Report By:

National TAB
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Report: Ulta Beauty (Baraboo, WI) TAB REPORT

Function: Test, Adjust, & Balance

Date: 09/14/2023

PROJECT

Ulta Beauty (Baraboo, WI)

210 N. GASSER RD.

BARABOO, WI 53913

Client

Air Temperature Services

5301 Voges Road

Madison , WI 53718

CERTIFICATION

PROJECT: Ulta Beauty (Baraboo, WI)

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 Standards for Testing, Adjusting, and Balancing of Environmental Systems.* Any variances from design quantities, which exceed NEBB tolerances, are noted in the Test-Adjust-Balance Report Project Summary.

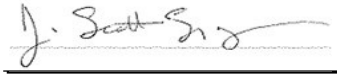
The air distribution system has been tested and balanced and final adjustments have been made in accordance with NEBB standards and the project specifications.

NEBB TAB FIRM:	National TAB-Southeast
REGISTRATION NO:	3755
CERTIFIED BY:	J. Scott Springer 23312
DATE:	9/28/2023

The hydronic distribution system has been tested and balanced and final adjustments have been made in accordance with NEBB standards and the project specifications.

NEBB TAB FIRM:	National TAB-Southeast
REGISTRATION NO:	3086
CERTIFIED BY:	J. Scott Springer 23312
DATE:	

Submitted and Certified by:

NEBB TAB FIRM:	National TAB-Southeast
TAB PROFESSIONAL:	J. Scott Springer
SIGNATURE:	
REGISTRATION NO:	3755 (NTAB) / 23312
CERTIFICATION EXP:	12/31/2023

National TAB

Testing, Adjusting, and Balancing Equipment

Function		Range	Minimum Accuracy	Instrument Information	Calibration Date	Date Due
AIR	AIR PRESSURE	0 in wg to 10 in wg	2% +/- 0.001 in wg	TSI Alnor EBT 731 S/N EBT732044025	11/17/2022	11/17/2023
	AIR VELOCITY INSTRUMENT	50 fpm to 3900 fpm	+/- 5 % +/- 7 fpm	TSI Alnor EBT 731 S/N EBT732044025	11/17/2022	11/17/2023
	DIRECT HOOD READING	100 cfm to 2000 cfm	+/- 5 % +/- 7 cfm	TSI Alnor EBT 731 S/N EBT732044025	11/17/2022	11/17/2023
TEMPERATURE	AIR METER	-20 F to 240 F	+/- .5 % 2 F	Cooper ATKINS - SRH77A S/N 071118034	6/6/2023	6/6/2024
	AIR PROBE	-20 F to 240 F	+/- .5 % 2 F	Cooper ATKINS - PD1388 7-6 S/N 5028	6/6/2023	6/6/2024
	IMMERSION METER	-20 F to 240 F	+/- .5 % 2 F	Cooper ATKINS - SRH77A S/N 071118034	6/6/2023	6/6/2024
	IMMERSION PROBE	-20 F to 240 F	+/- .5 % 2 F	Cooper ATKINS - PD1388 7-6 S/N 1075	6/6/2023	6/6/2024
	CONTACT METER	-20 F to 240 F	+/- .5 % 2 F	Cooper ATKINS - SRH77A S/N 071118034	6/6/2023	6/6/2024
	CONTACT PROBE	-20 F to 240 F	+/- .5 % 2 F	Cooper ATKINS - PD1388 7-6 S/N 4011	6/6/2023	6/6/2024
HUMIDITY	HUMIDITY PROBE	10 % RH to 90 % RH	3% of reading	Cooper ATKINS - SRH77A S/N 071118034	6/6/2023	6/6/2024
ELECTRICAL	VOLTAGE MEASUREMENT	0 VAC to 600 VAC	2 % reading +/- 5 digits	Fluke 373 True RMS, S/N: 33290686	6/1/2023	6/1/2024
	AMPERAGE MEASUREMENT	0 Amperers to 100 Amperes	2 % reading +/- 5 digits	Fluke 373 True RMS, S/N: 33290686	6/1/2023	6/1/2024
ROTATION	ROTATION MEASUREMENT	60 rpm to 5000 rpm	2 % reading 2 rpm	SHIMPO DT-207LR S/N: D1530081R	6/1/2023	6/1/2024
HYDRONIC	PRESSURE MEASUREMENT	-30 in Hg to 200 psi	±2% of reading +/- 1 psi	Alnor HM675 S/N: 72214041	5/2023	5/2024
	DIFFERENTIAL PRESSURE MEASUREMENT	0 psi - 80 psi	±2% of reading +/- 1 psi	Alnor HM675 S/N: 72214041	5/2023	5/2024

Abbreviation List

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

Project Summary

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

RTU's (Roof Top Units) w/ Diffusers

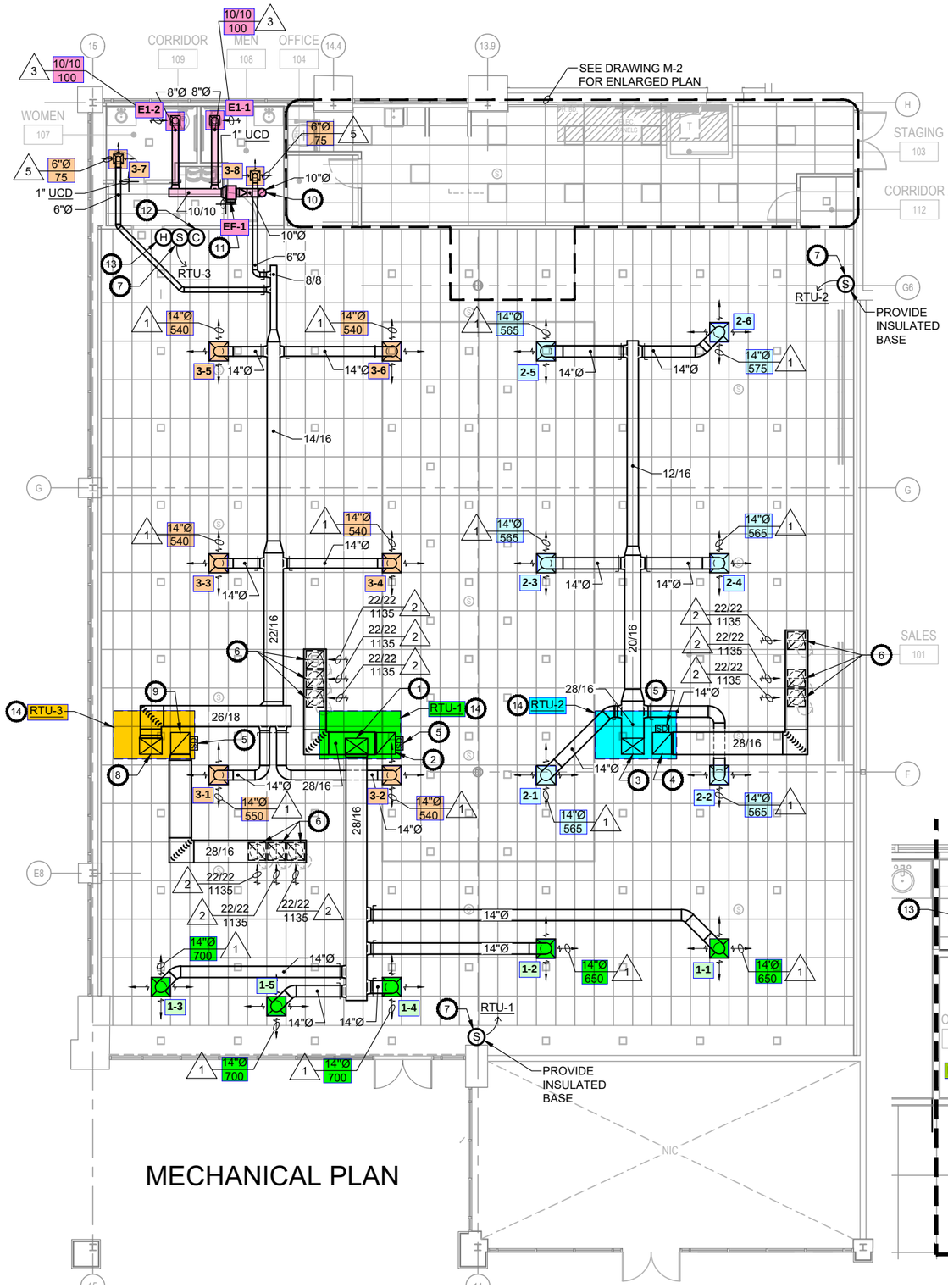
Each of the RTU's were measured with a flow hood at their terminal devices to establish a total flow for that unit. Each RTU was adjusted to within tolerance of the engineer's design flow. Each outlet was then adjusted to within tolerance of the design flow. Outside air was measured by reading the intake air opening with a velocity grid and multiplying by the free area. The outside air damper was adjusted until the airflow was within the design requirements. The mechanical plans indicate that calibration of the outside air dampers was to be performed in conjunction with the controls company (Novar/Honeywell). The controls system was not yet installed at the time of the Test and Balance. The listed controls company contacts were contacted several times and we received no response. High and low speed outside air damper setpoints were entered into the RTU programming and are listed in this report. The low-speed motor setpoint was set to 50% of the high-speed setpoint. Any equipment that fell outside of that tolerance is noted throughout the report.

General Exhaust Fans w/ Grilles

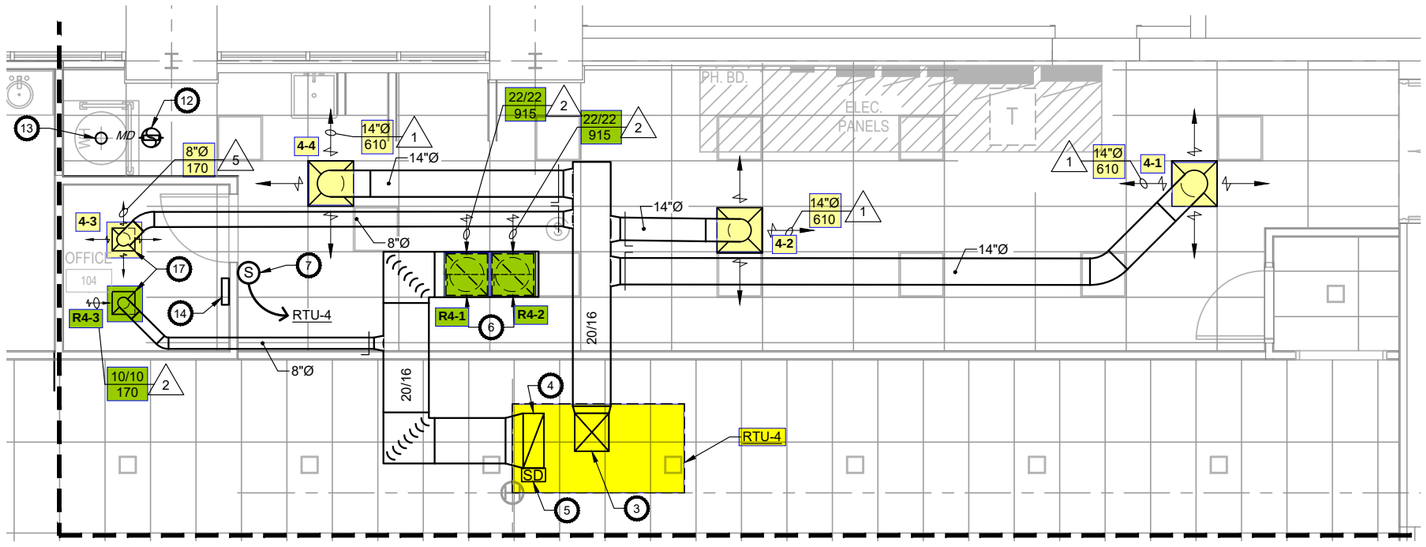
The general exhaust fans were measured by reading each air device with a flow hood. The total airflow for each fan is equivalent to the sum of these readings. Fan speed was then adjusted so that the airflow was within tolerance of design. This setpoint was marked on the speed controller. Each terminal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

Final Building Tests

After completing the Test and Balance the final building pressure was measured at 0.032" W.C.. It was confirmed that the building pressure fell within acceptable tolerances and that the pressure measurement coincides with the actual and design net airflow. Any deviations from these standards are noted throughout the report.



MECHANICAL PLAN



ENLARGED MECHANICAL PLAN

National TAB

Project: Ulta Beauty (Baraboo, WI)

System/Unit: AHU/RTU

Asset: RTU-1 AREA:SALES

Unit Data		
	Design	**Actual**
MFG	NA	LENNOX
Serial Num	-	5623G03743
Model Num	NA	LGM102U4
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	2
OA Filter Size 1	-	14.25X23
Num PreFilter 1	-	4
PreFilter Size 1	-	20X25X2

Motor Data		
	Design	**Actual**
Motor MFG	-	EBMPAPST
Frame	-	NL
Horsepower	-	3.8
Motor Rpm	-	NL
Phase	3	3
Rated Voltage	208	208
Rated Amperage	-	8.7
Service Factor	-	NL

Test Data		
	Design	**Actual**
SF CFM	3400	3465
RA CFM	2800	2883
OA CFM	600	582
RL Voltage	208	211/211/211
RL Amperage	-	2.0/2.0/1.9
OA Damper Position	-	HIGH SPEED: 29% LOW SPEED: 43%
Brake Horse Power	3.75	0.86

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.30"
Fan Suction SP	-	-0.44"
Fan Discharge SP	-	0.35"
Total ESP	1.00	0.65"
Fan Total SP	-	0.79"

Completed By: Michael McDonnell on 09/14/2023

Notes:
[1] ALARM 22: LOW PRESSURE SWITCH COMPRESSOR 1, NEEDS SERVICE.
[2] SYSTEM MOTOR SETPOINTS: HIGH-3000CFM / LOW-1500CFM

Written By: Michael McDonnell on 09/14/2023

National TAB

Project:Ulta Beauty (Baraboo, WI)

AHU/RTU

Diffuser Supply (GRD)

RTU-1/SALES

Asset							
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**CFM(1)**	**FINAL CFM**	**% to design**
1-1	SALES	CD	14	650	706	634	97.5
1-2	SALES	CD	14	650	731	654	100.6
1-3	SALES	CD	14	700	818	737	105.3
1-4	SALES	CD	14	700	809	727	103.9
1-5	SALES	CD	14	700	820	713	101.9
Total				3400	3884	3465	101.91%

Completed By: Michael McDonnell on 09/14/2023

National TAB

Project: Ulta Beauty (Baraboo, WI)

System/Unit: AHU/RTU

Asset: RTU-2 AREA:SALES

Unit Data		
	Design	**Actual**
MFG	NA	LENNOX
Serial Num	-	5623G03746
Model Num	NA	LGM102U4
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	2
OA Filter Size 1	-	14.25X23
Num PreFilter 1	-	4
PreFilter Size 1	-	20X25X2

Motor Data		
	Design	**Actual**
Motor MFG	-	EBMPAPST
Frame	-	NL
Horsepower	-	3.8
Motor Rpm	-	NL
Phase	3	3
Rated Voltage	208	208
Rated Amperage	-	8.7
Service Factor	-	NL

Test Data		
	Design	**Actual**
SF CFM	3400	3394
RA CFM	2800	2780
OA CFM	600	614
RL Voltage	208	212/212/212
RL Amperage	-	2.1/2.0/2.0
OA Damper Position	-	HIGH SPEED: 29% LOW SPEED: 43%
Brake Horse Power	3.75	0.89

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.33"
Fan Suction SP	-	-0.49"
Fan Discharge SP	-	0.35"
Total ESP	1.00	0.68"
Fan Total SP	-	0.84"

Completed By: Michael McDonnell on 09/14/2023

Notes:
[1] SYSTEM MOTOR SETPOINTS: HIGH-3000CFM / LOW-1500CFM

Written By: Michael McDonnell on 09/14/2023

National TAB

Project:Ulta Beauty (Baraboo, WI)

AHU/RTU

Diffuser Supply (GRD)

RTU-2/SALES

Asset							
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**CFM(1)**	**FINAL CFM**	**% to design**
2-1	SALES	CD	14	565	579	579	102.5
2-2	SALES	CD	14	565	560	560	99.1
2-3	SALES	CD	14	565	575	575	101.8
2-4	SALES	CD	14	565	553	553	97.9
2-5	SALES	CD	14	565	560	560	99.1
2-6	SALES	CD	14	575	567	567	98.6
Total				3400	3394	3394	99.82%

Completed By: Michael McDonnell on 09/14/2023

National TAB

Project: Ulta Beauty (Baraboo, WI)

System/Unit: AHU/RTU

Asset: RTU-3 AREA:SALES

Unit Data		
	Design	**Actual**
MFG	NA	LENNOX
Serial Num	-	5623G03744
Model Num	NA	LGM102U4
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	2
OA Filter Size 1	-	14.25X23
Num PreFilter 1	-	4
PreFilter Size 1	-	20X25X2

Motor Data		
	Design	**Actual**
Motor MFG	-	EBMPAPST
Frame	-	NL
Horsepower	-	3.8
Motor Rpm	-	NL
Phase	3	3
Rated Voltage	208	208
Rated Amperage	-	8.7
Service Factor	-	NL

Test Data		
	Design	**Actual**
SF CFM	3400	3505
RA CFM	2800	2877
OA CFM	600	628
RL Voltage	208	211/211/212
RL Amperage	-	2.4/2.5/2.4
OA Damper Position	-	HIGH SPEED: 28% LOW SPEED: 45%
Brake Horse Power	3.75	1.06

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.37"
Fan Suction SP	-	-0.53"
Fan Discharge SP	-	0.41"
Total ESP	1.00	0.78"
Fan Total SP	-	0.94"

Completed By: Michael McDonnell on 09/14/2023

Notes:
[1] SYSTEM MOTOR SETPOINTS: HIGH-3200CFM / LOW-1600CFM

Written By: Michael McDonnell on 09/14/2023

National TAB

Project:Ulta Beauty (Baraboo, WI)

AHU/RTU

Diffuser Supply (GRD)

RTU-3/SALES

Asset							
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**CFM(1)**	**FINAL CFM**	**% to design**
3-1	SALES	CD	14	550	445	566	102.9
3-2	SALES	CD	14	540	529	562	104.1
3-3	SALES	CD	14	540	539	536	99.3
3-4	SALES	CD	14	540	575	548	101.5
3-5	SALES	CD	14	540	497	574	106.3
3-6	SALES	CD	14	540	674	567	105.0
3-7	WOMENS RR	CD	6	75	93	77	102.7
3-8	MENS RR	CD	6	75	94	75	100.0
Total				3400	3446	3505	103.09%

Completed By: Michael McDonnell on 09/14/2023

National TAB

Project: Ulta Beauty (Baraboo, WI)

System/Unit: AHU/RTU

Asset: RTU-4 AREA:STAGING

Unit Data		
	Design	**Actual**
MFG	NA	LENNOX
Serial Num	-	5623F04022
Model Num	NA	LGM060U4
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	1
OA Filter Size 1	-	29X14
Num PreFilter 1	-	4
PreFilter Size 1	-	20X20X2

Motor Data		
	Design	**Actual**
Motor MFG	-	EBMPAPST
Frame	-	NL
Horsepower	-	1.5
Motor Rpm	-	NL
Phase	3	3
Rated Voltage	208	208
Rated Amperage	-	4.4
Service Factor	-	NL

Test Data		
	Design	**Actual**
SF CFM	2000	2026
RA CFM	1850	1883
OA CFM	150	143
RL Voltage	208	212/212/212
RL Amperage	-	1.9/1.9/1.7
OA Damper Position	-	HIGH SPEED: 21% LOW SPEED: 30%
Brake Horse Power	1.50	

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.35"
Fan Suction SP	-	-0.45"
Fan Discharge SP	-	0.30"
Total ESP	1.00	0.65"
Fan Total SP	-	0.75"

Completed By: Michael McDonnell on 09/14/2023

Notes:
[1] SYSTEM MOTOR SETPOINTS: HIGH-1900CFM / LOW-950CFM

Written By: Michael McDonnell on 09/14/2023

National TAB

Project:Ulta Beauty (Baraboo, WI)

AHU/RTU

Diffuser Supply (GRD)

RTU-4/STAGING

Asset							
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**CFM(1)**	**FINAL CFM**	**% to design**
4-1	STAGING	CD	14	610	605	621	101.8
4-2	STAGING	CD	14	610	717	623	102.1
4-3	OFFICE	CD	8	170	156	166	97.6
4-4	STAGING	CD	14	610	686	616	101.0
Total				2000	2164	2026	101.3%

Diffuser Ret/Exh (GRD)

RTU-4/STAGING

Asset								
Asset Name	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**	**FINAL CFM**	**% to design**
R4-1	CD	20X16	915	1.0	1009	861	852	93.1
R4-2	CD	20X16	915	1.0	992	880	864	94.4
R4-3	CD	8	170	1.0	104	178	167	98.2
Total			2000		2105	1919	1883	94.15%

Completed By: Michael McDonnell on 09/14/2023

National TAB

Project: Ulta Beauty (Baraboo, WI)

System/Unit: FAN - Exhaust

Asset: EF-1 AREA:MENS RR

Unit Data		
	Design	**Actual**
MFG	NA	COOK
Model Num	NA	GN-188
Serial Num	-	NA
Type	INLINE	INLINE

Test Data		
	Design	**Actual**
CFM	200	201
RL Voltage	-	118

Motor Data		
	Design	**Actual**
Motor MFG	-	NL
Motor Rpm	1357	DD
Phase	1	1
Voltage (rated)	115	115
Amperage (rated)	-	1.0

Completed By: Michael McDonnell on 09/14/2023

Notes:
[1] MOTOR SETPOINT MARKED ON SPEED CONTROLLER.

Written By: Michael McDonnell on 09/14/2023

National TAB

Project:Ulta Beauty (Baraboo, WI)

FAN - Exhaust

Diffuser Ret/Exh (GRD)

EF-1/MENS RR

Asset								
Asset Name	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**	**FINAL CFM**	**% to design**
E1-1	CD	8	100	1.0	114	99	99	99.0
E1-2	CD	8	100	1.0	118	102	102	102.0
Total			200		232	201	201	100.5%

Completed By: Michael McDonnell on 09/14/2023