TOWNSEND ENGINEERING INC.

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Prepared for: x\_APPROVED

REVISE & RESUBMIT

APPROVED AS NOTED \_\_\_\_ NOT APPROVED

APPROVAL IS FOR QUALITY STANDARDS, CAPACITY & Hoyt's Heating and AC, Inc

CONFORMANCE ONLY.

PHYSICAL SIZE AND OPERATING CHARACTERISTICS AND Project:

COORDINATION WITH OTHER TRADES ARE

CONTRACTORS RESPONSIBILITY.

6/12/25

Shaw Air Force Base B417

Sumter, South Carolina

#### M&M Test and Balance LLC

P.O. Box 31435 Greenville, South Carolina 29608 864-382-6500

Date:

May 14, 2025

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## **CERTIFIED**

## Test, Adjust and Balance Report

PROJECT:	B417	
	Shaw Air Force Base	
	Sumter, South Carolina 29152	
A D CHARTE CIT	DM A 124 A	
ARCHITECT:	PM Architecture	
	1642 Madison Avenue	
	New York, New York 10029	
ENGINEER:	20th Civil Engineering Squadron	
	428 Chapin Street	
	Sumter, South Carolina 29152	
CONTRACTOR		
CONTRACTOR:	Hoyt's Heating and AC, Inc.	
	710 North Wise Drive	
	Sumter, South Carolina 29153	

## **CERTIFICATION**

PROJECT:	B417	
_	Shaw Air Force Base	
	Sumter, South Carolina 29152	

The data presented in this report is an exact record of system performance and was obtained in accordance with NBC standard procedures. Any variances from design quantities, which exceed NBC tolerances, are noted thought this report and summarized on the Summary Report.

The air distribution systems have been tested & balanced and final adjustments have been made in accordance with NBC PROCEDURAL STANDARDS FOR TESTING, ADJUSTING, BALANCING OF ENVIRONMENTAL SYSTEMS and the project specifications.

NBC Contractor: Certified By: M & M Test and Balance Jeff Powell

Certification # CTP-1018-2016 Date: 5/14/2025

The hydronic distribution systems have been tested & balanced and final adjustments have been made in accordance with NBC "PROCEDURAL STANDARDS FOR TESTING, ADJUSTING, BALANCING OF ENVIRONMENTAL SYSTEMS" and the project specifications.

NBC Contractor: Certified By:

M & M Test and Balance Jeff Powell

Certification # CTP-1018-2016 Date: <u>5/14/2025</u>

#### **SUBMITTED AND CERTIFIED BY:**

**NBC TAB FIRM:** 

M & M Test and Balance LLC 110 Deborah Lane Greenville, South Carolina 29611

**CERTIFIED SUPERVISOR:** 



Jeffrey A Powell

## Shaw AFB B417

#### **INSTRUMENT CALIBRATION REPORT**

Date: May 14, 2025
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INSTRUMENT/MODEL#	APPLICATION	SERIAL#	CERT #	CALIBRATION DUE DATE
Cooper Instruments Thermometer/SRH77A	Wb/Db Temperature	483661	643108	07/15/25
TSI Hydronic Manometer	Hydronic Manometer	71922062	643111	07/15/25
Shortridge Balometer/ADM-860C	Air Volume/Air Pressure/Air Velocity	M11840	643104	07/15/25
Extech Tachometer	RPM's	10117016	643080	07/15/25
Fieldpiece Multimeter/HS36/AAV3	Amps/Volts, Air Velocity	731300/11080179	643083	07/15/25
Fluke Amp Clamp-Volt Meter/323	Volts/Amps	40870642WS	643079	07/15/25
Alnor Anenometer/9870	Duct Traverse	55070196	643089	07/15/25

### Shaw AFB B417

#### **ABBREVIATIONS**

Date: May 14, 2025

# Number **GPM** Gallons per Minute bHP Brake Horsepower Kilowatts kw Cubic Feet per Minute LAT **CFM** Leaving Air Temperature CONT'D Continued N/A Non Applicable ٥F OA Outside Air Degree Fahrenheit **DIAM** Diameter **%** Percent Db P.F. Power Factor Dry Bulb Pounds per Square Inch **ERU** Energy Recovery Unit **PSI EAT** Entering Air Temperature  $\Delta \mathbf{P}$ Pressure Differential EF Exhaust Fan **ROT** Rotation **EFF RPM Efficiency** Rotations per Minute FLA Full Load Amps S.F. Service Factor **FPM** Feet per Minute **SOFT** Square Feet FT Feet S.P. Static Pressure FT H<sub>2</sub>O Feet of Water SF Supply Fan HP T.P. Total Pressure Horsepower IN Inches VAV Variable Air Volume IN H<sub>2</sub>O Inches of Water **VFD** Variable Frequency Drive

## M&M Test and Balance LLC

Inches Water Column Pressure

IN W.C.

Wb

Wet Bulb

Pre	epared for:	Shaw AFB B417					
	SUMMARY REPORT						
Date:	May 14, 2025						

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 NBC "Procedural Standards for Testing,

Adjusting and Balancing of Environmental Systems". Any variances from design quantities, which exceed NBC tolerances, are noted on this Summary Report.

### Shaw AFB B417

#### Fan Test Report

AHU - 1 System: Shortridge 860 **Test Apparatus:** 

May 14, 2025 **Certified Tester:** Date: Jeff Powell

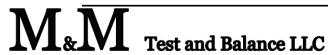
UNIT DATA			
Location	MECH ROOM		
Service	CAFETERIA		
Manufacturer	TRANE		
Model Number	CSAA030UAMOO		
Serial Number	H24D35068		
Classification	AIR HANDLER		
Filter Type	MERV 10		
Filters	7-20x24x2		
	1-16x20x2		
	3-12x24x2		

MOTOR DATA					
Fan Motor Manufacturer		BALDOR			
Motor HP/RPM/Frame	(2) 10	1770	215T		
Voltage/Phase/Hertz	208	3	60		
FLA/S.F.	29.5		1.15		
EFF%		97.7%			
P.F.%		80.0%			
Rotation	COUNT	ER CLO	CKWISE		
Service Factor Amps		33.9			

FAN DATA			
Motor Sheave Manufacturer	DIRECT DRIVE		
Motor Sheave Diam/Bore	DIRECT DRIVE		
Fan Sheave Manufacturer	DIRECT DRIVE		
Fan Sheave Diam/Bore	DIRECT DRIVE		
# Belts/Manufacturer/Size	DIRECT DRIVE		
Sheave Center Distance	DIRECT DRIVE		

TEST DATA	DESIGN	ACTUAL
Total CFM	14900	15231
Fan RPM		1235
Motor Volts	208	206/10/09
Motor Amps	59.0	30.0 AVG
Outside Air	6230	6291
Return Air		
SP In/Out		.60/.65
ESP		1.25
Hz	60	65
ΔP SET POINT		.64

REMARKS:			



### Shaw AFB B417

#### Fan Test Report

System: Shortridge 860 AHU - 2 **Test Apparatus:** 

May 14, 2025 **Certified Tester:** Date: Jeff Powell

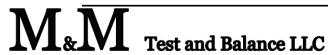
UNIT DATA			
Location	MECH ROOM		
Service	CAFETERIA		
Manufacturer	TRANE		
Model Number	CSAA025UAMOO		
Serial Number	H24D35076		
Classification	AIR HANDLER		
Filter Type	MERV 10		
Filters	6-20x20x2		
	2-16x20x2		
	3-12x24x2		

MOTOR DATA							
Fan Motor Manufacturer		BALDOR					
Motor HP/RPM/Frame	(2) 7.5	1770	213T				
Voltage/Phase/Hertz	208	3	60				
FLA/S.F.	23.3	23.3 1.15					
EFF%	91.0%						
P.F.%	77.0%						
Rotation	COUNTER CLOCKWISE						
Service Factor Amps	26.8						

FAN DATA						
Motor Sheave Manufacturer	DIRECT DRIVE					
Motor Sheave Diam/Bore	DIRECT DRIVE					
Fan Sheave Manufacturer	DIRECT DRIVE					
Fan Sheave Diam/Bore	DIRECT DRIVE					
# Belts/Manufacturer/Size	DIRECT DRIVE					
Sheave Center Distance	DIRECT DRIVE					

TEST DATA	DESIGN	ACTUAL
Total CFM	10000	10181
Fan RPM		1235
Motor Volts	208	210/12/13
Motor Amps	46.6	25.5 AVG
Outside Air	5100	5132
Return Air		
SP In/Out		.52/.48
ESP		1.00
Hz	60	52.5
ΔP SET POINT		.40

REMARKS:			



Prepared for:
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#### **Coil Test Report**

System: Chilled Water Test Apparatus: Cooper Thermometer

Date: May 14, 2025 Certified Tester: Jeff Powell

		WATER				A	IR			
AREA SERVED	ENT		LVG			RING		VING		
	°F		°F		Db °F	Wb °F	Db °F	Wb °F		
AHU - 1	55.1		62.9		75.6	66.5	54.2	52.9		
AHU - 2	49.0		62.5		73.4	63.8	52.6	51.9		
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Prepared f	or:
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#### **Coil Test Report**

System: Test Apparatus: Cooper Thermometer

Date: May 14, 2025 Certified Tester: Jeff Powell

		WATER			Α	IR		
AREA SERVED	ENT		LVG	ENTE	RING	LEA	VING	
	°F		°F	Db °F	Wb °F	Db °F	Wb °F	
CM - 1	106.9		98.9	75.8		98.9		
CM - 2	98.3		85.1	78.1		101.3		
								-



## Shaw AFB B417

#### PUMP TEST REPORT

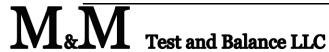
System: P - 1

**Certified Tester:** May 14, 2025 Date: **Jeff Powell** 

PUMP DATA				
LOCATION	MECH ROOM			
SERVICE	CHILL WATER			
MANUFACTURER	TACO			
MODEL#	F12513E4HA1L0DX81943D			
SERIAL#	F0485475			
MOTOR MFG.	BALDOR			
NAME PLATE H.P.	15			
NAME PLATE RPM	1770			
VOLTAGE/PHASE	208/3/60			
F.L. AMPERES/ S.F.	36.4/1.15			
DESIGN GPM	265			
DESIGN FT. OF HEAD	120			
DESIGN IMPELLER IN.	11.15			
REQ NPSH	11			
PUMP RPM	1750			
IMPELLER DIAM	11.15			
EFF/P.F.	.93/.83			
FRAME	254T			

TEST DATA	READING
VALVE SHUT DIFF PSI	57
VALVE SHUT HEAD FT	132
WIDE OPEN DIFF. PSI	57
WIDE OPEN HEAD FT.	132
WIDE OPEN GPM	280
FINAL SUCTION PSI	56.3
FINAL DISCHARGE PSI	1.6
FINAL HEAD FT.	125
FINAL GPM	271
PUMP OFF-PRESS PSI	12.3
VOLTAGE	210/12/13
AMPERE	26
HERTZ	58
ACTUAL IMP. DIA.	11.15
ΔP SET POINT	48

REMARKS:			



## Shaw AFB B417

#### **PUMP TEST REPORT**

System: P - 2

**Certified Tester:** May 14, 2025 Date: **Jeff Powell** 

DUMP DATA			
PUMP DATA			
LOCATION	MECH ROOM		
SERVICE	CHILL WATER		
MANUFACTURER	TACO		
MODEL #	F12513E4HA1L0DX81943D		
SERIAL#	F0485475		
MOTOR MFG.	BALDOR		
NAME PLATE H.P.	15		
NAME PLATE RPM	1770		
VOLTAGE/PHASE	208/3/60		
F.L. AMPERES/ S.F.	36.4/1.15		
DESIGN GPM	265		
DESIGN FT. OF HEAD	120		
DESIGN IMPELLER IN.	11.15		
REQ NPSH	11		
PUMP RPM	1750		
IMPELLER DIAM	11.15		
EFF/P.F.	.93/.83		
FRAME	254T		

TEST DATA	READING
VALVE SHUT DIFF PSI	58
VALVE SHUT HEAD FT	134
WIDE OPEN DIFF. PSI	57
WIDE OPEN HEAD FT.	132
WIDE OPEN GPM	280
FINAL SUCTION PSI	57
FINAL DISCHARGE PSI	2
FINAL HEAD FT.	127
FINAL GPM	274
PUMP OFF-PRESS PSI	12.3
VOLTAGE	210/12/13
AMPERE	27.1
HERTZ	56
ACTUAL IMP. DIA.	11.15
ΔP SET POINT	48

REMARKS:			

## $M_{\&}\overline{M}$ Test and Balance LLC

## Shaw AFB B417

#### **PUMP TEST REPORT**

System: P - 3

May 14, 2025 Certified Tester: Date: **Jeff Powell** 

PUMP DATA			
LOCATION	MECH ROOM		
SERVICE	BOILER WATER		
MANUFACTURER	TACO		
MODEL#	KV3011DE2KCXAC719D		
SERIAL#	F0485642		
MOTOR MFG.	BALDOR		
NAME PLATE H.P.	10		
NAME PLATE RPM	1770		
VOLTAGE/PHASE	208/3/60		
F.L. AMPERES/ S.F.	25		
DESIGN GPM	160		
DESIGN FT. OF HEAD	100		
DESIGN IMPELLER IN.	9.85		
REQ NPSH	9		
PUMP RPM	1750		
IMPELLER DIAM	9.85		
EFF/P.F.	91.7/82		
FRAME	215JM		

TEST DATA	READING
VALVE SHUT DIFF PSI	46
VALVE SHUT HEAD FT	106
WIDE OPEN DIFF. PSI	43
WIDE OPEN HEAD FT.	100
WIDE OPEN GPM	160
FINAL SUCTION PSI	1
FINAL DISCHARGE PSI	43
FINAL HEAD FT.	100
FINAL GPM	160
PUMP OFF-PRESS PSI	10.5
VOLTAGE	210/12/11
AMPERE	12.8
HERTZ	60
ACTUAL IMP. DIA.	9.85
ΔP SET POINT	40

REMARKS:		

## $\overline{\mathbf{M}}_{\mathbf{\&}}\overline{\mathbf{M}}_{\mathbf{Test} \ \mathbf{and} \ \mathbf{Balance} \ \mathbf{LLC}}$

## Shaw AFB B417

#### **PUMP TEST REPORT**

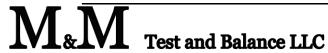
System: P - 4

**Certified Tester:** May 14, 2025 Date: **Jeff Powell** 

PUI	MP DATA
LOCATION	MECH ROOM
SERVICE	BOILER WATER
MANUFACTURER	TACO
MODEL#	KV3011DE2KCXAC719D
SERIAL#	F0485642
MOTOR MFG.	BALDOR
NAME PLATE H.P.	10
NAME PLATE RPM	1770
VOLTAGE/PHASE	208/3/60
F.L. AMPERES/ S.F.	25
DESIGN GPM	160
DESIGN FT. OF HEAD	100
DESIGN IMPELLER IN.	9.85
REQ NPSH	9
PUMP RPM	1750
IMPELLER DIAM	9.85
EFF/P.F.	91.7/82
FRAME	215JM

TEST DATA	READING
VALVE SHUT DIFF PSI	46
VALVE SHUT HEAD FT	106
WIDE OPEN DIFF. PSI	43
WIDE OPEN HEAD FT.	100
WIDE OPEN GPM	160
FINAL SUCTION PSI	1
FINAL DISCHARGE PSI	43
FINAL HEAD FT.	100
FINAL GPM	160
PUMP OFF-PRESS PSI	10.5
VOLTAGE	210/12/12
AMPERE	13.1
HERTZ	60
ACTUAL IMP. DIA.	9.85
ΔP SET POINT	40

REMARKS:		



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#### Fan Test Report

System: EF - 3 Test Apparatus: Shortridge 860

Date: May 14, 2025 Certified Tester: Jeff Powell

UNIT DATA		
Location	ROOF	
Service	N/A	
Manufacturer	GREENHECK	
Model Number	G-100-A-4-1-19-X	
Serial Number	25432203241	
Classification	EXHAUST	

MOTOR DATA				
Fan Motor Manufacturer	CHINA			
Motor HP/RPM/Frame	1/4	1725	48	
Voltage/Phase/Hertz	115	1	60	
FLA/S.F.	3.1		1.0	

FAN DATA				
Motor Sheave Manufacturer	DIRECT DRIVE			
Motor Sheave Diam/Bore	DIRECT DRIVE			
Fan Sheave Manufacturer	DIRECT DRIVE			
Fan Sheave Diam/Bore	DIRECT DRIVE			
# Belts/Manufacturer/Size	DIRECT DRIVE			
Sheave Center Distance	DIRECT DRIVE			

TEST DATA	DESIGN	ACTUAL
Total CFM	840	836
Fan RPM	1365	DIRECT
Total Static Pressure	.375	.31
Motor Volts	115	122
Motor Amps	3.1	3.0

REMARKS:			

Prepared for:	Pr	еp	ai	ec	l fo	r:
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#### Fan Test Report

System: EF - 4 Test Apparatus: Shortridge 860

Date: May 14, 2025 Certified Tester: Jeff Powell

UNIT DATA				
Location	ROOF			
Service	N/A			
Manufacturer	GREENHECK			
Model Number	G-080-D-1-17X			
Serial Number	25432204246			
Classification	EXHAUST			

MOTOR DATA					
Fan Motor Manufacturer	N	MCMILLAN			
Motor HP/RPM/Frame	1/15	1550	48		
Voltage/Phase/Hertz	115	1	60		
FLA/S.F.	1.2		1.0		

FAN DATA					
Motor Sheave Manufacturer	DIRECT DRIVE				
Motor Sheave Diam/Bore	DIRECT DRIVE				
Fan Sheave Manufacturer	DIRECT DRIVE				
Fan Sheave Diam/Bore	DIRECT DRIVE				
# Belts/Manufacturer/Size	DIRECT DRIVE				
Sheave Center Distance	DIRECT DRIVE				

TEST DATA	DESIGN	ACTUAL
Total CFM	200	210
Fan RPM	1254	DIRECT
Total Static Pressure	.25	.20
Motor Volts	115	122
Motor Amps	1.2	1.0

REMARKS:			

Prepared for:	Pr	еp	ai	ec	l fo	r:
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#### Fan Test Report

System: EF - 5 Test Apparatus: Shortridge 860

Date: May 14, 2025 Certified Tester: Jeff Powell

UNIT DATA			
Location	ROOF		
Service	N/A		
Manufacturer	GREENHECK		
Model Number	G-097-C-8-1-19-X		
Serial Number	25432205241		
Classification	EXHAUST		

MOTOR DATA					
Fan Motor Manufacturer		CHINA			
Motor HP/RPM/Frame	1/8	860	48Y		
Voltage/Phase/Hertz	115	1	60		
FLA/S.F.	2.3		1.0		

FAN DATA			
Motor Sheave Manufacturer	DIRECT DRIVE		
Motor Sheave Diam/Bore	DIRECT DRIVE		
Fan Sheave Manufacturer	DIRECT DRIVE		
Fan Sheave Diam/Bore	DIRECT DRIVE		
# Belts/Manufacturer/Size	DIRECT DRIVE		
Sheave Center Distance	DIRECT DRIVE		

TEST DATA	DESIGN	ACTUAL
Total CFM	90	93
Fan RPM	843	DIRECT
Total Static Pressure	.25	.22
Motor Volts	115	123
Motor Amps	2.3	2.1

REMARKS:				
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#### Fan Test Report

System: EF - 6 Test Apparatus: Shortridge 860

Date: May 14, 2025 Certified Tester: Jeff Powell

UNIT DATA			
Location	ROOF		
Service	N/A		
Manufacturer	GREENHECK		
Model Number	G-100-A-4-1-19-X		
Serial Number	25432206241		
Classification	EXHAUST		

MOTOR DATA					
Fan Motor Manufacturer		CHINA			
Motor HP/RPM/Frame	1/4	1725	48		
Voltage/Phase/Hertz	115	1	60		
FLA/S.F.	3.1 1.0				

FAN DATA				
Motor Sheave Manufacturer	DIRECT DRIVE			
Motor Sheave Diam/Bore	DIRECT DRIVE			
Fan Sheave Manufacturer	DIRECT DRIVE			
Fan Sheave Diam/Bore	DIRECT DRIVE			
# Belts/Manufacturer/Size	DIRECT DRIVE			
Sheave Center Distance	DIRECT DRIVE			

TEST DATA	DESIGN	ACTUAL
Total CFM	1100	1036
Fan RPM	1627	DIRECT
Total Static Pressure	.375	.29
Motor Volts	115	120
Motor Amps	3.1	2.9

REMARKS:			