

**Report By:**  
United Test and Balance, Inc.  
7013 Flagler Rd  
Nordland, WA 98358



**For:**  
National TAB  
1329 E Kemper Rd, Suite 4210  
Cincinnati, OH 45246

**INTELLIGENCE**

**Report: TAB REPORT**  
**Function: Test, Adjust, & Balance**  
**Date: 09/07/2023**

# **PROJECT**

**08-14-23 SHAKE SHACK #1434 - SEATTLE.  
WA (WESTFIELD SOUTHCENTER)**

SPACE FC15

SEATTLE , WA 98188

## **Client**

Evergreen Refrigeration LLC  
727 SOUTH KENYON ST

SEATTLE, WA 98108

### AIR BALANCE SCHEDULE

UNIT	AREA SERVED	HVAC SUPPLY		HVAC RETURN		HVAC OUTDOOR		OA %		HOOD MAKE-UP		HOOD EXHAUST		GENERAL EXH.	
		DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL	DESIGN	ACTUAL
FC-1	KITCHEN	3000	2989	3000	2989	0	0	0.0%	0.0%						
MUA-1	HOOD									2228	2185				
KEF-1	HOOD											2785	2848		
<b>TOTALS</b>		3000	2989	3000	2989	0	0			2228	2185	2785	2848	0	0

#### NET BUILDING AIRFLOW CALCULATION

TOTALS	DESIGN	ACTUAL
TOTAL OA	2228	2185
TOTAL EXHAUST	2785	2848
<b>NET AIRFLOW</b>	<b>-557</b>	<b>-663</b>

DOOR TESTED	BUILDING PRESSURE MEASUREMENTS (IN. H2O)
FRONT	
SIDE	
REAR	
<b>AVERAGE</b>	<b>N/A</b>

#### KITCHEN PRESSURIZATION (MUST BE NEGATIVE)

TOTALS	DESIGN	ACTUAL
TOTAL KITCHEN OA	2228	2185
TOTAL KITCHEN EXHAUST	2785	2848
<b>NET AIRFLOW</b>	<b>-557</b>	<b>-663</b>

# Report Summary/Remarks

PROJECT: Shake Shack 1434  
LOCATION: Tukwila, WA  
PROJECT #: 23327

DATE: 9/7/2023  
CONTACT: Steve Burns

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## SYSTEM/UNIT: Report Summary and Remarks

### Scope of Work

#### **Includes**

The Test and Balance (TAB) scope of work consist of 1 Kitchen Exhaust Fan (KEF), 1 Make-up Air Unit (MAU), 1 Fan Coil Unit (FCU), and the associated inlets/outlets/hoods.

### System Posturing & Remarks

#### **Air Apparatus**

The FCU was set for design airflow and the associated supply outlets were balanced in full cooling demand. 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 fan was energized, measured and set for total airflow. 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.

#### **Supply Fans**

The supply fan was energized, measured and set for total airflow. 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.

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# Air Apparatus

PROJECT: Shake Shack 1434  
 LOCATION: Tukwila, WA  
 PROJECT #: 23327

DATE: 9/7/2023  
 CONTACT: Steve Burns

## SYSTEM/UNIT: FC-01

Tested By: Guy Nunez  
 Date: 9/1/2023

Design Airflow (CFM)	
Design Total	3000
Design Grille Total	3000
Design Return	3000
Design Min O/A	0

Unit Design Data	
Submittal Make	Not Provided
Submittal Model #	Not Provided
Submittal Airflow	Not Provided
Sched./Sub. Volts	208
Sched./Sub. Phase	3
Sched./Sub. HP	Not Listed
Submittal BHP	Not Provided
Filter MERV Rating (Sched/Sub)	Not Listed

Design Static Pressures (in wg)	
Design Ext SP	1.0
Submittal Total SP	Not Provided
Submittal Clg Coil Δ SP	Not Provided

Design Temperatures (°F)	
<b>FC-01/Cooling</b>	
Des. Ent. DB (°F)	Not Listed
Des. Ent. WB (°F)	Not Listed
Design LAT DB (°F)	Not Listed
Design LAT WB (°F)	Not Listed

Filter Data	
Condition	Clean
Filter Type	Pleated
MERV Rating	8
Filter Size Set 1 (in)	16x24x2
# Filters Set 1	4
Filter Size Set 2 (in)	-
# Filters Set 2	-

Motor Nameplate Data	
Motor Make	No Access - Embedded Motor
Motor Frame	Not Listed
Motor HP	2.40
Motor RPM	Not Listed
Motor Volts	230
Motor Phase	3
Motor Amps	6.4
Motor S.F.	Not Listed
Motor % PF	Not Listed
Motor % Eff.	Not Listed
Other Motor Data	Above data from unit tag

Drive Data	

Final Airflow (CFM)	
Actual Total CFM	2989
Actual Grille Total CFM	2989
Actual Return Air CFM	2989
Actual Min O/A CFM	0
Fan CFM Test Method	Supply Outlet Total
OA Method/Instrument	Not Applicable
OA Ak (sq ft)	-
OA Damper Position	-
RA Damper Position	-

Unit Data	
Make (tag)	Carrier
Model # (tag)	40RFQA08A2A
Serial # (tag)	1823U12334
Location	Ceiling
Unit Discharge	Horizontal
Cooling Coil Location	Unit / Drawthru
Coil Area (sq ft)	Not Accessible
Clg Coil Vel (FPM)	
Fan Service	Supply
Fan Type	Centrifugal (BI)
Fan Discharge	Horizontal
Fan Arrangement	SWSI

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

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

Electrical Data	
Measurement Method	V/A Meter
Motor Volts 1	212
Motor Volts 2	212
Motor Volts 3	212
Motor Amps 1	3.9
Motor Amps 2	3.7
Motor Amps 3	3.7
Operating HZ	Internal to ECM
Approx. BHP	1.3
Corr. Nameplate Amps	6.9
Starter Data	Internal to ECM
VFD Reference	Not Applicable

Actual Temperatures (°F)	
<b>FC-01/Cooling</b>	
Outside Air DB	68.5
Outside Air WB	-

# Air Apparatus

PROJECT: Shake Shack 1434  
 LOCATION: Tukwila, WA  
 PROJECT #: 23327

DATE: 9/7/2023  
 CONTACT: Steve Burns

## SYSTEM/UNIT: FC-01

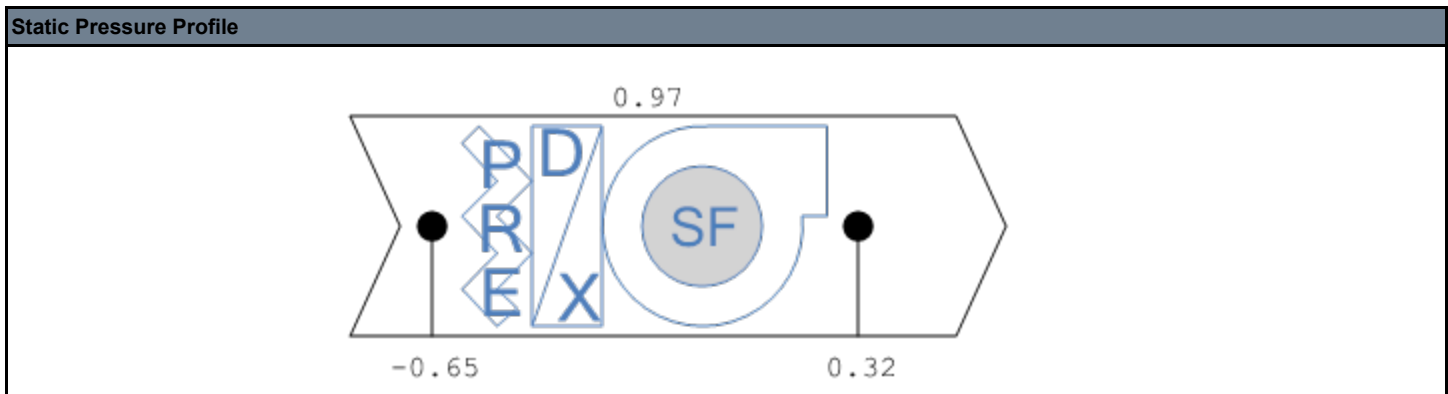
Tested By: Guy Nunez  
 Date: 9/1/2023

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	-

Actual Temperatures (°F)	
<b>FC-01/Cooling</b>	
Entering Air DB	73.3
Entering Air WB	-
Leaving Air DB	58.1
Leaving Air WB	-

## SYSTEM/UNIT: FC-01/Static Profile

Tested By: Guy Nunez  
 Date: 8/31/2023



## FC-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 Open Kitchen	CD	14	550	562	538	98	Capture Hood	1.000	1.000	538
S-02	100 Open Kitchen	CD	14	550	802	524	95	Capture Hood	1.000	1.000	524
S-03	101 Back Kitchen	CD	12	300	517	316	105	Capture Hood	1.000	1.000	316
S-04	101 Back Kitchen	CD	12	300	411	313	104	Capture Hood	1.000	1.000	313
S-05	101 Back Kitchen	CD	14	500	340	492	98	Capture Hood	1.000	1.000	492
S-06	100 Open Kitchen	CD	8	200	97	196	98	Capture Hood	1.000	1.000	196
S-07	100 Open Kitchen	CD	8	200	82	201	101	Capture Hood	1.000	1.000	201
S-08	100 Open Kitchen	CD	8	200	109	198	99	Capture Hood	1.000	1.000	198
S-09	100 Open Kitchen	CD	8	200	108	211	106	Capture Hood	1.000	1.000	211
<b>Totals:</b>		-	-	<b>3000</b>	<b>3028</b>	<b>2989</b>	<b>100</b>	-	-	-	-

# Air Apparatus

PROJECT: Shake Shack 1434  
 LOCATION: Tukwila, WA  
 PROJECT #: 23327

DATE: 9/7/2023  
 CONTACT: Steve Burns

SYSTEM/UNIT: MAU-01

Tested By: Guy Nunez  
 Date: 8/31/2023



Design Airflow (CFM)		Final Airflow (CFM)	
Design Total	2228	Actual Total CFM	2185
Design Grille Total	2228	Actual Grille Total CFM	See Kitchen Hood Sheets
Design Return	0	Actual Return Air CFM	0
Design Min O/A	2228	Actual Min O/A CFM	2185
<b>Unit Design Data</b>		<b>Unit Data</b>	
Submittal Make	Not Provided	Make (tag)	CaptiveAire
Submittal Model #	Not Provided	Model # (tag)	A2-D.250-20D-MPU
Submittal Airflow	Not Provided	Serial # (tag)	5904158
Sched./Sub. Volts	460	Location	Roof
Sched./Sub. Phase	3	Unit Discharge	Horizontal
Sched./Sub. HP	3.0	Cooling Coil Location	Unit / Blowthru
Submittal BHP	Not Provided	Coil Area (sq ft)	Not Accessible
Filter MERV Rating (Sched/Sub)	Not Listed	Clg Coil Vel (FPM)	
<b>Design Static Pressures (in wg)</b>		<b>Fan Design Data</b>	
Design Ext SP	2.0	Submittal Motor RPM	Not Provided
Submittal Total SP	Not Provided	Submittal Fan RPM	Not Provided
Submittal Clg Coil Δ SP	Not Provided	<b>Fan Data</b>	
<b>Filter Data</b>		<b>Electrical Data</b>	
Condition	Clean	Measurement Method	VFD Display
Filter Type	Manufacturer Specific	Motor Volts 1	Not Accessible
MERV Rating	Manufacturer Specific	Motor Volts 2	-
Filter Size Set 1 (in)	Manufacturer Specific	<b>Motor Nameplate Data</b>	
# Filters Set 1	Manufacturer Specific	Motor Make	TECO
Filter Size Set 2 (in)	-	Motor Frame	182T
# Filters Set 2	-	Motor HP	3.00
		Motor RPM	1755
		Motor Volts	460
		Motor Phase	3

# Air Apparatus

PROJECT: Shake Shack 1434  
 LOCATION: Tukwila, WA  
 PROJECT #: 23327

DATE: 9/7/2023  
 CONTACT: Steve Burns

## SYSTEM/UNIT: MAU-01

Tested By: Guy Nunez  
 Date: 8/31/2023

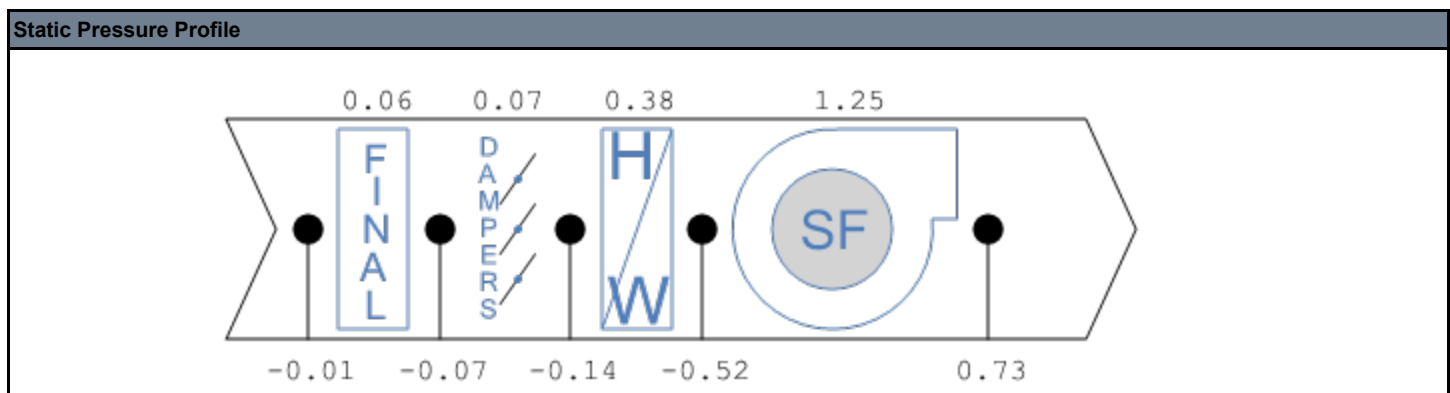
Motor Nameplate Data	
Motor Amps	8.6
Motor S.F.	1.15
Motor % PF	89.5
Motor % Eff.	87.5
Other Motor Data	-

Electrical Data	
Motor Volts 3	-
Motor Amps 1	3.0
Motor Amps 2	-
Motor Amps 3	-
Operating HZ	43.00
Approx. BHP	
Corr. Nameplate Amps	
Starter Data	Internal to VFD
VFD Reference	Internal to VFD

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	-

## SYSTEM/UNIT: MAU-01/Static Profile

Tested By: Guy Nunez  
 Date: 8/31/2023



# Air Apparatus

**PROJECT:** Shake Shack 1434  
**LOCATION:** Tukwila, WA  
**PROJECT #:** 23327

**DATE:** 9/7/2023  
**CONTACT:** Steve Burns

**SYSTEM/UNIT:** MAU-01/Kitchen Hood - Supply

Tested By: Guy Nunez  
Date: 8/31/2023

Design Airflow (CFM)	
Des. Make-up Air	2228
Halton Design SP	Not Provided

Filter Data	
MUA Filter (Type 1)	Manufacturer Specific
Qty MUA Filter (Type 1)	Manufacturer Specific
MUA Filter (Type 2)	-
Qty MUA Filter (Type 2)	-

Kitchen Hood Information	
Manufacturer	Captive Aire
Test Method	Perforated Supply

Final Airflow (CFM)	
Act. Make-up Air	2185
Halton Actual SP	-

Test Data	
PSP Length (in)	187
PSP Width (in)	12"
Correction Factor	0.83
Total MA Ak (sq ft)	12.93
Avg. MA Velocity (FPM)	169

# Fan

**PROJECT:** Shake Shack 1434  
**LOCATION:** Tukwila, WA  
**PROJECT #:** 23327

**DATE:** 9/7/2023  
**CONTACT:** Steve Burns

**SYSTEM/UNIT: KEF-01**

Tested By: Guy Nunez  
 Date: 8/31/2023



Design Airflow (CFM)		Final Airflow (CFM)	
Design Airflow	2785	Actual Airflow	2848
Design Grille Airflow	2785	Actual Grille Airflow	See KEH 1 and KEH 2
		Fan CFM Test Method	See KEH 1 and KEH 2
		Test Method Ak (sq ft)	See KEH 1 and KEH 2
Unit Design Data		Unit Data	
Submittal Make	Not Provided	Make (tag)	Captive Aire
Submittal Model #	Not Provided	Model # (tag)	DU180HFA
Submittal Airflow	Not Provided	Serial # (tag)	5904158
Sched./Sub. Volts	460	Unit Location	Roof
Sched./Sub. Phase	3	Unit Discharge	Upblast
Sched./Sub. HP	3.0	Fan Service	Exhaust
Submittal BHP	Not Provided	Fan Type	Centrifugal (BI)
		Fan Discharge	Upblast
		Fan Arrangement	SWSI
Design Static Pressures (in wg)		Fan Design Data	
Design External SP	2.0	Submittal Motor RPM	Not Provided
Submittal Total SP	Not Provided	Submittal Fan RPM	Not Provided
Motor Nameplate Data		Fan Data	
Motor Make (tag)	TECO	Actual Fan RPM/Speed	Not Accessible
Motor Frame (tag)	182T	Actual Motor RPM	Not Accessible
Motor HP (tag)	3	Speed Cont. Position	Not Applicable
Motor RPM (tag)	1755		
Motor Volts (tag)	460	Electrical Data	
Motor Phase (tag)	3	Measurement Method	V/A Meter
Motor Amps (tag)	4.3	Motor Volts 1	461
Motor S.F. (tag)	1.15	Motor Volts 2	461
Mtr % PF (tag)	87.5	Motor Volts 3	461
Mtr % Eff. (tag)	89.5	Motor Amps 1	3.7
Other Motor Data	-	Motor Amps 2	3.7
		Motor Amps 3	3.7
		Operating HZ	47.9
		Starter Data	Internal to VFD
		Approx. BHP	2.59
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 1434  
**LOCATION:** Tukwila, WA  
**PROJECT #:** 23327

**DATE:** 9/7/2023  
**CONTACT:** Steve Burns

## SYSTEM/UNIT: KEF-01

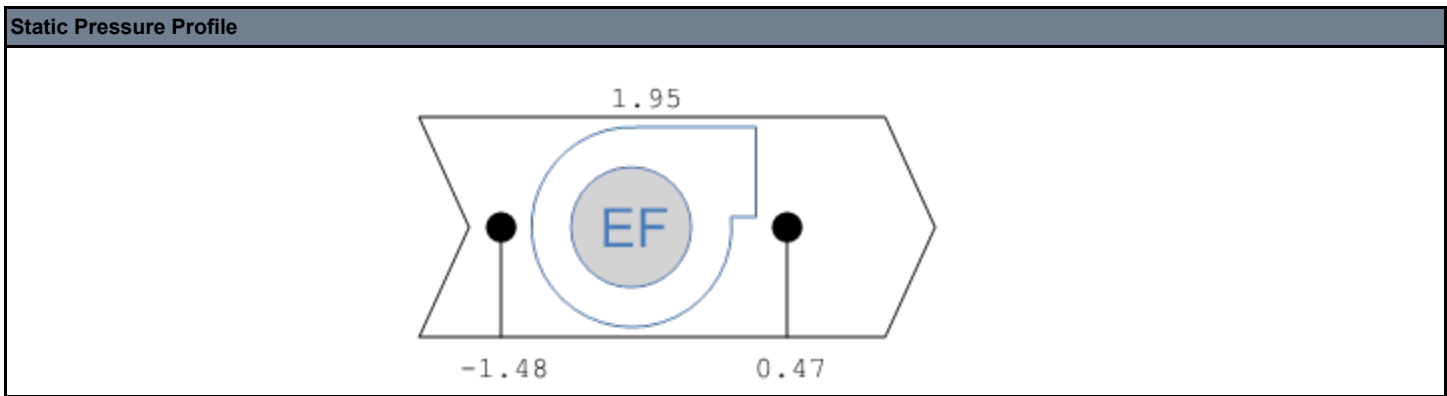
Tested By: Guy Nunez  
Date: 8/31/2023

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	4.3

## SYSTEM/UNIT: KEF-01/Static Profile

Tested By: Guy Nunez  
Date: 8/31/2023



## SYSTEM/UNIT: KEF-01/Kitchen Hood - Exhaust

Tested By: Guy Nunez  
Date: 8/31/2023

Design Airflow (CFM)	
Design Exhaust CFM	2785
Halton Design SP	Not Provided

Final Airflow (CFM)	
Actual Exhaust CFM	2848
Halton Actual SP	-

Kitchen Hood Information	
Service	Cooking Surface
Manufacturer	Captive Aire
Model Number	5430 ND-2
Serial Number	5904158
Test Method	Filters

