



## SUBMITTAL PACKAGE

[PURE Test & Balance LLC](#) is a National Balancing Council (NBC) certified commercial environmental systems testing and balancing member. We have served engineers, architects, contractors, industry and business throughout Louisiana and Mississippi.

Please accept this air balancing Submittal Package that introduces our staff, projects we've completed, services we offer, and information about the certification we hold.

We have also included some sample forms that give you a glimpse of the way we present our reports and arrive at solutions. Please keep this submittal package for future reference.

We offer a *solution-based* approach to air balancing, as we have maximized the efficiency and comfort of hundreds of HVAC systems. This is the primary strength we bring to your projects...**Solutions**, not just "match the numbers" balancing.

We would count it a privilege to be given the opportunity to participate in bringing your projects to completion.

[Donna Morgan](#)  
[President](#)  
[PURE Test & Balance LLC](#)

## SERVICES OFFERED

National Balancing Council (NBC) certified Air and Hydronic system balancing

HVAC System Diagnostics

HVAC System Troubleshooting

Indoor Air Quality Solutions

Comfort Balancing

Duct Leakage Testing

Building Pressure Testing

Consulting Services

Kitchen Exhaust System Balancing

Ventilation Rates Measured

Pre-remodel System Evaluations

Sound and Vibration

System Event Recording

DATE:

TO:

PROJECT:

PURE Test & Balance LLC

423 Big Four Rd. Wiggins, MS 39577  
Office: 601-928-5080; Email:  
donna@puretestandbalance.com  
NBC Certification #s: 228 and 229.





# STAFF

## Why PURE Test & Balance LLC?

### Experienced Staff

Over 20 years of  
Service

NBC Certified

Easy to read  
Reports

Serving the Gulf  
South Region

Responsive  
Service

Advanced  
Instruments

Large or Small  
Projects

PH: 601-928-5080  
WEB:

### Donna Morgan

#### **President/Owner**

Donna brings extensive administrative experience to the PURE Test & Balance team. She coordinates work flow; schedules labor and maintains calibration of test instrumentation. She is committed to timely project completion, thorough satisfaction of our client and ultimately the end user. Donna holds to the high standards of our Certifying Agency the National Balancing Council. Donna shares ownership of PURE Test & Balance LLC with both Michael Morgan and Jay Woodin.

### Michael Morgan

#### **Project Manager/Balancing Supervisor**

Michael has balanced over 1,000 commercial and industrial HVAC systems throughout the Gulfcoast region. His projects include hospitals, military bases, casinos, university and office buildings, restaurants and museums. He specializes in performance balancing, and system evaluations. He currently holds NBC Air and Hydronic balancing credentials (#229) and previously held certifications through other nationally recognized balancing agency. Michael reaches beyond the typical air balancing limits, delivering complete system solutions and creating measured system performance.

### Jay Woodin

#### **Balancing Technician**

Jay performs air diagnostics and balancing for new and existing HVAC systems. Jay is an NBC certified Air and Hydronic balancing technician (#228) and in addition to his testing, adjusting and balancing, he is EPA and Backflow Valve certified. His construction and maintenance experience provide excellent opportunities to make minor repairs and adjustments in the field expediting the specific goals of time sensitive projects. Jay is intent on delivering both thermal comfort and energy savings to the end user.

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## **NBC Air and Hydronic Balancing Certification**

The National Balancing Council is committed to providing and maintaining a comprehensive set of values, standards, practices, and procedures governing the field of testing, balancing, and adjusting commercial environmental systems. Our members pledge to faithfully uphold the highest standards of integrity and professionalism in the industry as a requisite to certification. NBC stands fully dedicated to the advancement of the testing and balancing field, and the support of its membership through training, communication, and leading-edge methodology.

## **NBC Philosophy**

The distinguishing characteristic of an NBC certified technician is the ability to prescribe solutions to the endless field conditions that prohibit an HVAC system from achieving balance and maximum field performance. Nearly all NBC technicians have extensive field experience in HVAC system repair, installation or service and possess skills required to troubleshoot the most difficult field conditions that can be revealed by their testing. These technicians test, diagnose and maximize the performance of over 200,000 HVAC systems per year.

## **Practical Standards**

Each certified technician subscribes to National Balancing Council Practical Standards and Procedures. These cover a full range of testing, balancing, adjusting, and diagnostic practices backed up by NBC reporting forms.

## **CSER™ and HSER™**

In addition to traditional independent test reports, NBI Technicians can provide *an efficiency rating of the installed system*. These ratings can be compared to the manufacturer's equipment efficiency ratings to offer a new view of system performance that is not offered anywhere else in the HVAC industry. CSER™ represents Cooling System Efficiency Rating and HSER™ is Heating System Efficiency Rating.

## **Technical Support and Backup**

NBC provides its certified technicians with toll free technical support. New field conditions affecting HVAC system performance are uncovered daily. Experienced support is available as a benefit of certification. Architects, engineers, and building maintenance staff are welcome to contact us with their questions and comments as well at 800-633-7058.

# PROJECTS COMPLETED

## Office buildings

Woodside Energy Building Mandeville, LA

MRHA VIII Gulfport and Moss Point, MS

Pass Christian Police and EOC Pass Christian, MS

## Hospitals

Greene County Hospital Leakesville, MS

Hattiesburg Clinic Picayune, MS

Memorial Hospital Gulfport, MS

Garden Park Medical Center Gulfport, MS

## Institutional

New Orleans Lakefront Airport New Orleans, LA

Jackson Barracks Chalmette, LA

Tudor Square Home for the Aged New Orleans, LA

Poplarville Airport Poplarville, MS

Gulfport HarborMaster Gulfport, MS

CN Railway Hammond, LA

Lafitte HeadStart New Orleans, LA

Tylertown FieldHouse Tylertown, MS

USM Lab Hoods Hattiesburg, MS

## Retail buildings, etc.

HHGregg Harvey, LA

Yamato Japanese Steakhouse Wiggins, MS

Fred's Store Baker, LA

Massage Envy Gulfport, MS

Shoe Show Flowood, MS

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## TEST INSTRUMENTS

Instrument	Manufacturer	Model	Serial	Calibrated	Description
Air Capture Hood	Shortridge	8400	None	N/A	14x14", 24x48", 24x24", 36x36", 12x48"
Air Multimeter	Shortridge	ADM-860C	M14664	Dec-14	Vel/Press/Temp/Hood/Velgrid/Accessory
Air Multimeter	Shortridge	ADM-860C	M10848	Jan-14	Vel/Press/Temp/Hood/Velgrid/Accessory
Magnehelics	Dwyer	2000	None	N/A	0.5", 1.0", 2.0", 5.0"
Pitot Tubes	Dwyer	160	None	N/A	12", 18", 24" and 36"
Electrical Meter	Fluke	179	22470006	Jan-14	Amp/Volt/Frequency/Temperature/Ohms
Electrical Meter	Fluke	902	27550074	Jul-15	Amp/Volt/Frequency/Temperature/Ohms
AC Current Clamp	Fluke	i400	20910047	N/A	400 amp
Tachometer	Cole-Parmer	87304-10	D12B0020R	Jul-15	1-100,000 RPM. Contact & Non-Contact
Tachometer	Shimpo	DT-205LR	C11C0093R	Jun-14	1-100,000 RPM. Contact & Non-Contact
Thermocouples	Fluke	Various	Various	N/A	Multiple Ranges and applications
Vane Anemometer	Kestrel	2000	1969790	Mar-15	2,000 FPM
Vane Anemometer	Extech	407113	Z327416	Mar-15	2,500 FPM, Rel. Hum., Temperature
Hydronic Meter	Alnor	HM-680	71109182	Mar-15	Hydronic Differential Gauge
Hydronic Meter	Dwyer	490-4	N46Z	Jul-15	Hydronic Differential Gauge
Pressure Gauge	Ashcroft	0-30 psi	MAY20108946	Mar-15	0-200 PSI Pressure Gauge
Pressure Gauge	Ashcroft	0-200 psi	DEC20108978	Mar-15	0-30 PSI Pressure Gauge

# AIR TEST AND BALANCE PROCEDURES

DATE:

PROJECT:

TO:

JBHM ARCHITECTS

MYRON JAMES &  
ASSOCIATES

JOB NUMBER

**PURE Test & Balance LLC**

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## 1. GATHER DESIGN INFORMATION

- ☐ Plans
- ☐ Specifications
- ☐ Equipment and control data
- ☐ Mark plans, number outlets, prepare system diagram sketch

## 2. AIR TESTING AND BALANCING:

- ☐ Locate actual registers, grills, equipment, controls & dampers
- ☐ Identify each register/grill to area served
- ☐ Set all system dampers to the "open" position
- ☐ Check filters and coils to make sure they are clear of debris
- ☐ Switch the thermostat fan switch to the "on" position with system in full cooling at 55 F to start high speed blower
- ☐ Check for proper fan rotation
- ☐ Drill test holes for static pressure and temperature
- ☐ Testing Outlets:
  - Measure each supply outlet, total readings
  - Measure each return outlet, total readings
  - Compare actual air flow to design airflow conditions
  - Adjust blower to obtain design airflow
  - Re-measure total supply and return airflows
  - Adjust dampers to obtain design airflow
  - Measure total airflow to verify that it is within  $\pm 10\%$
- ☐ Record any system deficiencies that exist
- ☐ Mark damper settings

## 3. FINAL EQUIPMENT TESTING:

- ☐ Record equipment and motor nameplate data
- ☐ Record sheave, pulley & belt sizes data
- ☐ Test and record full load motor amperes
- ☐ Test and record voltage
- ☐ Test and record motor & fan RPM
- ☐ Test and record supply and return static pressures
- ☐ Test and record entering air temperatures (heating and cooling)
- ☐ Test and record exiting air temperatures (heating and cooling)
- ☐ Return thermostat to normal operating conditions

## 4. REPORT COMPLETION:

- ☐ Cover letter including:
  - Project description & location
  - Installing contractor
  - Certification statement that project is correctly balanced
- ☐ HVAC System Report
- ☐ System Diagrams
- ☐ Symbols Legend
- ☐ Duct Traverse or Pulley Data forms, if needed
- ☐ Instrument list, including calibration dates
- ☐ Certificates of calibration, if needed

# HSER Test and Procedure

HSER is *Heating System Efficiency Ratio* is a rating performed by NCI air balancing certified technicians exclusively. HSER is the ratio of field measured system BTU's compared equipment rated BTU's. Heating BTU's are measured as sensible BTU's.

## RECORD TEST CONDITIONS

- ☐ Time of Day \_\_\_\_\_ Weather Conditions \_\_\_\_\_
- ☐ Equipment rated BTU output \_\_\_\_\_

## TEST PROCEDURE

- ☐ Determine the supply airflow that the system is delivering into the conditioned space. Measure all of the supply registers and add them together. \_\_\_\_\_

## TEMPERATURES

- ☐ Measure the average supply air temperature at the supply registers. \_\_\_\_\_
- ☐ Measure the average return air temperature of the air at the return grilles. \_\_\_\_\_
- ☐ Subtract supply temperature from return temperature. \_\_\_\_\_  
This is the  $\Delta t$  through the system.

## DETERMINE ACTUAL SYSTEM BTU DELIVERY

$$\frac{\text{SUPPLY CFM}}{\Delta t} \times \frac{1.08}{\text{HEATING BTU CONSTANT}} = \text{SYSTEM BTU DELIVERY}$$

## ESTABLISH HEATING SYSTEM EFFICIENCY RATIO

$$\frac{\text{SYSTEM BTU DELIVERY}}{\text{SYSTEM RATED BTU OUTPUT}} = \text{SYSTEM HSER RATING} \%$$

## QUALIFICATIONS:

*HSER Ratings should exceed 90% for most systems under standard operating conditions. The result of this system efficiency rating will vary depending on actual conditions. Duct renovation work, air balancing, combustion testing and adjusting and equipment repair or replacement will increase your system's HSER Rating.*



DATE

PROJECT

SYSTEM

READINGS BY

JOB NUMBER

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TEST  
HOLES (")

TEST LOCATIONS (")


DUCT/GRILLE	DESIGN	ACTUAL
FREE SIZE		
FREE AREA		
AVERAGE VELOCITY		
IF GRILL X AK FACTOR		
AIR FLOW (CFM)		
CALCULATIONS	TEST 1	FINAL
TOTAL READINGS (FPM)		
DIVIDED BY NO. OF READINGS		
AVERAGE VELOCITY		



DATE

PROJECT

SYSTEM

READINGS BY

JOB NUMBER

**DUCT TEST PATTERN**

**DISTANCE BETWEEN TEST HOLES AND READING LOCATIONS**

NO. OF TEST SITES AND FACTORS				X DUCT HEIGHT =	TEST HOLE LOCATION	X DUCT WIDTH =	READING LOCATION
4	5	6	7				
.15	.10	.10	.05				
.35	.25	.25	.20				
.65	.50	.40	.35				
.85	.75	.60	.50				
	.90	.75	.60				
		.90	.75				
			.95				

**VELOCITY READINGS**

READING NUMBER	TEST 1	TEST 2	FINAL TEST	READING NUMBER	TEST 1	TEST 2	FINAL TEST
1				27			
2				28			
3				29			
4				30			
5				31			
6				32			
7				33			
8				34			
9				35			
10				36			
11				37			
12				38			
13				39			
14				40			
15				41			
16				42			
17				43			
18				44			
19				45			
20				46			
21				47			
22				48			
23				49			
24				50			
25				51			
26				52			

Remarks

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# HVAC SYSTEM REPORT

## FAN NAMEPLATE DATA

MANUFACTURER

## MODEL

TYPE

## SIZE

SERIAL NUMBER

## FAN PULLEY DATA

DIAMETER

## SHAFT

ADJ/FIXED

## MOTOR NAMEPLATE DATA

MANUFACTURER

VOLTS/PHASE

## HORSEPOWER

## FULL LOAD AMPS

RPM

## SERVICE FACTOR

## MOTOR PULLEY

DIAMETER

SHAFT

ADJ/FIXED

BELT NO. &amp; SIZE

## CONDENSING UNIT DATA

MANUFACTURER

## MODEL

TONNAGE

SERIAL NUMBER

FAN	DESIGN	ACTUAL
SUPPLY AIR CFM		
RETURN AIR CFM		
OUTSIDE AIR CFM		
FAN RPM		
STATIC PRESSURE +		
STATIC PRESSURE -		
TOTAL STATIC PRESSURE		
FILTER STATIC PRESSURE		
MOTOR		
AMPS		
VOLTS		
HORSEPOWER		
RPM		

FIELD FORMS AVAILABLE

## DUCT TRAVERSE

## SYSTEM DIAGRAM

## PULLEY CALCULATIONS

# TEMPERATURE IN

TEMPERATURE OUT

## DROP/RISE

## DIFFUSERS AND GRILLS

[illegible]

## REMARKS

DATE \_\_\_\_\_

## PROJECT

## SYSTEM

## READINGS

**JOB NUMBER**

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# PULLEY CALCULATIONS

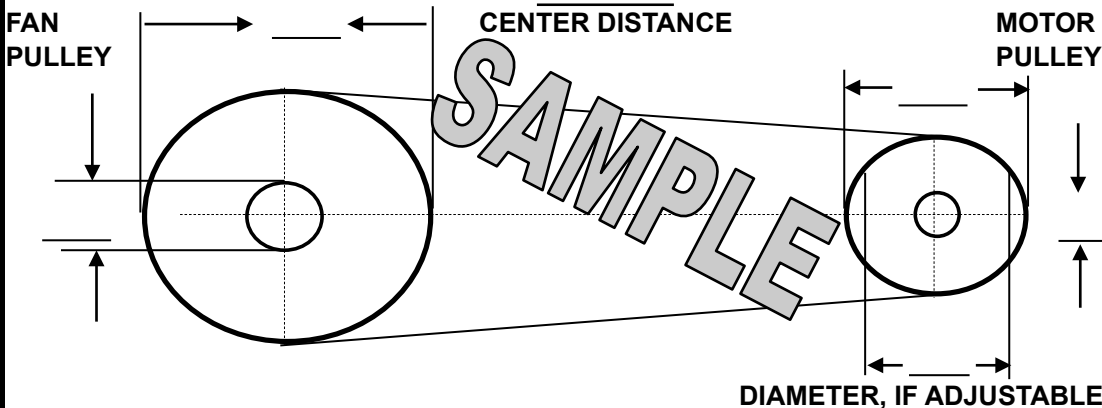
## MOTOR NAMEPLATE DATA:

MANUFACTURER  
VOLTS/PHASE  
HORSEPOWER  
FULL LOAD AMPS  
RPM  
SERVICE FACTOR

## BELT DATA:

MANUFACTURER  
MODEL  
BELT SIZE  
NUMBER OF BELTS

FAN	DESIGN	ACTUAL
SUPPLY AIR CFM		
STATIC PRESSURE +		
STATIC PRESSURE -		
TOTAL STATIC PRESSURE		
RPM		
MOTOR		
AMPS		
VOLTS		
HORSEPOWER		
RPM		



	MANUFACTURER	
	MODEL	
	ADJUSTABLE	
	BUSHING DATA	

IS THERE ROOM TO ADJUST MOTOR MOUNT? FORWARD BACKWARD

TEST	SUPPLY CFM	FAN RPM	TOTAL STATIC PRESSURE	AMP DRAW	MOTOR PULLEY DIAMETER	OTHER
TEST 1						
TEST 2						
TEST 3						

## FORMULAS

FAN LAW ONE - PULLEY SIZE

$$PD2 = PD1 \times \left( \frac{CFM2}{CFM1} \right)$$

FAN LAW TWO - STATIC PRESSURE

$$SP2 = SP1 \times \left( \frac{CFM2}{CFM1} \right)^2$$

FAN LAW THREE - AMP DRAW

$$AMP2 = AMP1 \times \left( \frac{CFM2}{CFM1} \right)^3$$

FAN LAW ONE - RPM

$$RPM2 = RPM1 \times \left( \frac{CFM2}{CFM1} \right)$$

DATE

PROJECT

SYSTEM

READINGS BY

JOB NUMBER

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# BALANCING QUOTE REQUEST



For a fast, reliable air or hydronic balancing quotes please complete this information and fax it to **PURE Test & Balance LLC**. We will return a proposal for the project as soon as possible, often in less than **2 hours**. Please include the TAB section of specifications.

Name of project \_\_\_\_\_ City \_\_\_\_\_

Estimated date when balancing will be needed \_\_\_\_\_

YES NO

- |                          |                          |   |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | NBC Balancing Certification. Other Certification _____  |
| <input type="checkbox"/> | <input type="checkbox"/> | Number of supply and return grilles _____   |
| <input type="checkbox"/> | <input type="checkbox"/> | Number of units or air handlers list tons or total CFM _____  |
| <input type="checkbox"/> | <input type="checkbox"/> | Number of exhaust fans with CFM _____   |
| <input type="checkbox"/> | <input type="checkbox"/> | Number of chillers, pumps, boilers with sizes _____   |
| <input type="checkbox"/> | <input type="checkbox"/> | Number of VAV boxes, or sub zones _____   |
| <input type="checkbox"/> | <input type="checkbox"/> | Number of hydronic balancing stations _____   |
| <input type="checkbox"/> | <input type="checkbox"/> | Number of exhaust hoods and CFM _____   |
| <input type="checkbox"/> | <input type="checkbox"/> | Number of Makeup air units and CFM _____  |
| <input type="checkbox"/> | <input type="checkbox"/> | Is duct leakage testing required ? Number _____   |
| <input type="checkbox"/> | <input type="checkbox"/> | Is phased work or multiple visits required?   |
| <input type="checkbox"/> | <input type="checkbox"/> | Are a man lift or special ladders required?   |
| <input type="checkbox"/> | <input type="checkbox"/> | Is prevailing wage required?  |
| <input type="checkbox"/> | <input type="checkbox"/> | Is night work required?   |
| <input type="checkbox"/> | <input type="checkbox"/> | If new pulleys or belts, are they to be provided by us?   |
| <input type="checkbox"/> | <input type="checkbox"/> | Will one of your technicians be present to make repairs that may be needed during the balancing work? |
| <input type="checkbox"/> | <input type="checkbox"/> | Any other unusual conditions? _____   |

QUOTE REQUESTED BY \_\_\_\_\_

COMPANY NAME \_\_\_\_\_

PHONE(\_\_\_\_\_) \_\_\_\_\_ - \_\_\_\_\_ FAX(\_\_\_\_\_) \_\_\_\_\_ - \_\_\_\_\_

What time & date do you need this quote returned? \_\_\_\_\_

DATE

TO

FROM

**PURE Test & Balance LLC**

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Some of the national accounts that have accepted NBC Certified Firms for test and balance.

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ENTERTAINMENT  
GROUP



at&t



**BED BATH & BEYOND**  
Beyond any store of its kind.

**KOHL'S**  
expect great things



**STAPLES**



**CINEMARK**

**BARNES & NOBLE**  
BOOKSELLERS

## **NBC Code of Conduct**

The National Balancing Council establishes and maintains a set of values, standards, practices, and procedures to govern daily operations and decision making in the commercial testing, balancing, and adjusting industry. NBC certified members are dedicated to the safety and comfort of all of their clients and agree to uphold the highest standards of professionalism and integrity at all times. Our Certified Companies pledge to take all possible measures to ensure that commercial environmental systems are properly installed, adjusted to design specifications, and achieving optimum performance levels.

### **Partial List of Federal, USACOE and NAVFAC Projects Completed by**

#### **NBC Certified Firms**

##### **Under UFGS 23 05 93 Testing, Adjusting and Balancing for HVAC**

**Goddard Space Flight Center – Greenbelt, MD – Multiple Projects**

**US Consulate Compound - Mumbai, India – 7 Buildings**

**USMC Air Station – Yuma, AZ – Flight Control Building**

**US Army Yuma Proving Ground – Yuma, AZ – Multiple Buildings**

**USDA Northern Arizona University – Flagstaff, AZ – Research Facility**

**VA Clinic - Elkins, WV**

**VA Clinic - Johnstown, PA**

**Seymour Johnson Air Force - Goldsboro, NC - Multiple Projects**

**VA Medical Center - Clarksburg, WV**

**AECOM - Arlington, VA**

**Minot Air Force Base - Minot ND - 3 Buildings**

**VA Medical Centers - Pittsburgh, Butler, Erie, PA & Clarksburg, WV**

**VA Medical Centers VISN-4 Wilkes-Barre and Lebanon, PA**

**FBI Headquarters - Fairmont, WV Mission Critical UPS Upgrade,**

**FBI Regional Office, - Charleston, WV TAB**

**Moorhead Federal Building - Pittsburgh, PA**

**ATK Missile Systems, - Rocket Center, WV – Multiple Projects**

**Dept. of Homeland Security Headquarters -Washington DC**

**NOAA – Washington, DC - Mission Critical Center**

**NASA IV & V Facility - Fairmont, WV**

**Hunter Army Airfield – Savannah, GA – Multiple Projects**

**Ft. Gordon, GA – Multiple Projects**

**Ft. Jackson, SC – Multiple Projects**

**Ft. Stewart, GA – Multiple Projects**

**Keesler Air Force Base, Biloxi, MS – Multiple Projects**

**Naval Construction Battalion, Gulfport, MS – Multiple Projects**

**NASA John C. Stennis Space Center – Hancock County, MS – Multiple Projects**

#### **NBC Certification**

The Naval Facilities Engineering Command currently employs

3 NBC Certified Supervisors



# Certified Test & Balance Supervisor

designation awarded to:

## JAY WOODIN

for successful completion of all required coursework and examinations  
in the field of commercial HVAC air and hydronic testing and balancing, and project management

Certified Since

April 8, 2011

as administered and recognized by the

National Balancing Council

Expires: 4/8/2017

NBC Certification #228



A blue ink signature of Rob Falke, consisting of stylized, overlapping loops.

Rob Falke, President



# Certified Test & Balancing Supervisor

designation awarded to:

## MICHAEL MORGAN

for successful completion of all required coursework and examinations  
in the field of commercial HVAC air and hydronic testing and balancing, and project management

Certified Since

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Rob Falke, President