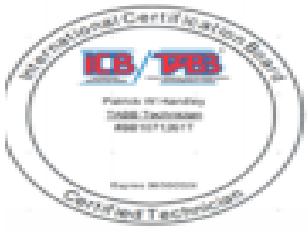
TESTING, ADJUSTING AND BALANCING

Project	Basecamp Steamboat
Address	1901 Curve Plaza Steamboat Springs, CO 80487
Architect	Kevin & Asako Sperry Architecture
Mechanical Engineer	Boulder Engineering
Contractor	Belly Ache Mechanical
Balancing Supervisors	Greg Barnes
ate	January 9, 2024
Job Number	5007



ABBREVIATION INDEX

(E): Existing
Actual D.P.: Recorded Differential Pressure
AHU: Air Handling Unit
AK: Area Correction
BV: Balance Valve
CD: Ceiling Diffuser
CFM: Cubic Feet Per Minute
CHW: Chilled Water
CRAC: Computer Room Air Conditioning Unit
CUH: Cabinet Unit Heater
CW: Condenser Water
D.P. (Pump): Discharge Pressure
Design D.P.: Design Differential Pressure
Diff.: Differential
DX: Direct Expansion
EAT: Entering Air Temperature
EF: Exhaust Fan
EG: Exhaust Grille
ERU: Energy Recovery Unit
ERV: Energy Recovery Ventilator
EWT: Entering Water Temperature
FCU: Fan Coil Unit
FPB: Fan Powered Box
FPM: Feet Per Minute
HW: Heating Water
HX: Heat Exchanger
IN.WC.: Inches of Water Column
ESP: External Static Pressure
Ind.Imp.Dia.: Indicated Impeller Diameter
K Factor: Correction/Calibration Factor
KEF: Kitchen Exhaust Fan
CS: Circuit Setter
LAT: Leaving Air Temperature
LD: Linear Diffuser
LWT: Leaving Water Temperature
MA: Mixed Air
MAU: Make Up Air Unit
Motor FLA: Full Load Amperage
MVD: Manual Volume Damper
NAC: No Access
NG: Not Given
NIC: Not in Contract
Nom. Eff.: Nominal Efficiency
OA/OSA: Outside Air
OA: Outside Air
OBD: Opposed Blade Damper
OD: Outside Diameter
P.F.: Power Factor
PSI: Pounds per Square Inch
RA: Return Air
RF: Return Fan
RG: Return Grille
RPM: Revolutions per Minute
RTU: Roof Top Unit
S.F.: Service Factor
S.P. (Pump): Suction Pressure
SA: Supply Air
SD: Supply Diffuser
SEF: Smoke Exhaust Fan
SF: Supply Fan
SP: Static Pressure
SPF: Stairwell Pressurization Fan
SWD: Sidewall Diffuser
T1: Terminal 1
T2: Terminal 2
T3: Terminal 3
TDH: Total Dynamic Head
TF: Transfer Fan
TSP: Total Static Pressure
UH: Unit Heater
VAV: Variable Air Volume
VP: Velocity Pressure

Method of Balancing:

Supply, Return and Exhaust diffusers, grilles and registers were measured with an Alnor Balometer EBT-721, which includes the flow hood, velgrid, pitot tube and airfoil. Heating and Chilled water flow rates were measured with an Alnor Hydronic Manometer HM-680 by obtaining pressure measurements. RPM was measured with a Shimpo tachometer. Amperage and Voltage readings were taken with a Fluke 930 meter.

Instrumentation:

Digital Manometer	Alnor Balometer EBT-721
Flow hood	Alnor Balometer EBT-721
Digital Pressure Gage	Alnor Hydronic Manometer HM-680
Tachometer	Shimpo
Digital Volt-Amp Meter	Fluke 930
Thermometer	Alnor Balometer EBT-721

Warranty Information:

This project was completed per TABB & NEBB Procedural Standards.
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 TABB & NEBB Procedural Standards for Testing, Adjusting, and Balancing Environmental Systems. Any variances from design quantities, which exceed TABB & NEBB tolerances, are noted in the Test-Adjust-Balance Report Project Summary. If a Test-Adjust-Balance Report Project Summary is not issued directly following this cover page, all measurements met the design requirements as specified by the design mechanical engineer.

This project has a one-year guarantee on all Testing, Adjusting & Balancing from the date listed on this cover page.

Greg Barnes
Owner / Supervisor
greg@certtab.com
720-201-6274

Project Summary

1. Individual Notes, Explanations, and Deficiencies, if applicable, are shown underneath the associated equipment.

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PROJECT:	STEAMBOAT BASE CAMP-PARTIAL RENOVATION & TENANT	**DATE:**	1/8/2024
LOCATION:	STEAMBOAT SPRINGS, CO	**CONTACT:**	Soun Barnes
PROJECT #:	5007	**AUTHOR:**	CBC REPORT DEPT.

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CERTIFIED BALANCING AND COMMISSIONING
SO EVERYONE GETS THEIR FAIR SHARE OF AIR

Roof Top Unit

PROJECT: STEAMBOAT BASE CAMP-PARTIAL RENOVATION & TENANT
LOCATION: STEAMBOAT SPRINGS, CO
PROJECT #: 5007

DATE: 1/8/2024
CONTACT: Soun Barnes
AUTHOR: CBC REPORT DEPT.

SYSTEM/UNIT: RTU-4(E)

Tested By: Greg Barnes
Date: 1/8/2024

Log:

RTU-4(E)	1/7/2024	Greg Barnes	EXISTING UNIT SHOWS AS RTU, BUT IS ACTUALLY A FURNACE.
RTU-4(E)	1/7/2024	Greg Barnes	UNIT WILL ONLY RUN AT 50% FAN SPEED NO MATTER WHAT THE TSTAT IS SET TO.
RTU-4(E)	1/7/2024	Greg Barnes	PROPORTIONED THE FAN AT 50% AND PROJECTED FINAL READING TO FULL SPEED.

RTU-4(E) Supply Outlet Summary

System/Unit	Outlet Type	Size LxW / D	AK Factor	Design Airflow	Prelim Airflow	% Prelim Diff.	Final Airflow	% Final Diff.
Outlet-01	CD	12X12	1	50	20	40		
Outlet-02	CD	12X12	1	50	45	90		
Outlet-03	CD	24X24	1	300	105	35		
Outlet-04	CD	24X24	1	300	100	33		
Outlet-05	CD	24X24	1	300	145	48		
Outlet-06	CD	24X24	1	300	170	57		
Outlet-07	CD	24X24	1	300	160	53		
Totals:	-	-	-	**1600**	**745**	**47**	**0**	**0**

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Roof Top Unit

PROJECT: STEAMBOAT BASE CAMP-PARTIAL RENOVATION & TENANT
LOCATION: STEAMBOAT SPRINGS, CO
PROJECT #: 5007

DATE: 1/8/2024
CONTACT: Soun Barnes
AUTHOR: CBC REPORT DEPT.

SYSTEM/UNIT: RTU-5

Tested By: Greg Barnes
Date: 1/8/2024

Log:

RTU-5	1/8/2024	Greg Barnes	CFM AT HIGH SPEED 1855
RTU-5	1/8/2024	Greg Barnes	UNIT WILL ONLY RUN AT WITH BOTH DAMPERS OSA AND RETUN WIDE OPEN. RETURN ACTUATOR HAS BEEN REMOVED.
RTU-5	1/8/2024	Greg Barnes	EXISTING UNIT SHOWS AS RTU, BUT IS ACTUALLY A FURNACE.

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Fan Unit

PROJECT: STEAMBOAT BASE CAMP-PARTIAL RENOVATION & TENANT
LOCATION: STEAMBOAT SPRINGS, CO
PROJECT #: 5007

DATE: 1/8/2024
CONTACT: Soun Barnes
AUTHOR: CBC REPORT DEPT.

SYSTEM/UNIT: EF-9

Tested By: Greg Barnes
Date: 1/8/2024

Unit Data	
Fan Manufacturer	NO TAG

Motor Data	
Motor Hertz	60 Hz

Test Data	
Design Airflow	50 CFM
Actual Airflow	60 CFM

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Fan Unit

PROJECT: STEAMBOAT BASE CAMP-PARTIAL RENOVATION & TENANT
LOCATION: STEAMBOAT SPRINGS, CO
PROJECT #: 5007

DATE: 1/8/2024
CONTACT: Soun Barnes
AUTHOR: CBC REPORT DEPT.

SYSTEM/UNIT: FU-5(E)-1A

Tested By: Greg Barnes
Date: 1/8/2024

Motor Data	
Motor Hertz	60 Hz

Log:

FU-5(E)-1A	1/8/2024	Greg Barnes	1910 CFM AT MAX SPEED
FU-5(E)-1A	1/8/2024	Greg Barnes	UNITS WERE NOT TWINED, AND WOULD ONLY RUN FOR FIVE MINUTES BEFORE UNIT WOULD GO INTO FAULT. UNSURE IF FAULT WAS BEING CAUSED BY UNITS COMING ON AT DIFFERENT TIMES BACK FEEDING.
FU-5(E)-1A	1/8/2024	Greg Barnes	READING TAKEN WITH UNIT RUNNING ONE AT A TIME.

FU-5(E)-1A Supply Outlet Summary

System/Unit	Outlet Type	Size LxW / D	AK Factor	Design Airflow	Prelim Airflow	% Prelim Diff.	Final Airflow	% Final Diff.
Outlet-01	CD	24X24	1	150				
Outlet-02	CD	12X12	1	50				
Outlet-03	CD	12X12	1	100				
Outlet-04	CD	12X12	1	100				
Outlet-05	SR	18X6	1	200				
Outlet-06	SR	18X6	1	200				
Outlet-07	SR	18X6	1	200				
Outlet-08	SR	18X6	1	200				
Outlet-09	SR	18X6	1	200				
Outlet-10	SR	18X6	1	200				
Outlet-11	SR	18X6	1	200				
Outlet-12	SR	18X6	1	200				
Outlet-13	SR	18X6	1	200				
Outlet-14	SR	18X6	1	200				
Outlet-15	SR	18X6	1	200				
Outlet-16	SR	18X6	1	200				
Outlet-17	SR	18X6	1	200				
Outlet-18	SR	18X6	1	200				
Outlet-19	SR	18X6	1	200				
Outlet-20	SR	18X6	1	200				
Outlet-21	SR	18X6	1	200				
Outlet-22	SR	18X6	1	200				
Totals:	-	-	-	**4000**	**0**	**0**	**0**	**0**

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Fan Unit

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LOCATION: STEAMBOAT SPRINGS, CO
PROJECT #: 5007

DATE: 1/8/2024
CONTACT: Soun Barnes
AUTHOR: CBC REPORT DEPT.

SYSTEM/UNIT: FU-5(E)-1B

Tested By: Greg Barnes
Date: 1/8/2024

Motor Data	
Motor Hertz	60 Hz

Log:

FU-5(E)-1B	1/8/2024	Greg Barnes	1880 CFM AT MAX SPEED
FU-5(E)-1B	1/8/2024	Greg Barnes	UNITS WERE NOT TWINED, AND WOULD ONLY RUN FOR FIVE MINUTES BEFORE UNIT WOULD GO INTO FAULT. UNSURE IF FAULT WAS BEING CAUSED BY UNITS COMING ON AT DIFFERENT TIMES BACK FEEDING.
FU-5(E)-1B	1/8/2024	Greg Barnes	READING TAKEN WITH UNIT RUNNING ONE AT A TIME.

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Fan Unit

PROJECT: STEAMBOAT BASE CAMP-PARTIAL RENOVATION & TENANT
LOCATION: STEAMBOAT SPRINGS, CO
PROJECT #: 5007

DATE: 1/8/2024
CONTACT: Soun Barnes
AUTHOR: CBC REPORT DEPT.

SYSTEM/UNIT: FU-5(E)-2A

Tested By: Greg Barnes
Date: 1/8/2024

Motor Data	
Motor Hertz	60 Hz

Log:

FU-5(E)-2A	1/8/2024	Greg Barnes	UNITS WERE NOT TWINED, AND WOULD ONLY RUN FOR FIVE MINUTES BEFORE UNIT WOULD GO INTO FAULT. UNSURE IF FAULT WAS BEING CAUSED BY UNIT
FU-5(E)-2A	1/8/2024	Greg Barnes	READING TAKEN WITH UNIT RUNNING ONE AT A TIME.
FU-5(E)-2A	1/8/2024	Greg Barnes	1810 CFM AT MAX SPEED

FU-5(E)-2A Supply Outlet Summary

System/Unit	Outlet Type	Size LxW / D	AK Factor	Design Airflow	Prelim Airflow	% Prelim Diff.	Final Airflow	% Final Diff.
Outlet-01	SR	18X6	1	250				
Outlet-02	SR	18X6	1	250				
Outlet-03	SR	18X6	1	250				
Outlet-04	SR	18X6	1	300				
Outlet-05	SR	18X6	1	300				
Outlet-06	SR	18X6	1	250				
Outlet-07	SR	18X6	1	300				
Outlet-08	SR	18X6	1	300				
Outlet-09	SR	18X6	1	300				
Outlet-10	SR	18X6	1	350				
Outlet-11	SR	18X6	1	250				
Outlet-12	SR	18X6	1	300				
Outlet-13	SR	18X6	1	300				
Totals:	-	-	-	**3700**	**0**	**0**	**0**	**0**

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Fan Unit

PROJECT: STEAMBOAT BASE CAMP-PARTIAL RENOVATION & TENANT
LOCATION: STEAMBOAT SPRINGS, CO
PROJECT #: 5007

DATE: 1/8/2024
CONTACT: Soun Barnes
AUTHOR: CBC REPORT DEPT.

SYSTEM/UNIT: FU-5(E)-2B

Tested By: Greg Barnes
Date: 1/8/2024

Motor Data	
Motor Hertz	60 Hz

Log:				
	FU-5(E)-2B	1/8/2024	Greg Barnes	1720 CFM AT MAX SPEED