Report By:

National TAB
1329 E. KEMPER ROAD
SUITE 4210
CINCINNATI, OH 45246

Report: TAB Report

Function: Test, Adjust, & Balance

Date: 06/05/2025

Completed By: National TAB

PROJECT

Seven Hills School (Cincinnati, OH)

5400 Red Bank Rd

Cincinnati, OH 45227

Client

KW Mechanical

25 East 32nd Street

Covington, KY 41015

National TAB

Project: Seven Hills School (Cincinnati, OH)

Table Of Contents

CERTIFICATION

PROJECT: Seven Hills School (Cincinnati, OH)

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
REGISTRATION NO:	3629
CERTIFIED BY:	Joe Hertenstein
DATE:	6/11/2025

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
REGISTRATION NO:	3629
CERTIFIED BY:	Joe Hertenstein
DATE:	

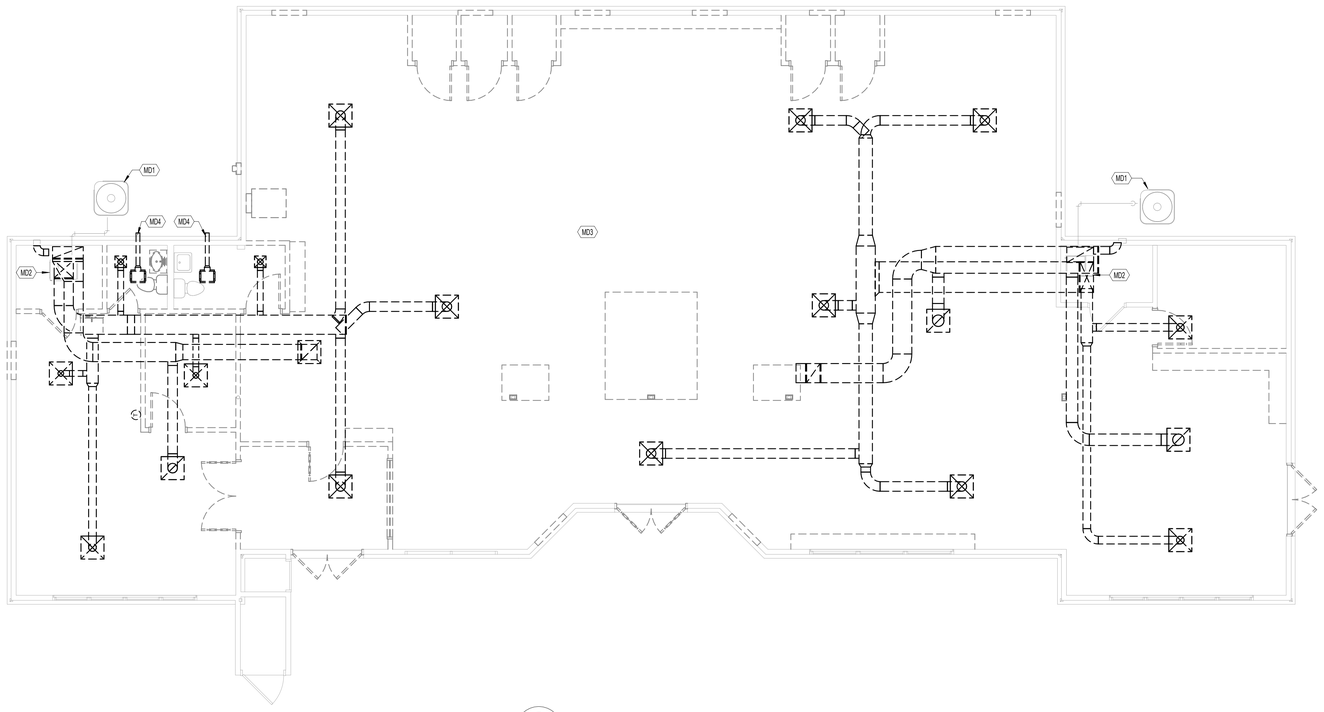
Submitted and Certified by:

NEBB TAB FIRM:	National TAB
TAB PROFESSIONAL:	Joe Hertenstein
SIGNATURE:	Joe Hertenstein
REGISTRATION NO:	3629
CERTIFICATION EXP:	12/31/2025

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	Evergreen S-PVF-1 S/N 2200484C	3/24/2025	3/24/2027
	AIR VELOCITY INSTRUMENT	50 fpm to 3900 fpm	+/- 5 % +/- 7 fpm	Evergreen S-PVF-1 S/N 2200484C	3/24/2025	3/24/2027
	DIRECT HOOD READING	100 cfm to 2000 cfm	+/- 5 % +/- 7 cfm	Evergreen S-PVF-1 S/N 2200484C	3/24/2025	3/24/2027
TEMPERATURE	AIR METER	-20 F to 240 F	+/- .5 % 2 F	Cooper ATKINS - SRH77A S/N 071118034	7/12/2024	7/12/2025
	AIR PROBE	-20 F to 240 F	+/- .5 % 2 F	Cooper ATKINS - PD1388 7-6 S/N 5028	7/12/2024	7/12/2025
	IMMERSION METER	-20 F to 240 F	+/- .5 % 2 F	Cooper ATKINS - SRH77A S/N 071118034	7/12/2024	7/12/2025
	IMMERSION PROBE	-20 F to 240 F	+/- .5 % 2 F	Cooper ATKINS - PD1388 7-6 S/N 1075	7/12/2024	7/12/2025
	CONTACT METER	-20 F to 240 F	+/- .5 % 2 F	Cooper ATKINS - SRH77A S/N 071118034	7/12/2024	7/12/2025
	CONTACT PROBE	-20 F to 240 F	+/- .5 % 2 F	Cooper ATKINS - PD1388 7-6 S/N 4011	7/12/2024	7/12/2025
HUMIDITY	HUMIDITY PROBE	10 % RH to 90 % RH	3% of reading	Cooper ATKINS - SRH77A S/N 071118034	7/12/2024	7/12/2025
ELECTRICAL	VOLTAGE MEASUREMENT	0 VAC to 600 VAC	2 % reading +/- 5 digits	Fluke 373 True RMS, S/N: 33290686	7/12/2024	7/12/2025
	AMPERAGE MEASUREMENT	0 Amperers to 100 Amperes	2 % reading +/- 5 digits	Fluke 373 True RMS, S/N: 33290686	7/12/2024	7/12/2025
ROTATION	ROTATION MEASUREMENT	60 rpm to 5000 rpm	2 % reading 2 rpm	SHIMPO DT-207LR S/N: D1530081R	7/12/2024	7/12/2025
HYDRONIC	PRESSURE MEASUREMENT	-30 in Hg to 200 psi	±2% of reading +/- 1 psi	Alnor HM680 S/N: 70807241	5/11/2024	5/31/2025
	DIFFERENTIAL PRESSURE MEASUREMENT	0 psi - 80 psi	±2% of reading +/- 1 psi	Alnor HM680 S/N: 70807241	5/11/2024	5/31/2025

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



2 M101 HVAC DEMOLITION PLAN
3/16" = 1'-0"

GENERAL DUCT PLAN NOTES:

A. DUCTS SERVING DIFFUSERS AND GRILLES ARE TO BE THE SAME SIZE AS DIFFUSER NECK SIZE OR GRILLE FACE UNLESS NOTED OTHERWISE.
B. DO NOT ROUTE DUCTWORK OVER ELECTRICAL EQUIPMENT.
C. PROVIDE VOLUME CONTROL DAMPERS IN RUN-OUT DUCT TO ALL SUPPLY AIR DEVICES.

KEYNOTES

M1 EXISTING AHU TO REMAIN. CONNECT SUPPLY MAINS INTO UNIT. CONNECT RETURN MAIN INTO PLENUM BELOW UNIT. REUSE EXISTING CONDENSATE, REFRIGERANT PIPING, ELECTRICAL, FLUE GAS PIPING, AND CONTROLS.

M2 REUSE THE OUTDOOR AIR DUCT OPENING. REBALANCE TO OA CFM ON SCHEDULE.

M3 INSTALL 8" ALUMINUM WALL CAP WITH RAIN HOOD AND BIRDSCREEN.

M4 EXISTING AHU TO REMAIN. CONNECT SUPPLY MAINS INTO UNIT. CONNECT RETURN MAIN INTO PLENUM BELOW UNIT. REUSE EXISTING CONDENSATE, REFRIGERANT PIPING, ELECTRICAL, FLUE GAS PIPING, AND CONTROLS. REWORK AND RELOCATE DISCONNECT SWITCH AS REQUIRED TO MAKE ROOM FOR NEW RETURN DUCT.

M5 BALANCE DAMPER ON NECK ACCESSIBLE THROUGH FACE OF DIFFUSER.

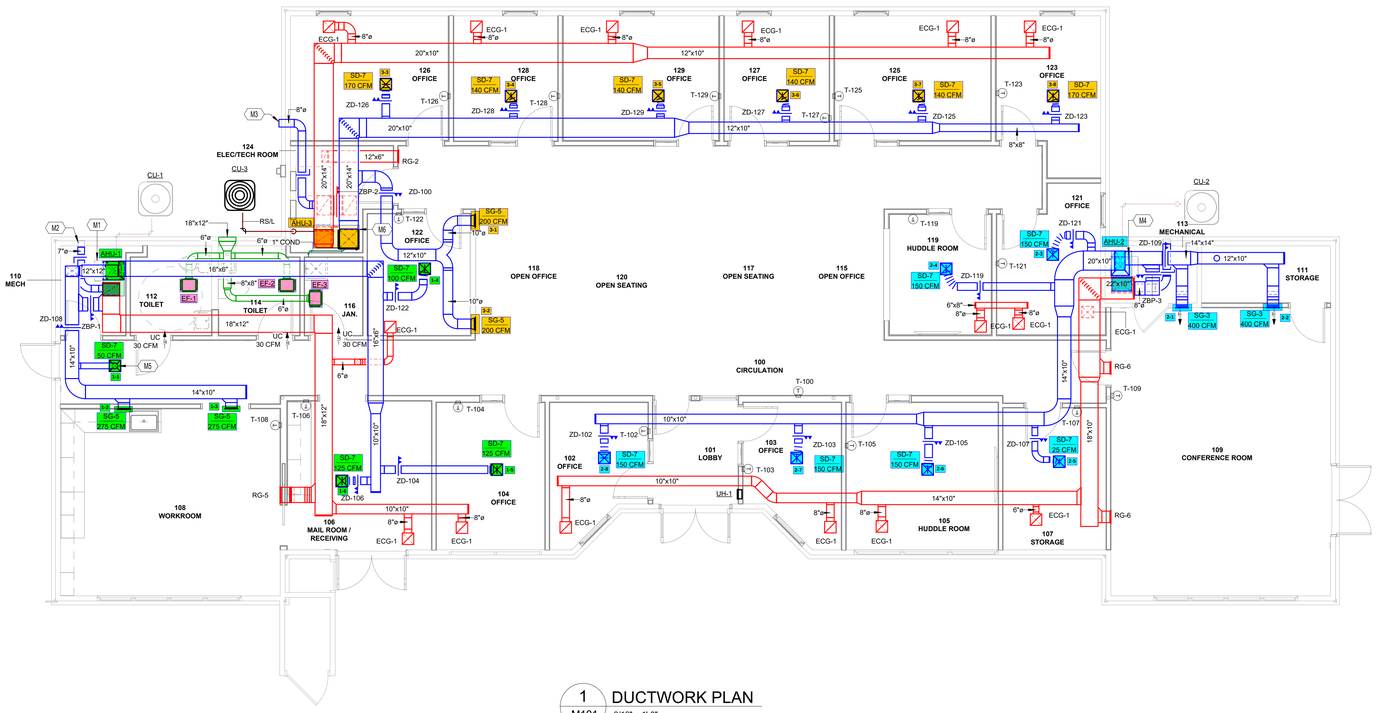
M6 ROUTE COMBUSTION AIR AND FLUE DUCT UP TO CONCENTRIC VENT AT ROOF.

MD1 EXISTING CONDENSING UNIT TO REMAIN. CLEAN COILS AND REMOVE DEBRIS FROM UNIT.

MD2 EXISTING AIR HANDLING UNIT TO REMAIN. CLEAN COIL.

MD3 REMOVE ALL DUCTWORK AND DIFFUSERS INDICATED. REMOVE ALL SUPPORTS NOT REUSED IN NEW WORK.

MD4 CAP AND SEAL PENETRATION TO MATCH EXISTING.



1 M101 DUCTWORK PLAN
3/16" = 1'-0"

0'-1" REFERENCE LINE

STATE OF OHIO
DAVID HAMMITT
88468
REGISTERED
PROFESSIONAL ENGINEER

SHP
512 PLUM STREET, SUITE 700
CINCINNATI, OH 45202 · 513.381.2112

THE SEVEN HILLS SCHOOL
ADMIN BUILDING ATLERATIONS
5400 RED BANK RD, CINCINNATI, OH 45227
SCHOOL DISTRICT
School District ADDRESS

ISSUANCES

08-30-24	SCHEMATIC DESIGN
11-15-24	DESIGN DEVELOPMENT
12-13-24	BID SET

FIRST FLOOR DUCTWORK PLAN

COMM NO. 2024098.01

M101

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National TAB

Project: Seven Hills School (Cincinnati, OH)

System/Unit: AHU/RTU

Asset: AHU-1 AREA:

Unit Data		
	Design	**Actual**
MFG	NA	CARRIER
Serial Num	-	1213A25719
Model Num	NA	58STA070-12
Configuration	-	VERTICAL
Num PreFilter 1	-	2
PreFilter Size 1	-	15"X13"X.25"
Num Final Filter 1	-	6
Final Filter Size 1	-	15"x5"x.25"

Test Data		
	Design	**Actual**
SF CFM	950	784
RA CFM	825	652
OA CFM	150	132
RL Voltage	115	112.2
RL Amperage	7.2	4.3
SF System SetPt	-	HIGH
OA Damper Position	-	OPEN
Brake Horse Power	-	0.2

Motor Data		
	Design	**Actual**
Horsepower	-	0.33
Phase	1	1
Rated Voltage	115	115
Rated Amperage	7.2	7.2

Performance Data		
	Design	**Actual**
Fan Suction SP	-	-0.16"
Fan Discharge SP	-	0.3"
Total ESP	1.0	.46"

Completed By: Jordan Best on 06/12/2025

Notes:
Dirty filters, removed for testing.
Unit below design at highest speed.

Written By: Jordan Best on 06/11/2025

National TAB

Project:Seven Hills School (Cincinnati, OH)

AHU/RTU

Diffuser Supply (GRD)

AHU-1/

Asset							
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**CFM(1)**	**FINAL CFM**	**% to design**
SGRD1	CORR	SD-7	6	50	53	53	106.0
SGRD2	108	SG-5	12X6	275	116	211	76.7
SGRD3	108	SG-5	12X6	275	105	196	71.3
SGRD4	122	SD-7	6	100	97	92	92.0
SGRD5	104	SD-7	6	125	125	114	91.2
SGRD6	106	SD-7	6	125	124	118	94.4
Total				950	620	784	82.53%

Completed By: Jordan Best on 06/05/2025

National TAB

Project: Seven Hills School (Cincinnati, OH)

System/Unit: AHU/RTU

Asset: AHU-2 AREA:

Unit Data		
	Design	**Actual**
MFG	NA	CARRIER
Serial Num	-	3712A19222
Model Num	NA	58STA135-22
Configuration	-	VERTICAL
Num PreFilter 1	-	1
PreFilter Size 1	-	20"X13"

Motor Data		
	Design	**Actual**
Horsepower	-	0.75
Phase	1	1
Rated Voltage	115	115
Rated Amperage	14.4	14.4

Test Data		
	Design	**Actual**
SF CFM	1575	1255
RA CFM	1275	1055
OA CFM	300	200
RL Voltage	115	122
RL Amperage	14.4	8.15
SF System SetPt	-	HIGH
OA Damper Position	-	OPEN
Brake Horse Power	-	0.42

Performance Data		
	Design	**Actual**
Fan Suction SP	-	-0.15"
Fan Discharge SP	-	0.80"
Total ESP	0.5	0.95"

Completed By: Jordan Best on 06/12/2025

Notes:
OA below design w/ damper fully open.
Dirty filter, removed for testing, recommend replacing.

Written By: Jordan Best on 06/11/2025

National TAB

Project:Seven Hills School (Cincinnati, OH)

AHU/RTU

Diffuser Supply (GRD)

AHU-2/

Asset							
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**CFM(1)**	**FINAL CFM**	**% to design**
SGRD1	109	SG-3	12X8	400	167	172	43.0
SGRD2	109	SG-3	12X8	400	334	345	86.3
SGRD3	121	SD-7	6	150	127	144	96.0
SGRD4	119	SD-7	6	150	117	149	99.3
SGRD5	107	SD-7	6	25	78	30	120.0
SGRD6	105	SD-7	6	150	121	138	92.0
SGRD7	103	SD-7	6	150	167	136	90.7
SGRD8	102	SD-7	6	150	169	141	94.0
Total				1575	1280	1255	79.68%

Completed By: Jordan Best on 06/05/2025

National TAB

Project: Seven Hills School (Cincinnati, OH)

System/Unit: AHU/RTU

Asset: AHU-3 AREA:

Unit Data		
	Design	**Actual**
MFG	NA	CARRIER
Serial Num	-	0925A61629
Model Num	NA	59SC2E060M17--14
Configuration	-	VERTICAL
Num PreFilter 1	-	1
PreFilter Size 1	-	16"X25X1"

Motor Data		
	Design	**Actual**
Horsepower	-	0.5
Phase	1	1
Rated Voltage	115	115
Rated Amperage	7.5	7.5

Test Data		
	Design	**Actual**
SF CFM	1300	1109
RA CFM	1100	920
OA CFM	200	189
RL Voltage	115	122.8
RL Amperage	7.5	6.37
SF System SetPt	-	18 (HIGHEST SPEED)
OA Damper Position	-	OPEN
Brake Horse Power	-	0.42

Performance Data		
	Design	**Actual**
Fan Suction SP	-	-0.48"
Fan Discharge SP	-	0.17"
Total ESP	0.5	0.65"

Completed By: Jordan Best on 06/12/2025

Notes:
Diffusers 3 and 8 below design, damper fully open.
Dirty filters, removed for testing.

Written By: Jordan Best on 06/11/2025

National TAB

Project:Seven Hills School (Cincinnati, OH)

AHU/RTU

Diffuser Supply (GRD)

AHU-3/

Asset							
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**CFM(1)**	**FINAL CFM**	**% to design**
SGRD1	118	SG-5	12X6	200	400	184	92.0
SGRD2	118	SG-5	12X6	200	370	198	99.0
SGRD3	126	SD-7	6	170	52	131	77.1
SGRD4	128	SD-7	6	140	46	130	92.9
SGRD5	129	SD-7	6	140	50	134	95.7
SGRD6	127	SD-7	6	140	56	138	98.6
SGRD7	125	SD-7	6	140	53	134	95.7
SGRD8	123	SD-7	6	170	35	135	79.4
Total				1300	1062	1184	91.08%

Completed By: Jordan Best on 06/11/2025

National TAB

Project: Seven Hills School (Cincinnati, OH)

System/Unit: FAN - Exhaust

Asset: EF-1 AREA:112 - TLT

Unit Data		
	Design	**Actual**
MFG	NA	GREENHECK
Model Num	NA	SP-A200-QD
Serial Num	-	26391635
Type	CEILING	CEILING

Test Data		
	Design	**Actual**
CFM	50	201

Motor Data		
	Design	**Actual**
Motor MFG	-	GREENHECK
Horsepower	27W	0.025
Motor Rpm	745	900
Phase	1	1
Voltage (rated)	120	115
Amperage (rated)	-	0.5

Completed By: Jordan Best on 06/12/2025

Notes:
Unit above design, not equipped with speed controller.

Written By: Jordan Best on 06/11/2025

National TAB

Project: Seven Hills School (Cincinnati, OH)

System/Unit: FAN - Exhaust

Asset: EF-2 AREA:114 - TLT

Unit Data		
	Design	**Actual**
MFG	NA	GREENHECK
Model Num	NA	SP-A200-QD
Serial Num	-	26391647
Type	CEILING	CEILING

Test Data		
	Design	**Actual**
CFM	50	224

Motor Data		
	Design	**Actual**
Motor MFG	-	GREENHECK
Horsepower	27W	0.025
Motor Rpm	745	900
Phase	1	1
Voltage (rated)	120	115
Amperage (rated)	-	0.5

Completed By: Jordan Best on 06/12/2025

Notes:
Unit above design, not equipped with speed controller.

Written By: Jordan Best on 06/11/2025

National TAB

Project: Seven Hills School (Cincinnati, OH)

System/Unit: FAN - Exhaust

Asset: EF-3 AREA:116 - JAN

Unit Data		
	Design	**Actual**
MFG	NA	GREENHECK
Model Num	NA	SP-A200-QD
Serial Num	-	26391634
Type	CEILING	CEILING

Test Data		
	Design	**Actual**
CFM	50	201

Motor Data		
	Design	**Actual**
Motor MFG	-	GREENHECK
Horsepower	27W	0.025
Motor Rpm	745	900
Phase	1	1
Voltage (rated)	120	115
Amperage (rated)	-	0.5

Completed By: Jordan Best on 06/12/2025

Notes:
Unit above design, not equipped with speed controller.

Written By: Jordan Best on 06/11/2025