



Shake Shack

Store #1453
Scottsdale, AZ

Submission of
Certified Test, Adjust and Balance Report
April 2, 2024

Architect: Zebra Projects

Engineer: Schnackel Engineers
3035 S 72nd St, Omaha, NE 68124

General Contractor: Not Provided

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 1453
 LOCATION: Scottsdale, AZ
 PROJECT #: 24049

DATE: 4/2/2024
 CONTACT: Clayton Nelson

SYSTEM/UNIT: Air Balance Summary

Tested By: Hank Wulk
 Date: 3/27/2024

Unit Design Data	
Design O/A + MUA CFM	4500
Design Exhaust CFM	4225
Design CFM Difference	275
Designed Pos or Neg	Positive

Test Data	
Actual O/A + MUA CFM	4619
Actual Exhaust CFM	3858
Actual CFM Difference	761
Building Set	Positive

Building	
Front Door DP (in wg)	0.0100
Back Door DP (in wg)	0.0097
Side Door 1 DP (in wg)	0.0040
Side Door 2 DP (in wg)	0.0036
Wind Conditions	No Wind

Air Balance Summary Equipment Summary

System/Unit	Area Served	SA Des (CFM)	RA Des (CFM)	OA Des (CFM)	EA Des (CFM)	SA Act (CFM)	RA Act (CFM)
EF-01		0	0	0	1970	0	0
EF-02		0	0	0	1955	0	0
EF-03		0	0	0	300	0	0
RTU-01	-	3000	2000	1000	0	2527	1465
RTU-02	-	4970	1500	3500	0	4258	701
Totals:		-	-	4500	4225	-	-



Report Certification

PROJECT: Shake Shack 1453
LOCATION: Scottsdale, AZ
PROJECT #: 24049

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

12/31/2024

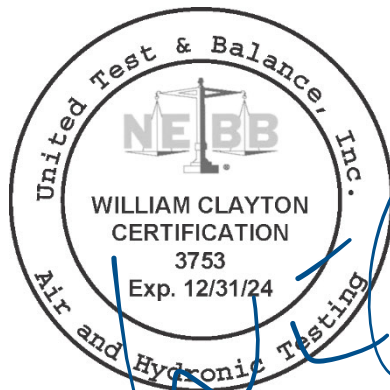
Certification Date

April 2, 2024

Signed & Sealed By

Certifying NEBB Certified TAB Professional

William Clayton



Handwritten signature in blue ink over the seal.
4/2/24



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LOCATION: Scottsdale, AZ
PROJECT #: 24049

DATE: 4/2/2024
CONTACT: Clayton Nelson

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Report Summary/Remarks

PROJECT: Shake Shack 1453
LOCATION: Scottsdale, AZ
PROJECT #: 24049

DATE: 4/2/2024
CONTACT: Clayton Nelson

SYSTEM/UNIT: Report Summary and Remarks

Scope of Work

Preface

The summary below provides a quick understanding of how well your HVAC systems balanced in respect to the design criteria. The summary concludes with a quick understanding of your building environment and possible suggestions for each of your systems after testing has been performed. Our focus is to work with the trades to remedy any issues or deficiencies during the actual field balancing and not after the balancing has occurred. Our focus is to achieve a positive environment and outcome. The level of success is determined by the availability of the trades, possible parts needed, or time constraints. Also, enclosed are pictures of building assets and items listed below that will provide your team with more insight.

Facility Identification and TAB Requirements

The mechanical equipment to be tested, adjusted, and balanced includes: All Rooftop Units (RTUs), All Exhaust Fans (EF), All Make Up Air Units (MUA), All Kitchen Hoods, and all associated air devices.

System Posturing & Remarks

Air Apparatuses

Each of the RTUs were measured at their terminal devices utilizing a flow hood. The sum of these readings is equal to the total flow for that particular unit. The total flow of each HP was then adjusted to +/-10% of the specified design. Each terminal diffuser was balanced to within +/-10% of the engineer's design volume utilizing the provided hand damper located at the takeoff of the main & branch trunk line(s). Any equipment that fell outside of this tolerance is noted throughout the report.

Kitchen Exhaust Hood & Associated Fans

Each kitchen exhaust fan was measured at the hood filter bay utilizing a velocity matrix and a manufacturer's correction factor. Each filter velocity is multiplied by the manufacturer's corrected area. The sum of these readings equals the total flow of the exhaust fans. The total flow of the exhaust was then adjusted to +/-10% of the engineers design flow. Total flow for the MAU (Make-up Air Unit) unit was measured by readings taken at the discharge of the hood's perforated supply plenum. Readings taken with a velocity matrix were averaged and multiplied by a manufacturer's corrected area. Adjustments to the fan speed were made in order to bring the unit to within +/-10% of design criteria. Any EF's or MUA's that fell outside of this tolerance is noted throughout the report.

General Exhaust Fans

The general exhaust fans were measured by reading each air device with a flow hood. The total airflow for each fan is equivalent to the sum of these readings. Fan speed was then adjusted so that the airflow was within +/-10% of design. Each terminal device was balanced to within +/-10% of the design volume using the installed volume dampers. Any equipment that fell outside of this tolerance is noted throughout the report.

Final Building Test

After completing the test and balance, the final building pressure was recorded on the Building Summary form. This pressure falls within the recommended tolerances by the International Mechanical Code of +0.02" W.C. to -0.02" W.C. The building is designed for a net positive pressure and this measurement coincides with that requirement.



Project Checklist

PROJECT: Shake Shack 1453
 LOCATION: Scottsdale, AZ
 PROJECT #: 24049

DATE: 4/2/2024
 CONTACT: Clayton Nelson

SYSTEM/UNIT: Project Checklist

Tested By: Hank Wulk
 Date: 3/27/2024

Inspection Data - Project Checklist

Verification	Response	Notes	By	Date/Time
1 All diffusers and grilles are installed and match design?	No		CN	3/13/24 13:16
2 Deflector plates are removed from 1x1 diffusers on the serve line (double check that this is specified on the diffuser schedule first)	NA		CN	3/13/24 13:16
3 All hood filters installed and accounted for?	Yes		CN	3/13/24 13:16
4 Hoods are wired and have power?	No		CN	3/13/24 13:16
5 Hood is free of alarms?	No		CN	3/13/24 13:16
6 Thermostats have power?	No		CN	3/13/24 13:16
7 Have trades/general contractor been notified about any issues and are they created on FaciliBuild?	Yes		CN	3/13/24 13:16

General - Project Checklist

Verification	Response	Notes	By	Date/Time
1 Is space free of drafting?	Yes		HW	3/27/24 12:18
2 Is space comfortable in all areas?	Yes		HW	3/27/24 12:18
3 Is the space free of ventilation noise?	Yes		HW	3/27/24 12:18
4 If deviations from design were necessary to resolve 103 what were they? Otherwise put "NA"	NA		HW	3/27/24 12:18



Equipment Comment Log

PROJECT: Shake Shack 1453
LOCATION: Scottsdale, AZ
PROJECT #: 24049

DATE: 4/2/2024
CONTACT: Clayton Nelson

Page #s	System / Unit Name	Notes / Logs
Page 8	RTU-01	Unit is limited on performance from the factory start-up to 84% of design due to issues with breakers.
Page 16	RTU-02	Unit is limited on performance from the factory start-up to 85% of design due to issues with breakers.
Mini Split System	FC-01	Outside air intake is not installed on ductless mini-split. Unable to achieve minimum design OA CFM.

Air Apparatus

PROJECT: Shake Shack 1453
 LOCATION: Scottsdale, AZ
 PROJECT #: 24049

DATE: 4/2/2024
 CONTACT: Clayton Nelson

SYSTEM/UNIT: RTU-01

Tested By: Hank Wulk
 Date: 3/27/2024



Design Airflow (CFM)		Final Airflow (CFM)	
Design Total	3000	Actual Total CFM	2527
Design Grille Total	3000	Actual Grille Total CFM	2527
Design Return	2000	Actual Return Air CFM	1465
Design Min O/A	1000	Actual Min O/A CFM	1062
Unit Design Data		Fan CFM Test Method Capture Hood	
Submittal Make	Not Provided	OA Method/Instrument	Face Velocity/RVA
Submittal Model #	-	OA Ak (sq ft)	4.610
Submittal Airflow	3000	OA Damper % (High Spd)	50% Open
Sched./Sub. Volts	Not Listed	OA Damper % (Low Spd)	-
Sched./Sub. Phase	-	RA Damper % (High Spd)	50% Open
Sched./Sub. HP	-	Unit Data	
Submittal BHP	Not Provided	Make (tag)	CaptiveAire
Filter MERV Rating (Sched/Sub)	Not Listed	Model # (tag)	CASRTU2-1.150-18-10T
Design Static Pressures (in wg)		Serial # (tag)	5842574
Design Ext SP	-	Location	Roof
Submittal Total SP	Not Provided	Unit Discharge	Downblast
Submittal Clg Coil Δ SP	-	Cooling Coil Location	Unit / Drawthru
Filter Data		Coil Area (sq ft)	-
Condition	Clean	Clg Coil Vel (FPM)	-
Filter Type	Pleated	Fan Service	Supply
MERV Rating	8	Fan Type	Centrifugal (FC)
Filter Size Set 1 (in)	16/20/2	Fan Discharge	Downblast
# Filters Set 1	4	Fan Arrangement	SWSI
Filter Size Set 2 (in)	16/20/2	Fan Design Data	
# Filters Set 2	4	Submittal Motor RPM	Not Provided
Motor Nameplate Data		Submittal Fan RPM	-
Motor Make	TECO	Fan Data	
Motor Frame	182T	Actual Fan RPM/Speed	High
Motor HP	3.00	Actual Motor RPM	Not Accessible
Motor RPM	1755	Electrical Data	
Motor Volts	230/460	Measurement Method	V/A Meter
Motor Phase	3	Motor Volts 1	211

Air Apparatus

PROJECT: Shake Shack 1453
LOCATION: Scottsdale, AZ
PROJECT #: 24049

DATE: 4/2/2024
CONTACT: Clayton Nelson

SYSTEM/UNIT: RTU-01

Tested By: Hank Wulk
 Date: 3/27/2024

Motor Nameplate Data	
Motor Amps	8.6/4.3
Motor S.F.	1.15
Motor % PF	.
Motor % Eff.	89.5
Other Motor Data	-

Electrical Data	
Motor Volts 2	212
Motor Volts 3	213
Motor Amps 1	8.9
Motor Amps 2	9.2
Motor Amps 3	9.6
Operating HZ	60.00
Approx. BHP	5633.7
Corr. Nameplate Amps	0.0
Starter Data	-
VFD Reference	Not Applicable

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	-

Filters Set 1 Photo:



Name: # Filters Set 1.jpg
 Captured: 3/14/2024 8:52 AM
 Caption:

Air Apparatus

PROJECT: Shake Shack 1453
LOCATION: Scottsdale, AZ
PROJECT #: 24049

DATE: 4/2/2024
CONTACT: Clayton Nelson

SYSTEM/UNIT: RTU-01

Tested By: Hank Wulk
 Date: 3/27/2024

Motor Make Photo:



Name: Motor Make.jpg
 Captured: 3/14/2024 8:42 AM
 Caption:

Make (tag) Photo:



Name: Make (tag).jpg
 Captured: 3/14/2024 8:38 AM
 Caption:

Air Apparatus

PROJECT: Shake Shack 1453
LOCATION: Scottsdale, AZ
PROJECT #: 24049

DATE: 4/2/2024
CONTACT: Clayton Nelson

SYSTEM/UNIT: RTU-01

Tested By: Hank Wulk
Date: 3/27/2024

Motor Amps 2 Photo:



Name: Motor Amps 2.jpg
Captured: 3/27/2024 3:41 PM
Caption:

Motor Amps 3 Photo:



Name: Motor Amps 3.jpg
Captured: 3/27/2024 3:41 PM
Caption:

Air Apparatus

PROJECT: Shake Shack 1453
LOCATION: Scottsdale, AZ
PROJECT #: 24049

DATE: 4/2/2024
CONTACT: Clayton Nelson

SYSTEM/UNIT: RTU-01

Tested By: Hank Wulk
Date: 3/27/2024

Motor Volts 3 Photo:



Name: Motor Volts 3.jpg
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Caption:

Motor Volts 2 Photo:



Name: Motor Volts 2.jpg
Captured: 3/27/2024 3:40 PM
Caption:

Air Apparatus

PROJECT: Shake Shack 1453
LOCATION: Scottsdale, AZ
PROJECT #: 24049

DATE: 4/2/2024
CONTACT: Clayton Nelson

SYSTEM/UNIT: RTU-01

Tested By: Hank Wulk
Date: 3/27/2024

Motor Amps 1 Photo:



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Caption:

Motor Volts 1 Photo:



Name: Motor Volts 1.jpg
Captured: 3/27/2024 3:40 PM
Caption:

Air Apparatus

PROJECT: Shake Shack 1453
 LOCATION: Scottsdale, AZ
 PROJECT #: 24049

DATE: 4/2/2024
 CONTACT: Clayton Nelson

SYSTEM/UNIT: RTU-01

Tested By: Hank Wulk
 Date: 3/27/2024

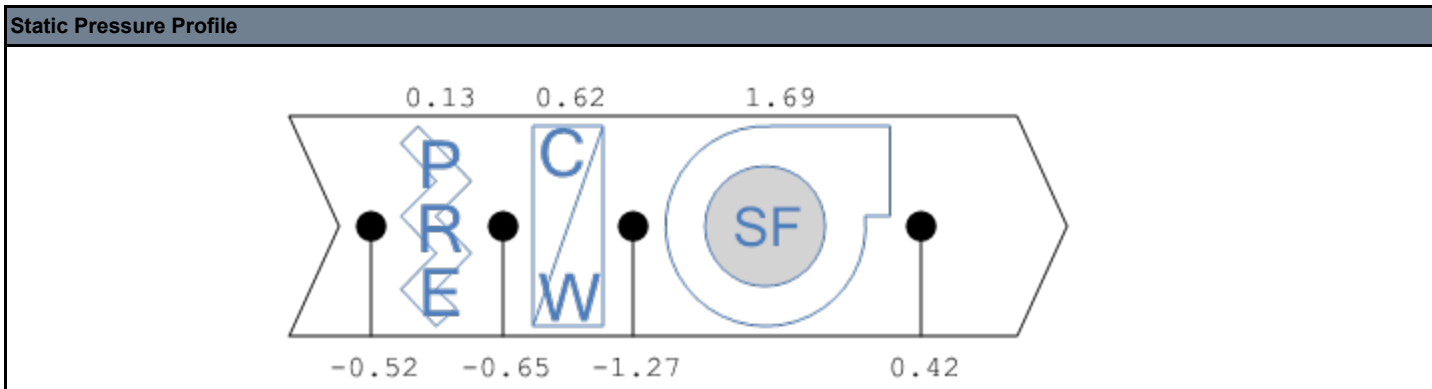
Inspection Data - RTU-01

Verification	Response	Notes	By	Date/Time
1	IS ECONOMIZER BLANK PLATE INSTALLED BELOW THE OUTDOOR AIR FILTERS? (IF NO, REMOVE THE PIECE FROM UNDERNEATH THE COIL FILTER BANK AND INSTALL) Trane only (N/A = not applicable)	NA		CN 3/13/24 13:17
2	Economizers are assembled and functional?	NA		HW 3/27/24 15:32
3	DCV Max damper opening position is set to minimum?	NA		CN 3/13/24 13:17
4	Free cooling enthalpy set point set for lowest setting (Typically "D")	NA		CN 3/13/24 13:17
5	Is the motor operating below the motor FLA rating?	Yes		HW 3/27/24 15:32
6	Belts are Tight?	NA		CN 3/13/24 13:17
7	If direct drive unit is the speed controller working.	NA		HW 3/27/24 15:33
8	Gas piping is installed and valves are in on position?	Yes		HW 3/27/24 15:33
9	Unit free of noticeable noise and vibration?	Yes		HW 3/27/24 15:33

Log: RTU-01 Unit is limited on performance from the factory start-up to 84% of design due to issues with breakers.

SYSTEM/UNIT: RTU-01/Static Profile

Tested By: Hank Wulk
 Date: 3/27/2024





Air Apparatus

PROJECT: Shake Shack 1453
 LOCATION: Scottsdale, AZ
 PROJECT #: 24049

DATE: 4/2/2024
 CONTACT: Clayton Nelson

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	101 Dining	SW	36/10	675	562	559	83	RVA	1.880	-	297
S-02	101 Dining	SW	12/8	300	272	258	86	RVA	0.470	-	549
S-03	101 Dining	SW	36/10	675	532	557	83	RVA	1.880	-	296
S-04	101 Dining	SW	36/10	675	540	574	85	RVA	1.880	-	305
S-05	101 Dining	SW	36/10	675	611	579	86	RVA	1.880	-	308
Totals:		-	-	3000	2517	2527	84	-	-	-	-



Air Apparatus

PROJECT: Shake Shack 1453
 LOCATION: Scottsdale, AZ
 PROJECT #: 24049

DATE: 4/2/2024
 CONTACT: Clayton Nelson

SYSTEM/UNIT: RTU-02

Tested By: Hank Wulk
 Date: 3/27/2024



Design Airflow (CFM)		Final Airflow (CFM)	
Design Total	5000	Actual Total CFM	4258
Design Grille Total	4970	Actual Grille Total CFM	4253
Design Return	1500	Actual Return Air CFM	701
Design Min O/A	3500	Actual Min O/A CFM	3557
Unit Design Data		Unit Data	
Submittal Make	Not Provided	Make (tag)	CaptiveAire
Submittal Model #	-	Model # (tag)	CASRTU3-1.300-24-20T
Submittal Airflow	5000	Serial # (tag)	5842574
Sched./Sub. Volts	Not Listed	Location	Roof
Sched./Sub. Phase	-	Unit Discharge	Downblast
Sched./Sub. HP	-	Cooling Coil Location	Unit / Drawthru
Submittal BHP	Not Provided	Coil Area (sq ft)	-
Filter MERV Rating (Sched/Sub)	Not Listed	Clg Coil Vel (FPM)	-
Design Static Pressures (in wg)		Fan Design Data	
Design Ext SP	-	Submittal Motor RPM	Not Provided
Submittal Total SP	Not Provided	Submittal Fan RPM	-
Submittal Clg Coil Δ SP	-	Fan Data	
Filter Data		Electrical Data	
Condition	Clean	Measurement Method	V/A Meter
Filter Type	Pleated	Motor Volts 1	211
MERV Rating	8		
Filter Size Set 1 (in)	20/25/2		
# Filters Set 1	4		
Filter Size Set 2 (in)	20/25/2		
# Filters Set 2	4		
Motor Nameplate Data			
Motor Make	TECO		
Motor Frame	213T		
Motor HP	7.50		
Motor RPM	1755		
Motor Volts	230/460		
Motor Phase	3		

Air Apparatus

PROJECT: Shake Shack 1453
LOCATION: Scottsdale, AZ
PROJECT #: 24049

DATE: 4/2/2024
CONTACT: Clayton Nelson

SYSTEM/UNIT: RTU-02

Tested By: Hank Wulk
 Date: 3/27/2024

Motor Nameplate Data	
Motor Amps	19.1/9.55
Motor S.F.	1.15
Motor % PF	-
Motor % Eff.	91
Other Motor Data	-

Electrical Data	
Motor Volts 2	213
Motor Volts 3	213
Motor Amps 1	17.4
Motor Amps 2	18.6
Motor Amps 3	18.7
Operating HZ	60.00
Approx. BHP	27535.5
Corr. Nameplate Amps	0.0
Starter Data	-
VFD Reference	Not Applicable

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	-

Filter Size Set 1 (in) Photo:



Name: Filter Size Set 1 (in).jpg
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 Caption:

Air Apparatus

PROJECT: Shake Shack 1453
LOCATION: Scottsdale, AZ
PROJECT #: 24049

DATE: 4/2/2024
CONTACT: Clayton Nelson

SYSTEM/UNIT: RTU-02

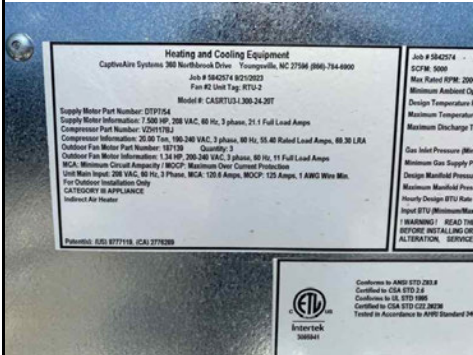
Tested By: Hank Wulk
 Date: 3/27/2024

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 Caption:

Make (tag) Photo:



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 Caption:

Air Apparatus

PROJECT: Shake Shack 1453
LOCATION: Scottsdale, AZ
PROJECT #: 24049

DATE: 4/2/2024
CONTACT: Clayton Nelson

SYSTEM/UNIT: RTU-02

Tested By: Hank Wulk
Date: 3/27/2024

Motor Amps 2 Photo:



Name: Motor Amps 2.jpg
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Caption:

Motor Amps 3 Photo:



Name: Motor Amps 3.jpg
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Caption:

Air Apparatus

PROJECT: Shake Shack 1453
LOCATION: Scottsdale, AZ
PROJECT #: 24049

DATE: 4/2/2024
CONTACT: Clayton Nelson

SYSTEM/UNIT: RTU-02

Tested By: Hank Wulk
Date: 3/27/2024

Motor Volts 3 Photo:



Name: Motor Volts 3.jpg
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Caption:

Motor Volts 2 Photo:



Name: Motor Volts 2.jpg
Captured: 3/27/2024 3:41 PM
Caption:

Air Apparatus

PROJECT: Shake Shack 1453
LOCATION: Scottsdale, AZ
PROJECT #: 24049

DATE: 4/2/2024
CONTACT: Clayton Nelson

SYSTEM/UNIT: RTU-02

Tested By: Hank Wulk
Date: 3/27/2024

Motor Amps 1 Photo:



Name: Motor Amps 1.jpg
Captured: 3/27/2024 3:42 PM
Caption:

Motor Volts 1 Photo:



Name: Motor Volts 1.jpg
Captured: 3/27/2024 3:41 PM
Caption:

Air Apparatus

PROJECT: Shake Shack 1453
 LOCATION: Scottsdale, AZ
 PROJECT #: 24049

DATE: 4/2/2024
 CONTACT: Clayton Nelson

SYSTEM/UNIT: RTU-02

Tested By: Hank Wulk
 Date: 3/27/2024

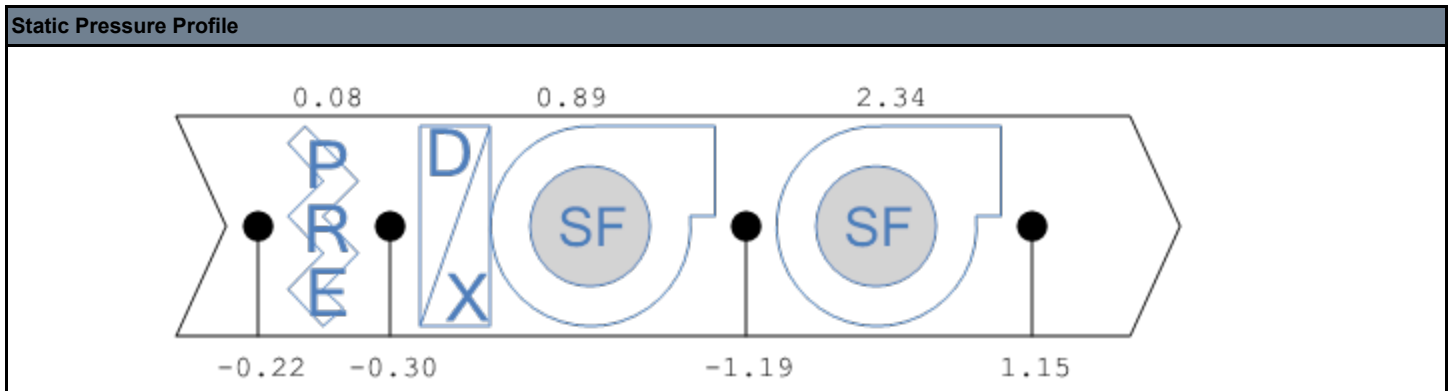
Inspection Data - RTU-02

Verification	Response	Notes	By	Date/Time
1	IS ECONOMIZER BLANK PLATE INSTALLED BELOW THE OUTDOOR AIR FILTERS? (IF NO, REMOVE THE PIECE FROM UNDERNEATH THE COIL FILTER BANK AND INSTALL) Trane only (N/A = not applicable)	Yes		
2	Economizers are assembled and functional?	Yes	HW	3/27/24 15:34
3	DCV Max damper opening position is set to minimum?	NA	HW	3/27/24 15:34
4	Free cooling enthalpy set point set for lowest setting (Typically "D")	NA	HW	3/27/24 15:34
5	Is the motor operating below the motor FLA rating?	Yes	HW	3/27/24 15:34
6	Belts are Tight?	NA	HW	3/27/24 15:34
7	If direct drive unit is the speed controller working.	NA	HW	3/27/24 15:34
8	Gas piping is installed and valves are in on position?	Yes	HW	3/27/24 15:34
9	Unit free of noticeable noise and vibration?	Yes	HW	3/27/24 15:34

Log: RTU-02 Unit is limited on performance from the factory start-up to 85% of design due to issues with breakers.

SYSTEM/UNIT: RTU-02/Static Profile

Tested By: Hank Wulk
 Date: 3/27/2024





Air Apparatus

PROJECT: Shake Shack 1453
 LOCATION: Scottsdale, AZ
 PROJECT #: 24049

DATE: 4/2/2024
 CONTACT: Clayton Nelson

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	Entry	CD	15	885	1480	751	85	Capture Hood	1.000	1.000	751
S-02	103 Back Kit	CD	15	885	534	754	85	Capture Hood	1.000	1.000	754
S-03	102 Open Kit	CD	16	600	512	504	84	Capture Hood	1.000	1.000	504
S-04	102 Open Kit	CD	16	600	530	505	84	Capture Hood	1.000	1.000	505
S-05	102 Open Kit	CD	16	600	495	508	85	Capture Hood	1.000	1.000	508
S-06	102 Open Kit	CD	16	600	298	514	86	Capture Hood	1.000	1.000	514
S-07	102 Open Kit	CD	15	600	188	513	86	Capture Hood	1.000	1.000	513
S-08	107 W RR	CD	6	100	183	102	102	Capture Hood	1.000	1.000	102
S-09	106 M RR	CD	6	100	130	102	102	Capture Hood	1.000	1.000	102
Totals:		-	-	4970	4350	4253	86	-	-	-	-

Fan

PROJECT: Shake Shack 1453
LOCATION: Scottsdale, AZ
PROJECT #: 24049

DATE: 4/2/2024
CONTACT: Clayton Nelson

SYSTEM/UNIT: EF-01

Tested By: Hank Wulk
 Date: 3/27/2024



Design Airflow (CFM)		Final Airflow (CFM)	
Design Airflow	1970	Actual Airflow	1768
Design Grille Airflow	Not Applicable	Actual Grille Airflow	Not Applicable
		Fan CFM Test Method	Face Velocity - Velgid/ADM
		Test Method Ak (sq ft)	-
Unit Design Data		Unit Data	
Submittal Make	Not Provided	Make (tag)	CaptiveAire
Submittal Model #	-	Model # (tag)	DU85HFA
Submittal Airflow	-	Serial # (tag)	5783357
Sched./Sub. Volts	Not Listed	Unit Location	Roof
Sched./Sub. Phase	-	Unit Discharge	Upblast
Sched./Sub. HP	-	Fan Service	Exhaust
Submittal BHP	Not Provided	Fan Type	Centrifugal (AF)
		Fan Discharge	Upblast
		Fan Arrangement	SWSI
Design Static Pressures (in wg)		Fan Design Data	
Design External SP	Not Listed	Submittal Motor RPM	Not Provided
Submittal Total SP	-	Submittal Fan RPM	-
Motor Nameplate Data		Fan Data	
Motor Make (tag)	TELCO GREEN	Actual Fan RPM/Speed	High
Motor Frame (tag)	-	Actual Motor RPM	Not Accessible
Motor HP (tag)	3/4	Speed Cont. Position	100%
Motor RPM (tag)	1800		
Motor Volts (tag)	310 VDC	Electrical Data	
Motor Phase (tag)	-	Measurement Method	Not Accessible
Motor Amps (tag)	-	Motor Volts 1	-
Motor S.F. (tag)	-	Motor Volts 2	-
Mtr % PF (tag)	-	Motor Volts 3	-
Mtr % Eff. (tag)	-	Motor Amps 1	Not Accessible
Other Motor Data	-	Motor Amps 2	-
		Motor Amps 3	-
		Operating HZ	60.0
		Starter Data	Not Applicable
		Approx. BHP	-
Drive Data			
Drive Type	Direct Drive		
Sheave Type	-		
Fan Sheave Make	-		
Fan Shv Mod# or Size (in)	-		
Fan Sheave Bore (in.)	-		
Motor Sheave Make	-		

Fan

PROJECT: Shake Shack 1453
LOCATION: Scottsdale, AZ
PROJECT #: 24049

DATE: 4/2/2024
CONTACT: Clayton Nelson

SYSTEM/UNIT: EF-01

Tested By: Hank Wulk
 Date: 3/27/2024

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	-

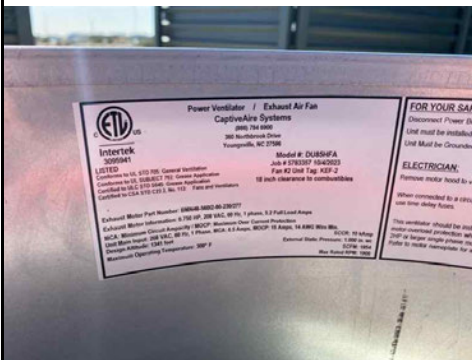
Electrical Data
Corr. Nameplate Amps

Motor Make (tag) Photo:



Name: Motor Make (tag).jpg
 Captured: 3/14/2024 8:57 AM
 Caption:

Make (tag) Photo:



Name: Make (tag).jpg
 Captured: 3/14/2024 8:55 AM
 Caption:

Fan

PROJECT: Shake Shack 1453
LOCATION: Scottsdale, AZ
PROJECT #: 24049

DATE: 4/2/2024
CONTACT: Clayton Nelson

SYSTEM/UNIT: EF-01

Tested By: Hank Wulk
 Date: 3/27/2024

Inspection Data - EF-01

Verification	Response	Notes	By	Date/Time
1	Fan Rotation is Correct?	Yes	HW	3/27/24 13:06
2	Belts are Tight?	NA	CN	3/13/24 13:18
3	Internal motorized damper is fully opening?	NA	CN	3/13/24 13:18
4	Motor is operating below the FLA rating?	NA	HW	3/27/24 13:06
5	Unit free of noticeable noise and vibration?	Yes	HW	3/27/24 13:06
6	There is no major leakage around base of fan?	Yes	HW	3/27/24 13:06
7	Is the motor operating below the motor FLA rating?	NA	HW	3/27/24 13:06

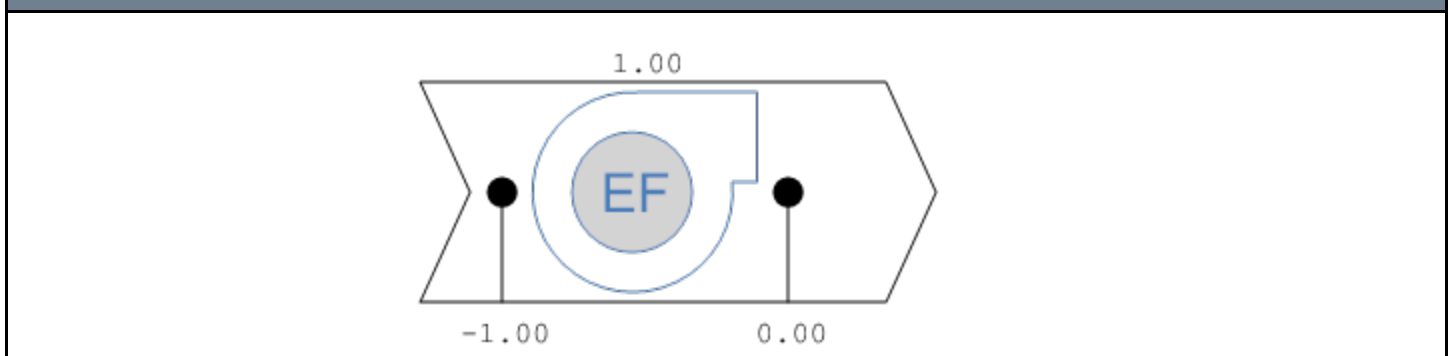
HVAC Units / Fans - EF-01

Verification	Response	Notes	By	Date/Time
1	Grease cup is installed on hood fan?	Yes	CN	3/13/24 13:19
2	Hinge kit installed on hood fan.	Yes	HW	3/27/24 13:06
3	Lean fan back. Is grease duct installation adequate and is duct ran all the way to the base of the fan?	Yes	HW	3/27/24 13:07
4	Flex conduit is long enough so that fan can be completely tilted back?	Yes	HW	3/27/24 13:07

SYSTEM/UNIT: EF-01/Static Profile

Tested By: Hank Wulk
 Date: 3/27/2024

Static Pressure Profile





Fan

PROJECT: Shake Shack 1453
LOCATION: Scottsdale, AZ
PROJECT #: 24049

DATE: 4/2/2024
CONTACT: Clayton Nelson

SYSTEM/UNIT: EF-01/HD-01L

Design Airflow (CFM)	
Design Exhaust CFM	1954

Final Airflow (CFM)	
Actual Exhaust CFM	1768

Kitchen Hood Information	
Service	Cooking Equipment
Manufacturer	CaptiveAire
Model Number	5430 ND-2
Serial Number	58783357
Test Method	Filter Total

EF-01/HD-01L Exhaust Filter Summary

System/Unit	Size	Type	Ak	Reading 2	Reading 1	FPM	Instrument	CFM
Filter-01	20x16	Baffle	2.08		110	110	Velgrid	229
Filter-02	20x16	Baffle	2.08		111	111	Velgrid	231
Filter-03	20x16	Baffle	2.08		114	114	Velgrid	237
Filter-04	20x16	Baffle	2.08		109	109	Velgrid	227
Filter-05	20x16	Baffle	2.08		103	103	Velgrid	214
Filter-06	20x16	Baffle	2.08		93	93	Velgrid	193
Filter-07	20x16	Baffle	2.08		107	107	Velgrid	223
Filter-08	20x16	Baffle	2.08		99	99	Velgrid	206
Totals:	-	-	-	-	-	-	-	1760

Fan

PROJECT: Shake Shack 1453
LOCATION: Scottsdale, AZ
PROJECT #: 24049

DATE: 4/2/2024
CONTACT: Clayton Nelson

SYSTEM/UNIT: EF-02

Tested By: Hank Wulk
 Date: 3/27/2024



Design Airflow (CFM)		Final Airflow (CFM)	
Design Airflow	1955	Actual Airflow	1778
Design Grille Airflow	Not Applicable	Actual Grille Airflow	Not Applicable
Unit Design Data		Fan CFM Test Method Face Velocity - Velgid/ADM	
Submittal Make	Not Provided	Test Method Ak (sq ft)	2.080
Submittal Model #	-	Unit Data	
Submittal Airflow	-	Make (tag)	CAPTIVEAIRE
Sched./Sub. Volts	Not Listed	Model # (tag)	DU85HFA
Sched./Sub. Phase	-	Serial # (tag)	5783357
Sched./Sub. HP	-	Unit Location	Roof
Submittal BHP	Not Provided	Unit Discharge	Upblast
Design Static Pressures (in wg)		Fan Service	Exhaust
Design External SP	Not Listed	Fan Type	Centrifugal (AF)
Submittal Total SP	-	Fan Discharge	Upblast
Motor Nameplate Data		Fan Arrangement	SWSI
Motor Make (tag)	TELCO GREEN	Fan Design Data	
Motor Frame (tag)	-	Submittal Motor RPM	Not Provided
Motor HP (tag)	3/4	Submittal Fan RPM	-
Motor RPM (tag)	1800	Fan Data	
Motor Volts (tag)	310 VDC	Actual Fan RPM/Speed	High
Motor Phase (tag)	-	Actual Motor RPM	Not Accessible
Motor Amps (tag)	-	Speed Cont. Position	100%
Motor S.F. (tag)	-	Electrical Data	
Mtr % PF (tag)	-	Measurement Method	Not Accessible
Mtr % Eff. (tag)	-	Motor Volts 1	-
Other Motor Data	-	Motor Volts 2	-
Drive Data		Motor Volts 3	-
Drive Type	Direct Drive	Motor Amps 1	Not Accessible
Sheave Type	-	Motor Amps 2	-
Fan Sheave Make	-	Motor Amps 3	-
Fan Shv Mod# or Size (in)	-	Operating HZ	60.0
Fan Sheave Bore (in.)	-	Starter Data	Not Applicable
Motor Sheave Make	-	Approx. BHP	-

Fan

PROJECT: Shake Shack 1453
LOCATION: Scottsdale, AZ
PROJECT #: 24049

DATE: 4/2/2024
CONTACT: Clayton Nelson

SYSTEM/UNIT: EF-02

Tested By: Hank Wulk
 Date: 3/27/2024

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

Motor Make (tag) Photo:



Name: Motor Make (tag).jpg
 Captured: 3/14/2024 9:02 AM
 Caption:

Model # (tag) Photo:



Name: Make (tag).jpg
 Captured: 3/14/2024 9:00 AM
 Caption:

Fan

PROJECT: Shake Shack 1453
LOCATION: Scottsdale, AZ
PROJECT #: 24049

DATE: 4/2/2024
CONTACT: Clayton Nelson

SYSTEM/UNIT: EF-02

Tested By: Hank Wulk
 Date: 3/27/2024

Make (tag) Photo:



Name: Make (tag).jpg
 Captured: 3/14/2024 9:00 AM
 Caption:

Inspection Data - EF-02

Verification		Response	Notes	By	Date/Time
1	Fan Rotation is Correct?	Yes		HW	3/27/24 13:08
2	Belts are Tight?	NA		HW	3/27/24 13:08
3	Internal motorized damper is fully opening?	NA		HW	3/27/24 13:08
4	Motor is operating below the FLA rating?	NA		HW	3/27/24 13:08
5	Unit free of noticeable noise and vibration?	Yes		HW	3/27/24 13:08
6	There is no major leakage around base of fan?	Yes		HW	3/27/24 13:08
7	Is the motor operating below the motor FLA rating?	NA		HW	3/27/24 13:08
8	Back draft damper installed and can it fully open?	NA		HW	3/27/24 13:09

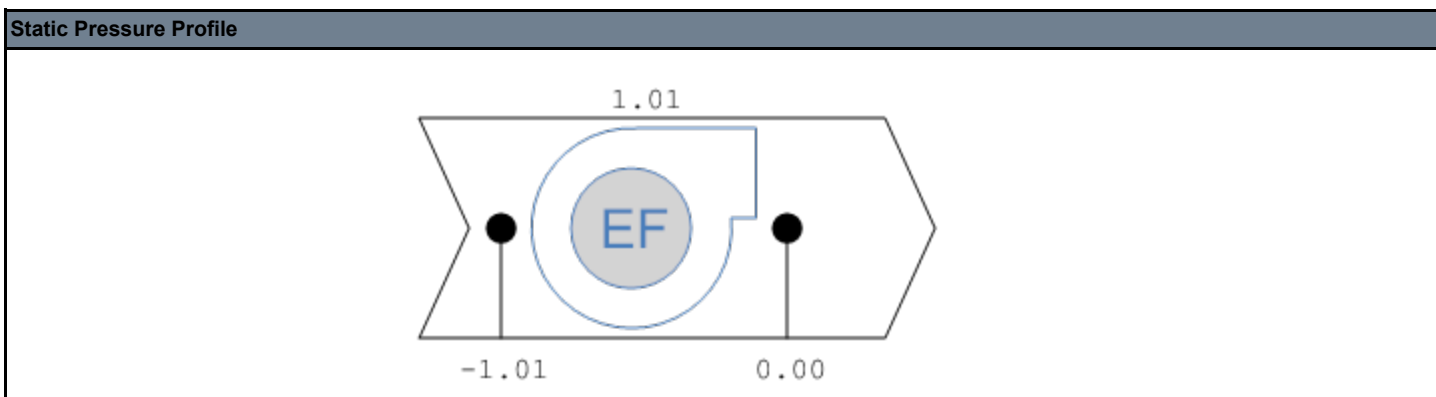
Fan

PROJECT: Shake Shack 1453
 LOCATION: Scottsdale, AZ
 PROJECT #: 24049

DATE: 4/2/2024
 CONTACT: Clayton Nelson

SYSTEM/UNIT: EF-02/Static Profile

Tested By: Hank Wulk
 Date: 3/27/2024



SYSTEM/UNIT: EF-02/HD-01R

Design Airflow (CFM)	
Design Exhaust CFM	1954

Final Airflow (CFM)	
Actual Exhaust CFM	1778

Kitchen Hood Information	
Service	Cooking Equipment
Manufacturer	CaptiveAire
Model Number	5430 ND-2
Serial Number	58783357
Test Method	Filter Total

EF-02/HD-01R Exhaust Filter Summary

System/Unit	Size	Type	Ak	Reading 2	Reading 1	FPM	Instrument	CFM
Filter-01	20x16	Baffle	2.08		100	100	Velgrid	208
Filter-02	20x16	Baffle	2.08		106	106	Velgrid	220
Filter-03	20x16	Baffle	2.08		121	121	Velgrid	252
Filter-04	20x16	Baffle	2.08		114	114	Velgrid	237
Filter-05	20x16	Baffle	2.08		98	98	Velgrid	204
Filter-06	20x16	Baffle	2.08		104	104	Velgrid	216
Filter-07	20x16	Baffle	2.08		108	108	Velgrid	225
Filter-08	20x16	Baffle	2.08		104	104	Velgrid	216
Totals:	-	-	-	-	-	-	-	1778



Fan

PROJECT: Shake Shack 1453
LOCATION: Scottsdale, AZ
PROJECT #: 24049

DATE: 4/2/2024
CONTACT: Clayton Nelson

SYSTEM/UNIT: EF-03

Tested By: Hank Wulk
 Date: 3/27/2024

Design Airflow (CFM)	
Design Airflow	300
Design Grille Airflow	Not Applicable

Unit Design Data	
Submittal Make	Not Provided
Submittal Model #	-
Submittal Airflow	-
Sched./Sub. Volts	115
Sched./Sub. Phase	1
Sched./Sub. HP	1/8
Submittal BHP	Not Provided

Design Static Pressures (in wg)	
Design External SP	.50
Submittal Total SP	Not Provided

Motor Nameplate Data	
Motor Make (tag)	VARI-GREEN
Motor Frame (tag)	-
Motor HP (tag)	1/6
Motor RPM (tag)	300-1750
Motor Volts (tag)	115/208-230
Motor Phase (tag)	1
Motor Amps (tag)	2.2/1.3/1.1
Motor S.F. (tag)	-
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	312
Actual Grille Airflow	Not Applicable
Fan CFM Test Method	Inlet Total
Test Method Ak (sq ft)	Not Applicable

Unit Data	
Make (tag)	Greenheck
Model # (tag)	G-095-6VG117XQD
Serial # (tag)	22233356 23D
Unit Location	Roof
Unit Discharge	Upblast
Fan Service	Exhaust
Fan Type	Centrifugal (AF)
Fan Discharge	Upblast
Fan Arrangement	SWSI

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

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

Electrical Data	
Measurement Method	Not Accessible
Motor Volts 1	-
Motor Volts 2	-
Motor Volts 3	-
Motor Amps 1	Not Accessible
Motor Amps 2	-
Motor Amps 3	-
Operating HZ	60.0
Starter Data	-
Approx. BHP	-
Corr. Nameplate Amps	-

Fan

PROJECT: Shake Shack 1453
LOCATION: Scottsdale, AZ
PROJECT #: 24049

DATE: 4/2/2024
CONTACT: Clayton Nelson

SYSTEM/UNIT: EF-03

Tested By: Hank Wulk
 Date: 3/27/2024

Motor Make (tag) Photo:



Name: Motor Make (tag).jpg
 Captured: 3/27/2024 1:02 PM
 Caption:

Make (tag) Photo:



Name: Make (tag).jpg
 Captured: 3/27/2024 1:01 PM
 Caption:

Inspection Data - EF-03

Verification	Response	Notes	By	Date/Time
1	Fan Rotation is Correct?	Yes	HW	3/27/24 13:05
2	Belts are Tight?	NA	HW	3/27/24 13:05
3	Internal motorized damper is fully opening?	Yes	HW	3/27/24 13:05
4	Motor is operating below the FLA rating?	NA	HW	3/27/24 13:05
5	Unit free of noticeable noise and vibration?	Yes	HW	3/27/24 13:05
6	There is no major leakage around base of fan?	Yes	HW	3/27/24 13:05
7	Is the motor operating below the motor FLA rating?	NA	HW	3/27/24 13:05

Fan

PROJECT: Shake Shack 1453
 LOCATION: Scottsdale, AZ
 PROJECT #: 24049

DATE: 4/2/2024
 CONTACT: Clayton Nelson

SYSTEM/UNIT: EF-03

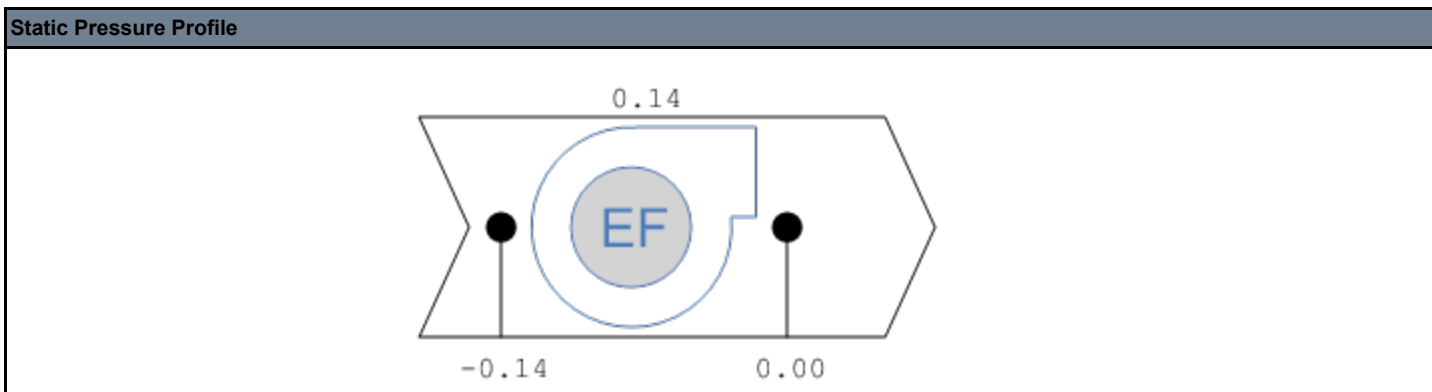
Tested By: Hank Wulk
 Date: 3/27/2024

HVAC Units / Fans - EF-03

Verification		Response	Notes	By	Date/Time
1	Grease cup is installed on hood fan?	NA		HW	3/27/24 13:05
2	Hinge kit installed on hood fan.	NA		HW	3/27/24 13:05
3	Lean fan back. Is grease duct installation adequate and is duct ran all the way to the base of the fan?	NA		HW	3/27/24 13:05
4	Flex conduit is long enough so that fan can be completely tilted back?	NA		HW	3/27/24 13:05

SYSTEM/UNIT: EF-03/Static Profile

Tested By: Hank Wulk
 Date: 3/27/2024



EF-03 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	Men's RR	CD	8/8	150	-	141	94	Capture Hood	1.000	1.000	141
E-02	Women's RR	CD	8/8	150	-	159	106	Capture Hood	1.000	1.000	159
Totals:		-	-	300	0	300	100	-	-	-	-



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	Resolution	0.1°F / .1 %RH
Serial:	2300198		0% - 100%RH		
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.



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		Test Instrument
			Min	Max	
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
Differential 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
Via Pilot Velocity Pressure >> (in W.C. / FPM) >>	7	0.0067 / 103	-3% - 7	+3% + 7	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	220500006	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 Institute of Standards and Technology, or accepted intrinsic standards of measurement, or derived by the ratio type of self-calibrated techniques.

Calibrated by Joshua Mcland 13-Jul-2023 13-Jul-2025
 Calibration Date Date Due

602.574.6192 | info@evergreentelemetry.com | www.evergreentelemetry.com | 33 S Sycamore, Mesa, AZ 85202



Certificate of Calibration

Cert No.



Date: Jul 19, 2023
 Customer:
 UNITED TEST AND BALANCE INC

Work Order #: TX-8028008
 Purchase Order #: CC
 Serial Number: 21000125
 Department: N/A
 Performed By: JOSHUA MCLAND
 Received Condition: IN TOLERANCE
 Returned Condition: IN TOLERANCE
 Cal. Date: July 18, 2023
 Cal. Interval: 12 MONTHS
 Cal. Due Date: July 18, 2024

MPC Control #: 2100125
 Asset ID: N/A
 Gage Type: THERMO-ANEMOMETER
 Manufacturer: EXTECH INSTRUMENT
 Model Number: AN300
 Size: N/A
 Temp/RH: 69.0°F / 54.0%
 Location: Calibration performed at MPC facility

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 #
CE6646	WIND TUNNEL	NMN	NSN	PAXTON AIRRESEARCH	Jul 31, 2023	5512200836989505
CD6300	THERMAL ANEMOMETER	CF8570	55070088	ALNOR	Jul 31, 2023	551220081509555

Procedures Used in this Event

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

Calibrating Technician:

Joshua Mcland
 JOSHUA MCLAND

QC Approval:

Michael Rodriguez
 MICHAEL RODRIGUEZ

STATEMENTS OF PASS OR FAIL CONFORMANCE: The uncertainty of measurement has been taken into account when determining compliance with specifications. All measurements and test results guard banded to ensure the probability of false-accept does not exceed 2% in compliance with ANSI/ISO/IEC 17025:2018.

THE CALIBRATION REPORT STATUS:
 PASS - Test used when compliance statement is given, and the measurement result is PASS.
 PASS* - Test used when compliance statement is given, and the measurement result is conditional passed or PASS*.
 FAIL - Test used when compliance statement is given, and the measurement result is FAIL.
 FAIL* - Test used when compliance statement is given, and the measurement result is conditional failed or FAIL*.
 REFUSE OR RECAL - Test used when required measurement is not meeting 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 based on the stated uncertainty of measurement published by the average factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%, unless otherwise stated. The calibration report complies with ISO/IEC 17025:2018, ANSI/NCSL Z540-3:2018 and ANSI/NCSL Z540-1:1994. Calibration cycles and tracking data were submitted/required 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 systems accuracy. An interval is recommended to fit through the National Institute of Standards and Technology (NIST) and/or required national or international standards requirements. Services rendered through proper manufacturer's service technician 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 whole without the prior written approval of the issuing NIST Calibration Laboratory.



Certificate of Calibration

Date: Jul 19, 2023

Cert No. 5523631030212360

Customer:
 UNITED TEST AND BALANCE INC

Work Order #: TX-8028008
 Purchase Order #: CC
 Serial Number: 56081376SV
 Department: N/A
 Performed By: JOSHUA MCLAND
 Received Condition: IN TOLERANCE
 Returned Condition: IN TOLERANCE
 Cal. Date: July 18, 2023
 Cal. Interval: 12 MONTHS
 Cal. Due Date: July 18, 2024

MPC Control #: 56081376SV
 Asset ID: N/A
 Gage Type: CLAMP METER
 Manufacturer: FLUKE
 Model Number: 375 FC
 Size: N/A
 Temp/RH: 69.0°F / 54.0%
 Location: Calibration performed at MPC facility

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
 JOSHUA MCLAND

QC Approval:

Michael Rodriguez
 MICHAEL RODRIGUEZ

STATEMENTS OF PASS OR FAIL CONFORMANCE: The uncertainty of measurement has been taken into account when determining compliance with specifications. All measurements and test results guard banded to ensure the probability of false-accept does not exceed 2% in compliance with ANSI/ISO/IEC 17025:2018.

THE CALIBRATION REPORT STATUS:
 PASS - Test used when compliance statement is given, and the measurement result is PASS.
 PASS* - Test used when compliance statement is given, and the measurement result is conditional passed or PASS*.
 FAIL - Test used when compliance statement is given, and the measurement result is FAIL.
 FAIL* - Test used when compliance statement is given, and the measurement result is conditional failed or FAIL*.
 REFUSE OR RECAL - Test used when required measurement is not meeting 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 based on the stated uncertainty of measurement published by the average factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%, unless otherwise stated. The calibration report complies with ISO/IEC 17025:2018, ANSI/NCSL Z540-3:2018 and ANSI/NCSL Z540-1:1994. Calibration cycles and tracking data were submitted/required 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 systems accuracy. An interval is recommended to fit through the National Institute of Standards and Technology (NIST) and/or required national or international standards requirements. Services rendered through proper manufacturer's service technician 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 whole without the prior written approval of the issuing NIST Calibration Laboratory.



Certificate of Calibration

United Test & Balance

Manufacturer	Evergreen Telemetry	Calibration Environment		
Product	Water Pressure Sensing Module	Temperature	75	°F
Model	S-OP-250	Rel. Humidity	24	%
SN	2200123B	Bar. Pressure	28.5	in Hg

As Found
 As Left
 In Tolerance
 Out of Tolerance

Calibration Data

Specification	Cal Std	Sensor 1 Diff Pres	Difference	Cal Std	Sensor 2 Gage Lo	Diff
+/- 2% +/- last digit			(%)			%
Approx Sel Point						
PSI	(ftwc)	(ftwc)		(ftwc)	(ftwc)	
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	ftwc	ftwc				
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	3-Oct-21	3-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 Institute of Standards and Technology, or accepted intrinsic standards of measurement, or derived by the ratio type of self-calibrated techniques.

Calibrated by Chris Stoddard 25-Aug-2023 25-Aug-2024
 Calibration Date Date Due

602.574.6192 | info@evergreentelemetry.com | www.evergreentelemetry.com | 33 S Sycamore, Mesa, AZ 85202



Certificate of Calibration

Date: Jul 19, 2023
Customer:
UNITED TEST AND BALANCE INC

Cert No. 5523631030212364

Work Order #: TX-8028008
Purchase Order #: CC
Serial Number: D21B0070R
Department: N/A
Performed By: JOSHUA MCLAND
Received Condition: IN TOLERANCE
Returned Condition: IN TOLERANCE
Cal. Date: July 18, 2023
Cal. Interval: 12 MONTHS
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/ISO/IEC 17025:2005.



Certificate of Calibration

Date: Jul 19, 2023
Customer:
UNITED TEST AND BALANCE INC



Work Order #: TX-8028008
Purchase Order #: CC
Serial Number: 2753796
Department: N/A
Performed By: JOHNNATHON BISERCHICH
Received Condition: IN TOLERANCE
Returned Condition: IN TOLERANCE
Cal. Date: July 12, 2023
Cal. Interval: 12 MONTHS
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:
JOHNNATHON 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/ISO/IEC 17025:2005.

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		Test Instrument
			Min	Max	
Cal Lab Module & Test Probe	Spec				
	1	78.9	-0.3	+0.3	78.9
	2	242.5	-2.6	+2.6	243.1
Temperature (°F)	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 Institute of Standards and Technology, or accepted intrinsic standards of measurement, or derived by the ratio type of self-calibrated techniques.

Calibrated By: 19-Jul-2023 19-Jul-2025
Calibration Date 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		Test Instrument
			Min	Max	
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
Barometric Pressure (In Hg)	4	128.6	-2.0	2.0	128.4
	Spec		-2% - 0.1	+2% + 0.1	
	1	20.0			20.0
	2	28.5			28.4
Humidity %RH 10 to 90%	3	33.0			33.0
	Spec		-3	3	
	1	8.5			8.2
2	26.9			26.9	
3	82.5			80.8	
4	98.8			95.5	

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	20568772	26-Oct-21	28-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 Institute 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 35-100F +/- 1.0 F
 Temperature over 100-155F +/- 2.0 F

Calibrated By: 12-Jul-2023 13-Jul-2024
Calibration Date Date Due

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Certificate of Calibration

United Test and Balance

Manufacturer	Evergreen Telemetry	Calibration Environment
Temperature Product	Module	Probe
Model	PR-T-2	Rel. Humidity
SN	2300142	Bar. Pressure

As Found
 As Left
 In Tolerance
 Out of Tolerance

Calibration Data

Measurement Variable	Test Point	C# Standard	Allowable Range		Test Instrument
			Min	Max	
Cal Lab Module & Test Probe 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 Institute of Standards and Technology, or accepted intrinsic standards of measurement, or derived by the ratio type of self calibrated techniques.

Queen Stoddard
Calibrated By

11-Jul-2023 11-Jul-2025
Calibration Date Date Due



Certificate of Calibration

United Test and Balance



Manufacturer	Evergreen Telemetry	Calibration Environment
Temperature Product	Module Sensor	Temperature
Model	MS-T&H-101	Rel. Humidity
SN	2300207C	Bar. Pressure

As Found
 As Left
 In Tolerance
 Out of Tolerance

Calibration Data

Measurement Variable	Test Point	C# Standard	Allowable Range		Test Instrument
			Min	Max	
Cal Lab Probe & Test Module 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 Institute of Standards and Technology, or accepted intrinsic standards of measurement, or derived by the ratio type of self calibrated techniques.

Queen Stoddard
Calibrated By

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

Terms & Abbreviations

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



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.

HVAC NOTES:

- TOP OPEN RETURN AIR DUCT. PROVIDE OPENING WITH 1/4" MESH GALVANIZED SCREEN.
- CONTRACTOR SHALL UNDERCUT DOOR 3/4".
- PROVIDE 8/8 EXHAUST AIR DUCT UP TO EF-5 ON ROOF.
- NEW CAPTIVEAIRE GREASE EXHAUST HOOD TO BE FURNISHED BY OWNER FOR INSTALLATION BY THE MECHANICAL CONTRACTOR. SEE CAPTIVEAIRE SHEETS M701 THROUGH M710 FOR ADDITIONAL INFORMATION. BALANCE HOOD EXHAUST AS NOTED ON CAPTIVEAIRE SHEETS. VERIFY ALL MANUFACTURER AND CODE REQUIRED CLEARANCES ARE MAINTAINED. NOTIFY ARCHITECT IF ANY CONFLICTS OCCUR.
- TRANSITION FROM HOOD EXHAUST COLLAR AS INDICATED ON PLANS AND EXTEND 22/8 KITCHEN HOOD GREASE EXHAUST DUCTWORK UP TO CORRESPONDING GREASE EXHAUST FAN ON ROOF. SEE SHEET M150 FOR CONTINUATION. GREASE DUCT SHALL BE WRAPPED WITH TWO (2) LAYERS OF THERMAL CERAMICS FAST WRAP XL, 1 1/2" THICK WITH 3" PERIMETER AND LONGITUDINAL OVERLAPS OR EQUIVALENT U.L. LISTED GREASE DUCT WRAP FOR ZERO CLEARANCE TO COMBUSTIBLES. REFER TO SHEET M501, DETAIL 1, FOR ADDITIONAL INFORMATION. TYPICAL.
- PROVIDE CLEANOUTS ON GREASE DUCTWORK AS REQUIRED BY CODE. REFERENCE SHEET M501, DETAILS 1 AND 2 FOR ADDITIONAL INFORMATION. TYPICAL OF GREASE EXHAUST DUCTWORK.
- DUCTWORK TO BE INSTALLED AS HIGH AS CONDITIONS ALLOW. COORDINATE ROUTING AND MOUNTING HEIGHT WITH LIGHTING FIXTURES. NOTIFY THE ARCHITECTS OF ANY CONFLICTS AND COORDINATE WITH THE CONSTRUCTION MANAGER.

- PROVIDE REMOTE VOLUME DAMPER AS INDICATED ON PLANS. REFERENCE SHEET M502, DETAIL 5, FOR ADDITIONAL INFORMATION. TYPICAL OF DIFFUSERS/GRILLES INSTALLED IN GYP. BOARD CEILINGS.
- PROVIDE NEW FC UNIT AS NOTED ON PLANS AND AS SCHEDULED ON SHEET M601.
- PROVIDE REFRIGERANT LINES FROM ASHP-1 ON ROOF TO FC-1 IN ROOM 104. LINES SHALL BE SIZED ACCORDING TO MANUFACTURER'S SPECIFICATIONS.
- PROVIDE ALL ACCESSORIES AS REQUIRED BY MANUFACTURER FOR COMPLETE WORKING SYSTEM, INCLUDING ANY ACCESSORIES ASSOCIATED WITH LONG LENGTH APPLICATIONS WHERE APPLICABLE.
- COORDINATE WITH CAPTIVEAIRE ON REMOTE SENSORS AND COMFORT CONTROLS PACKAGE THAT IS TO BE INSTALLED IN THE OFFICE. VERIFY CONTROLS ARE A FULLY DIGITAL 7 DAY PROGRAMMABLE TYPE THERMOSTAT WITH REMOTE SENSING CAPABILITIES, AUTO CHANGE OVER AND AUTO SET BACK. MOUNT SENSOR AND CONTROLS AT 48" ABOVE FINISHED FLOOR. UNITS SERVING THE SAME TEMPERATURE ZONE SHALL BE INTERLOCKED TO PREVENT SIMULTANEOUS HEATING AND COOLING. LOCATE REMOTE TEMPERATURE SENSORS AS INDICATED ON PLAN. COORDINATE LOCATION WITH CONSTRUCTION MANAGER AND WALL GRAPHICS LAYOUT. REFERENCE CAPTIVEAIRE SHEETS FOR ADDITIONAL INFORMATION.
- HOOD MANUFACTURER TO PROVIDE A "KIT" TO FASTEN THE BOTTOM FLANGE OF THE HOOD TO THE WALL, WITH ONE FASTENER PER STUD WALL. SIL-BOND RTV 4500 ALUMINUM SILICONE SEALANT OR APPROVED SIMILAR, TO BE APPLIED BY GENERAL CONTRACTOR /HOOD INSTALLER FOR ANY REMAINING SMALL GAPS. HOOD FASTENING "KIT" DETAIL TO BE INCLUDED IN MANUFACTURER DRAWINGS. REFERENCE SHEET M503, DETAIL 6, FOR ADDITIONAL INFORMATION.

- AIR CURTAIN FOR SERVICE THRU WINDOW IS INTEGRAL TO THE WINDOW. REFER TO ARCHITECTURAL SHEETS FOR ADDITIONAL INFORMATION.
- BALANCE DAMPER TO PROVIDE 30 CFM.
- MOUNT CAPTIVEAIRE ROOM TEMPERATURE SENSOR FURNISHED WITH KITCHEN HOODS ON WALL AS INDICATED ON THE PLANS AND AS SPECIFIED BY THE MANUFACTURER.
- ELECTRIC UNIT HEATERS ARE FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR. REFERENCE ELECTRICAL PLANS FOR ADDITIONAL INFORMATION.
- ALL GREASE DUCTWORK TURNS ARE TO USE RADIUS THROAT AND HEEL ELBOWS. TURNING VANES OR MITERED ELBOWS NOT PERMITTED.

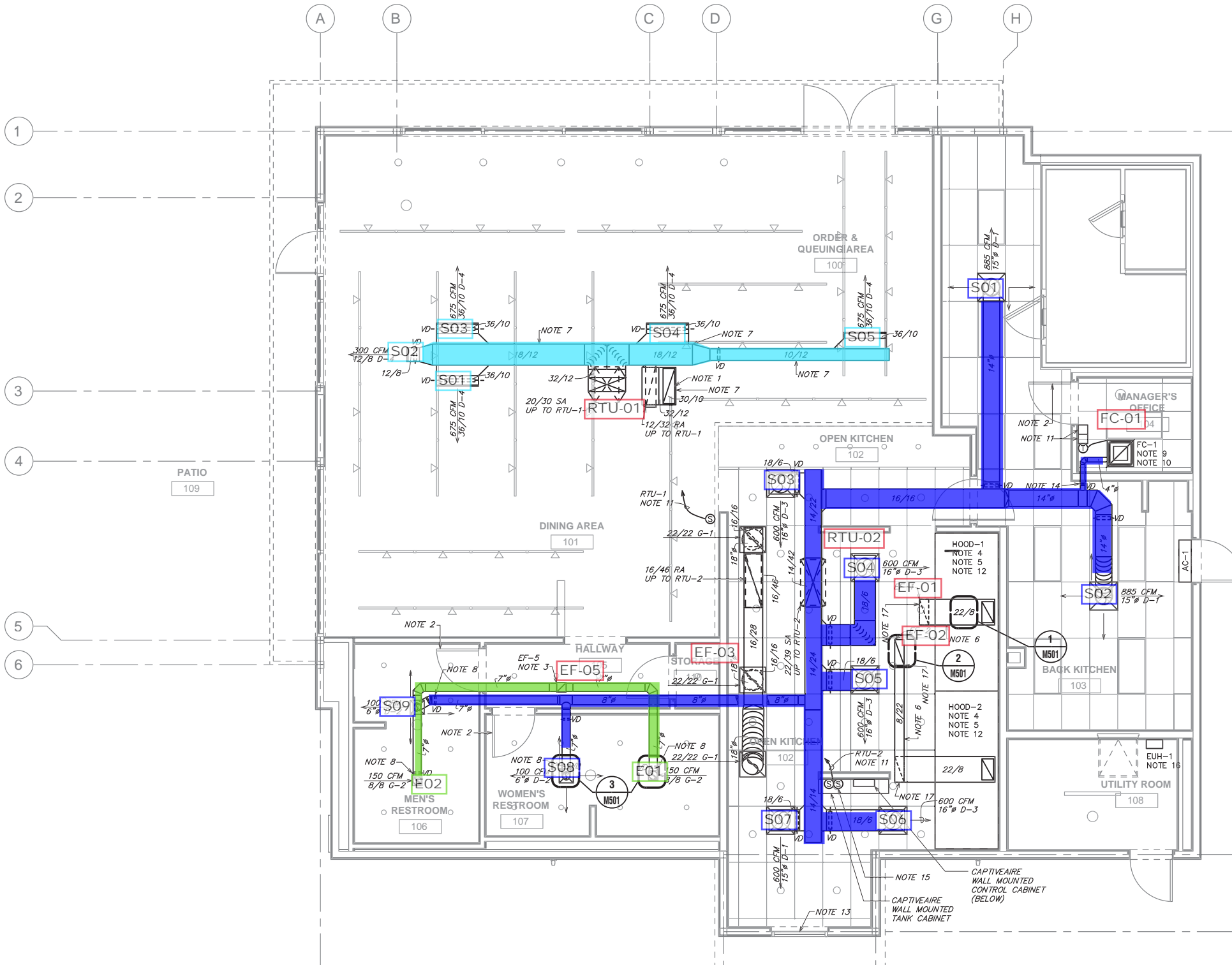
GENERAL NOTES:

- EXISTING CONDITIONS ARE BASED ON RECORD DRAWINGS PROVIDED BY THE OWNER. CONTRACTOR SHALL ADJUST TO ACTUAL FIELD CONDITIONS AT NO ADDITIONAL EXPENSE TO THE PROJECT.
- CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFICATION OF ALL EXISTING CONDITIONS PRIOR TO SUBMITTING THE BID. NO ADDITIONAL COMPENSATION WILL BE PROVIDED FOR ANY EXTRAS DUE TO THE CONTRACTOR'S FAILURE TO VISIT THE PROJECT SITE PRIOR TO SUBMITTING THE BID. ANY DISCREPANCIES SHALL BE IMMEDIATELY REPORTED TO THE ENGINEER FOR RESOLUTION.
- ALL CONTRACTORS SHALL REVIEW A COMPLETE SET OF CONSTRUCTION DOCUMENTS. CONTRACTORS SHALL FAMILIARIZE THEMSELVES WITH DEMOLITION WORK PRIOR TO BIDDING AND START OF WORK. CONTRACTOR IS RESPONSIBLE TO DEMOLISH ALL EXISTING AS REQUIRED FOR INSTALLATION/CONSTRUCTION OF NEW WORK.
- ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH ALL APPLICABLE GOVERNMENT AND LOCAL CODES.
- MECHANICAL CONTRACTOR SHALL FIELD COORDINATE WITH ELECTRICAL CONTRACTOR FOR ALL POWER REQUIREMENTS.
- ALL CONTRACTORS SHALL REVIEW A COMPLETE SET OF CONSTRUCTION DOCUMENTS AND COOPERATE WITH THE OTHER TRADES SO THAT THE INSTALLATION OF ALL EQUIPMENT MAY BE PROPERLY COORDINATED.
- ALL EQUIPMENT FURNISHED SHALL FIT THE SPACE AVAILABLE WITH CONNECTIONS IN THE REQUIRED LOCATIONS AND WITH ADEQUATE SPACE FOR OPERATING AND SERVICING. THE DRAWINGS ARE GENERALLY DIAGRAMMATIC AND INDICATE THE INTENT OF THE INSTALLATION WHILE THE SPECIFICATIONS AND EQUIPMENT LIST DENOTE THE TYPE AND QUALITY OF MATERIAL AND WORKMANSHIP TO BE USED. THE DRAWINGS SHALL NOT BE SCALED FOR EXACT MEASUREMENTS. WHERE A CONFLICT EXISTS BETWEEN THE DRAWINGS AND THE SPECIFICATIONS, THE HIGHER AND/OR MORE COSTLY STANDARD WILL APPLY. THE CONTRACTOR SHALL PROMPTLY NOTIFY THE ENGINEER WHOSE DECISION SHALL BE FINAL. NO ALLOWANCE WILL BE MADE SUBSEQUENTLY IN THIS REGARD ON BEHALF OF THE CONTRACTOR AFTER AWARD OF THE CONTRACT.
- COORDINATE DUCT ROUTING AND HEIGHTS WITH GENERAL CONTRACTOR. VERIFY ALL CLEARANCES BEFORE STARTING WORK.
- THE CONTRACTOR SHALL INSTALL ALL PIPING, DUCTWORK AND EQUIPMENT AS REQUIRED TO CONFORM TO THE STRUCTURE TO AVOID OBSTRUCTIONS. PRESERVE CEILING HEIGHTS AND HEADROOM AND MAKE ALL EQUIPMENT REQUIRING MAINTENANCE OR REPAIR ACCESSIBLE.
- ALL DUCT CONNECTIONS TO HVAC EQUIPMENT MUST BE MADE WITH FLEXIBLE CONNECTORS.
- DO NOT ATTACH ANYTHING TO DECK ABOVE. ATTACH TO STRUCTURE (I.E. BEAMS, JOISTS) ONLY. DUCT HANGERS SHALL BE INSTALLED IN ACCORDANCE WITH LOCAL CODE. ALL CONNECTIONS TO JOISTS SHALL BE MADE AT THE TOP COR.
- ALL DUCT DIMENSIONS INDICATED ARE CLEAR INSIDE DIMENSIONS. ALL SUPPLY AND UNTEMPERED OUTDOOR AIR DUCTWORK SHALL BE LINED WITH 1" ACOUSTICAL DUCT LINER OR WRAPPED WITH 1-1/2" THICK FIRE RETARDANT FIBERGLASS WITH A RETARDANT PIPING JACKET SHALL BE APPROVED FOR USE BY SMCNA AND NAIMA. RETURN AIR TRANSFER DUCTS AND RETURN DUCTWORK WITHIN 10 FEET OF THE UNIT FAN SHALL BE LINED WITH 1" ACOUSTICAL DUCT LINER. ALL SUPPLY AND UNTEMPERED OUTDOOR AIR DUCTWORK VISIBLE TO THE PUBLIC SHALL BE INTERNALLY LINED AND PAINTED TO MATCH THE SURROUNDING AREA. DUCT WRAP INSULATION IS NOT PERMITTED IN THESE AREAS.
- ALL EXPOSED DUCTWORK SHALL BE INSTALLED TIGHT TO THE BOTTOM OF THE STRUCTURE.
- PROVIDE REMOTE VOLUME DAMPER CONTROL MANUFACTURED BY YOUNG REGULATOR OR UNITED ENERTECH FOR DAMPERS LOCATED ABOVE INACCESSIBLE CEILINGS. LOCATE CONTROLLER ABOVE ACCESSIBLE CEILING LOCATION.
- REFRIGERANT PIPING SHALL BE SIZED PER MANUFACTURER'S RECOMMENDATIONS. PROVIDE ALL ACCESSORIES AS REQUIRED BY MANUFACTURER FOR COMPLETE WORKING SYSTEM, INCLUDING ANY ACCESSORIES ASSOCIATED WITH LONG LENGTH APPLICATIONS WHERE APPLICABLE.
- TENANT'S CONTRACTOR SHALL BE RESPONSIBLE FOR THE FIELD VERIFICATION OF ALL UTILITY RUNS AND/OR OTHER IMPROVEMENTS LOCATED ON THE PREMISES PRIOR TO BIDDING. TENANT'S CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR ALL COSTS RELATING TO THE RELOCATION OF, DAMAGE TO, REPAIR OF ANY EXISTING UTILITY RUNS AND/OR IMPROVEMENTS WHICH ARE DAMAGED AS A RESULT OF TENANT'S WORK IN OR AROUND THE PREMISES.
- ALL ROOFING WORK SHALL BE PERFORMED BY LANDLORD'S APPROVED ROOFING CONTRACTOR AT TENANT'S EXPENSE, IF REQUIRED IN LEASE OR TENANT CRITERIA MANUAL.
- ALL GREASE EXHAUST DUCTWORK SHALL BE PROVIDED WITH 3" FOIL FACED THERMAL-CERAMIC INSULATION FOR GREASE DUCTS. INSULATION SHALL MEET NFPA 96 AND ASTM E 2336 REQUIREMENTS.
- GREASE DUCT LEAKAGE TESTING MUST BE PERFORMED PRIOR TO CONCEALMENT OF THE DUCTWORK.
- MECHANICAL CONTRACTOR SHALL PROVIDE TENANT WITH A WRITTEN ONE (1) YEAR MANUFACTURER'S WARRANTY ON ALL HVAC EQUIPMENT PROVIDED AND / OR INSTALLED. THE WARRANTY SHALL INCLUDE ALL LABOR, MATERIALS AND THREE (3) ROUTINE SERVICES INCLUDING FILTER CHANGES DURING A ONE (1) YEAR PERIOD.
- AT THE COMPLETION OF CONSTRUCTION AN NEBB, AARC OR TABB CERTIFIED AIR BALANCE REPORT SHALL BE SUBMITTED TO THE ENGINEER AND LANDLORD. PRIOR TO SCHEDULING BALANCING, COORDINATE WITH LANDLORD'S FIELD REPRESENTATIVE FOR THE VENDOR LISTED BELOW. IF APPROVED, THE BALANCING SHALL BE COMPLETED BY NATION TABB. CONTACT WILL TURNBOURNE AT WILL@NATIONTABB.COM OR 314-954-6244.

- PROVIDE A PERFORMANCE TEST, AS WELL AS A CAPTURE & CONTAINMENT TEST, FOR ALL TYPE I AND TYPE II HOOD SYSTEMS. THE CAPTURE AND CONTAINMENT TEST IS A VISUAL FIELD TEST WITH THE INSPECTOR. THE PERFORMANCE TEST INVOLVES TESTING AND BALANCING BY A QUALIFIED THIRD PARTY. TESTING AND BALANCING REPORTS ARE REQUIRED AT TIME OF FINAL INSPECTION, PER IMC 507.6.

- PROVIDE A "LIGHT TEST" FOR ALL GREASE DUCTS PRIOR TO ENCLLOSING OR CONCEALING, PER IMC 506.3.2.5.

- THE PERMIT HOLDER SHALL PROVIDE THE NECESSARY TEST EQUIPMENT AND DEVICES REQUIRED TO TEST THE EQUIPMENT, PER IMC 507.6.



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



zebra

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REVISIONS

DATE	DESCRIPTION
A 03/31/23	REVISION A
B 04/17/23	REVISION B
D 05/17/23	REVISION D
E 05/24/23	REVISION E

STATUS:
PERMIT SET

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

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SHEET NAME:
MECHANICAL FLOOR PLAN

DATE:
01/12/23

PROJECT NO:
34968

DRAWN:
RAS

SCALE:
AS NOTED

SHEET NO.:
M101