Report By:

National TAB
1329 E. KEMPER ROAD
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CINCINNATI, OH 45246

NATIONAL TAB

Comfort. Under control.

Report: TAB REPORT
Function: Test, Adjust, & Balance
Date: 11/07/2022

PROJECT

10-17 HARBOR FREIGHT TOOLS - FORT WORTH, TX

1460 EASTCHASE PKWY

FORT WORTH, TX

Client

EG Mechanical Services

National TAB

Project: 10-17 HARBOR FREIGHT TOOLS - FORT WORTH, TX

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CERTIFICATION

PROJECT: 10-17 HARBOR FREIGHT TOOLS - FORT WORTH, TX

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: 11/7/2022

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: 3/31/2023

National TAB - Southeast
JEFFREY S. SPRINGER
CERTIFICATION
3755
Exp. 3/31/23
Air and Hydronic Testing

National TAB

Project: 10-17 HARBOR FREIGHT TOOLS - FORT WORTH, TX

System/Unit: AHU/RTU

Comfort. Under control.

Asset: RTU-1 AREA:101

Unit Data		
	Design	**Actual**
MFG	LENNOX	LENNOX
Serial Num	-	5622G06774
Model Num	LGH150H4M41G	LGH150H4MH2G
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	2
OA Filter Size 1	-	23X14
Num PreFilter 1	-	4
PreFilter Size 1	-	20X25X2

Test Data		
	Design	**Actual**
SF CFM	5000	5530
SF RPM	-	1009
RA CFM	3700	4155
OA CFM	1300	1375
RL Voltage	-	478/477/478
RL Amperage	-	5.6/5.4/5.5
OA Damper Position	-	37%
Brake Horse Power	-	

Motor Data		
	Design	**Actual**
Motor MFG	-	US MOTORS
Frame	-	184TZ
Horsepower	-	5
Motor Rpm	-	1765
Phase	-	3
Rated Voltage	-	460
Rated Amperage	-	6.50
Service Factor	-	1.15

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.53"
Fan Suction SP	-	-1.07"
Fan Discharge SP	-	0.69"
Total ESP	0.80"	1.22""
Fan Total SP	-	1.76"

Drive Data		
	Design	**Actual**
Motor Sheave Size	-	1VP60
Motor Bore Size	-	1.125"
Motor Sheave SetPt	-	2.5 TURNS OUT
Fan Sheave Size	-	BK77
Fan Sheave Bore	-	1"
Belt CL Distance	-	21.5"
Num of Belts	-	1
Belt Size	-	BX59

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Notes:

Diffuser Supply (GRD)

RTU-1/101

Asset							
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**CFM(1)**	**FINAL CFM**	**% to design**
SGRD1	101	CD D	24"X24"	4050		4446	109.8
SGRD2	100	CD B	10"	350		398	113.7
SGRD3	102	CD A	8"	250		280	112.0
SGRD4	103	CD A	10"	350		406	116.0

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Project: 10-17 HARBOR FREIGHT TOOLS - FORT WORTH, TX

System/Unit: AHU/RTU

Comfort. Under control.

Asset: RTU-2 AREA:101

Unit Data		
	Design	**Actual**
MFG	LENNOX	LENNOX
Serial Num	-	5622G06904
Model Num	LGH120H4MH1G	LGH120H4MH4G
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	2
OA Filter Size 1	-	23X14
Num PreFilter 1	-	4
PreFilter Size 1	-	20X25X2

Test Data		
	Design	**Actual**
SF CFM	4000	4125
SF RPM	-	809
RA CFM	2960	3076
OA CFM	1040	1049
RL Voltage	-	480/481/480
RL Amperage	-	3.7/3.9/3.9
OA Damper Position	-	36%
Brake Horse Power	-	

Motor Data		
	Design	**Actual**
Motor MFG	-	INTERLINK
Frame	-	56HZ
Horsepower	-	3
Motor Rpm	-	1750
Phase	-	3
Rated Voltage	-	460
Rated Amperage	-	4.0
Service Factor	-	1.15

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.46”
Fan Suction SP	-	-0.94”
Fan Discharge SP	-	0.73”
Total ESP	0.60"	1.19”
Fan Total SP	-	1.67”

Drive Data		
	Design	**Actual**
Motor Sheave Size	-	VP50
Motor Bore Size	-	0.875"
Motor Sheave SetPt	-	1 TURN OUT
Fan Sheave Size	-	AK84
Fan Sheave Bore	-	1"
Belt CL Distance	-	21.5"
Num of Belts	-	1
Belt Size	-	AX60

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Notes:

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Project:10-17 HARBOR FREIGHT TOOLS - FORT WORTH, TX

AHU/RTU

Comfort. Under control.

Diffuser Supply (GRD)

RTU-2/101

Asset									
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**	**FINAL CFM**	**% to design**
SGRD1	101	CD D	24"X24"	4000	6.07			4125	103.1

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Project: 10-17 HARBOR FREIGHT TOOLS - FORT WORTH, TX

System/Unit: AHU/RTU

Comfort. Under control.

Asset: RTU-3 AREA:101

Unit Data		
	Design	**Actual**
MFG	LENNOX	LENNOX
Serial Num	-	5622G06444
Model Num	LGH120H4MH1G	LGH120H4MH4G
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	2
OA Filter Size 1	-	23X14
Num PreFilter 1	-	4
PreFilter Size 1	-	20X25X2

Test Data		
	Design	**Actual**
SF CFM	4000	4288
SF RPM	-	NR
RA CFM	2960	3113
OA CFM	1040	1115
RL Voltage	-	490/492/490
RL Amperage	-	3.6/3.6/3.5
OA Damper Position	-	33%
Brake Horse Power	-	

Motor Data		
	Design	**Actual**
Motor MFG	-	INTERLINK
Frame	-	56HZ
Horsepower	-	3
Motor Rpm	-	1750
Phase	-	3
Rated Voltage	-	460
Rated Amperage	-	4.0
Service Factor	-	1.15

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.45”
Fan Suction SP	-	-0.74”
Fan Discharge SP	-	0.38”
Total ESP	0.60"	0.83”
Fan Total SP	-	1.12”

Drive Data		
	Design	**Actual**
Motor Sheave Size	-	1VP50
Motor Bore Size	-	0.875"
Motor Sheave SetPt	-	5 TURNS OUT
Fan Sheave Size	-	AK84
Fan Sheave Bore	-	1"
Belt CL Distance	-	21.5"
Num of Belts	-	1
Belt Size	-	AX60

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Notes:

Diffuser Supply (GRD)

RTU-3/101

Asset							
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**CFM(1)**	**FINAL CFM**	**% to design**
SGRD1	101	CD D	24"X24"	4000		4288	107.2

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Project: 10-17 HARBOR FREIGHT TOOLS - FORT WORTH, TX

System/Unit: AHU/RTU

Comfort. Under control.

Asset: RTU-4 AREA:104

Unit Data		
	Design	**Actual**
MFG	LENNOX	LENNOX
Serial Num	-	5622G06839
Model Num	LGH120H4MH1G	LGH120H4MH4G
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	2
OA Filter Size 1	-	23X14
Num PreFilter 1	-	4
PreFilter Size 1	-	20X25X2

Test Data		
	Design	**Actual**
SF CFM	4000	4460
SF RPM	-	754
RA CFM	3400	3811
OA CFM	600	649
RL Voltage	-	491/490/491
RL Amperage	-	2.7/2.7/2.7
OA Damper Position	-	28%
Brake Horse Power	-	

Motor Data		
	Design	**Actual**
Motor MFG	-	INTERLINK
Frame	-	56HZ
Horsepower	-	3
Motor Rpm	-	1750
Phase	-	3
Rated Voltage	-	460
Rated Amperage	-	4.0
Service Factor	-	1.15

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.36”
Fan Suction SP	-	-0.57”
Fan Discharge SP	-	0.45”
Total ESP	0.60"	0.81”
Fan Total SP	-	1.02”

Drive Data		
	Design	**Actual**
Motor Sheave Size	-	1VP50
Motor Bore Size	-	0.875"
Motor Sheave SetPt	-	5 TURNS OUT
Fan Sheave Size	-	AK84
Fan Sheave Bore	-	1"
Belt CL Distance	-	21.5"
Num of Belts	-	1
Belt Size	-	AX60

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Notes:

Diffuser Supply (GRD)

RTU-4/104

Asset							
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**CFM(1)**	**FINAL CFM**	**% to design**
SGRD1	104	CD D	24"X24"	3450		3992	115.7
SGRD2	106	CD A	10"	400		331	82.8
SGRD3	107	CD C	6"	75		69	92.0
SGRD4	108	CD C	6"	75		68	90.7

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Project: 10-17 HARBOR FREIGHT TOOLS - FORT WORTH, TX

System/Unit: AHU/RTU

Comfort. Under control.

Asset: RTU-5 AREA:104

Unit Data		
	Design	**Actual**
MFG	LENNOX	LENNOX
Serial Num	-	5622G0643
Model Num	LGH120H4MH1G	LGH120H4MH4G
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	2
OA Filter Size 1	-	23X14
Num PreFilter 1	-	4
PreFilter Size 1	-	20X25X2

Test Data		
	Design	**Actual**
SF CFM	4000	4744
SF RPM	-	756
RA CFM	3400	4047
OA CFM	600	697
RL Voltage	-	491/490/491
RL Amperage	-	2.6/2.5/2.6
OA Damper Position	-	20%
Brake Horse Power	-	

Motor Data		
	Design	**Actual**
Motor MFG	-	INTERLINK
Frame	-	56HZ
Horsepower	-	3
Motor Rpm	-	1750
Phase	-	3
Rated Voltage	-	460
Rated Amperage	-	4.0
Service Factor	-	1.15

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.27"
Fan Suction SP	-	-0.65"
Fan Discharge SP	-	0.46"
Total ESP	0.60"	0.73"
Fan Total SP	-	1.11"

Drive Data		
	Design	**Actual**
Motor Sheave Size	-	1VP50
Motor Bore Size	-	0.875"
Motor Sheave SetPt	-	2.5 TURNS OUT
Fan Sheave Size	-	AK84
Fan Sheave Bore	-	1"
Belt CL Distance	-	21.5"
Num of Belts	-	1
Belt Size	-	AX60

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Notes:

Diffuser Supply (GRD)

RTU-5/104

Asset							
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**CFM(1)**	**FINAL CFM**	**% to design**
SGRD1	104	CD D	24"X24"	4000			-

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National TAB

Project: 10-17 HARBOR FREIGHT TOOLS - FORT WORTH, TX

System/Unit: FAN - Exhaust

Comfort. Under control.

Asset: EF1 AREA:

Unit Data		
	Design	**Actual**
MFG	NA	ZHONGSHAN
Model Num	CEILING	CEILING
Serial Num	-	12-2021

Test Data		
	Design	**Actual**
CFM	100	67

Motor Data		
	Design	**Actual**
Motor MFG	-	NR
Horsepower	-	NR
Motor Rpm	1400	NR
Phase	1	NR
Voltage (rated)	120	NR
Amperage (rated)	-	NR

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Notes:

National TAB

Project: 10-17 HARBOR FREIGHT TOOLS - FORT WORTH, TX

System/Unit: FAN - Exhaust

Comfort. Under control.

Asset: EF2 AREA:

Unit Data		
	Design	**Actual**
MFG	NA	ZHONGSHAN
Model Num	CEILING	CEILING
Serial Num	-	04-2022

Test Data		
	Design	**Actual**
CFM	100	75

Motor Data		
	Design	**Actual**
Motor MFG	-	NR
Horsepower	-	NR
Motor Rpm	1400	NR
Phase	1	NR
Voltage (rated)	120	NR
Amperage (rated)	-	NR

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Notes:

National TAB

Project: 10-17 HARBOR FREIGHT TOOLS - FORT WORTH, TX

System/Unit: FAN - Exhaust

Comfort. Under control.

Asset: EF3 AREA:102

Unit Data		
	Design	**Actual**
MFG	NA	FANTECH
Model Num	DD	FG8
Serial Num	-	1003425190
Type	INLINE	INLINE

Test Data		
	Design	**Actual**
CFM	250	251
RL Voltage	-	121
RL Amperage	-	0.80
Total ESP	-	0.50"

Motor Data		
	Design	**Actual**
Motor MFG	-	FANTECH
Frame	-	NL
Horsepower	-	NL
Motor Rpm	2550	NL
Phase	1	1
Voltage (rated)	120	120
Amperage (rated)	-	0.99
Service Factor	-	NL

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Notes:

National TAB

Project:10-17 HARBOR FREIGHT TOOLS - FORT WORTH, TX

FAN - Exhaust

Comfort. Under control.

Diffuser Ret/Exh (GRD)

EF3/102

Asset								
Asset Name	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**	**FINAL CFM**	**% to design**
EGRD1	EG A	8"X8"	250	1			251	100.4

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National TAB

Project: 10-17 HARBOR FREIGHT TOOLS - FORT WORTH, TX

System/Unit: FAN - Exhaust

Comfort. Under control.

Asset: EF4 AREA:103

Unit Data		
	Design	**Actual**
MFG	NA	FANTECH
Model Num	DD	FG8
Serial Num	-	1006425190
Type	INLINE	INLINE

Test Data		
	Design	**Actual**
CFM	350	270
RL Voltage	-	119
RL Amperage	-	0.69
Total ESP	-	0.50"

Motor Data		
	Design	**Actual**
Motor MFG	-	FANTECH
Frame	-	NL
Horsepower	-	NL
Motor Rpm	3000	NL
Phase	1	1
Voltage (rated)	120	120
Amperage (rated)	-	0.99
Service Factor	-	1

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Notes:

National TAB

Project:10-17 HARBOR FREIGHT TOOLS - FORT WORTH, TX

FAN - Exhaust

Comfort. Under control.

Diffuser Ret/Exh (GRD)

EF4/103

Asset								
Asset Name	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**	**FINAL CFM**	**% to design**
EGRD1	EG A	10"X10	350	1			270	77.1

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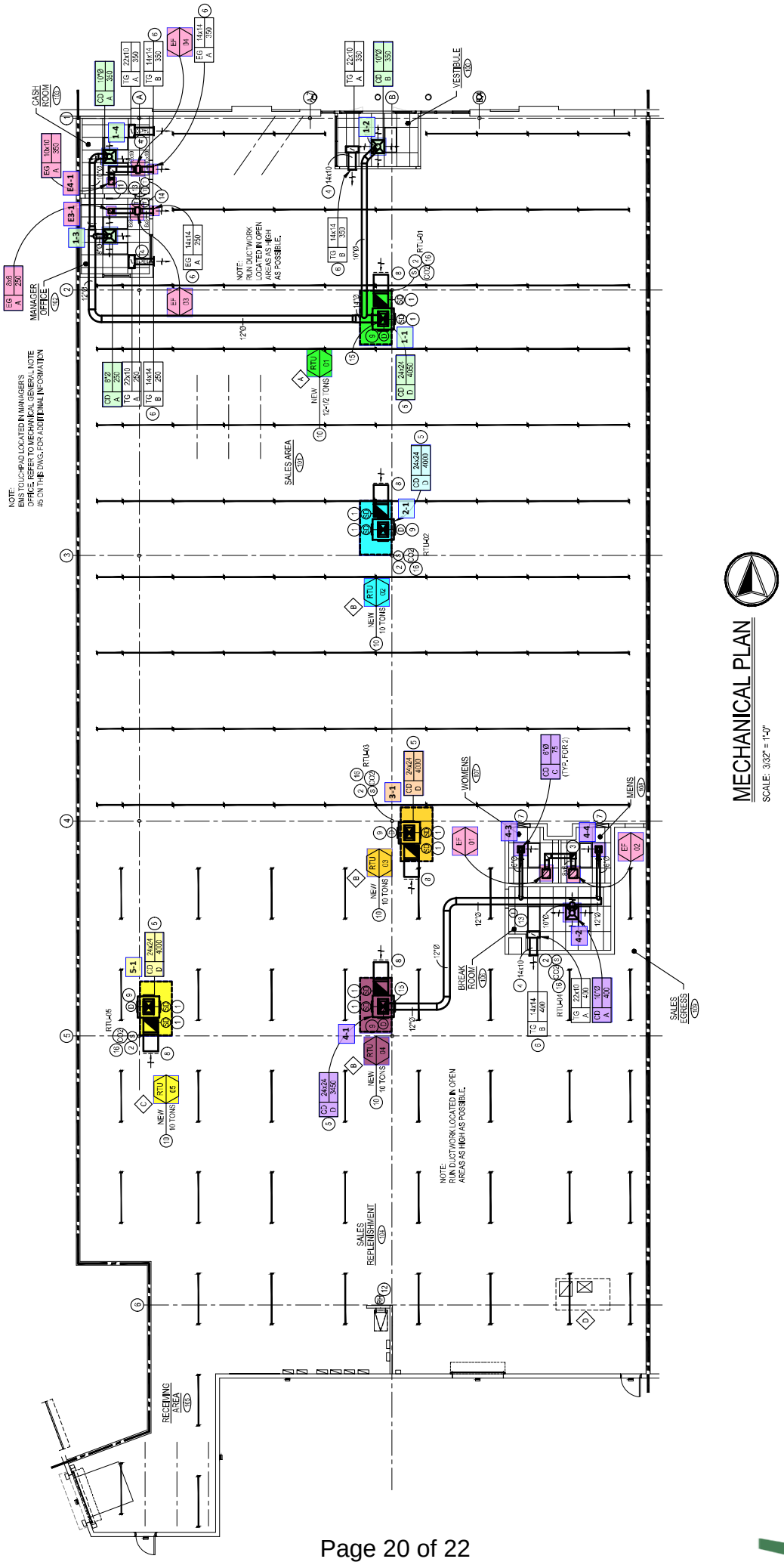

National TAB

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	Shortridge ADM 880C - S/N M05066	9/28/2022	9/28/2023
	AIR VELOCITY INSTRUMENT	50 fpm to 3900 fpm	+/- 5 % +/- 7 fpm	Shortridge ADM 880C - S/N M05066	9/28/2022	9/28/2023
	DIRECT HOOD READING	100 cfm to 2000 cfm	+/- 3 % +/- 7 cfm	Shortridge ADM 880C - S/N M05066	9/28/2022	9/28/2023
TEMPERATURE	AIR METER	-20 F to 240 F	+/- .5 % 2 F	Cooper ATKINS - SRH77A S/N 081820093	10/12/2022	10/12/2023
	AIR PROBE	-20 F to 240 F	+/- .5 % 2 F	Cooper ATKINS - PD1388 7-6 S/N 5028	10/12/2022	10/12/2023
	IMMERSION METER	-20 F to 240 F	+/- .5 % 2 F	Cooper ATKINS - SRH77A S/N 081820093	10/12/2022	10/12/2023
	IMMERSION PROBE	-20 F to 240 F	+/- .5 % 2 F	Cooper ATKINS - PD1388 7-6 S/N 1075	10/12/2022	10/12/2023
	CONTACT METER	-20 F to 240 F	+/- .5 % 2 F	Cooper ATKINS - SRH77A S/N 081820093	10/12/2022	10/12/2023
	CONTACT PROBE	-20 F to 240 F	+/- .5 % 2 F	Cooper ATKINS - PD1388 7-6 S/N 4011	10/12/2022	10/12/2023
HUMIDITY	HUMIDITY PROBE	10 % RH to 90 % RH	3% of reading	Cooper ATKINS - SRH77A S/N 090315046	10/12/2022	10/12/2023
ELECTRICAL	VOLTAGE MEASUREMENT	0 VAC to 600 VAC	2 % reading +/- 5 digits	Dwyer CM-1 - S/N 190800099	10/12/2022	10/12/2023
	AMPERAGE MEASUREMENT	0 Amperers to 100 Amperes	2 % reading +/- 5 digits	Dwyer CM-1 - S/N 190800099	10/12/2022	10/12/2023
ROTATION	ROTATION MEASUREMENT	60 rpm to 5000 rpm	2 % reading 2 rpm	Dwyer TAC-L - S/N S1100123	10/12/2022	10/12/2023
HYDRONIC	PRESSURE MEASUREMENT	-30 in Hg to 200 psi	±2% of reading +/- 1 psi	Dwyer 490W-6 - S/N 01L6NK	6/29/2022	6/29/2023
	DIFFERENTIAL PRESSURE MEASUREMENT	0 psi - 80 psi	±2% of reading +/- 1 psi	Dwyer 490W-6 - S/N 01L6NK	6/29/2022	6/29/2023

NEBB ABBREVIATIONS	
A = Area (ft^2) IP, (m^2) SI	M = Mass (lb) IP, (kg) SI
ACH = Air Changes per Hour	ma = Mixed Air
A_k = Effective Area	m = meter (metre)
AV = Average	m^3/s = Volumetric Flow: Cubic Meters Per Second
BHP = Brake Horsepower (IP) HP	NLA = No Load Amperage
BP = Brake Power (SI) kW	NPSHA = Net Positive Suction Head Available
Btu = British Thermal Unit	oa = Outside Air
Btu/h = Btuh = BTUH = BTU/Hour	$\%_{oa}$ = % of Outside Air
℄ = Center Distance (used in belt formula)	Ω = Ohm
°C = Degrees Celsius, °C	P = Pressure
C = Friction Loss Coefficient (For Duct Fittings)	P_a = Atmospheric Pressure
CCF = 100 Cubic Feet	P_{ab} = Absolute Pressure (Atmospheric Pressure + Gauge Pressure)
CFM = Volumetric Flow: Cubic Feet Per Minute	Pa = Pascals, Pressure SI
C_p = Specific Heat	π = 3.14
C_v = Flow Constant (IP)	PD = Sheave Pitch Diameter
ρ = Density (lb/ft^3) IP, (kg/m^3) SI	$P_℄$ = Pressure at Pump Centerline
d = Diameter (in.) IP, (mm) SI	ppm = parts per million
Δ = Difference or Change (Final - Initial)	psi = Pounds Per Square Inch
d_{imp} = Impeller Diameter	psia = Pounds Per Square Inch Absolute
E = Volts	psig = Pounds Per Square Inch Gauge
Eff = Efficiency	P_{vp} = Absolute Vapor Pressure
EP = Pump Efficiency	Q (flow) = Volumetric Fluid Flow Rate: (i.e. CFM, GPM, m^3/s, l/s, etc.)
°F = Degrees Fahrenheit, °F	Q (heat) = Heat Flow Rate (BTU/Hour) IP, (W or kW) SI
f = Friction Factor	°R = °Rankin = Degrees Rankin, °R
FLA = Full Load Amps	r = Radius (in) IP, (mm) SI
fpm = Feet per Minute (fpm)	$\%_{ra}$ = % of Return Air
ft = Foot	R = Resistance
g = Acceleration of Gravity	ra = Return Air
gal = Gallons	rad = Radians
GPM = Gallons Per Minute (GPM)	RH = Relative Humidity
h = Enthalpy (BTU/lb dry air) IP, (kJ/kg dry air) SI	RPM = Revolutions Per Minute
H = Head (in wc, ft wc, psi) IP, (Pa, kPa) SI	R_{value} = Thermal Resistance
Hg = Mercury	s = second
h_{ma} = Mixed Air Enthalpy	SHR = Sensible Heat Ratio
h_{oa} = Outside Air Enthalpy	SME = Sash Movement Effect Performance Rating (SME-XX yyy)
HP = Horsepower	SP = Static Pressure
hr = Hour	Sp Gr = Specific Gravity (for water use 1.00)
h_{ra} = Return Air Enthalpy	T = Temperature
HT = Height (in) IP, (mm) SI	Ta = Absolute Temperature (460˚ + T) or °R
I = Amps	T_{ma} = Mixed Air Temperature
J = Joules	T_{oa} = Outside Air Temperature
K = Kelvin, K	TP = Total Pressure
K_v = Flow constant (SI)	T_{ra} = Return Air Temperature
kg = Kilogram	TS = Tip Speed (fpm) IP, (m/s) SI
kJ = Kilojoule	U = Heat Transfer Coefficient
kPa = Kilopascal	μ = viscosity, dynamic
kW = Kilowatt = 1000 Watts	V = Velocity
l = Liter (Litre)	VP = Velocity Pressure
l/s = Volumetric Flow: Liters Per Second	W = Watt
lb = Pounds	WD = Width (in) IP, (mm) SI
lm = Lumens	wg = wc = water gauge = water column
ln = natural log	WHP = Water Horsepower (IP)
LG = Length (in) IP, (mm) SI	WP = Water Power (SI)
lx = Lux	ω = Humidity Ratio (lb or grains of water/lb of dry air) (g H_2O/kg dry air)