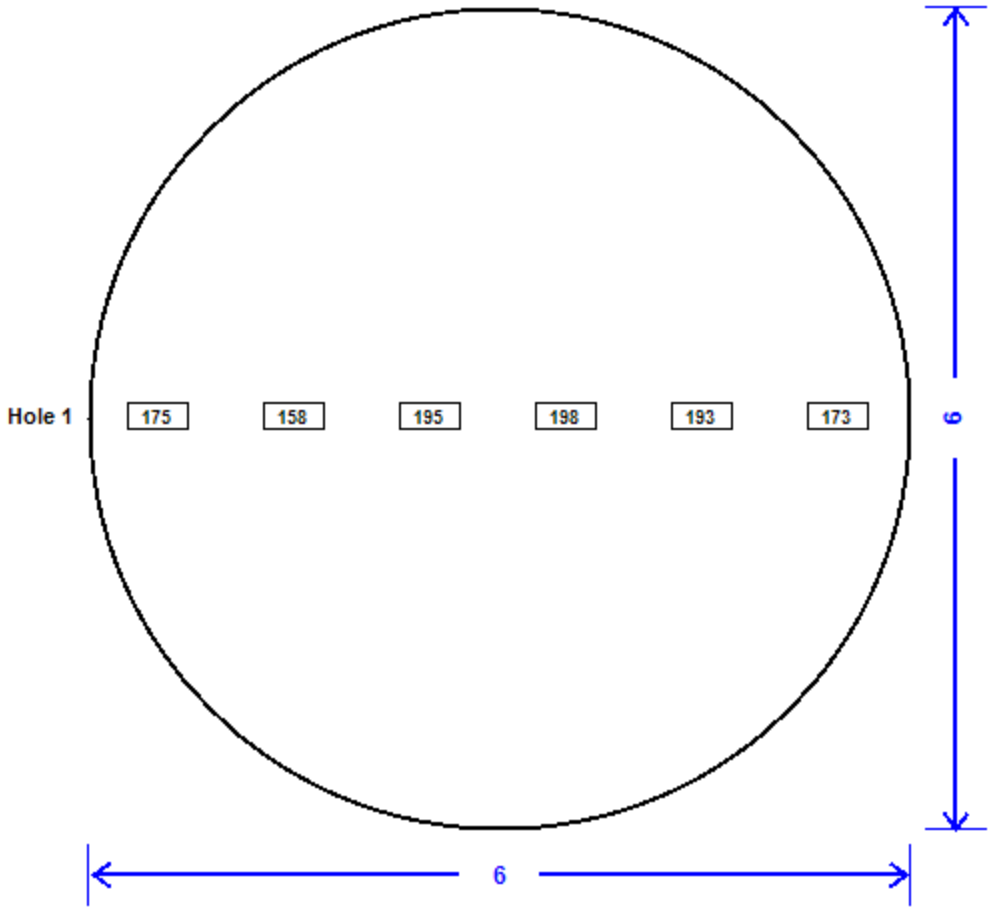
Tested By: Jorge Acosta
Date: 8/4/2023

Unit Design Data	
Design Airflow (CFM)	40
Location	OA Duct

Traverse Data	
Duct Shape	Round
Interior Insulation (in)	Not Applicable
Duct Width (in)	Not Applicable
Duct Height (in)	Not Applicable
Round Duct Diam (in)	6
Inner Dimensions (in)	6
AK (sq ft)	0.196

Test Data	
Actual Airflow (CFM)	36
Average Velocity (FPM)	182
Centerline SP (in wg)	-0.02
Altitude (ft)	0
Duct Air Temp (°F)	70.0
Probe	Airfoil
Instrument	ADM
Number Of Rows	1
Readings Per Row	6
Total Readings	6

Traverse Data Points



Instrument Calibration

Air Pressure Measurement					
Instrument Type:	ADM	**Date of Calibration:**	7/13/2023	**Measured Units**	in wg
Manufacturer:	Evergreen Telemetry	**Due for Calibration:**	7/13/2024	**Accuracy**	+/- 2%
Model:	S-PVF-1	**Range:**	+/- 60 in wg	**Resolution**	0.0001 in wg
Serial:	220179C			*Corrects local bar. press. to standard cond.	

Air Volume Measurement / Balometer					
Instrument Type:	Balometer	**Date of Calibration:**	7/13/2023	**Measured Units**	CFM
Manufacturer:	Evergreen Telemetry	**Due for Calibration:**	7/13/2024	**Accuracy**	+/- 2%
Model:	CH-15D / S-PVF-1	**Range:**	25-1500 CFM (Exhaust) 24-2500 CFM (Supply)	**Resolution**	1 CFM
Serial:	220179C				

Direct Air Velocity Measurement					
Instrument Type:	RVA	**Date of Calibration:**	7/18/2023	**Measured Units**	FPM
Manufacturer:	Extech	**Due for Calibration:**	7/18/2024	**Accuracy**	+/- 3%
Model:	AN300	**Range:**	80 - 5,900 FPM	**Resolution**	1 FPM
Serial:	21000125				

Electrical Measurement					
Instrument Type:	V/A Meter	**Date of Calibration:**	7/18/2023	**Measured Units**	Volts / Amperes
Manufacturer:	Fluke	**Due for Calibration:**	7/18/2024	**Accuracy**	1% / 2%
Model:	375 FC	**Range:**	0 - 600.0V / 0 - 600.0A	**Resolution**	0.1 V / 0.1 A
Serial:	56081376SV				

Hydronic Pressure Measurement					
Instrument Type:	HDM	**Date of Calibration:**	4/25/2023	**Measured Units**	psi, Ft, inches
Manufacturer:	Evergreen Telemetry	**Due for Calibration:**	4/25/2024	**Accuracy**	+/- 2%
Model:	S-DP-250	**Range:**	0.01 - 250 psi	**Resolution**	0.01 psi
Serial:	2200123B			*For use w/ADM	

Rotation Measurement					
Instrument Type:	Tachometer	**Date of Calibration:**	2/9/2023	**Measured Units**	RPM
Manufacturer:	Shimpo	**Due for Calibration:**	2/9/2024	**Accuracy**	+/- 1 RPM
Model:	DT-207LR	**Range:**	0.01 - 250 psi	**Resolution**	1 RPM
Serial:	D2150121R				

Rotation Measurement					
Instrument Type:	Stroboscope	**Date of Calibration:**	7/12/2023	**Measured Units**	RPM
Manufacturer:	Monarch	**Due for Calibration:**	7/12/2024	**Accuracy**	+/- 0.005%
Model:	PLS Pocket	**Range:**	30-300,000 RPM	**Resolution**	0.1 RPM
Serial:	2753796				

Instrument Calibration

Humidity WB/DB Measurement					
Instrument Type:	RH Meter	**Date of Calibration:**	7/13/2023	**Measured Units**	WB / %RH
Manufacturer:	Evergreen Telemetry	**Due for Calibration:**	7/13/2024	**Accuracy**	+/- 1°F / 2.5%RH
Model:	PR-TH-1	**Range:**	-4 to 140°F 0% - 100%RH	**Resolution**	0.1°F / .1 %RH
Serial:	2300198				

Temperature Measurement (Immersion)					
Instrument Type:	Temperature	**Date of Calibration:**	7/19/2023	**Measured Units**	°F
Manufacturer:	Evergreen Telemetry	**Due for Calibration:**	7/19/2024	**Accuracy**	+/- .05%
Model:	PR-T-4-6	**Range:**	−40°F to 500°F	**Resolution**	0.1°F
Serial:	2300252				

Temperature Measurement (Surface)					
Instrument Type:	Temperature	**Date of Calibration:**	7/11/2023	**Measured Units**	°F
Manufacturer:	Evergreen Telemetry	**Due for Calibration:**	7/11/2024	**Accuracy**	+/- .05%
Model:	PR-T-2	**Range:**	−40°F to 500°F	**Resolution**	0.1°F
Serial:	2300142				

Temperature Measurement Meter					
Instrument Type:	Temp Module	**Date of Calibration:**	7/13/2023	**Measured Units**	°F
Manufacturer:	Evergreen Telemetry	**Due for Calibration:**	7/13/2024	**Accuracy**	+/- .05%
Model:	MS - T&H-101	**Range:**	−40°F to 500°F	**Resolution**	0.1°F
Serial:	2300207C			*For use w/Imm./Sur.	

EVERGREEN TELEMETRY

Certificate of Calibration

United Test and Balance

Manufacturer	Evergreen Telemetry	Calibration Environment		
Product	Pressure / Velocity Module	Temperature	75	°F
Model	S-PVF-1	Rel. Humidity	42	%
SN	2200179C	Bar. Pressure	28.6	in Hg

☐ As Found ☒ As Left ☒ In Tolerance ☐ Out of Tolerance

Calibration Data

Measurement Variable	Test Point	Cal Standard	Allowable Range Min	Allowable Range Max	Test Instrument	
Barometric Pressure (in Hg)	Spec		-2% - 0.1	+ 2% + 0.1		
	1	20.0			20.1	
	2	28.6			28.7	
	3	33.0			33.1	
Differental Pressure (in wc)	Spec		-2%-.001	+2%+.001		
	1	10.00			9.973	
	2	2.000			1.990	
	3	0.5000			0.4977	
	4	0.0500			0.0498	
	5	-10.00			-10.022	
	6	-0.0500			-0.0498	
			-3% - 7	+3% + 7		
Via Pitot >> Velocity Pressure >> (inW.C. / FPM) -3% -7	7	.00067 / 103			104	
	8	.016 / 506			505	

Indicates out of tolerance condition ←

NIST-Traceable Lab Calibration Standards

Variable	System ID	Calibration Last	Calibration Due
Pressure	7481227	8-Mar-23	8-Mar-25
Pressure	7568470	8-Mar-23	8-Mar-25
Pressure	7871917	16-Nov-21	16-Nov-23
Pressure	7870754	16-Nov-21	16-Nov-23
Pressure	2205000006	27-Jan-22	27-Jan-24
Velocity	2100191A	24-Feb-23	24-Feb-25

This instrument has been checked for accuracy, calibrated to manufacturer's specifications, and found to be within the specified tolerance unless otherwise stated. It has been calibrated using measurement standards traceable to the National Institue of Standards and Technology, or accepted intrinsic standards of measurement, or derived by the ratio type of self calibrated techniques.

Calibrated By	13-Jul-2023 Calibration Date	13-Jul-2025 Date Due

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MICRO PRECISION

Certificate of Calibration

Date: Jul 19, 2023 **Cert No.** 5523631030212360

Customer:
UNITED TEST AND BALANCE INC

		Work Order #:	TX-8028008
		Purchase Order #:	CC
MPC Control #:	56081376SV	Serial Number:	56081376SV
Asset ID:	N/A	Department:	N/A
Gage Type:	CLAMP METER	Performed By:	JOSHUA MCLAND
Manufacturer:	FLUKE	Received Condition:	IN TOLERANCE
Model Number:	375 FC	Returned Condition:	IN TOLERANCE
Size:	N/A	Cal. Date:	July 18, 2023
Temp/RH:	69.0°F / 54.0%	Cal. Interval:	12 MONTHS
Location:	Calibration performed at MPC facility	Cal. Due Date:	July 18, 2024

Calibration Notes:
Three point calibration was performed. Unit under test passes calibration in accordance with manufacturer set tolerances.

Standards Used to Calibrate Equipment

I.D.	Description.	Model	Serial	Manufacturer	Cal. Due Date	Traceability #
DX3046	CALIBRATOR	5520A W/ SC600	8035004	FLUKE	Jul 31, 2023	551220085312712
EA4683	50 TURN CURRENT COIL	5500A / COIL	83010069	FLUKE		

Procedures Used in this Event

Procedure Name	Description
FLUKE 37X SUPPLEMENT Rev. ISS.5	Clamp Meter, Fluke 374/375/376, Iss.5, Jul-26-2016

Calibrating Technician: JOSHUA MCLAND QC Approval: MICHAEL RODRIGUEZ

MICRO PRECISION

Certificate of Calibration

Date: Jul 19, 2023 **Cert No.**

Customer:
UNITED TEST AND BALANCE INC

UNITED TEST & BALANCE, INC.

		Work Order #:	TX-8028008
		Purchase Order #:	CC
MPC Control #:	2100125	Serial Number:	21000125
Asset ID:	N/A	Department:	N/A
Gage Type:	THERMO-ANEMOMETER	Performed By:	JOSHUA MCLAND
Manufacturer:	EXTECH INSTRUMENT	Received Condition:	IN TOLERANCE
Model Number:	AN300	Returned Condition:	IN TOLERANCE
Size:	N/A	Cal. Date:	July 18, 2023
Temp/RH:	69.0°F / 54.0%	Cal. Interval:	12 MONTHS
Location:	Calibration performed at MPC facility	Cal. Due Date:	July 18, 2024

Calibration Notes:
Three point calibration was performed. Unit under test passes calibration in accordance with manufacturer set tolerances.

Standards Used to Calibrate Equipment

I.D.	Description.	Model	Serial	Manufacturer	Cal. Due Date	Traceability #
CE6546	WIND TUNNEL	NMN	NSN	PAXTON AIRRESEARCH	Jul 31, 2023	551220083698505
CD6300	THERMAL ANEMOMETER	CF8570	55070088	ALNOR	Jul 31, 2023	551220081509553

Procedures Used in this Event

Procedure Name	Description
EXTECH AN200 Rev. VERSION 2.1	CFM/CMM Thermo-Anemometer w/ InfraRed Thermometer ,Extech AN200, ver.2.1, Mar-01-2008

Calibrating Technician: JOSHUA MCLAND QC Approval: MICHAEL RODRIGUEZ

EVERGREEN TELEMETRY

Certificate of Calibration

United Test & Balance

Manufacturer	Evergreen Telemetry	Calibration Environment		
Product	Water Pressure Sensing Module	Temperature	75	°F
Model	S-DP-250	Rel. Humidity	24	%
SN	22001238	Bar. Pressure	28.5	in Hg

☐ As Found ☒ As Left ☒ In Tolerance ☐ Out of Tolerance

Calibration Data

Specification +/- 2% +/- last digit Approx Set Point	Cal Std	Sensor 1 Diff Pres	Difference (%)	Cal Std	Sensor 2 Gage Lo	Diff %
PSI	(fwc)	(fwc)		(fwc)	(fwc)	
0.13	0.3	0.3	0	0.3	0.3	0
0.434	1.0	1.0	0	1.0	1.0	0
0.867	2.0	2.0	0	2.0	2.0	0
2.168	5.0	5.0	0	5.0	5.0	0
	PSI	PSI		PSI	PSI	
10	10.0	10.1	1.0	10.0	10.1	1.0
40	40.0	40.0	0.0	40.0	40.1	0.3
80	80.0	80.5	0.6	80.0	80.5	0.6
120	120.0	120.1	0.1	120.0	120.0	0.0
240	240.0	240.2	0.1	240.0	240.4	0.2

Conversion

PSI	fwc	inwc
1.00	2.307	27.68
0.434	1.00	12.00

Indicates out of tolerance condition ←

NIST-Traceable Calibration Lab Standards

Variable	System ID	Calibration Last	Calibration Due
Pressure	5564304	20-Sep-21	20-Sep-23
Temperature	21396189	5-Oct-21	5-Oct-23

This instrument has been checked for accuracy, calibrated to manufacturer's specifications, and found to be within the specified tolerance unless otherwise stated. It has been calibrated using measurement standards traceable to the National Institue of Standards and Technology, or accepted intrinsic standards of measurement, or derived by the ratio type of self calibrated techniques.

Calibrated By	25-Apr-2023 Calibration Date	25-Apr-2024 Date Due

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MICRO PRECISION

Certificate of Calibration

Date: Jul 19, 2023 **Cert No.** 5523631030212364

Customer:

UNITED TEST AND BALANCE INC

		Work Order #:	TX-8028008
		Purchase Order #:	CC
MPC Control #:	D21B0070R	Serial Number:	D21B0070R
Asset ID:	N/A	Department:	N/A
Gage Type:	TACHOMETER	Performed By:	JOSHUA MCLAND
Manufacturer:	NIDEC	Received Condition:	IN TOLERANCE
Model Number:	DT-207LR	Returned Condition:	IN TOLERANCE
Size:	N/A	Cal. Date:	July 18, 2023
Temp/RH:	69.0°F / 54.0%	Cal. Interval:	12 MONTHS
Location:	Calibration performed at MPC facility	Cal. Due Date:	July 18, 2024

Calibration Notes:

Three point calibration was performed. Unit under test passes calibration in accordance with manufacturer set tolerances.

Standards Used to Calibrate Equipment

I.D.	Description.	Model	Serial	Manufacturer	Cal. Due Date	Traceability #
DH0135	FUNCTION / ARBITRARY WAVEFORM GENERATOR	33120A	SG40019241	HEWLETT PACKARD	Mar 31, 2024	551220084949009

Procedures Used in this Event

Procedure Name	Description
DT-200LR SERIES Rev. NA	Check-Line DT-200LR Series Contact and no Contact Tachometer Specifications.

Calibrating Technician: JOSHUA MCLAND QC Approval: MICHAEL RODRIGUEZ

STATEMENTS OF PASS OR FAIL CONFORMANCE: The uncertainty of measurement has been taken into account when determining compliance with specification. All measurements and test results guard banded to ensure the probability of false-accept does not exceed 2% in compliance with ANSI/NCSL Z540.3-2006.

THE CALIBRATION REPORT STATUS:

PASS- Term used when compliance statement is given, and the measurement result is PASS.
PASS^{z}- Term used when compliance statement is given, and the measurement result is conditional passed or PASS^{z}.
FAIL- Term used when compliance statement is given, and the measurement result is FAIL.
FAIL^{z}- Term used when compliance statement is given, and the measurement result is conditional failed or FAIL^{z}.
REPORT OF VALUE - Term used when reported measurement is not requiring compliance statement in report.
ADJUSTED- When adjustments are made to an instrument which changes the value of measurement from what was measured as found to new value as left.
LIMITED - When an instrument fails calibration but is still functional in a limited manner.

The expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%, unless otherwise stated.
This calibration report complies with ISO/IEC 17025:2017, ANSI/NCSL Z540.3-2006 and ANSI/NCSL Z540.1-1994. Calibration cycles and resulting due dates were submitted/approved by the customer. Any number of factors may cause an instrument to drift out of tolerance before the next scheduled calibration. Recalibration cycles should be based on frequency of use, environmental conditions and customer's established systematic accuracy. All standards are traceable to SI through the National Institute of Standards and Technology (NIST) and/or recognized national or international standards laboratories. Services rendered include proper manufacturer's service instruction and are warranted for no less than thirty (30) days. The information on this report pertains only to the instrument identified, this may not be reproduced in part or in a whole without the prior written approval of the issuing MP Calibration Laboratory.

Page 1 of 1 (CERT, Rev 9)

MICRO PRECISION

Certificate of Calibration

UNITED TEST & BALANCE, INC.

Date: Jul 19, 2023 **Cert No.**

Customer:

UNITED TEST AND BALANCE INC

		Work Order #:	TX-8028008
		Purchase Order #:	CC
MPC Control #:	2753796	Serial Number:	2753796
Asset ID:	N/A	Department:	N/A
Gage Type:	POCKET LED STROBE	Performed By:	JOHNATHON BISERCHICH
Manufacturer:	MONARCH INSTRUMENTS	Received Condition:	IN TOLERANCE
Model Number:	PLS	Returned Condition:	IN TOLERANCE
Size:	N/A	Cal. Date:	July 12, 2023
Temp/RH:	70.0°F / 40.0%	Cal. Interval:	12 MONTHS
Location:	Calibration performed at MPC facility	Cal. Due Date:	July 12, 2024

Calibration Notes:

Three point calibration was performed. Unit under test passes calibration in accordance with manufacturer set tolerances.

Standards Used to Calibrate Equipment

I.D.	Description.	Model	Serial	Manufacturer	Cal. Due Date	Traceability #
CE9038	TACHOMETER	HHT13	1823361	OMEGA	Oct 31, 2023	551220085563017

Procedures Used in this Event

Procedure Name	Description
MONARCH NOVA-STROBE BXX	Stroboscope, Monarch Instrument Nova-Strobe BXX, May-07-2010

Calibrating Technician: JOHNATHON BISERCHICH QC Approval: MICHAEL RODRIGUEZ

STATEMENTS OF PASS OR FAIL CONFORMANCE: The uncertainty of measurement has been taken into account when determining compliance with specification. All measurements and test results guard banded to ensure the probability of false-accept does not exceed 2% in compliance with ANSI/NCSL Z540.3-2006.

THE CALIBRATION REPORT STATUS:

PASS- Term used when compliance statement is given, and the measurement result is PASS.
PASS^{z}- Term used when compliance statement is given, and the measurement result is conditional passed or PASS^{z}.
FAIL- Term used when compliance statement is given, and the measurement result is FAIL.
FAIL^{z}- Term used when compliance statement is given, and the measurement result is conditional failed or FAIL^{z}.
REPORT OF VALUE - Term used when reported measurement is not requiring compliance statement in report.
ADJUSTED- When adjustments are made to an instrument which changes the value of measurement from what was measured as found to new value as left.
LIMITED - When an instrument fails calibration but is still functional in a limited manner.

The expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%, unless otherwise stated.
This calibration report complies with ISO/IEC 17025:2017, ANSI/NCSL Z540.3-2006 and ANSI/NCSL Z540.1-1994. Calibration cycles and resulting due dates were submitted/approved by the customer. Any number of factors may cause an instrument to drift out of tolerance before the next scheduled calibration. Recalibration cycles should be based on frequency of use, environmental conditions and customer's established systematic accuracy. All standards are traceable to SI through the National Institute of Standards and Technology (NIST) and/or recognized national or international standards laboratories. Services rendered include proper manufacturer's service instruction and are warranted for no less than thirty (30) days. The information on this report pertains only to the instrument identified, this may not be reproduced in part or in a whole without the prior written approval of the issuing MP Calibration Laboratory.

Page 1 of 1 (CERT, Rev 9)

EVERGREEN TELEMETRY

Certificate of Calibration

United Test and Balance

Manufacturer	Evergreen Telemetry			Calibration Environment		
Temperature Product		Module	Probe	Temperature	76	°F
Model			PR-T-4-6	Rel. Humidity	37	%
SN			2300252	Bar. Pressure	28.6	in Hg

☐ As Found ☒ As Left ☒ In Tolerance ☐ Out of Tolerance

Calibration Data

Measurement Variable	Test Point	Cal Standard	Allowable Range Min	Allowable Range Max	Test Instrument	
Cal Lab Module & Test Probe	Spec					
Temperature (°F)	1	78.9	-0.3	+0.3	78.9	
	2	242.5	-2.6	+2.6	243.1	
	3	-42.8	-1.6	+1.6	-42.7	

Indicates out of tolerance condition ——↑

Calibration Standard SN & Dates

Variable	System ID	Calibration Last	Calibration Due
Temperature	21396189	5-Oct-21	5-Oct-23

This instrument has been checked for accuracy, calibrated to manufacturer's specifications, and found to be within the specified tolerance unless otherwise stated. It has been calibrated using measurement standards traceable to the National Institue of Standards and Technology, or accepted intrinsic standards of measurement, or derived by the ratio type of self calibrated techniques.

Calibrated By: Julie Stoddard 19-Jul-2023 Calibration Date 19-Jul-2025 Date Due

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EVERGREEN TELEMETRY

Certificate of Calibration

United Test and Balance

Manufacturer	Evergreen Telemetry	Calibration Environment		
Product	Humidity Sensor	Temperature	75	°F
Model	PR-TH-1	Rel. Humidity	42	%
SN	2300198	Bar. Pressure	28.6	in Hg

☐ As Found ☒ As Left ☒ In Tolerance ☐ Out of Tolerance

Calibration Data

Measurement Variable	Test Point	Cal Standard	Allowable Range Min	Allowable Range Max	Test Instrument	
Temperature (°F)	Spec					
	1	39.7	-1.0	1.0	39.5	
	2	78.5	-1.0	1.0	78.3	
	3	85.9	-1.0	1.0	85.9	
	4	128.6	-2.0	2.0	129.4	
Barometric Pressure (in Hg)	Spec		-2% - 0.1	+ 2% + 0.1		
	1	20.0			20.0	
	2	28.5			28.4	
	3	33.0			33.0	
Humidity %RH 10 to 90%	Spec		-3	3		
	1	8.5			8.2	
	2	26.9			26.9	
	3	62.5			60.6	
	4	86.8			85.5	

Indicates out of tolerance condition ——↑

Calibration Standard

Variable	System ID	Calibration Last	Calibration Due
Temperature	21396189	5-Oct-21	5-Oct-23
Pressure	2205000006	27-Jan-22	27-Jan-24
Humidity	20558772	26-Oct-21	26-Oct-23

This instrument has been checked for accuracy, calibrated to manufacturer's specifications, and found to be within the specified tolerance unless otherwise stated. It has been calibrated using measurement standards traceable to the National Institue of Standards and Technology, or accepted intrinsic standards of measurement, or derived by the ratio type of self calibrated techniques.

Temperature accuracy (dry bulb) varies across the operating range:
Temperature over 32-100F +/- 1.0 F
Temperature over 100-158F +/- 2.0 F

Calibrated By: Julie Stoddard 13-Jul-2023 Calibration Date 13-Jul-2024 Date Due

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EVERGREEN TELEMETRY

Certificate of Calibration

United Test and Balance

Manufacturer	Evergreen Telemetry		Calibration Environment		
Temperature Product		Module	Temperature	75	°F
Model		PR-T-2	Rel. Humidity	40	%
SN		2300142	Bar. Pressure	29.6	in Hg

☐ As Found ☒ As Left ☒ In Tolerance ☐ Out of Tolerance

Calibration Data

Measurement Variable	Test Point	Cal Standard	Allowable Range Min	Allowable Range Max	Test Instrument	
Cal Lab Module & Test Probe	Spec					
Temperature (°F)	1	78.7	-0.3	+0.3	78.8	
	2	241.3	-2.6	+2.6	241.6	
	3	-41.7	-1.6	+1.6	-42.8	

Indicates out of tolerance condition —→

Calibration Standard SN & Dates

Variable	System ID	Calibration Last	Calibration Due
Temperature	21396189	5-Oct-21	5-Oct-23

This instrument has been checked for accuracy, calibrated to manufacturer's specifications, and found to be within the specified tolerance unless otherwise stated. It has been calibrated using measurement standards traceable to the National Institue of Standards and Technology, or accepted intrinsic standards of measurement, or derived by the ratio type of self calibrated techniques.

Calibrated By

11-Jul-2023 Calibration Date

11-Jul-2025 Date Due

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EVERGREEN TELEMETRY

Certificate of Calibration

United Test and Balance

Manufacturer	Evergreen Telemetry		Calibration Environment		
Temperature Product	Module Sensor		Temperature	75	°F
Model	MS - T&H - 101		Rel. Humidity	42	%
SN	2300207C		Bar. Pressure	28.6	in Hg

☐ As Found ☒ As Left ☒ In Tolerance ☐ Out of Tolerance

Calibration Data

Measurement Variable	Test Point	Cal Standard	Allowable Range Min	Allowable Range Max	Test Instrument	
Cal Lab Probe & Test Module	Spec					
Temperature (°F)	1	78.7	-0.3	+0.3	78.7	
	2	242.4	-2.6	+2.6	243.1	
	3	-43.5	-1.6	+1.6	-43.4	

Indicates out of tolerance condition —→

Calibration Standard SN & Dates

Variable	System ID	Calibration Last	Calibration Due
Temperature	21396189	5-Oct-21	5-Oct-23

This instrument has been checked for accuracy, calibrated to manufacturer's specifications, and found to be within the specified tolerance unless otherwise stated. It has been calibrated using measurement standards traceable to the National Institue of Standards and Technology, or accepted intrinsic standards of measurement, or derived by the ratio type of self calibrated techniques.

Calibrated By

13-Jul-2023 Calibration Date

13-Jul-2025 Date Due

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UNITED TEST & BALANCE, INC.

Terms & Abbreviations

AHU	AIR HANDLING UNIT
AC OR ACU	AIR CONDITIONER UNIT
ACCU	AIR COOLED CONDENSING UNIT
ADJ P.D.	ADJUSTED PITCH DIAMETER
AMP	AMPERE
AVG	AVERAGE
B.H.P.	BRAKE HORSEPOWER
C.D.	CEILING DIFFUSER
CFM	CUBIC FEET PER MINUTE
C.E.	CEILING EXHAUST
CH	CHILLER
CHWR	CHILLED WATER RETURN
CHW OR CHWS	CHILLED WATER SUPPLY
C.R.	CEILING RETURN
CT	COOLING TOWER
CWR	CONDENSER WATER RETURN
CW OR CWS	CONDENSER WATER SUPPLY
DB	DRY BULB
D.D.	DIRECT DRIVE
D.P.	DIFFERENCE, NET DECREASE OR INCREASE
DIA	DIAMETER
D.N.A.	DATA NOT AVAILABLE
D.N.L	DATA NOT LISTED
EAT	ENTERING AIR TEMPERATURE
EDC	ELECTRIC DUCT COIL
EDH	ELECTRIC DUCT HEALER
EF	EXHAUST FAN
EMCS	ENERGY MANAGEMENT CONTROL SYSTEM
EWT	ENTERING WATER TEMPERATURE
FCU	FAN COIL UNIT
FH	FUME HOOD
FG	FLOOR GRILLE
F.E.	FLOOR EXHAUST OR RETURN
F.L.A	FULL LOAD AMPERAGE
FPB	FAN POWERED BOX
FPM	FEET PER MINUTE
F.S.	FLOOR SUPPLY
F.S.R	FLOOR SUPPLY REGISTER
FT. HD	FEET OF HEAD
GPM	GALLONS PER MINUTE
GFH	GAS FIRED HEATER
HC	HEATING COIL
HEATER O.L.	THERMAL OVERLOAD PROTECTION FOR MOTORS
	LOCATED AT THE MOTOR STARTER
HEPA	HIGH EFFICIENCY PARTICULATE AIR
H.F.	HEPA FILTER
HOA	HAND/OFF/AUTO SWITCH
H.P.	HORSEPOWER
HPS	HIGH PRESSURE STEAM
HRC	HEAT RECOVERY COIL OR HEAT RECLAIM COIL
HVAC	HEATING , VENTILATION AND AIR CONDITIONING
HWR	HOT WATER RETURN OR HEATING WATER RETURN
HWS	HOT WATER SUPPLY OR HEATING WATER SUPPLY
HX	HEAT EXCHANGER
I.D.	INSIDE DIAMETER
LAT	LEAVING AIR TEMPERATURE
L.D.	LINEAR SUPPLY DIFFUSER
LPS	LOW PRESSURE STEAM
L.T.	LIGHT TROFFER
LWG	LOW WALL GRILLE
LWR	LOW WALL RETURN
LWT	LEAVING WATER TEMPERATURE
MAU/MUA	MAKE UP AIR UNIT
MBH	1,000 BTU'S PER HOUR
N.A.	NOT ACCESSIBLE
N.I.	NOT INSTALLED
N.T.	NOT TAKEN
N.V.L	NO VALID LOCATION
N.Z.	NOZZLE
O.D.	OUTSIDE DIAMETER
OPEN	NO TERMINAL DEVICE INSTALLED
O.S.A. MIN	OUTSIDE AIR MINIMUM
OAT	OUTSIDE AIR TEMPERATURE
PF	POWER FACTOR
PHC	PREHEAT COIL
PH	PHASE(S)
PMP	CIRCULATING PUMP
PSI	POUNDS PER SQUARE INCH
P.T.	PITOT TRAVERSE
RA	RETURN AIR
RF	RETURN AIR FAN
R.G.	RETURN GRILLE
RHC	REHEAT COIL
RPM	REVOLUTIONS PER MINUTE
SA	SUPPLY AIR
SAT	SUPPLY AIR TEMPERATURE
S.D.	SUPPLY DIFFUSER
SEF	SMOKE EXHAUST FAN
SF (AIR)	SUPPLY FAN
S.F. (ELECT)	SERVICE FACTORS
SHC	STEAM HEATING COIL
S.P. "W.C."	STATIC PRESSURE RESISTANCE, MEASURED
	IN INCHES OF WATER COLUMN
S.W.E.	SIDEWALL EXHAUST
S.W.R.	SIDEWALL RETURN
S.W.S.	SIDEWALL SUPPLY
TAB	TESTING, ADJUSTING, AND BALANCING
TSP	TOTAL STATIC PRESSURE
UH	UNIT HEATER
V	VOLTS
VAV	VARIABLE AIR VOLUME
VD	VOLUME DAMPER
VFD	VARIABLE FREQUENCY DRIVE
VP	VELOCITY PRESSURE
W	WATTS
WB	WET BULB
W.G.	WATER GAUGE
°F	DEGREES FAHRENHEIT
ΔP	DIFFERENTIAL (DELTA) PRESSURE
	OR PRESSURE DROP
ΔT	DIFFERENTIAL (DELTA) TEMPERATURE, NET
	TEMPERATURE DECREASE OR INCREASE

Warranty Page

United TAB provides a one-year warranty for the Test and Balance work associated with this project. The warranty period is one year from the date of this report and/or warranty page. Within the warranty period if the systems tested and reported show evidence of major performance deterioration, or is significantly out of tolerance, resulting from defective test and balance workmanship; United TAB will repair and/or replace defective work or materials if responsibility is solely identified as related to the TAB work. Any evidence of the following will be deemed as not a material work defect caused by tested and balance 1) evidence of improper materials, improper installation or failed control operations 2) evidence of controls, mechanical or commissioning contractor's failure to perform specified project requirements 3) evidence of the owner or occupant's failure to maintain mechanical systems.

If the warranty issue is found to be attributed to mechanical equipment, control or maintenance related failure, or any other cause not related to the TAB work, the return trip may be subject to a service charge. Important: United TAB reserves the right to resolve TAB issues and correct any errors or omissions in test data. If any third-party or competing agency (TAB or Commissioning) tests or adjust any equipment or fluid flows, ALL PROJECT WARRANTY IS VOIDED.

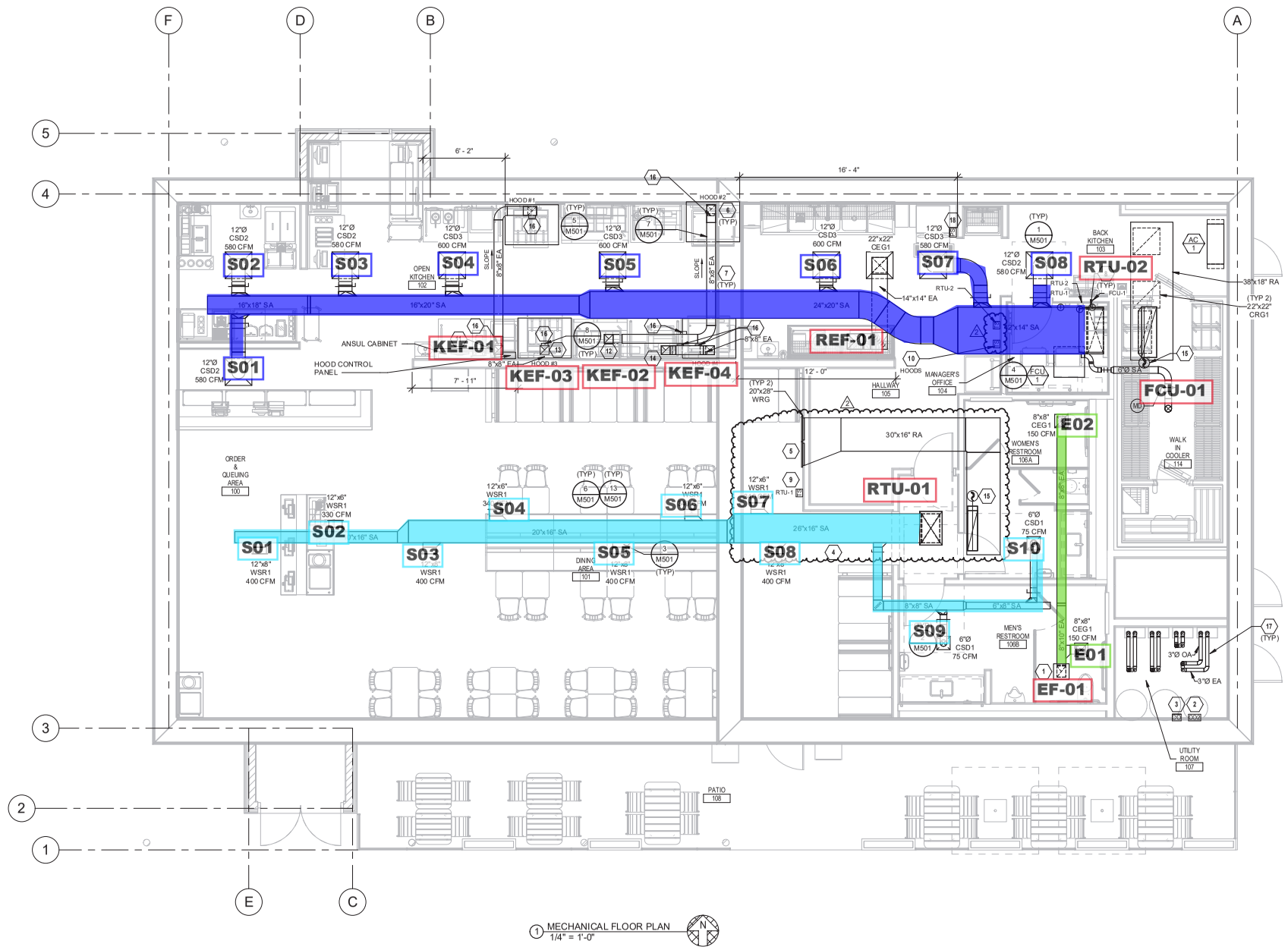
United TAB needs written notice for any TAB warranty item. Notice should be specific, itemized, and include any issues or concerns, including the specific location or system. After receiving written notice, United TAB will Assign a Project Manager to address the warrant issue. United TAB recommends an owner representative is on-site for the warrant visit.

For any balancing issues or concerns that arise, United TAB will return to the project site to address the issue or concern. United TAB will check and corroborate that the tested systems adhere with the reported data. This work will be performed at no charge.

United TAB's warranty covers comfort balancing for occupants at a maximum of one year or two warranty comfort balance visits.

As a default, TAB work is performed with systems configured for total design flow condition for both cooling and heating modes regardless of OA ambient temperature. Therefore, unless otherwise noted, this TAB report fulfills any Opposite Season requirements.

United TAB keeps an electronic file of all test documents through the end of the warranty period. During that time electronic copies of the report are provided at no charge. Extra paper copies may be subject to a fee. Building owners should keep all documentation for future reference. All documentation about this project will be destroyed in accordance with our record retention schedule.



1 MECHANICAL FLOOR PLAN
1/4" = 1'-0"

MECHANICAL GENERAL NOTES:

1. DO NOT ROUTE ANY DUCTWORK OR PIPING ABOVE ELECTRICAL PANELS.
2. REFER TO SHEET M001 FOR ADDITIONAL GENERAL NOTES AND REQUIREMENTS.
3. REFER TO DETAILS AND SCHEDULES SHEETS FOR FURTHER INFORMATION.
4. MOUNT ALL THERMOSTATS AND SENSORS CONTROLLING HVAC EQUIPMENT AT 48" AFF UNLESS OTHERWISE NOTED.

MECHANICAL PLAN NOTES:

1. UP TO EF-1 ON ROOF.
2. PROVIDE ANALOX AX60 OR APPROVED EQUAL CARBON DIOXIDE SENSOR WITH REMOTE ALARM REPEATER TO BE MOUNTED AT 18"AFF. PROVIDE CARBON DIOXIDE SENSOR WITH RELAY. RELAY SHALL BE INTERLOCKED WITH THE BUILDING FIRE ALARM SYSTEM. THE SENSOR SHALL BE EQUIPPED WITH A LOCAL AUDIBLE AND VISUAL ALARM. THE LOW LEVEL ALARM SHALL ACTIVATE THE LOCAL AUDIBLE AND VISUAL ALARM. THE HIGH LEVEL ALARM SHALL ACTIVATE RELAY. INSTALL SENSOR PER MANUFACTURER'S INSTALLATION INSTRUCTIONS.
3. CARBON MONOXIDE DETECTOR FURNISHED BY OWNER. INSTALL AT 5'-0" AFF. COORDINATE FINAL LOCATION WITH OWNER REPRESENTATIVE.
4. B.O.D. 13'4" A.F.F.
5. MOUNT RETURN GRILLES 12' A.F.F.
6. TYPE I HOODS SHALL BE FURNISHED COMPLETE WITH INTERNALLY PIPED FIRE SUPPRESSION SYSTEM AND EXTERNAL FOAM SUPPLY BOTTLES WITH REMOTE PULL CONTROLS AND IN COMPLIANCE WITH NFPA 96. DIVISION 23 SHALL COORDINATE COMPLETE INSTALLATION WITH FIRE PROTECTION CONTRACTOR TO MEET APPROVAL OF LOCAL INSPECTOR AND CODE COMPLIANCE INCLUDING TESTING.
7. TYPE I GREASE HOOD EXHAUST DUCTWORK SHALL BE MINIMUM 16 GAUGE STEEL OR MINIMUM 18 GAUGE STAINLESS STEEL WITH LIQUID TIGHT WELDS. INSTALL ACCESS PANELS FOR CLEANING AS REQUIRED BY NFPA 96 AND LOCAL CODES. TRANSITION GREASE DUCTWORK AS REQUIRED TO HOOD AND FAN CONNECTIONS. PROVIDE 45° MAX OFFSETS AS REQUIRED TO COORDINATE WITH STRUCTURE. PROVIDE RADIUS ELBOWS WITHOUT TURNING VANES. SLOPE HORIZONTAL GREASE DUCT BACK TOWARDS HOOD AT MINIMUM OF 1/4" PER LINEAL FOOT. GREASE DUCTS SHALL BE CONTAINED IN A UL APPROVED GREASE DUCT WRAP SYSTEM.
8. MOUNT THERMOSTATS AND TEMPERATURE SENSOR(S) ON WALL. THERMOSTATS AND SENSOR(S) SHALL BE LABELED TO MATCH THE UNIT TAG AND CORRESPOND TO THE ELECTRICAL LEGEND IN THE ELECTRICAL PANELBOARD SERVING THE EQUIPMENT. COORDINATE COLOR WITH ARCHITECT.
9. COMBINATION TEMPERATURE SENSOR AND HUMIDITY SENSOR. REFERENCE SPECIFICATIONS FOR REQUIREMENTS.
10. MOUNT TEMPERATURE SENSOR PROVIDED WITH KITCHEN EXHAUST HOODS ON WALL.
11. 8"X8" GREASE DUCT UP THRU ROOF TO KEF-1, REF M150 FOR CONTINUATION. PROVIDE TRANSITION AS REQUIRED TO MAKE FULL SIZE CONNECTION TO FAN.
12. 8"X8" GREASE DUCT UP THRU ROOF TO KEF-2, REF M150 FOR CONTINUATION. PROVIDE TRANSITION AS REQUIRED TO MAKE FULL SIZE CONNECTION TO FAN.
13. 8"X8" GREASE DUCT UP THRU ROOF TO KEF-3, REF M150 FOR CONTINUATION. PROVIDE TRANSITION AS REQUIRED TO MAKE FULL SIZE CONNECTION TO FAN.
14. 8"X8" GREASE DUCT UP THRU ROOF TO KEF-4, REF M150 FOR CONTINUATION. PROVIDE TRANSITION AS REQUIRED TO MAKE FULL SIZE CONNECTION TO FAN.
15. INSTALL DUCT SMOKE DETECTOR IN RETURN AIR PLENUM.
16. INSTALL "DUCTMATE ULTIMATE DOOR" ON DUCTS 12" OR LARGER AND INSTALL "DUCTMATE F1 SANDWICH ACCESS DOOR" FOR DUCTS LESS THAN 12" ON GREASE DUCT ACCESS PANELS FOR CLEANING IN LOCATION SHOWN AT A MINIMUM AND AS REQUIRED BY NFPA 96 AND LOCAL CODES.
17. PROVIDE COMBUSTION AIR AND EXHAUST PIPE AND ROUTE TO CONCENTRIC VENT THROUGH ROOF.
18. INSTALL HOOD FIRE SUPPRESSION MANUAL PULL STATION. COORDINATE EXACT LOCATION AND REQUIREMENTS WITH FIRE SUPPRESSION SYSTEM INSTALLER AND THE AUTHORITY HAVING JURISDICTION.

ALL GREASE DUCT TO BE WATER TESTED BY ENVIROMATIC AT MECHANICAL CONTRACTOR'S EXPENSE. CONTACT OWNER'S NATIONAL ACCOUNT VENDOR:

ENVIROMATIC
DON PFLEDERER
1.800.325.8476
inspections@enviromatic.com

THE BUILDINGS HVAC SYSTEMS SHALL BE BALANCED BY NATIONAL TAB (NO EXCEPTIONS) AND CONTRACTED BY THE GENERAL CONTRACTOR.

CONTACT:
WILL TURNBOUGH
will@nationaltab.com
855-682-6822 ext704

zebra
ZEBRA ARCHITECTURE, PLLC
14614 N KIERLAND BLVD. SUITE N300
SCOTTSDALE, ARIZONA 85254
PHONE: 480.912.1169 zbr.global

HENDERSON ENGINEERS
8345 LENEXA DRIVE, SUITE 300
LENEXA, KS 66214
TEL 913.742.5000 FAX 913.742.5001
WWW.HENDERSONENGINEERS.COM
21600011407
WA. CORPORATE NO: 1754
EXPIRES 6/30/2023

STORE NO: 1377

SHAKE SHACK
ALDERWOOD MALL
18801 ALDERWOOD MALL PKWY
LYNNWOOD, WA 98037

REVISION

	DATE	DESCRIPTION
	01/24/22	PERMIT/BID SET
A	05/02/22	REVISION A
B	05/19/22	REVISION B
C	08/29/22	REVISION C
1	11/10/22	REVISION 1
2	01/13/23	VE CHANGES

STATUS: IFC SET

JUSTIN M. OLDER
STATE OF WASHINGTON
36737
REGISTERED
PROFESSIONAL ENGINEER
01/13/2023

FIELD VERIFICATION:
The contractor shall verify all found dimensions and condition at the project site and notify Zebra Architecture, PLLC of any dimensional errors, or omissions or discrepancies before beginning or fabricating any work. Do not scale these drawings.

SHEET NAME: **MECHANICAL FLOOR PLAN**

DATE: 02/17/22
PROJECT NO: 34288
DRAWN: AJP
SCALE:

SHEET NO: **M101**

ROOFTOP UNIT CONTROL MATRIX

CONTROL FEATURE	UNITS	RTU-1 DINING SETPOINT OR Y/N	RTU-2 KITCHEN SETPOINT OR Y/N	NOTES
SETPOINTS				
COOLING - OCCUPIED SETPOINT	°F	75	75	
COOLING - UNOCCUPIED SETPOINT	°F	80	80	
HEATING - OCCUPIED SETPOINT	°F	70	68	
HEATING - UNOCCUPIED SETPOINT	°F	60	60	
DEHUMIDIFICATION SETPOINT - HUMIDITY SENSOR FEEDBACK	% RH	50%	50%	B
PROGRAMMED CONTROL FEATURES				
HVAC SYSTEM OCCUPIED/UNOCCUPIED MODE - PROGRAMMABLE THERMOSTAT		Y	Y	B
REMOTE TEMPERATURE AND HUMIDITY SENSOR		Y	Y	B
EQUIPMENT ACCESSORIES AND CONTROL MODULES				
OUTSIDE AIR DAMPER - MOTOR OPERATED (MODULATING)		Y	Y	L
INTEGRATED ECONOMIZER - DIFFERENTIAL ENTHALPY ENABLE (OA ENTHALPY < RA ENTHALPY)	BTU/LB	Y	Y	E
ECONOMIZER FAULT DETECTION AND DIAGNOSTICS (FDD) SYSTEM		Y	Y	F, G
RELIEF - CONSTANT VOLUME POWERED EXHAUST FAN		Y	Y	H
COOLING COIL (DX - STAGED)		Y	N	M
COOLING COIL (DX - VARIABLE SPEED)		N	Y	M
DEHUMIDIFICATION - HOT GAS REHEAT		Y	Y	O
HEATING COIL (NATURAL GAS)		Y	Y	M
SUPPLY FAN CONTROL METHODS				
ON DURING OCCUPIED HOURS		Y	Y	
CYCLE WITH LOADS DURING UNOCCUPIED HOURS		Y	Y	
SAFETIES, INTERLOCKS, AND ALARMS				
GAS VALVE SAFETY		Y	Y	F
RETURN AIR SMOKE DETECTOR - SAFETY SHUTDOWN		Y	Y	U
FIRE ALARM CONTROL PANEL - SAFETY SHUTDOWN INTERLOCK		Y	Y	
KITCHEN EXHAUST SYSTEM INTERLOCK		Y	Y	S

DIV. 23 CONTRACTOR SHALL PROVIDE CONTROL PANEL(S), WIRING, THERMOSTAT(S), TEMPERATURE SENSOR(S), HUMIDISTAT(S), AND/OR CO2 SENSOR(S) WHERE SHOWN ON THE DRAWINGS AND AS REQUIRED TO FACILITATE THE SCHEDULED CONTROL MODULES AND SEQUENCES OF OPERATION. EACH UNIT SHALL CONTROL BASED ON ITS OWN INTERNAL SAFETIES, TIME DELAYS, AND SEQUENCES UNLESS NOTED OTHERWISE. COORDINATE WITH OWNER FINAL BUILDING AND EQUIPMENT SCHEDULES DURING STARTUP. REFERENCE DIVISION SPECIFICATIONS FOR INDIVIDUAL DEVICE REQUIREMENTS.

NOTES:

B. DIVISION 23 CONTRACTOR SHALL PROVIDE DEVICE.
E. IF SETPOINT VALUE IS LISTED, IT INDICATES ECONOMIZER HIGH-LIMIT SHUTOFF. UNIT SHALL BE IN ECONOMIZER IF CONDITIONS ARE LESS THAN SETPOINT. THE FOLLOWING SENSORS SHALL DETERMINE ECONOMIZER ON POINT.
  - OUTSIDE AIR TEMPERATURE; DIVISION 23 PROVIDED AS PART OF ECONOMIZER CONTROL MODULE.
  - RETURN AIR TEMPERATURE; DIVISION 23 PROVIDED AS PART OF ECONOMIZER CONTROL MODULE.
  - OUTSIDE AIR HUMIDITY; DIVISION 23 PROVIDED AS PART OF ECONOMIZER CONTROL MODULE.
  - RETURN AIR HUMIDITY; DIVISION 23 PROVIDED AS PART OF ECONOMIZER CONTROL MODULE.
F. DEVICE SHALL BE FACTORY MOUNTED AND PRE-WIRED FOR OPERATION SUBJECT TO THE ONBOARD CONTROLLER.
G. PROVIDE UNIT WITH AN FDD SYSTEM CONSISTING OF PERMANENTLY INSTALLED OUTSIDE AIR, SUPPLY AIR, AND RETURN AIR TEMPERATURE SENSORS. THE UNIT CONTROLLER SHALL AT A MINIMUM BE CAPABLE OF PROVIDING SYSTEM STATUS OF ECONOMIZER, COMPRESSOR, HEATING, MIXED AIR LOW LIMIT ALARM, AND SENSOR VALUES. EACH OPERATING MODE SHALL BE CAPABLE OF INDEPENDENTLY OPERATING FOR TESTING. THE SYSTEM SHALL REPORT FAULTS TO AN APPLICATION ACCESSIBLE BY SERVICE PERSONNEL. THE FOLLOWING FAULTS SHALL BE DETECTED: AIR TEMPERATURE SENSOR FAILURE, ECONOMIZER ENABLED/DISABLED WHEN ECONOMIZER SHOULD BE OFF/ON, RESPECTIVELY, DAMPER NOT MODULATING, AND EXCESS OUTSIDE AIR.
H. POWERED EXHAUST FAN SHALL STAGE ON AND OFF ACCORDING TO DAMPER POSITION.
L. EQUIPMENT MANUFACTURER SHALL PROVIDE MODULATING DAMPER AND CONTROLS CAPABLE OF ADJUSTING THE DAMPER POSITION TO MAINTAIN THE SCHEDULED OUTSIDE AIR ON THE DRAWINGS ACROSS ALL FAN SPEEDS. DIV. 23 CONTRACTOR SHALL PROGRAM MULTIPLE DAMPER POSITION SETPOINTS IN THE FIELD DURING TESTING AND BALANCING TO MAINTAIN MINIMUM VENTILATION WHEN NOT IN ECONOMIZER. DAMPER SHALL BE CLOSED DURING UNOCCUPIED HOURS.
M. UNITARY CONTROLLER SHALL MODULATE AND/OR CYCLE SUPPLY FAN SPEED SETTING AND COIL CAPACITY STAGES SUBJECT TO THE INTERNAL SAFETIES AND SEQUENCES TO MAINTAIN SCHEDULED SETPOINTS.
O. PROGRAM DEHUMIDIFICATION SEQUENCE BASED ON ZONE AIR HUMIDITY.
S. INTERLOCK RTU WITH KITCHEN EXHAUST HOOD SYSTEM(S) TO SHUT DOWN UPON SIGNAL FROM HOOD FIRE EXTINGUISHING SYSTEM. INTERLOCK RTU WITH KITCHEN EXHAUST FAN TO ENERGIZE WHEN HOOD SYSTEM IS ENERGIZED FOR PRESSURIZATION.
U. DIVISION 28 CONTRACTOR SHALL PROVIDE DEVICE.

UNIT HEATER SCHEDULE (ELECTRIC)

MARK	MANUFACTURER	MODEL	OUTPUT (MBH)	OUTPUT (KW)	MIN. NO. OF STAGES	CFM	MAX AMPS	V/PH	NOTES
UH-1	QMARK	MUH03-81	10.2	3	1	350	14.5	208/1	A-C

MODEL NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND MODEL NUMBERS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

NOTES:

A. EQUIPMENT FURNISHED AND INSTALLED PER THE RESPONSIBILITY SCHEDULE.
B. PROVIDE WITH UNIT MOUNTED THERMOSTAT.
C. PROVIDE FACTORY MOUNTED DISCONNECT INSTALLED ON SERVICE SIDE OF UNIT.

BUILDING AIR BALANCE SUMMARY NORMAL OPERATION

UNIT NO.	SUPPLY (CFM)	OUTDOOR (CFM)	EXHAUST (CFM)	PERCENT OA/SA
DOAS-1	4,700	2,500	--	53%
RTU-1	3,100	1,000	--	32%
FCU-1	420	40	--	10%
KEF-1	--	–	700	--
KEF-2	--	–	700	--
KEF-3	--	–	700	--
KEF-4	--	–	700	--
EF-1	--	–	300	--
TOTAL	8,220	3,540	3,100	--
			DESIGN BUILDING PRESSURIZATION AIRFLOW (CFM)	440
			PRESSURIZATION CHECK	12%

FAN COIL UNIT SCHEDULE (HEAT PUMP)

MARK	MFR	MODEL	SUPPLY FAN			COOLING COIL						REFR	HEAT PUMP HEATING COIL				MIN	ELECTRICAL				WEIGHT	NOTES
			CFM	ESP (IN)	NOM HP	TH (MBH)	SH (MBH)	EAT (°F DB)	EAT (°F WB)	LAT (°F DB)	LAT (°F WB)	TYPE	MIN OUT (MBH)	AMBIENT (DB)	EAT (°F DB)	LAT (°F DB)	O/A (CFM)	V/PH	MCA	MOCP	DISC TYPE	(LBS)	
FCU-1	CARRIER	40MBCQ18	420	0.025	0.061	9.6	8.9	75.4	62.8	56.2	55.1	R410A	11.3	19.2	65.2	90	40	208/1	N/A	N/A	NF	45	A - J

*** EQUIPMENT SHALL BE OBTAINED THROUGH SHAKE SHACK NATIONAL ACCOUNT. REFER TO T002 / VENDOR LIST FOR MORE INFORMATION.**
MODEL NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND MODEL NUMBERS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

NOTES:

A. EQUIPMENT FURNISHED AND INSTALLED PER THE RESPONSIBILITY SCHEDULE, REF ARCHITECTURAL DRAWINGS.
B. ASSOCIATED CONDENSING UNIT SHALL BE BY THE SAME MANUFACTURER.
C. FOR COOLING, EQUIPMENT SIZED FOR 80°F AMBIENT TEMPERATURE. HEAT PUMP HEATING CAPACITY BASED ON AMBIENT TEMPERATURE LISTED.
D. PROVIDE UNIT WITH CLEANABLE AIR FILTERS.
E. PROVIDE WITH 7-DAY PROGRAMMABLE THERMOSTAT WITH STAGED HEATING AND COOLING CAPABILITY AS REQUIRED FOR OPERATION OF HEATING AND COOLING CONTROLS.
F. PROVIDE FACTORY MOUNTED STARTER AND DISCONNECT SWITCH INSTALLED ON SERVICE SIDE OF UNIT.
G. PROVIDE SINGLE POINT POWER CONNECTION.
H. PROVIDE WITH SPRING VIBRATION ISOLATION AND ALL-THREAD HANGING RODS.
J. REFERENCE PLUMBING PLANS FOR CONDENSATE DRAIN PIPING FROM UNIT.

PROJECT DESIGN CONDITIONS

CLIMATE CONDITONS

WEATHER STATION:		BELLINGHAM INTL, WA, USA			
CLIMATE ZONE		4A			
HEATING (DB):	99.6%	19.2	°F		
COOLING (DB/MCWB):	0.4%	79.4	°F/	65.3	°F/

BUILDING...

MONDAY - FRIDAY	TBD BY OWNER
SATURDAY	TBD BY OWNER
SUNDAY	TBD BY OWNER
HOLIDAY	TBD BY OWNER

SPACE / UNIT DESCRIPTION	SET POINTS											SPACE OPERATING HOURS OCCUPIED / UNOCCUPIED			NOTES
	COOLING / DE-HUMIDIFICATION				HEATING		HUMIDIFICATION		ZONE VENTILATION RESET						
	OCC °F	UNOCC °F	MAX RH %	MIN RH %	OCC °F	UNOCC °F	MIN RH %	MAX RH %	CONTROL METHOD	BASE PPM	MAXIMUM PPM	M-F	SAT	SUN	
DINING AREAS	75	80	50%	NA	70	60	NA	NA	NA	NA	NA	TBD	TBD	TBD	A,B,C
OFFICES	75	80	50%	NA	70	60	NA	NA	NA	NA	NA	TBD	TBD	TBD	A,B,C
STOCKROOM/STORAGE	75	80	50%	NA	70	60	NA	NA	NA	NA	NA	TBD	TBD	TBD	A,B,C
FOOD PREP AREAS	75	80	50%	NA	70	60	NA	NA	NA	NA	NA	TBD	TBD	TBD	A,B,C

NOTES:

A. ZONE LEVEL SET POINT CONDITIONS SHALL BE AS SCHEDULED UNLESS OTHERWISE SCHEDULED OR NOTED ON THE DRAWINGS FOR ROOM SPECIFIC SPACE CONDITIONS.
B ZONE LEVEL OCCUPANCY HOUR SCHEDULE SHALL BE PER BUILDING OPERATING HOURS UNLESS OTHERWISE SCHEDULED.
C. ZONE LEVEL CONTROLS SHALL BE CAPABLE OF OPERATING WITH INDEPENDENT OCCUPANCY SCHEDULES.

ROOFTOP UNIT SCHEDULE (DX COOLING, NATURAL GAS HEAT)

MARK	MANUFACTURER	MODEL	NOMINAL TONS	UNIT TYPE	SUPPLY FAN				COOLING COIL						REFR	MIN EFF		MIN NO	HEAT EXCHANGER						MIN	ELECTRICAL				WEIGHT	NOTES
					CFM	ESP (IN)	HP	VFD (Y/N)	TH (MBH)	SH (MBH)	EAT (°F DB)	EAT (°F WB)	LAT (°F DB)	LAT (°F WB)	TYPE	(EER)	(IEER)	STAGES	MIN OUT (MBH)	NOM INPUT (MBH)	MIN EFF (%)	EAT (°F DB)	LAT (°F DB)	MIN NO STAGES	O/A CFM	V/PH	MCA	MOCP	DISC TYPE	(LBS)	
RTU-1	CAPTIVEAIRE	CASRTU2-I.200-18-8T-DOAS	8	SINGLE ZONE	3,100	1.72	3	N	92.8	69.2	76.4	64.4	56.1	54.4	R410A	12	13	2	149	187	80	53.6	97.6	2	1000	208/3	41.3	50	NON-FUSED	1927	A-R

*** EQUIPMENT FURNISHED AND INSTALLED PER THE RESPONSIBILITY SCHEDULE, REF ARCHITECTURAL DRAWINGS. EQUIPMENT SHALL BE OBTAINED THROUGH SHAKE SHACK NATIONAL ACCOUNT. REFER TO T.12 / VENDOR LIST FOR MORE INFORMATION.**
MODEL NUMBERS AND NOMINAL TONS LISTED SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER, MODEL NUMBERS, OR NOMINAL TONS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED.
THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

NOTES:

A. REFER TO ROOFTOP UNIT CONTROL MATRIX FOR CONTROL FEATURES, MODULES, AND ACCESSORIES THAT SHALL BE PROVIDED WITH THE EQUIPMENT.
B. EQUIPMENT SIZED FOR 80°F AMBIENT TEMPERATURE.
C. PROVIDE 2" MERV 8, EFFICIENT PLEATED THROWAWAY AIR FILTERS.
D. PROVIDE FACTORY MOUNTED DISCONNECT INSTALLED ON SERVICE SIDE OF UNIT.
E. STARTERS FOR ALL MOTORS SHALL BE FURNISHED INTEGRAL WITH UNIT.
F. PROVIDE FACTORY MOUNTED VARIABLE FREQUENCY DRIVE OR 2-SPEED MOTOR TO FACILITATE STAGED FAN SPEED CONTROL.
G. PROVIDE SINGLE POINT POWER CONNECTION.
H. COORDINATE SIZE OF CONDUCTOR TERMINATION LUGS WITH CONDUCTOR SIZES SHOWN ON ELECTRICAL DRAWINGS.
J. PROVIDE 125 VAC, 20 AMP DUPLEX CONVENIENCE RECEPTACLE MOUNTED TO UNIT READY FOR FIELD WIRING WITH A COVER UL LISTED FOR WET AND DAMPER LOCATIONS WHEN IN USE.
K. SPECIFIED FAN ESP ACCOUNTS FOR DUCT LOSSES EXTERNAL TO UNIT.
L. PROVIDE MOTOR HORSEPOWER TO OVERCOME INTERNAL UNIT STATIC PRESSURE DROP PLUS SPECIFIED EXTERNAL STATIC PRESSURE DROP. NOMINAL MOTOR HP SHALL BE NO LARGER THAN THE FIRST AVAILABLE NOMINAL MOTOR SIZE GREATER THAN THE REQUIRED BHP.
M. PROVIDE INSULATED ROOF CURB WITH MINIMUM HEIGHT REQUIRED TO MAINTAIN BOTTOM OF EQUIPMENT A MINIMUM OF 14 INCHES ABOVE FINISHED ROOF SURFACE. PROVIDE SLOPED CURB IF NEEDED TO MATCH ROOF SLOPE. COORDINATE WITH ROOF INSULATION THICKNESS AND ROOF TAPER AT INSTALLED LOCATION. COORDINATE CURB TYPE WITH DRAWINGS.
N. SCHEDULED WEIGHT IS THE MAXIMUM ALLOWABLE OPERATING WEIGHT OF THE EQUIPMENT ONLY.
O. COOLING COIL LAT IS LEAVING AIR TEMPERATURE OF COIL.
P. PROVIDE GUARDS TO PROTECT CONDENSER COIL FROM HAIL OR OTHER DAMAGE.
Q. PROVIDE HEATER TO MEET OR EXCEED SCHEDULED MINIMUM MBH OUTPUT. NOMINAL INPUT IS BASED ON LISTED MANUFACTURER'S STANDARD PRODUCT. COORDINATE EQUIPMENT GAS LOAD WITH PLUMBING CONTRACTOR IF DIFFERENT FROM THAT SCHEDULED. MEET MINIMUM EFFICIENCY SCHEDULED.
R. PROVIDE EQUIPMENT WITH AIRBORNE DISINFECTION SYSTEM, RGF MODEL PHI-PKG14-24V.

DEDICATED OUTDOOR AIR UNIT SCHEDULE (DX COOLING, NATURAL GAS HEAT)

****PART OF CAPTIVE AIRE KITCHEN PACKAGE****

MARK	MANUFACTURER	MODEL	UNIT TYPE	SUPPLY FAN					DX COOLING COIL						REFR	GAS HEAT EXCHANGER				ELECTRICAL			WEIGHT	NOTES
				SA (CFM)	OA (CFM)	ESP (IN)	HP	MIN OA (CFM)	TH (MBH)	SH (MBH)	EAT (°F DB)	EAT (°F WB)	LAT (°F DB)	LAT (°F WB)	TYPE	MIN OUT (MBH)	NOM INPUT (MBH)	MIN EFF (%)	LAT (°F DB)	V/PH	DISC TYPE	STARTER TYPE	(LBS)	
RTU-2	CAPTIVE AIRE	CASRTU3-I.400-24-20T-DOAS	DOAS	4700	2500	1	7.5	2500	135.4	111.9	77.2	64.2	56.8	55.3	R410A	297.0	371.3	80	99.3	208 / 3	FUSED	COMBINATION	2671	A-R

*...
MODEL NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND MODEL NUMBERS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

NOTES:

A. EQUIPMENT FURNISHED AND INSTALLED PER THE EQUIPMENT RESPONSIBILITY SCHEDULE.
B. EQUIPMENT SIZED FOR 80F AMBIENT TEMPERATURE.
C. PROVIDE INLET WITH 2" MERV 8, EFFICIENT PLEATED THROWAWAY AIR FILTERS.
D. PROVIDE FACTORY MOUNTED DISCONNECT INSTALLED ON SERVICE SIDE OF UNIT.
E. STARTERS FOR ALL MOTORS SHALL BE FURNISHED INTEGRAL WITH UNIT.
F. PROVIDE UNIT WITH SINGLE POINT ELECTRICAL CONNECTION.
G. SPECIFIED FAN ESP ACCOUNTS FOR DUCT LOSSES EXTERNAL TO UNIT. FILTER LOSS IS AT A MAXIMUM OF 400 FPM FACE VELOCITY.
H. PROVIDE MOTOR HORSEPOWER TO OVERCOME INTERNAL UNIT STATIC PRESSURE DROP PLUS SPECIFIED EXTERNAL STATIC PRESSURE DROP. NOMINAL MOTOR HP SHALL BE NO LARGER THAN THE FIRST AVAILABLE NOMINAL MOTOR SIZE GREATER THAN THE REQUIRED BHP.
I DIVISION 28 CONTRACTOR SHALL PROVIDE SMOKE DETECTORS IN RETURN AIR DUCT.
J PROVIDE SEISMIC WITH VIBRATION ISOLATION INSULATED ROOF CURB WITH MINIMUM HEIGHT OF 14" INCHES. PROVIDE SLOPED CURB IF NEEDED TO MATCH ROOF SLOPE.
K. SCHEDULED WEIGHT IS THE MAXIMUM ALLOWABLE OPERATING WEIGHT OF THE EQUIPMENT AND CURB.
L. PROVIDE WITH STAINLESS STEEL HEAT EXCHANGER.
M. UNIT DESIGNED FOR NATURAL GAS AT 300 BTU PER CUBIC FOOT AT A GAS SUPPLY PRESSURE OF 7-10" W.C.
N. PROVIDE HEATER TO MEET OR EXCEED SCHEDULED MINIMUM MBH OUTPUT. NOMINAL INPUT IS BASED ON LISTED MANUFACTURER'S STANDARD PRODUCT. COORDINATE EQUIPMENT GAS LOAD WITH PLUMBING CONTRACTOR IF DIFFERENT FROM THAT SCHEDULED. MEET MINIMUM EFFICIENCY SCHEDULED.
P. PROVIDE UNIT WITH VERTICAL SUPPLY AIR DUCT DISCHARGE THROUGH UNIT CURB.
R. PROVIDE FREEZESTAT IN THE SUPPLY AIR DUCT TO SHUT DOWN THE SUPPLY FAN AND CLOSE THE OUTDOOR AIR DAMPER IF TEMPERATURE IN THE SUPPLY DUCT DROPS BELOW 40 DEGREES FAHRENHEIT.

AIR CURTAIN SCHEDULE

MARK	SERVICE AREA	MANUFACTURER	MODEL	UNIT SPECS				V/PH/HZ	NOTES
				LENGTH (IN)	MAX. AIRFLOW	HEATING CAPACITY (KW)	MOTOR (HP)		
AC-1	SERVICE ENTRY	MARS	STD2	36	1379	N/A	1/2	115/1	A-F

MODEL NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND MODEL NUMBERS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

NOTES:

A. EQUIPMENT FURNISHED AND INSTALLED PER THE RESPONSIBILITY SCHEDULE, REF ARCHITECTURAL DRAWINGS.
B. MOUNT UNIT PER MANUFACTURERS RECOMMENDATIONS TO FACE OF WALL AND SUPPORT VERTICALLY.
C. PROVIDE INTEGRAL STARTER AND DISCONNECT SWITCH.
D. PROVIDE AIR CURTAIN WITH NORMALLY CLOSED DOOR LIMIT SWITCH FOR INSTALLATION ON DOOR. THE AIR CURTAIN SHALL ENERGIZE WHEN DOOR OPENS.
E. PROVIDE WITH DELAY MICROSWITCH WITH ADJUSTABLE DELAY TIMERS PRE MOUNTED IN THE AIR CURTAIN CONTROL PANEL.
F. MOUNT UNIT PER MANUFACTURERS RECOMMENDATIONS IN CEILING ASSEMBLY AND SUPPORT VERTICALLY.

HEAT PUMP CONDENSING UNIT SCHEDULE

MARK	SERVICE	MANUFACTURER	MODEL	REFR	COOLING CAPACITY			HEATING CAPACITY			ELECTRICAL			WEIGHT	NOTES
				TYPE	TH (MBH)	AMBIENT (DB)	MIN EFF (SEER)	CAP (MBH)	AMBIENT (DB)	MIN EFF COP 47°F	MCA	MOCP	V/PH	(LBS)	
CU-1	FCU-1	CARRIER	38MARBQ18AA3	R410A	9.6	79.4	19.0	12.2	19.2	3.3	18	25	208 / 1	102.5	A - H

*** EQUIPMENT SHALL BE OBTAINED THROUGH SHAKE SHACK NATIONAL ACCOUNT. REFER TO T002 / VENDOR LIST FOR MORE INFORMATION.**
MODEL NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND MODEL NUMBERS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

NOTES:
A. EQUIPMENT FURNISHED AND INSTALLED PER THE RESPONSIBILITY SCHEDULE, REF ARCHITECTURAL DRAWINGS.
B. EQUIPMENT CAPACITY SCHEDULED IS MINIMUM CAPACITY THAT MUST BE PROVIDED AT AMBIENT TEMPERATURE INDICATED.
C. CONTRACTOR SHALL VERIFY WITH EQUIPMENT SUPPLIER EXACT QUANTITY AND SIZE OF REFRIGERANT PIPING.
D. PROVIDE LIQUID LINE FILTER DRYER AND SIGHT GLASS.
E. PROVIDE PREFABRICATED EQUIPMENT SUPPORT RAILS.
F. PROVIDE FACTORY MOUNTED DISCONNECT INSTALLED ON SERVICE SIDE OF UNIT.
G. STARTERS FOR ALL MOTORS SHALL BE FURNISHED INTEGRAL WITH UNIT.
H. COORDINATE SIZE OF CONDUCTOR TERMINATION LUGS WITH CONDUCTOR SIZES SHOWN ON ELECTRICAL DRAWINGS.

OUTSIDE AIR REQUIREMENTS, IMC-2018 (IP)

SYSTEM DESIGNATION	SYSTEM TAB NAME OR LIST 'SINGLE'	SINGLE-ZONE SYSTEMS ONLY		MULTI-ZONE SYSTEMS ONLY	FLOOR AREA SERVED BY SYSTEM [As] (SF)	SYSTEM AVERAGED AREA-BASED OUTDOOR AIR RATE (CFM/SF)	SYSTEM POPULATION [Ps] (PEOPLE)	SYSTEM AVERAGED PEOPLE-BASED OUTDOOR AIR RATE (CFM/P)	REQUIRED OA INTAKE FLOW [Vot] (CFM)	REQUIRED DCV OA INTAKE FLOW [Vot] (CFM)	DESIGN OA INTAKE FLOW [Vot] (CFM)	NOTES
		SINGLE-ZONE SYSTEM ASSOCIATED VENTILATION ZONE	SINGLE ZONE WORST CASE ZONE AIR DISTRIBUTION EFFECTIVENESS [Ez]	SYSTEM VENTILATION EFFICIENCY [Ev]								
RTU-1	MULTIZONE (RTU-1)	-	-	0.79	1,114	0.097	42.9	7.50	542	N/A	1,000	-
DOAS-1	MULTIZONE (DOAS-1)	-	-	1.00	1,505	0.120	30.1	7.50	406	N/A	2,500	-
FCU-1	SINGLE ZONE	OFFICE	0.80	-	53	0.060	0.265	5.00	6	N/A	40	-
								TOTALS	954	0	3,540	

GENERAL NOTES:
1. VENTILATION CALCULATIONS BASED ON IMC-2018.
2. SYSTEM POPULATIONS BASED ON MAX SEATING AND/OR CODE MAXIMUM VALUES.
3. SINGLE ZONE SYSTEMS (Vot = Voz): SYSTEM VENTILATION EFFICIENCY CALCULATION IS NOT REQUIRED FOR SINGLE ZONE SYSTEMS. WORST CASE AIR DISTRIBUTION EFFECTIVENESS BETWEEN HEATING AND COOLING MODES OF OPERATION IS SHOWN IN TABLE.
4. 100% OA SYSTEMS (Vot = ∑all zones Voz): WHEN ONE AIR HANDLER SUPPLIES ONLY OUTDOOR AIR TO ONE OR MORE ZONES. EACH ZONE IS INDIVIDUALLY CALCULATED WITH ITS WORST CASE ZONE AIR DISTRIBUTION EFFECTIVENESS (HEATING/COOLING).
5. MULTI-ZONE RECIRCULATING SYSTEMS: CALCULATOR USED TO DETERMINE VENTILATION AIRFLOW IN COMPLIANCE WITH IMC-2018 VRP AND ASHRAE 62.1-2016 APPENDIX A. VENTILATION RATE SHOWN IS ACTUAL CALCULATED WITH CORRECTION FACTORS INCLUDED. EACH ZONE IS CALCULATED WITH ITS WORST CASE ZONE AIR DISTRIBUTION EFFECTIVENESS (HEATING/COOLING) AS PART OF CALCULATIONS TO FIND Ev.

FAN SCHEDULE

MARK	SERVICE DESCRIPTION	MANUFACTURER	MOUNTING	MODEL	CFM	ESP (IN)	NOM HP	FAN RPM	DRIVE (BELT/DIRECT)	VFD (Y/N)	ELECTRICAL			WEIGHT (LBS)	NOTES
											V/PH	DISC TYPE	STARTER TYPE		
EF-1	TOILETS	GREENHECK	ROOF	G-095-D	300	0.5	1/8	1550	DIRECT	N	120/1	NON-FUSED	N/A	30	A - E
REF-1	RELIEF	GREENHECK	ROOF	GB-160	2600	0.5	1/2	1016	DIRECT	N	120/1	NON-FUSED	N/A	76	A-C,E-F

MODEL NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND MODEL NUMBERS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

NOTES:

A. EQUIPMENT FURNISHED AND INSTALLED PER THE RESPONSIBILITY SCHEDULE, REF ARCHITECTURAL DRAWINGS.
B. PROVIDE WITH MINIMUM 24" HIGH ROOF CURB, BIRDSCREEN AND BACKDRAFT DAMPER.
C. PROVIDE FACTORY MOUNTED DISCONNECT SWITCH.
D. INTERLOCK FAN OPERATION WITH TIME CLOCK.
E. PROVIDE WITH MANUFACTURER'S FAN SPEED CONTROLLER FOR BALANCING PURPOSES.

GRILLE, REGISTER, AND DIFFUSER SCHEDULE

MARK	MANUFACTURER	SERVICE	MODEL	CONSTRUCTION MATERIAL	FACE TYPE	MOUNTING LOCATION	FACE SIZE (IN)	MAX. NC	NOTES
CEG	E.H. PRICE	EXHAUST GRILLE W/ DAMPER	80D	STEEL	EGGCRATE	SURFACE	12x12	30	A B C F G H
CRG	E.H. PRICE	RETURN GRILLE	80	STEEL	EGGCRATE	LAY-IN	24x24	30	A B C F H
CSD1	E.H. PRICE	SUPPLY DIFFUSER	SCD	STEEL	SQUARE CONE	SURFACE	12x12	30	A B C F H J K L
CSD2	E.H. PRICE	SUPPLY DIFFUSER	SCD	STEEL	SQUARE CONE	LAY-IN	24x24	30	A B C F H K
CSD3	E.H. PRICE	SUPPLY DIFFUSER	PDDR	STEEL	PERFORATED	LAY-IN	24x24	30	A B C F H
WRG	E.H. PRICE	RETURN GRILLE W/DAMPER	530D	STEEL	LOUVERED FACE	WALL OR DUCT	(SEE PLANS)	30	A B C D F H
WSR	E.H. PRICE	SUPPLY REGISTER W/ DAMPER	520D	STEEL	LOUVERED FACE	WALL OR DUCT	(SEE PLANS)	30	A B C D E F G H

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NOTES:

A. EQUIPMENT FURNISHED AND INSTALLED PER THE EQUIPMENT RESPONSIBILITY SCHEDULE.
B. NECK SIZE SHOWN ON DRAWINGS. PROVIDE BRANCH DUCT TO MATCH NECK SIZE UNLESS OTHERWISE SHOWN ON DRAWINGS.
C. DIFFUSERS SHALL BE PREFINISHED TO MATCH CEILING/WALL/EXPOSED DUCT COLOR (COORDINATE WITH ARCHITECT).
D. FRONT BLADES PARALLEL TO LONG DIMENSION.
E. DOUBLE DEFLECTION BARS SHALL BE ADJUSTABLE.
F. FRAME TYPE TO MATCH CEILING/WALL CONSTRUCTION, COORDINATE WITH ARCHITECTURAL REFLECTED CEILING/WALL PLAN.
G. PROVIDE OPPOSED BLADE DAMPER ADJUSTABLE FROM FACE OF DEVICE.
H. PROVIDE DIFFUSERS, LINEAR SLOTS, AND GRILLES WITH NO EXPOSED MOUNTING SCREWS.
J. CONTRACTOR SHALL PROVIDE REMOTE CABLE-OPERATED VOLUME DAMPER BY METROPOLITAN AIR TECHNOLOGIES MODEL RT-250 WITH EXTERNAL WORM GEAR OPERATOR OR EQUIVALENT YOUNG REGULATOR BUTTERFLY DAMPER WITH 270-275 CONTROLLER. OPERATOR SHALL HAVE A SQUARE DRIVE FOR 1/4" NUT DRIVER. DAMPER ASSEMBLY SHALL INCLUDE GALVANIZED STEEL DUCT WITH ROLLED BEAD STIFFENERS, REINFORCED BLADE, SELF LUBRICATING BEARING AND WORM GEAR MOUNTING PLATE. DAMPER SHALL BE INSTALLED IN BRANCH DUCT NOT INLET OF PLENUM DIFFUSER. (RE: 2/M501)
K. 4-WAY THROW PATTERN UNLESS OTHERWISE INDICATED BY FLOW ARROWS ON DRAWINGS.
L. PROVIDE RAPID MOUNT FRAME FOR INSTALLATION IN HARD CEILING.

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zebra
ZEBRA ARCHITECTURE, PLLC
14614 N KIERLAND BLVD. SUITE N300
SCOTTSDALE, ARIZONA 85254
PHONE: 480.912.1169 zbr.global

HENDERSON ENGINEERS
8345 LENEXA DRIVE, SUITE 300
LENEXA, KS 66214
TEL 913.742.5000 **FAX** 913.742.5001
WWW.HENDERSONENGINEERS.COM
2150001407
WA. CORPORATE NO: 1754
EXPIRES 6/30/2023

STORE NO:
1377

SHAKE SHACK
ALDERWOOD MALL
18800 ALDERWOOD MALL PKWY
LYNNWOOD, WA 98037

REVISION

△	DATE	DESCRIPTION
	01/24/22	PERMIT/BID SET
A	05/02/22	REVISION A
B	05/19/22	REVISION B
C	08/29/22	REVISION C
1	11/10/22	REVISION 1

STATUS:
IFC SET

JUSTIN M. OLDER
56737
11/14/2022

FIELD VERIFICATION:
The contractor shall verify all figured dimensions and condition at the project site and notify Zebra Architecture, PLLC. of any dimensional errors, or omissions or discrepancies before beginning or fabricating any work. Do not scale these drawings.

SHEET NAME:
MECHANICAL SCHEDULES

DATE: 02/17/22
PROJECT NO: 34288
DRAWN: AJP
SCALE:

SHEET NO:
M601

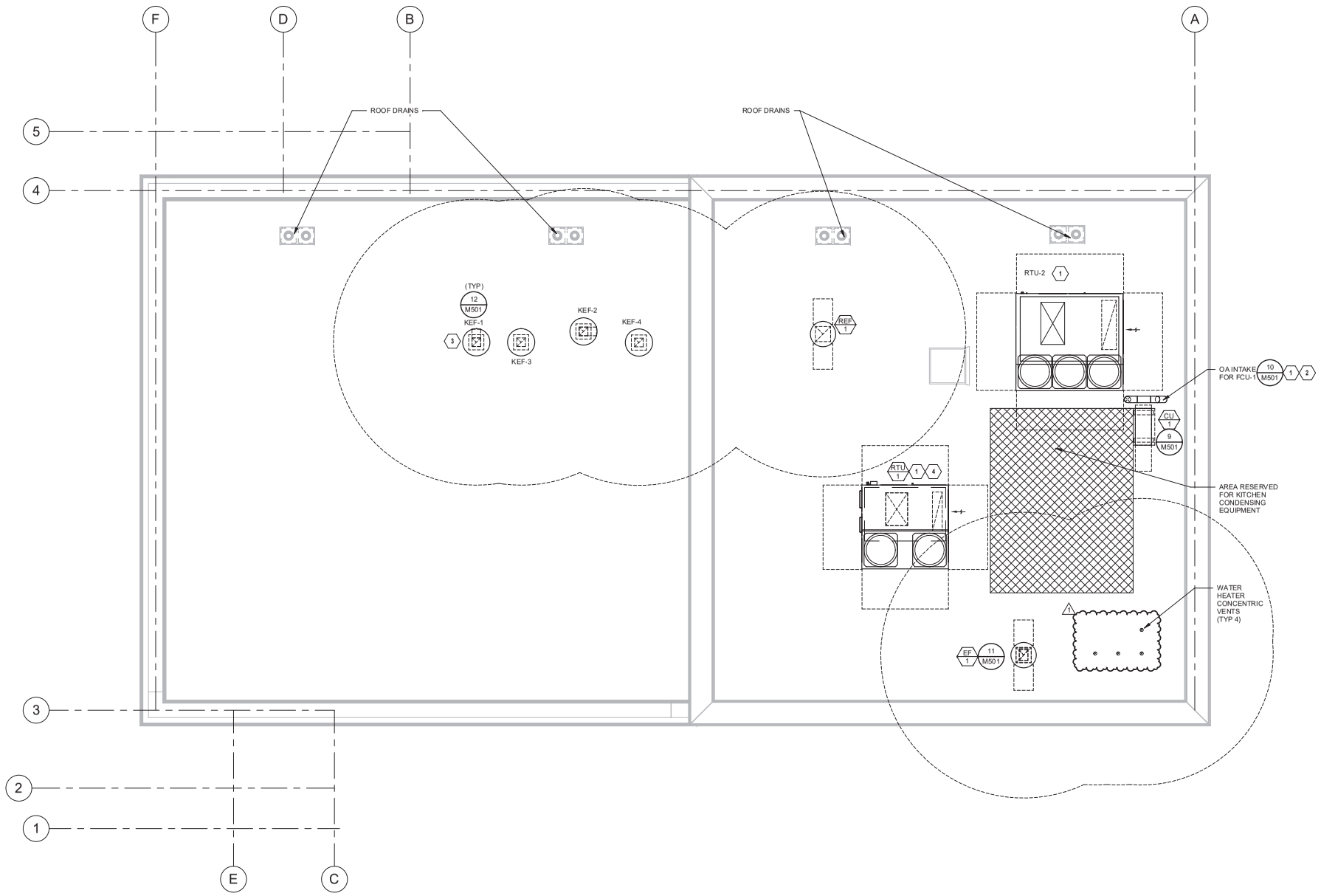
JUSTIN M. OLDER

MECHANICAL GENERAL NOTES:

1. ALL VENT STACKS SHALL BE NO LESS THAN 12" FROM PARAPET, AT LEAST 10 FEET FROM OUTSIDE AIR INTAKES, AND ABOVE ROOF SURFACE 6" MINIMUM TO FULL HEIGHT OF PARAPET, WHICHEVER IS GREATER. CONTRACTOR SHALL PROVIDE BRACING AS SPECIFIED.
2. COORDINATE EXACT EQUIPMENT LOCATIONS WITH OTHER TRADES PRIOR TO INSTALLATION.
3. REFER TO SHEET M001 FOR ADDITIONAL GENERAL NOTES.
4. REFER TO DETAILS AND SCHEDULES SHEETS FOR FURTHER INFORMATION.

MECHANICAL PLAN NOTES:

1. MAINTAIN ALL OUTSIDE AIR INTAKES A MINIMUM OF 10'-0" RADIUS FROM EXHAUST, TYPICAL.
2. TURN DOWN 6"Ø INTAKE AND END OPEN OVER ROOF (MIN. 24") WITH INSECT SCREEN.
3. REFER TO CAPTIVEAIRE DRAWINGS FOR INFORMATION REGARDING KITCHEN EXHAUST FANS.
4. PROVIDE EQUIPMENT WITH NATIONAL TAB UV-PHI INDOOR AIR PURIFICATION SYSTEM, MODEL PHI-PKG-24V. INSTALL IN UNIT BLOWER COMPARTMENT PER MANUFACTURER'S INSTRUCTIONS.



1 MECHANICAL ROOF PLAN
1/4" = 1'-0"

zebra
ZEBRA ARCHITECTURE, PLLC
14614 N KIERLAND BLVD. SUITE N300
SCOTTSDALE, ARIZONA 85254
PHONE: 480.912.1169 zbr.global

HENDERSON ENGINEERS
8345 LENEXA DRIVE, SUITE 300
LENEXA, KS 66214
TEL 913.742.5000 FAX 913.742.5001
WWW.HENDERSONENGINEERS.COM
21500011407
WA. CORPORATE NO: 1754
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STORE NO: 1377

SHAKE SHACK
ALDERWOOD MALL
18800 ALDERWOOD MALL PKWY
LYNNWOOD, WA 98037

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A	05/02/22	REVISION A
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C	08/29/22	REVISION C
1	11/10/22	REVISION 1

STATUS: IFC SET

JUSTIN M. OLDER
STATE OF WASHINGTON
56737
REGISTERED
PROFESSIONAL ENGINEER
11/14/2022

FIELD VERIFICATION:
The contractor shall verify all figured dimensions and conditions at the project site and notify Zebra Architecture, PLLC, of any dimensional errors, or omissions or discrepancies before beginning or fabricating any work. Do not scale these drawings.

SHEET NAME: **MECHANICAL ROOF PLAN**

DATE: 02/17/22
PROJECT NO: 34288
DRAWN: AJP
SCALE:

SHEET NO: **M150**

JUSTIN M. OLDER

EXHAUST FAN INFORMATION – JOB#5175551

FAN UNIT NO	TAG	QTY	FAN UNIT MODEL #	MANUFACTURER	CFM	ESP	RPM	MOTOR ENCL	HP	BHP	PHASE	VOLT	FLA	DISCHARGE VELOCITY	WEIGHT (LBS)	SONES
1	KEF-1 (GRILL-1)	1	DU33HFA	CAPTIVEAIRE	700	1.000	1659	TEAO-ECM	0.333	0.2770	1	115	4.3	347 FPM	74	17.6
2	KEF-2-(GRILL-2)	1	DU33HFA	CAPTIVEAIRE	700	1.000	1659	TEAO-ECM	0.333	0.2780	1	115	4.3	347 FPM	74	17.6
3	KEF-3 (FRYER)	1	DU33HFA	CAPTIVEAIRE	700	1.000	1659	TEAO-ECM	0.333	0.2770	1	115	4.3	347 FPM	74	17.6
4	KEF-4 (FRYER)	1	DU33HFA	CAPTIVEAIRE	700	1.000	1659	TEAO-ECM	0.333	0.2770	1	115	4.3	347 FPM	74	17.6

DOAS/RTU FAN SCHEDULE – JOB#5175551

FAN UNIT NO	TAG	QTY	DOAS/RTU MODEL #	MANUFACTURER	BLOWER	RETURN AIR CFM	MAX OUTSIDE AIR CFM	TOTAL CFM	ESP	HP	BHP	PHASE	VOLT	MCA	MOCP	WEIGHT (LBS)
5	RTU-2	1	CASRTU3-1.400-24-20T-DOAS	CAPTIVEAIRE	24P-3	2200	2500	4700	1.000	7.500	4.4940	3	208	95.1A	110A	2677

DOAS/RTU COOLING SCHEDULE

FAN UNIT NO	TAG	COMPRESSOR			OUTDOOR FAN				INDOOR COIL		OUTSIDE AIR DB TEMP	OUTSIDE AIR WB TEMP	MIXED AIR DB TEMP	MIXED AIR WB TEMP	LEAVING DB TEMP	LEAVING WB TEMP	LEAVING DP TEMP	TOTAL CAPACITY	SENSIBLE CAPACITY	LATENT CAPACITY	REHEAT LEAVING DB TEMP	REHEAT LEAVING WB TEMP	DESIRED REHEAT CAPACITY	MAX REHEAT CAPACITY	REHEAT LEAVING RELATIVE HUMIDITY	MOISTURE REMOVAL RATE	IEER
		TONNAGE	VOLTAGE	PHASE	MOTOR VOLTAGE	MOTOR Ø	MOTOR FREQUENCY	MOTOR QTY	ROWS	FACE AREA																	
5	RTU-2	20	190-240	3	200-240	3	60	3	7	11.9 SQFT	95.0°F	75.0°F	85.6°F	69.3°F	52.4°F	52.4°F	52.5°F	243.4 MBH	168.6 MBH	74.8 MBH	75.0°F	62.5°F	114.7 MBH	129.6 MBH	50	66.1 LBS/HR	18.2

DOAS/RTU HEATING SCHEDULE

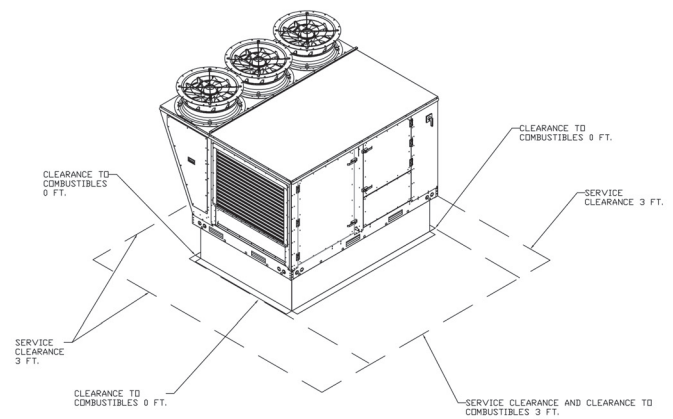
FAN UNIT NO	TAG	INPUT BTUs	OUTPUT BTUs	TEMP RISE	REQUIRED INPUT GAS PRESSURE	GAS TYPE	BURNER EFFICIENCY(%)
5	RTU-2	348975	279180	55°F	7 IN. W.C. – 14 IN. W.C.	NATURAL	80

FAN OPTIONS

FAN UNIT NO	TAG	QTY	DESCRIPTION
1	KEF-1 (GRILL-1)	1	GREASE BOX.
		1	FAN BASE CERAMIC SEAL – INSTALLED AT PLANT – FOR GREASE DUCTS.
		1	ECM WIRING PACKAGE – PWM SIGNAL FROM ECPM03 PREWIRE (TELCO MOTOR), CCW ROTATION.
		1	2 YEAR PARTS WARRANTY.
2	KEF-2-(GRILL-2)	1	GREASE BOX.
		1	FAN BASE CERAMIC SEAL – INSTALLED AT PLANT – FOR GREASE DUCTS.
		1	ECM WIRING PACKAGE – PWM SIGNAL FROM ECPM03 PREWIRE (TELCO MOTOR), CCW ROTATION.
		1	2 YEAR PARTS WARRANTY.
3	KEF-3 (FRYER)	1	GREASE BOX.
		1	FAN BASE CERAMIC SEAL – INSTALLED AT PLANT – FOR GREASE DUCTS.
		1	ECM WIRING PACKAGE – PWM SIGNAL FROM ECPM03 PREWIRE (TELCO MOTOR), CCW ROTATION.
		1	2 YEAR PARTS WARRANTY.
4	KEF-4 (FRYER)	1	GREASE BOX.
		1	FAN BASE CERAMIC SEAL – INSTALLED AT PLANT – FOR GREASE DUCTS.
		1	ECM WIRING PACKAGE – PWM SIGNAL FROM ECPM03 PREWIRE (TELCO MOTOR), CCW ROTATION.
		1	2 YEAR PARTS WARRANTY.
5	RTU-2	1	INLET PRESSURE GAUGE, 0-35".
		1	MANIFOLD PRESSURE GAUGE, 0 TO 10" WC, 1 FURNACE.
		1	RTU TOTAL CFM MONITORING.
		1	SINGLE POINT ELECTRICAL CONNECTION FOR RTU. 750VA TRANSFORMER USED. IF A NON-DCV PREWIRE CONTROLS THIS UNIT, THE #28, #47, 'MA', OR 'E2' PREWIRE OPTION MUST BE SELECTED. DOES NOT PROVIDE SUPPLY STARTER IN PREWIRE.
		1	CASLINK BUILDING MONITORING SYSTEM – INTERNET OR CELLULAR CONNECTION REQUIRED.
		1	RTU3 DOWN DISCHARGE.
		1	2" MERV 13 FILTERS FOR RTU3 (QTY. 4).
		1	2" MERV 8 FILTERS FOR RTU3 (QTY. 4).
		1	OVERHEAT STAT.
		1	VFD FACTORY MOUNTED AND WIRED IN RTU COMMERCIAL CONTROL VESTIBULE.
		1	20 TON MODULATING COOLING OPTION, 208/230V. R410A REFRIGERANT, VARIABLE SPEED COMPRESSOR, ECM CONDENSING FANS.
		1	20 TON MODULATING REHEAT OPTION – SPACE DEWPOINT CONTROL.
		1	RTU3 CURB DUCT HANGER.
		1	COMMERCIAL SMOKE DETECTOR/ALARM INTERLOCK – ALARM SUPPLIED BY OTHERS.
		1	OCCUPIED SCHEDULING.
		1	RTU3 CONVENIENCE OUTLET (GFCI), 15 AMP – REQUIRES SEPARATE 120V CONNECTION. INCLUDES RECEPTACLE, COVER AND J-BOX.
		1	CLOGGED FILTER SWITCH – NOTIFICATION ON HMI.
		1	RTU INTAKE/RETURN DAMPER – MANUAL CONTROL VIA HMI.
		1	DAMPER PRESET POSITIONS.
		1	RTU3 DOWN RETURN.
		1	FREEZESTAT.
		1	VAV PACKAGE W/ MANUAL/DDC CONTROL (571 VFD INCLUDED).
		1	LOAD REACTOR MOUNTED IN FAN.
		1	RTU3 ECONOMIZER BAROMETRIC RELIEF.
		1	RTU ECONOMIZER – DIFFERENTIAL ENTHALPY CONTROL.
		1	5 YEAR ENTIRE UNIT PARTS WARRANTY, 10 YEAR ENTIRE UNIT PARTS WARRANTY WITH REMOTE MONITORING AND CAPTIVEAIRE SERVICE CONTRACT, 25 YEAR STAINLESS STEEL FURNACE PARTS WARRANTY (SEE ADDITIONAL DETAILS).

CURB ASSEMBLIES

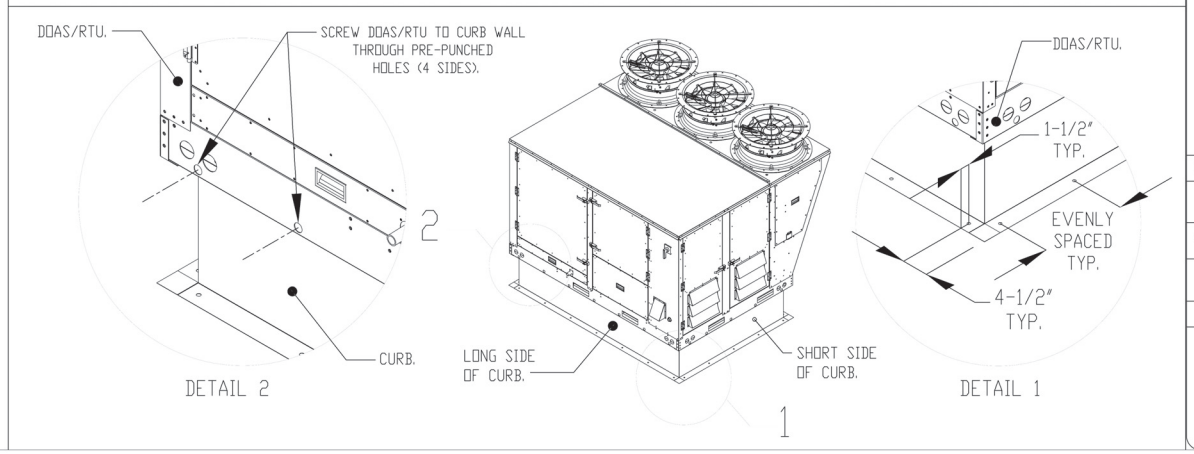
NO	ON FAN	TAG	WEIGHT	ITEM	SIZE
1	# 1	KEF-1 (GRILL-1)	34 LBS	CURB	19.500"W X 19.500"L X 22.000"H ALONG LENGTH, RIGHT VENTED HINGED.
2	# 2		34 LBS	CURB	19.500"W X 19.500"L X 22.000"H ALONG LENGTH, RIGHT VENTED HINGED.
3	# 3	KEF-3 (FRYER)	34 LBS	CURB	19.500"W X 19.500"L X 22.000"H ALONG LENGTH, RIGHT VENTED HINGED.
4	# 4	KEF-4 (FRYER)	34 LBS	CURB	19.500"W X 19.500"L X 22.000"H ALONG LENGTH, RIGHT VENTED HINGED.
5	# 5	RTU-2	68 LBS	CURB	59.500"W X 91.000"L X 12.000"H ALONG WIDTH, RIGHT INSULATED.



TYPICAL DOAS/RTU ROOF MOUNTING INSTALLATION INSTRUCTIONS

1. SECURE THE CURB TO THE ROOF FRAMING MEMBERS BY DRILLING 1/4" PILOT HOLES IN THE CURB FLANGES AT LOCATIONS SHOWN IN THE DIAGRAM BELOW. USING 3/8" X 2" ZINC PLATED STEEL LAG BOLTS, AND ZINC PLATED WASHERS, SCREW THROUGH THE CURB FLANGES AND INTO THE ROOF FRAMING MEMBERS. A MINIMUM OF (5) LAG BOLTS ON EACH SHORT SIDE, AND (7) LAG BOLTS ON EACH LONG SIDE IS REQUIRED.

2. SECURE THE UNIT BASE TO THE SIDE WALLS OF THE CURB USING (24) 1/4"-14 X 2" SELF-DRILLING, STEEL ZINC PLATED SCREWS. PRE-PUNCHED HOLES HAVE BEEN PROVIDED FOR EACH SCREW LOCATION.



NOTE:

THE DOCUMENTATION CONTAINED ON THIS SHEET WAS NOT PREPARED BY HENDERSON ENGINEERS AND IS INCLUDED IN THIS SET FOR REFERENCE ONLY. HENDERSON ENGINEERS REVIEWED THE DOCUMENTATION ON THIS SHEET FOR GENERAL COMPLIANCE WITH DESIGN INTENT. SUPPLIER IS RESPONSIBLE THAT ALL FURNISHED EQUIPMENT ON THIS SHEET COMPLIES WITH APPICABLE LOCAL, STATE, AND FEDERAL LAWS, CODES, AND REGULATIONS.

zebra
ZEBRA ARCHITECTURE, PLLC
14614 N KIERLAND BLVD. SUITE N300
SCOTTSDALE, ARIZONA 85254
PHONE: 480.912.1169 zbr.global

REVISIONS

DESCRIPTION	DATE

CAPTIVE AIRE
Eastern PA Mechanical
PO Box 2520, 1 Union Ave. Bala Cynwyd, PA, 19004 PHONE: (267) 504-4126 EMAIL: reg108@captiveaire.com
www.captiveaire.com

Shake Shack-1377-Lynnwood,WA-R1
LYNNWOOD, WA, 98036

DATE: 11/8/2021

DWG.#: 5175551

DRAWN BY: joe.shilloa

SCALE: 3/4" = 1'-0"

MASTER DRAWING

SHEET NO. 4

STORE NO: **1377**

SHAKE SHACK
ALDERWOOD MALL
18800 ALDERWOOD MALL PKWY
LYNNWOOD, WA 98037

REVISION

	DATE	DESCRIPTION
	01/24/22	PERMIT/BID SET
A	05/02/22	REVISION A
B	05/19/22	REVISION B
C	08/29/22	REVISION C
1	11/1/022	REVISION 1

STATUS: IFC SET

FOR REFERENCE ONLY

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SHEET NAME: **CAPTIVE AIRE DRAWINGS**

DATE: 02/17/22 | PROJECT NO: 34288

DRAWN: AJP | SCALE:

SHEET NO: **KM704**

HOOD INFORMATION

HOOD NO	TAG	MODEL	MANUFACTURER	LENGTH	MAX COOKING TEMP	TYPE	APPLIANCE DUTY	DESIGN CFM/FT	TOTAL EXH CFM	EXHAUST PLENUM RISER(S) WIDTH	LENG	HEIGHT	DIA	CFM	VEL	SP	HOOD CONSTRUCTION	HOOD CONFIG END TO END	ROW
1	GRILL	3650 BD-2	CAPTIVEAIRE	4' 0"	600 DEG	I	HEAVY	175	700	8"	8"	4"		700	1575	-0.574"	430 SS WHERE EXPOSED	ALONE	ALONE
2	GRILL	3650 BD-2	CAPTIVEAIRE	4' 0"	600 DEG	I	HEAVY	175	700	8"	8"	4"		700	1575	-0.574"	430 SS WHERE EXPOSED	ALONE	ALONE
3	FRYER	3650 BD-2	CAPTIVEAIRE	4' 0"	600 DEG	I	HEAVY	175	700	8"	8"	4"		700	1575	-0.574"	430 SS WHERE EXPOSED	ALONE	ALONE
4	FRYER	3650 BD-2	CAPTIVEAIRE	4' 0"	600 DEG	I	HEAVY	175	700	8"	8"	4"		700	1575	-0.574"	430 SS WHERE EXPOSED	ALONE	ALONE

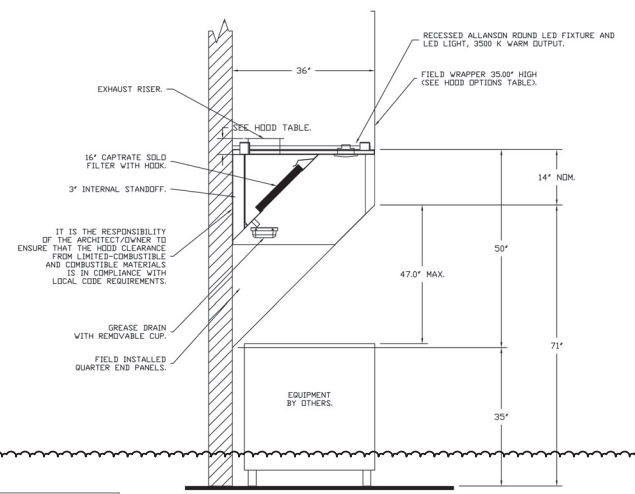
FOR QUESTIONS, CALL THE
Eastern PA Mechanical
REGION 108
PHONE: (267) 504-4126
EMAIL: reg108@captiveaire.com

HOOD INFORMATION

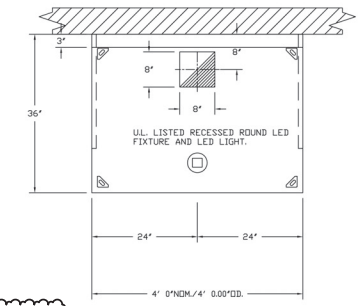
HOOD NO	TAG	FILTER(S) TYPE	QTY	HEIGHT	LENGTH	EFFICIENCY @ 7 MICRONS	LIGHT(S) QTY	TYPE	WIRE GUARD	LOCATION	SIZE	UTILITY CABINET(S) FIRE SYSTEM TYPE	SIZE	ELECTRICAL MODEL #	SWITCHES QUANTITY	FIRE SYSTEM PIPING	HANGING WEIGHT
1	GRILL	CAPTRATE SOLO FILTER	2	16"	20"	85% SEE FILTER SPEC	1	RECESSED ROUND	NO	WALL MNT	12"x36"x24"	TANK FS	4.0/4.0			YES	215 LBS
2	GRILL	CAPTRATE SOLO FILTER	2	16"	20"	85% SEE FILTER SPEC	1	RECESSED ROUND	NO	WALL MNT	12"x36"x24"	TANK FS	4.0/4.0			YES	215 LBS
3	FRYER	CAPTRATE SOLO FILTER	2	16"	20"	85% SEE FILTER SPEC	1	RECESSED ROUND	NO							YES	215 LBS
4	FRYER	CAPTRATE SOLO FILTER	2	16"	20"	85% SEE FILTER SPEC	1	RECESSED ROUND	NO							YES	215 LBS

HOOD OPTIONS

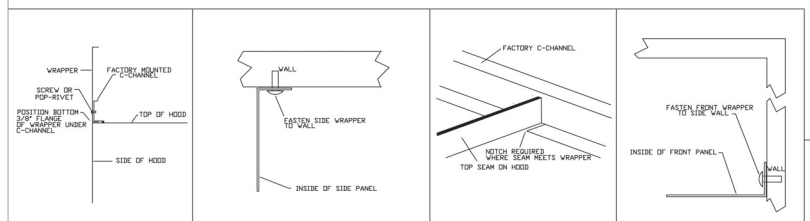
HOOD NO	TAG	OPTION
1	FRYER	FIELD WRAPPER 37.00" HIGH FRONT, LEFT, RIGHT.
		RIGHT QUARTER END PANEL 26" TOP WIDTH, 0" BOTTOM WIDTH, 26" HIGH 430 SS.
		LEFT QUARTER END PANEL 26" TOP WIDTH, 0" BOTTOM WIDTH, 26" HIGH 430 SS.
		1-PINT GREASE CUP.
		RISER SENSOR INSTALL 6IN PLEN.
2	FRYER	FIELD WRAPPER 37.00" HIGH FRONT, LEFT, RIGHT.
		RIGHT QUARTER END PANEL 26" TOP WIDTH, 0" BOTTOM WIDTH, 26" HIGH 430 SS.
		LEFT QUARTER END PANEL 26" TOP WIDTH, 0" BOTTOM WIDTH, 26" HIGH 430 SS.
		1-PINT GREASE CUP.
		RISER SENSOR INSTALL 6IN PLEN.
3	GRILL	FIELD WRAPPER 37.00" HIGH FRONT, LEFT, RIGHT.
		RIGHT QUARTER END PANEL 26" TOP WIDTH, 0" BOTTOM WIDTH, 26" HIGH 430 SS.
		LEFT QUARTER END PANEL 26" TOP WIDTH, 0" BOTTOM WIDTH, 26" HIGH 430 SS.
		1-PINT GREASE CUP.
		RISER SENSOR INSTALL 6IN PLEN.
		GFCI DUPLEX OUTLET, 20A 125V - HOOD FRONT LEFT - HORIZONTAL - DIST FROM END: 3.50 DIST FROM BOTTOM: 3.00.
4	GRILL	FIELD WRAPPER 37.00" HIGH FRONT, LEFT, RIGHT.
		RIGHT QUARTER END PANEL 26" TOP WIDTH, 0" BOTTOM WIDTH, 26" HIGH 430 SS.
		LEFT QUARTER END PANEL 26" TOP WIDTH, 0" BOTTOM WIDTH, 26" HIGH 430 SS.
		1-PINT GREASE CUP.
		RISER SENSOR INSTALL 6IN PLEN.
		GFCI DUPLEX OUTLET, 20A 125V - HOOD FRONT LEFT - HORIZONTAL - DIST FROM END: 3.50 DIST FROM BOTTOM: 3.00.



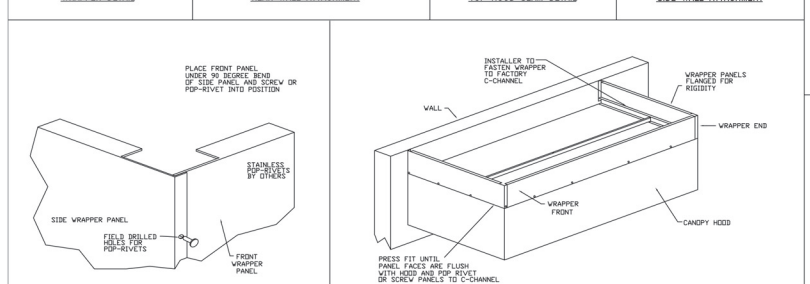
SECTION VIEW - MODEL 3650BD-2



PLAN VIEW - HOOD #1 (GRILL), #2 (GRILL), #3 (FRYER), #4 (FRYER)
4' 0.00" LONG 3650BD-2

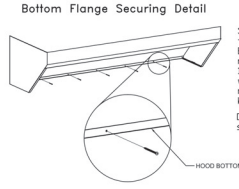


WRAPPER DETAIL | REAR WALL ATTACHMENT | TOP HOOD SEAM DETAIL | SIDE WALL ATTACHMENT



FRONT CORNER ASSEMBLY | COMPLETED WRAPPER ASSEMBLY

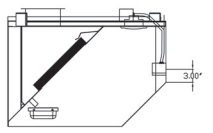
Bottom Flange Securing Detail



Secure the bottom of the hood to the rear wall using 1404 Evergreen Quik-Fastener. Use a minimum of 1 fastener every 16"on the bottom flange. For walls with metal studs, use a minimum of 1 fastener on the bottom flange at each stud

Only Use SIL-BOND RTV 4500 silicone sealent on hood

SECTION VIEW



ELEVATION VIEW

GFCI Duplex outlet (typ.) installed and factory wired in liquid tight conduit to top mounted j-box.

LISTINGS & CERTIFICATIONS

CAPTIVEAIRE HOODS BUILT IN COMPLIANCE WITH:

#3054804-001
& #3054804-002

STANDARD 710

BUILT IN ACCORDANCE WITH NFPA No. 96

Listed under ETL File number 3054804-001/002

CLEARANCE TO COMBUSTIBLES

CAPTIVEAIRE HOODS HAVE OPTIONAL CLEARANCE REDUCTION SYSTEMS AVAILABLE AS FOLLOWS:

MATERIAL	CLEARANCE REDUCTION SYSTEM
NON-COMBUSTIBLE	NONE REQUIRED
LIMITED-COMBUSTIBLE	3" UNINSULATED STANDOFF
COMBUSTIBLE	1" INSULATED STANDOFF

GENERAL NOTES

INSTALLATION

1. ALL ELECTRICAL "FIELD" CONNECTIONS AND RELATED INTERCONNECTIONS BY ELECTRICAL CONTRACTORS.
2. ALL PLUMBING "FIELD" CONNECTIONS AND RELATED INTERCONNECTIONS BY PLUMBING CONTRACTORS.
3. HANGING BRACKETS LOCATED AND WELDED AS SHOWN ON PLANS. ALL OTHER HANGER MATERIALS PROVIDED BY INSTALLING CONTRACTORS.
4. ALL CONNECTIONS FROM CAPTIVEAIRE HOOD PER MECHANICAL PLANS.
5. COOKING EQUIPMENT TO SHUT OFF IN EVENT OF FIRE.
6. EXHAUST FANS TO TURN ON IN EVENT OF FIRE.
7. ALL LIGHT FIXTURES SHOWN INSTALLED BY CAPTIVEAIRE ARE FACTORY PREWIRED. INTERCONNECTIONS BETWEEN HOODS AND TO SWITCHES ARE BY ELECTRICAL CONTRACTOR.
8. LAMPS FOR LIGHT FIXTURES BY INSTALLING CONTRACTORS.
9. SEISMIC RESTRAINTS ARE RESPONSIBILITY OF INSTALLING CONTRACTOR.
10. INSTALLING CONTRACTORS ASSUME ALL RELATED REPONSIBILITY FOR VERIFICATION OF DIMENSIONAL DATA CONTAINED ON THESE DOCUMENTS FOR ACCURACY, INTEGRATION, AND ADMINISTRATION OF CODE REQUIREMENTS IN EFFECT PRIOR TO ANY RELEASE FOR PRODUCTION OF EQUIPMENT SHOWN.

BALANCE

11. KITCHEN HOODS MUST BE BALANCED WITH KITCHEN.
12. KITCHEN SHALL BE NEGATIVE WITH RESPECT TO DINING AREA.
13. RESTAURANT SHALL BE POSITIVE WITH RESPECT TO AMBIENT PRESSURE.

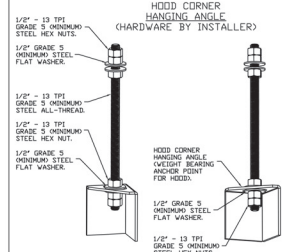
ADDITIONAL

14. WRITTEN HOOD DIMENSIONS HAVE PRECEDENCE OVER SCALE.
15. SIGNED AND "APPROVED" COPIES OF THIS DOCUMENT MUST BE RECEIVED BY THE FACTORY PRIOR TO COMMENCEMENT OF FABRICATION.

HVAC DISTRIBUTION NOTE

IT IS RECOMMENDED NOT TO INSTALL HIGH VELOCITY DIFFUSERS OR HVAC RETURNS WITHIN TEN (10) FEET OF THE EXHAUST HOOD. PERFORATED, LOW-VELOCITY, NON-DIRECTIONAL DIFFUSERS ARE RECOMMENDED.

HOOD CORNER HANGING ANGLE (HARDWARE BY INSTALLER)



ASSEMBLY INSTRUCTIONS

HANGING ANGLE MUST BE SUPPORTED WITH 1/2" - 13 TPI GRADE 5 (MINIMUM) ALL-THREAD. SANDWICH HANGING ANGLES AND CEILING ANCHOR POINTS WITH 1/2" GRADE 5 (MINIMUM) STEEL FLAT WASHERS AND 1/2" - 13 TPI GRADE 5 (MINIMUM) HEX NUTS AS SHOWN. MUST USE DOUBLED HEX NUT CONFIGURATION BENEATH HOOD HANGING ANGLES AND ABOVE CEILING ANCHORS. MAINTAIN 1/4" OF EXPOSED THREADS BENEATH BOTTOM HEX NUT. TORQUE ALL HEX NUTS TO 57 FT-LBS.

VERIFY CEILING HEIGHT

___' - ___"

HEIGHT REQUIRED TO VERIFY THAT HOOD FITS SPACE AND TO SIZE THE ENCLOSURE PANELS

NOTE:

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REVISIONS

	DESCRIPTION	DATE
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CAPTIVEAIRE
Eastern PA Mechanical
PO Box 2520, 1 Union Ave, Bala Cynwyd, PA, 19004 PHONE: (267) 504-4126 EMAIL: reg108@captiveaire.com
www.captiveaire.com

Snake Shack-1377-Alderwood Mall(hoods)-R3
3000 184th St SW,
Lynnwood, WA, 98037

DATE: 12/29/2022

DWG.#: 5787990

DRAWN BY: Joe.shilba

SCALE: 3/4" = 1'-0"

MASTER DRAWING

SHEET NO. 1

ZEBRA ARCHITECTURE, PLLC
14614 N KIERLAND BLVD. SUITE N300
SCOTTSDALE, ARIZONA 85254
PHONE: 480.912.1169 zbr.global

STORE NO: 1377

SHAKE SHACK
ALDERWOOD MALL
18800 ALDERWOOD MALL PKWY
LYNNWOOD, WA 98037

REVISION

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C	08/29/22	REVISION C
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2	01/1 3/23	VE CHANGES

STATUS: IFC SET

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SHEET NAME: CAPTIVE AIRE DRAWINGS

DATE: 02/17/22

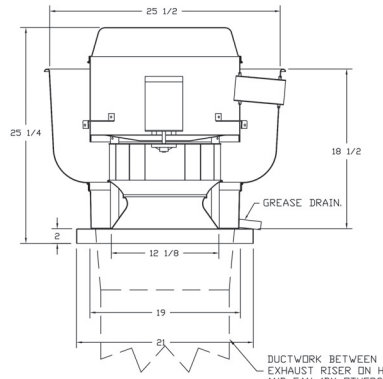
PROJECT NO: 34288

DRAWN: AJP

SCALE:

SHEET NO: KM701

FANS #1 (KEF-1 (GRILL-1)), #2 (KEF-2-(GRILL-2)), #3 (KEF-3 (FRYER)), #4 (KEF-4 (FRYER)) - DU33HFA EXHAUST FAN



FEATURES:

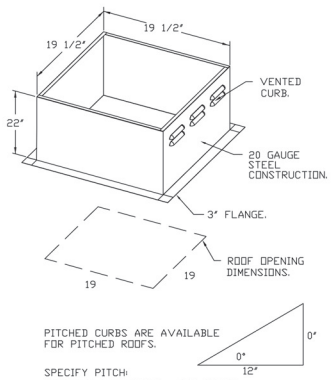
- DIRECT DRIVE CONSTRUCTION (NO BELTS/PULLEYS).
- ROOF MOUNTED FANS.
- RESTAURANT MODEL.
- UL705 AND UL762 AND ULC-S645
- VARIABLE SPEED CONTROL.
- INTERNAL WIRING.
- THERMAL OVERLOAD PROTECTION (SINGLE PHASE).
- HIGH HEAT OPERATION 300°F (149°C).
- GREASE CLASSIFICATION TESTING.
- NEMA 3R SAFETY DISCONNECT SWITCH.

NORMAL TEMPERATURE TEST
EXHAUST FAN MUST OPERATE CONTINUOUSLY WHILE EXHAUSTING AIR AT 300°F (149°C) UNTIL ALL FAN PARTS HAVE REACHED THERMAL EQUILIBRIUM, AND WITHOUT ANY DETERIORATING EFFECTS TO THE FAN WHICH WOULD CAUSE UNSAFE OPERATION.

ABNORMAL FLARE-UP TEST
EXHAUST FAN MUST OPERATE CONTINUOUSLY WHILE EXHAUSTING BURNING GREASE VAPORS AT 600°F (316°C) FOR A PERIOD OF 15 MINUTES WITHOUT THE FAN BECOMING DAMAGED TO ANY EXTENT THAT COULD CAUSE AN UNSAFE CONDITION.

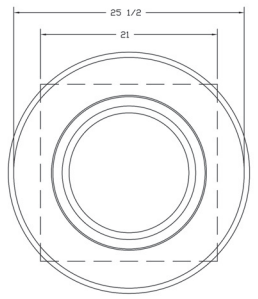
OPTIONS

GREASE BOX.
FAN BASE CERAMIC SEAL - INSTALLED AT PLANT - FOR GREASE DUCTS.
ECM WIRING PACKAGE - PWM SIGNAL FROM ECPM03 PREWIRE (TELCO MOTOR), CCW ROTATION.
2 YEAR PARTS WARRANTY.

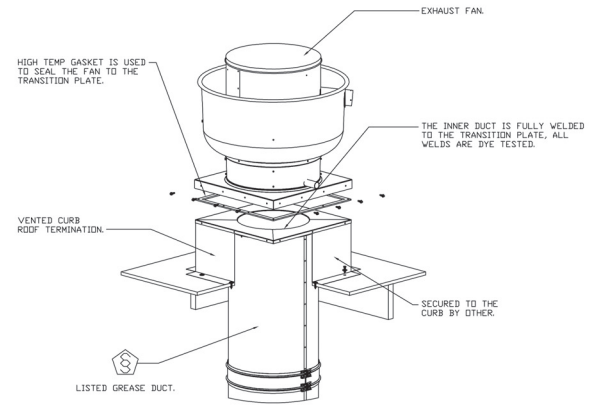


PITCHED CURBS ARE AVAILABLE FOR PITCHED ROOFS.

SPECIFY PITCH:
EXAMPLE: 7/12 PITCH = 30° SLOPE.



TOP VIEW



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Shake Shack-1377-Lynnwood,WA-R1

LYNNWOOD, WA, 98036

DATE: 11/8/2021

DWG.#: 5175551

DRAWN BY: joe.shilba

SCALE: 3/4" = 1'-0"

MASTER DRAWING

SHEET NO. 5

zebra
ZEBRA ARCHITECTURE, PLLC
14614 N KIERLAND BLVD. SUITE N300
SCOTTSDALE, ARIZONA 85254
PHONE: 480.912.1169 zbr.global

STORE NO: 1377

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ALDERWOOD MALL
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DATE: 02/17/22 | PROJECT NO: 34288

DRAWN: AJP | SCALE:

SHEET NO: **KM705**