

CALVARY ELEMENTARY SCHOOL LEBANON, KY

COMMISSIONING PROPOSAL

PROVIDED BY:



**PERFORMANCE
COMMISSIONING AGENCY**

Partnering in Design Execution

PERFORMANCE COMMISSIONING AGENCY

109 WIND HAVEN DRIVE

SUITE 201

NICHOLASVILLE, KY 40356

P: (859) 277-0191

Project: Calvary Elementary School
Lebanon, KY

Date: 3/23/2023

Specification: 230800

The amount below is the estimated cost for Performance Commissioning Agency (“PCA”) to provide commissioning services per the contract documents. This cost quote is only for the services provided by PCA and does not include any services provided by the owner, architect, engineer, or contractors unless stipulated below.

Commissioning services included:

HVAC Domestic Water Lighting Building Envelope Testing

Total: \$29,500.00

Remarks:

Price includes Commissioning plan, System Verification, functional performance test, And final commissioning report.

Alternate Area B – Add \$920.00

Excluded from this quote are the following:

1. Any costs associated with delayed or failed test by any commissioning team member
2. Any costs associated with existing systems deficiencies beyond our control
3. Any costs associated with any commissioning team member’s failure to perform their due diligence

This estimate is subject to a final written agreement signed by each party. If there are any questions concerning this quotation, please feel free to call.

Sincerely,



Steve Turner, President, TBT, CxA
sturner@perfcx.com

This quote is valid for 30 days from the date written above.

Systems to be commissioned:

- **BAS System**
- **DOAS-1**
- **VRV HP's**
- **Split Systems**
- **WSHP's**
- **Pumps**
- **Kitchen Hoods**
- **Exhaust Fans**
- **Domestic Hot Water Systems**
- **Geothermal System**
- **Electric Heaters**
- **VAV Boxes**
- **Lighting Controls**

Additional services not included in the scope of work will be billed at \$105.00 per hour.

System verification checklists will be created based on the design documents and actual equipment submittals. The SVC's are to ensure that all equipment is installed per the design documents, and that the equipment is ready for start-up.

Once all equipment has been started and balanced, we will then begin functional testing. Functional performance tests will be created



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and carried out based on the design documents. PerfCx will functionally test all equipment above with the aid of the contractors to ensure that all equipment is operating at or as close as possible to design conditions.

Once all testing is complete, we will submit a detailed final report with our findings to the owner and engineer for review.

PERFORMANCE

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COMPANY INFORMATION AND SUBMITTALS



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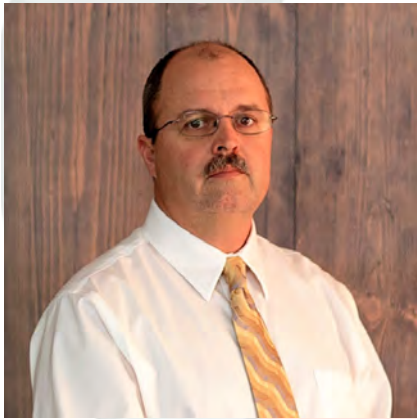
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HISTORY

PERFORMANCE COMMISSIONING AGENCY (PCA) WAS ORIGINATED FROM 50 YEARS OF SERVICE IN THE TEST AND BALANCE INDUSTRY. IN THESE YEARS WE HAVE SEEN MANY COMMISSIONING PRACTICES AND KNEW THAT A BETTER PRODUCT COULD BE PROVIDED WITH LESS EXPENSE.

PERFORMANCE COMMISSIONING AGENCY WAS ESTABLISHED TO PROVIDE EACH CLIENT WITH AN EFFICIENT MEANS OF ESTABLISHING A HIGHLY EFFICIENT PRODUCT. OUR FIELD EXPERIENCE IN THE INDUSTRY CAN HELP STREAMLINE A COMMISSIONING PLAN WHICH WILL IN TURN BE MORE COST EFFECTIVE WHILE STILL ACHIEVING A HIGH PERFORMANCE BUILDING.

LEADERSHIP



STEVE W. TURNER **PRESIDENT, CxA, TBT**

OSHA 30 CERTIFIED
COMMISSIONING EXPERIENCE: 16 YEARS
BALANCE EXPERIENCE: 19 YEARS
STURNER@PERFCX.COM

I bring a real world approach to the commissioning field. My Knowledge and expertise come from over 30 years of working in the fields of HVAC and electrical. Early in my carrier I held a master HVAC license as well as being a licensed electrician and owning and operating my own sheet metal and electrical company. After working for myself 10 years I then entered the field of test and balance, and went to work for Thermal Balance Incorporated, where I spent the next fifteen years before taking over as President and CxA of Performance Commissioning Agency.



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ACG CERTIFICATIONS



Annual Membership Certificate

Awarded to

Performance Commissioning Agency, LLC

as a member in good standing of the AABC Commissioning Group for the year

2023

This company has met all requirements for membership and is entitled to all rights and privileges thereof. This certificate is renewable on an annual basis and expires December 31, 2023.

A handwritten signature in blue ink, reading 'Troy Byers', written over a horizontal line.

Troy N. Byers, P.E., CxA, President

A handwritten signature in blue ink, reading 'Ray Bert', written over a horizontal line.

Ray Bert, Executive Director



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hereby certifies that

Steve W. Turner, CxA

Performance Commissioning Agency, LLC

has met all prerequisites demonstrating independence and the technical, management, and communications skills required to implement the commissioning process in new and existing buildings, and passed the necessary examination to be awarded this certificate in recognition of their qualifications as an ACG

Certified Commissioning Authority

Registration number: 217-1509 . This certificate, valid only for the year 2023, is renewable on an annual basis upon meeting all requirements noted in the CxA Candidate Handbook.



Program #1215

Justin F. Garner
Justin F. Garner, P.E., CxA
Certification Council Chair

Ray Bert
Ray Bert
ACG Executive Director



This certificate is the sole property of ACG and must be returned upon request.



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RECENT PROJECTS

WEST JESSAMINE HIGH SCHOOL

HVAC AND ELECTRICAL COMMISSIONING
NICHOLASVILLE, KY



MURRAY HIGH SCHOOL

HVAC AND ELECTRICAL COMMISSIONING
MURRAY, KY



BAPTIST HEALTH MADISONVILLE PHARMACY RELOCATION

HVAC AND ELECTRICAL COMMISSIONING
MADISONVILLE, KY



BUFFALO TRACE DISTILLERY PROJECT TIRE

HVAC COMMISSIONING
FRANKFORT, KY

CAMPGROUND ELEMENTARY SCHOOL RENOVATION

HVAC AND ELECTRICAL COMMISSIONING
LONDON, KY



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REFERENCES

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DAVID JACKSON

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STEVE GRAVES

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sgraves@triangle-co.com

PURPOSE OF COMMISSIONING

BUILDING COMMISSIONING (Cx) IS THE PROCESS OF VERIFYING, IN NEW CONSTRUCTION, ALL (OR SOME, DEPENDING ON SCOPE) OF THE SUBSYSTEMS FOR MECHANICAL (HVAC), PLUMBING, ELECTRICAL, FIRE/LIFE SAFETY, BUILDING ENVELOPES, INTERIOR SYSTEMS (EXAMPLE LABORATORY UNITS), CO-GENERATION, UTILITY PLANTS, SUSTAINABLE SYSTEMS, LIGHTING, WASTEWATER, CONTROLS, AND BUILDING SECURITY TO ACHIEVE THE OWNER'S PROJECT REQUIREMENTS AS INTENDED BY THE BUILDING OWNER AND AS DESIGNED BY THE BUILDING ARCHITECTS AND ENGINEERS. RECOMMISSIONING IS THE METHODICAL PROCESS OF TESTING AND ADJUSTING THE AFOREMENTIONED SYSTEMS IN EXISTING BUILDINGS.

BUILDING COMMISSIONING IS A QUALITY-FOCUSED PROCESS NECESSARY FOR BOTH NON-COMPLEX AND COMPLEX MODERN CONSTRUCTION PROJECTS. NORMALLY THE INITIAL COMMISSIONING TEAM AND A TEAM LEADER (TYPICALLY KNOWN AS THE COMMISSIONING AUTHORITY OR CXA) IS INVOLVED FROM PROJECT INITIATION THROUGH ONE YEAR OF OCCUPANCY. IN MANY CASES AND IDEALLY, THERE IS AN ONGOING BUILDING ENHANCING AND COMMISSIONING PROGRAM AND TEAM FOR THE LIFE OF THE BUILDING. WHILE THE SERVICE METHOD CAN VARY FROM OWNER TO OWNER AND PROJECT TO PROJECT, THE BASIC FORMULA FOR A SUCCESSFUL BUILDING COMMISSIONING PROCESS INVOLVES A SYNERGY TEAM FROM PRE-DESIGN TO DEVELOP THE OWNER'S PROJECT REQUIREMENTS (OPR), COMMISSIONING SCOPE AND PLAN, INCLUDING BENCHMARKS FOR SUCCESS, REVIEW OF DESIGN DOCUMENTS AND CHECKLISTS FOR ACHIEVING THE OWNER'S PROJECT REQUIREMENTS (OPR), DEVELOPMENT OF CHECKLISTS AND VERIFYING A SAMPLE OF CONSTRUCTION CHECKLISTS AND SUBMITTALS, DEVELOPING TRAINING NEEDS AND EVALUATING TRAINING DELIVERED BY THE CONTRACTORS, WITNESSING AND VERIFYING CONSTRUCTION PHASE TESTS, AND PERIODIC SITE OBSERVATIONS DURING THE CONSTRUCTION PHASE, AND PERFORMING COMMISSIONING FUNCTIONAL TESTING AS THE PROJECT NEARS COMPLETION. WHILE THE PRACTICE OF BUILDING COMMISSIONING PROCESS IS STILL FAIRLY NEW IN THE CONSTRUCTION INDUSTRY, IT HAS QUICKLY BECOME COMMON PRACTICE AS BUILDING OWNERS AND DEVELOPERS TRY TO GET MORE OUT OF THEIR INVESTMENT. **THE COMMISSIONING PROCESS MAIN GOAL IS TO IMPROVE A PROJECT FROM THE DESIGN PHASE THROUGH POST CONSTRUCTION AND OCCUPANCY.**



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REASONING FOR THIRD PARTY COMMISSIONING

AN INDEPENDENT, CERTIFIED, COMMISSIONING AUTHORITY UNDER CONTRACT TO THE OWNER IS THE PREFERRED CONTRACTUAL ARRANGEMENT BETWEEN A COMMISSIONING PROVIDER AND BUILDING OWNER. **A THIRD PARTY PROFESSIONAL BRINGS OBJECTIVITY AND PRACTICAL EXPERIENCE TO THE PROJECT TO ENSURE THAT THE OWNER WILL TRULY GET THE BUILDING PERFORMANCE THAT HE OR SHE EXPECTS.** ACG MEMBERS MUST BE INDEPENDENT.

ALTHOUGH CONTRACTORS MAY HAVE THE KNOWLEDGE AND CAPABILITY TO TEST THE EQUIPMENT THEY INSTALL, THEY MAY NOT BE SKILLED AT TESTING OR DIAGNOSING INTEGRATION PROBLEMS. IN ADDITION, SOME CONTEND THAT IT IS DIFFICULT FOR CONTRACTORS TO OBJECTIVELY TEST AND ASSESS THEIR OWN WORK, ESPECIALLY SINCE REPAIRING DEFICIENCIES FOUND THROUGH COMMISSIONING MAY INCREASE THEIR COSTS.

IT IS IMPORTANT TO INVOLVE THE INDEPENDENT COMMISSIONING AUTHORITY AS EARLY IN THE PROJECT AS POSSIBLE. THIS ALLOWS THE PROVIDER THE OPPORTUNITY TO REVIEW THE DESIGN INTENT FOR THE PROJECT, BEGIN SCHEDULING COMMISSIONING ACTIVITIES, AND BEGIN WRITING SPECIFICATIONS INTO BID DOCUMENTS FOR OTHER CONTRACTORS.



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SAMPLE REPORT DOCUMENTS



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HVAC COMMISSIONING SYSTEM VERIFICATION/START-UP CHECKLIST HOT WATER BOILER

PROJECT: _____

Equipment Name/Tag: _____ Location: _____

ITEM	✓	COMMENTS
PRE-START-UP INSPECTION		
Commissioning lock-out procedures reviewed	<input type="checkbox"/>	
Operation and maintenance information	<input type="checkbox"/>	
Boiler certificate / registration (copy attached)	<input type="checkbox"/>	
Mounting/support system	<input type="checkbox"/>	
Seismic restraints	<input type="checkbox"/>	
Maintenance clearance	<input type="checkbox"/>	
Local valving/piping correct (including expansion tanks and make-up water).	<input type="checkbox"/>	
Chemical cleaning and treatment (report attached)	<input type="checkbox"/>	
Temperature and pressure gauges	<input type="checkbox"/>	
Pressure relief valve	<input type="checkbox"/>	
Pressurization and leak tests	<input type="checkbox"/>	
Blowdown system	<input type="checkbox"/>	
Safety interlocks- low water and high temperature	<input type="checkbox"/>	
Combustion air supply and ventilation	<input type="checkbox"/>	
Insulation/lagging	<input type="checkbox"/>	
Stack and breaching	<input type="checkbox"/>	
Combustion chamber inspection	<input type="checkbox"/>	
Fuel system (including emergency shutdown and gas inspection certificate)	<input type="checkbox"/>	
Electrical wiring	<input type="checkbox"/>	
Overload protection (sized correctly)	<input type="checkbox"/>	
Disconnect switch (tested)	<input type="checkbox"/>	
Control system - point to point checks complete	<input type="checkbox"/>	
START-UP		
Start HWS pumps to create load.	<input type="checkbox"/>	
Start boiler circulation pumps.	<input type="checkbox"/>	
Boiler startup by supplier	<input type="checkbox"/>	
Supplier certificate or log provided for start-up and all specified and regulatory tests.	<input type="checkbox"/>	



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acg
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Group

**HVAC COMMISSIONING
SYSTEM VERIFICATION/START-UP CHECKLIST
EXHAUST FAN**

PROJECT: _____

Equipment Name/Tag: _____ Location: _____

ITEM	√	COMMENTS
PRE-START-UP INSPECTION		
Commissioning lock-out procedures reviewed	<input type="checkbox"/>	
Operation and maintenance information	<input type="checkbox"/>	
Mounting/support system and vibration isolation	<input type="checkbox"/>	
Flexible connections	<input type="checkbox"/>	
Seismic restraints	<input type="checkbox"/>	
Equipment guards	<input type="checkbox"/>	
Alignment & V-belt tension	<input type="checkbox"/>	
Freedom of rotation	<input type="checkbox"/>	
Lubrication	<input type="checkbox"/>	
Plenum/volute clean and free of loose material	<input type="checkbox"/>	
Duct system tested and cleaned	<input type="checkbox"/>	
Fire & balance dampers positioned	<input type="checkbox"/>	
Exhaust louvers tested (gravity or motorized)	<input type="checkbox"/>	
Building & fan room cleanliness	<input type="checkbox"/>	
Electrical wiring	<input type="checkbox"/>	
Motor rated for VSD service	<input type="checkbox"/>	
Overload protection (sized correctly)	<input type="checkbox"/>	
Disconnect switch (tested)	<input type="checkbox"/>	
Control system - point to point checks complete	<input type="checkbox"/>	
START-UP		
Start-up by manufacturer's rep. (report attached)	<input type="checkbox"/>	
Direction of rotation	<input type="checkbox"/>	
Electrical interlocks - stop/start	<input type="checkbox"/>	
Local air leakage acceptable	<input type="checkbox"/>	
Vibration & noise level acceptable	<input type="checkbox"/>	
Motor Amps - Rated : _ Actual : _	<input type="checkbox"/>	
Motor Volts - Rated : _ Actual : _	<input type="checkbox"/>	

HVAC COMMISSIONING FUNCTIONAL PERFORMANCE TEST PUMPS

PROJECT:	
Equipment Name/Tag: P#	Location: Room #
System/Area Served: Area #	Related:

Occupied Mode:

Note

Verify pump start using control system command ON	YES	NO	
Verify pump start using control system command AUTO	YES	NO	
Verify pump start using control system command OFF	YES	NO	
Verify inlet pressure drop across strainer	___		PSIG
Verify outlet pressure drop across strainer	___		PSIG

Verify pump inlet pressure reading with comparison to TAB and design conditions.

Design Pump inlet pressure	___		PSIG
TAB Pump inlet pressure	___		PSIS
Actual Pump inlet pressure	___		PSIG
Design Pump Outlet Pressure	___		PSIG
TAB Pump Outlet Pressure	___		PSIG
Actual Pump Outlet Pressure	___		PSIG

Operate pump at shutoff and at minimum flow or when all components are in full by-pass. Plot test readings on pump curve and compare results against readings taken from flow measuring devices.

Pump Inlet Pressure SHUTOFF	___		PSIG
Pump Inlet Pressure 100 Percent	___		PSIG
Pump Outlet Pressure SHUTOFF	___		PSIG
Pump Outlet Pressure 100 Percent	___		PSIG
Pump Flow Rate SHUTOFF	___		GPM
Pump Flow Rate 100 Percent	___		GPM

HVAC COMMISSIONING FUNCTIONAL PERFORMANCE TEST PUMPS

Operate pump at shutoff and at minimum flow or when all components are in full by-pass. Plot test readings on pump curve and compare results against readings taken from flow measuring devices

Pump Inlet Pressure SHUTOFF	_____	PSIG
Pump Inlet Pressure 100 Percent	_____	PSIG
Pump Outlet Pressure SHUTOFF	_____	PSIG
Pump Outlet Pressure 100 Percent	_____	PSIG
Pump Flow Rate SHUTOFF	_____	GPM
Pump Flow Rate 100 Percent	_____	GPM

Verify motor amperage each phase and voltage phase to phase and phase to ground for both the full flow and the minimum flow conditions.

FULL FLOW

Phase 1 Amperage	_____	A
Phase 2 Amperage	_____	A
Phase 3 Amperage	_____	A
Phase 1 Voltage	_____	V
Phase 2 Voltage	_____	V
Phase 3 Voltage	_____	V
Phase 1 Voltage to Ground	_____	V
Phase 2 Voltage to Ground	_____	V
Phase 3 Voltage to Ground	_____	V

MINIMUM FLOW

Phase 1 Amperage	_____	A
Phase 2 Amperage	_____	A
Phase 3 Amperage	_____	A
Phase 1 Voltage	_____	V
Phase 2 Voltage	_____	V



**HVAC COMMISSIONING
FUNCTIONAL PERFORMANCE TEST
PUMPS**

Phase 3 Voltage	_____	V
Phase 1 Voltage to Ground	_____	V
Phase 2 Voltage to Ground	_____	V
Phase 3 Voltage to Ground	_____	V

Comments

SAMPLE



**HVAC COMMISSIONING
FUNCTIONAL PERFORMANCE TEST
ENERGY RECOVERY VENTILLATOR**

PROJECT:	
Equipment Name/Tag: ERV #	Location: Room #
System/Area Served: Area #	Related:

Start Up

Note

B.A.S. energizes ERV	YES	NO	
When ERV energizes, Outside Air and Exhaust Air dampers open	YES	NO	
Confirm that when OA damper is open, Supply Fan starts	YES	NO	
When supply airflow proven, confirm that Exhaust Fan starts	YES	NO	
Verify energy wheel rotation	YES	NO	
Supply Fan Motor Nameplate FLA	_____	A	
Supply Fan Motor Measured Amperage	_____	A	
	_____	A	
	_____	A	
Exhaust Fan Motor Nameplate FLA	_____	A	
Exhaust Fan Motor Measured Amperage	_____	A	
	_____	A	
	_____	A	
Design Supply Airflow	_____	CFM	
TAB reported Supply Airflow	_____	CFM	
PCA Measured Supply Airflow	_____	CFM	
Design Exhaust Airflow	_____	CFM	
TAB reported Exhaust Airflow	_____	CFM	
PCA Measured Exhaust Airflow	_____	CFM	

**HVAC COMMISSIONING
FUNCTIONAL PERFORMANCE TEST
ENERGY RECOVERY VENTILLATOR**

Temperature

Entering Supply Air Temperature	_____	°F
Leaving Supply Air Temperature	_____	°F
Entering Exhaust Air Temperature	_____	°F
Leaving Exhaust Air Temperature	_____	°F

Alarm Status

Simulate SF Failure, confirm SF alarm generated	YES	NO
Simulate EF Failure, confirm EF alarm generated	YES	NO

Comments

SAMPLE

**HVAC COMMISSIONING
FUNCTIONAL PERFORMANCE TEST
ROOF TOP UNIT**

PROJECT:	
Equipment Name/Tag: RTU #	Location: Room #
System/Area Served: Area #	Related:

Occupied Mode:	YES	NO	Note
Confirm that SF is ON	YES	NO	
When heating is required, confirm that:			
MAD is positioned to minimum OA setpoint (value set by TAB agency).	YES	NO	
DX cooling if OFF	YES	NO	
GB cycles ON/OFF to maintain space heating temp. setpoint.	YES	NO	
Record the following data:			
OA temperature	_____	°F	
Max. space temp., when GB stops	_____	°F	
Min. space temp., when GB starts	_____	°F	
Max. supply air temp. (SAT)	_____	°F	
Min. SAT	_____	°F	
When heating is not required, and free cooling can maintain space temp below cooling setpoint, confirm that:			
GB and DX cooling are both OFF.	YES	NO	
MAD modulates from min. OA position to 100% open to OA, to maintain space cooling setpoint	_____	°F	
When cooling is required, confirm that:			
MAD is positioned to minimum OA setpoint (value set by TAB agency).	YES	NO	
DX cooling cycles ON/OFF to maintain space cooling temp. setpoint.	YES	NO	
Record the following data:			
OA temp.	_____	°F	
Max. space temp., when DX starts	_____	°F	
Min. space temp., when DX stops	_____	°F	

**HVAC COMMISSIONING
FUNCTIONAL PERFORMANCE TEST
ROOF TOP UNIT**

Max. supply air temp. (SAT) _____ °F
 Min. SAT _____ °F

Unoccupied mode:

When space temp. > night setback heating setpoint, confirm that:

MAD is tightly closed to OA.	YES	NO
Heating and cooling are both OFF	YES	NO
Supply fan (SF) is OFF.	YES	NO

When space temp. < night setback heating, confirm that:

MAD stays tightly closed to OA and cooling stays OFF.	YES	NO
SF is started	YES	NO
Gas heating (GB) fires	YES	NO
When space temp. rises to > night setback heating setpoint, confirm GB and SF turn OFF.	YES	NO

Comments

SAMPLE

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THERMOGRAPHY INFORMATION



BUILDING COMMISSIONING
CERTIFIED THERMOLOGIST



ELECTRICAL
CERTIFIED THERMOLOGIST



WATER INTRUSION
CERTIFIED THERMOLOGIST



Roof Scan
CERTIFIED THERMOLOGIST



BUILDING SCIENCE
CERTIFIED THERMOLOGIST



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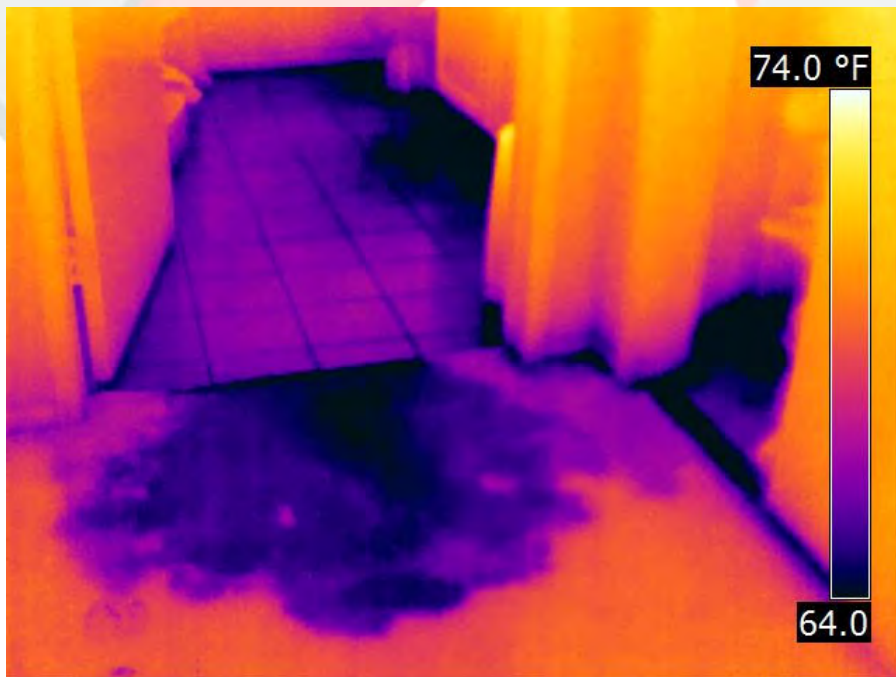
ELECTRICAL SYSTEMS



THERMAL IMAGING IS A LOW COST, EFFECTIVE METHOD OF PROTECTING YOUR BUSINESS'S ASSETS AND GIVING YOU PEACE OF MIND. IT IS AN ESSENTIAL PART OF EVERY COMMERCIAL AND INDUSTRIAL BUSINESS'S PREVENTATIVE MAINTENANCE PLAN. AN ELECTRICAL HOT SPOT CAN RESULT IN EXTENSIVE DAMAGE TO YOUR SYSTEMS AND YOUR EQUIPMENT OR EVEN A CATASTROPHIC LOSS FROM FIRE. OUR ELECTRICAL SURVEYS WILL HELP REDUCE DOWN TIME, REPAIR COSTS, AND ALLOW FOR A TIMELY & SCHEDULED REPAIR VERSUS A COSTLY SHUT-DOWN. OUR THERMOGRAPHY METHODS CAN HELP IDENTIFY LOOSE CONNECTIONS, OVERLOADED EQUIPMENT, AS WELL AS BAD BREAKERS.

WATER INTRUSION

EXCESSIVE MOISTURE DESTROYS THE STRUCTURAL INTEGRITY OF ANY BUILDING AND CAN CREATE EXPENSIVE PROBLEMS LIKE MOLD AND MILDEW WHICH CAN CAUSE SERIOUS HEALTH CONCERNS OR LAWSUITS. OFTEN, MOISTURE INTRUSION PROBLEMS ARE NOT OBVIOUS UNTIL IT'S TOO LATE. MOISTURE CAN COME FROM LEAKY ROOFING, PIPING, WINDOWS, TOILETS, EVEN HVAC EQUIPMENT. LET PERFCX USE THERMAL IMAGING TO NOT ONLY FIND THE AFFECTED AREA BUT THE SOURCE OF THE LEAK.



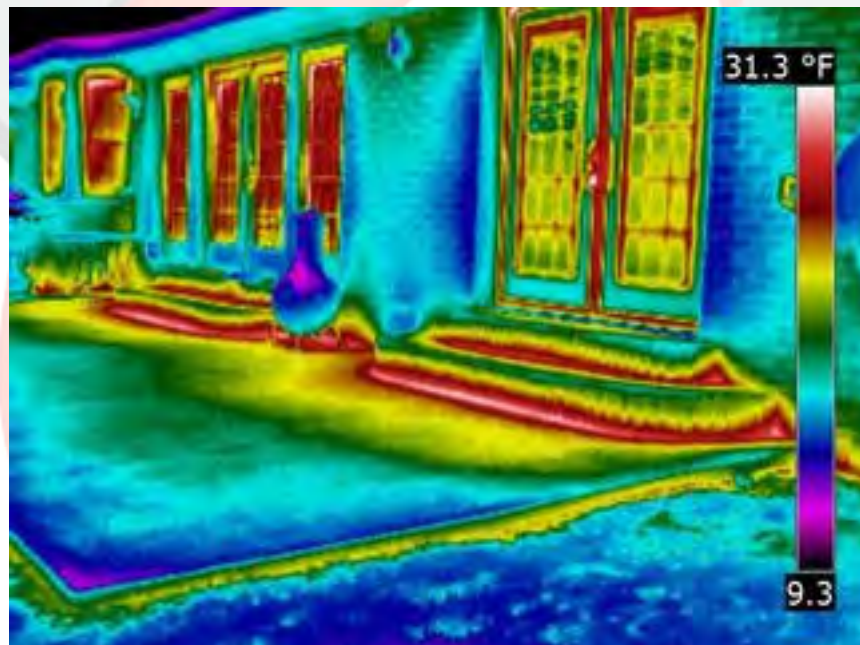
ROOF SCAN



NON-DESTRUCTIVE INVESTIGATIONS SAVE TIME AND MONEY ALL WHILE TAKING THE GUESS WORK OUT OF COSTLY REPAIRS. OUR SCANS ALLOW YOU TO REDUCE YOUR ROOF BUDGET BY HELPING YOU KEEP DRY UNDAMAGED INSULATION INTACT. DON'T SPEND UNNECESSARY AMOUNTS ON FULLY REPLACING A ROOF THAT DOESN'T NEED IT! PERFCX CAN IDENTIFY AREAS THAT ARE INFILTRATED BY MOISTURE, AND IDENTIFY AREAS THAT ARE DRY. THIS ALLOWS THE OWNER TO REPLACE ONLY THE AFFECTED AREAS, SAVING THEM THOUSANDS IF NOT MILLIONS OF DOLLARS.

ENERGY LOSS

AIR LEAKAGE FROM LARGE BUILDINGS IS JUST LIKE THROWING YOUR MONEY OUT THE WINDOW. INFRARED THERMOGRAPHY IS A PROVEN DIAGNOSTIC TECHNIQUE RECOMMENDED BY THE US DEPARTMENT OF ENERGY FOR IDENTIFYING AREAS OF HEAT LOSS. CONSIDERING YOUR HEATING AND COOLING LOAD CAN BE UP TO 50% OF YOUR ACTUAL ENERGY BILL, OUR SPECIALIZED IMAGING SERVICE OF YOUR PROPERTY CAN IDENTIFY WHERE THOSE WASTED DOLLARS ARE GOING REGARDLESS OF WHAT TYPE OF HEATING OR COOLING SYSTEM YOU HAVE.



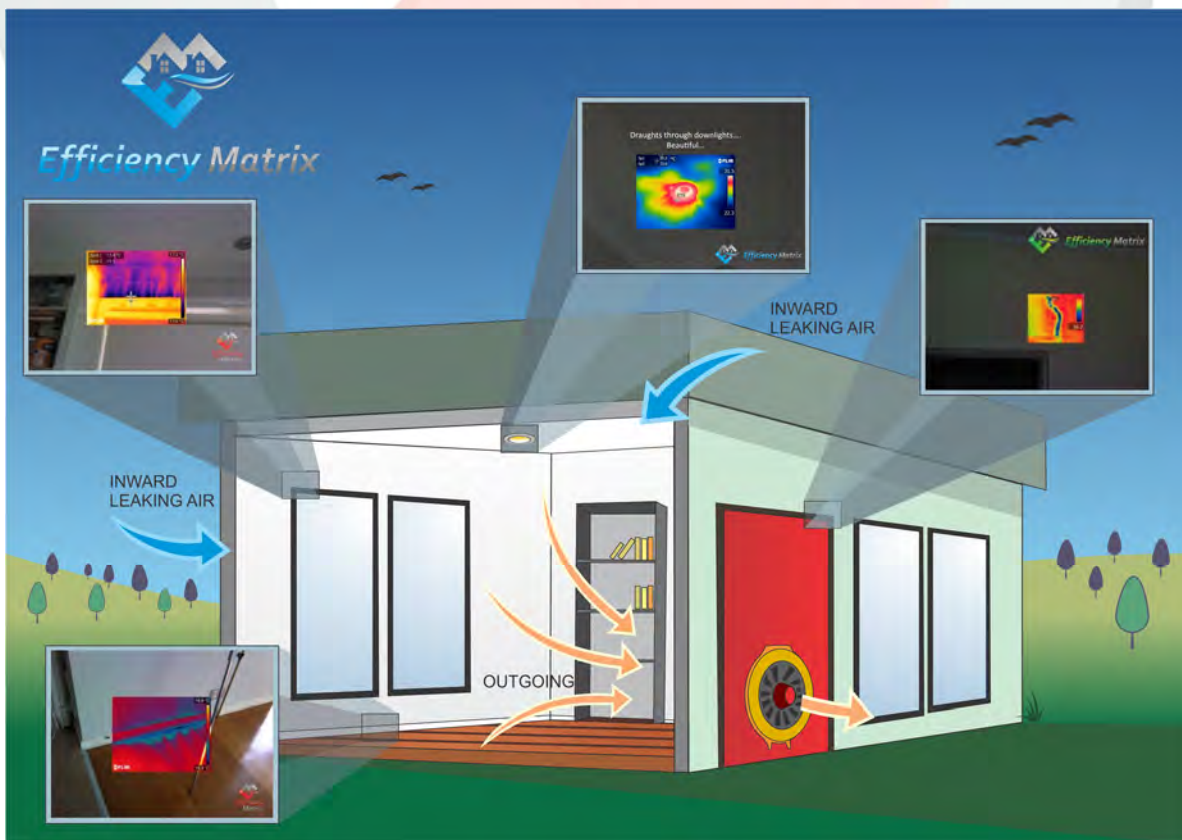
BLOCK WALL SCAN



IMAGING OF NEWLY GROUTED CMU WALLS WILL PROVIDE PROPER INSTALLATION AND ALSO LOCATE DEFICIENCIES. IF DEFICIENCIES ARE LOCATED THEN THEY CAN EASILY BE REPAIRED WITHOUT THE DESTRUCTION OF EXCESSIVE MATERIALS. THIS IS A MUST TO HAVE AS A QC CONFIRMATION PRIOR TO INSTALLING ROOF SYSTEMS OR THE DEFICIENCIES MAY RESULT IN SHORT OR LONG TERM FAILURE.

BUILDING ENVELOPE TESTING

BUILDING ENVELOPE TESTING IS THE PROCESS OF TESTING THE PHYSICAL SEPARATOR BETWEEN THE INTERIOR AND EXTERIOR OF A BUILDING TO DETERMINE IF THERE ARE ANY AIR, WATER, OR THERMAL LEAKS WITHIN THE STRUCTURE. THESE DIFFERENT INTRUSIONS CAN RESULT FROM AN IMPROPERLY BUILT OR MAINTAINED BUILDING ENVELOPE. ENVELOPE TESTING WILL ENSURE A PROPER SEAL IS MADE BETWEEN THE INSIDE AND THE OUTSIDE, AND REQUIRED FOR SOME LEED GREEN BUILDING RATINGS



EMPLOYEE CERTIFICATIONS




Steve Turner  **Kentucky Thermal Institute**
Platinum Partner EDUCATION · EQUIPMENT · TRAINING

THERMOLOGIST #18003
 HAS SUCCESSFULLY COMPLETED THE
 REQUIREMENTS AND TESTING PROCEDURES
 FOR THE CERTIFICATION OF:

 **BLOCK WALL THERMOLOGIST**
 KENTUCKY THERMAL INSTITUTE



Haney *M. A. Kio*
 FOUNDER / LEVEL 2 THERMOGRAPHER EDUCATION COORDINATOR / LEVEL 1 THERMOGRAPHER CERTIFICATION DATE
 10/10/2018-10/13/2018

Steve Turner  **Kentucky Thermal Institute**
Platinum Partner EDUCATION · EQUIPMENT · TRAINING

THERMOLOGIST #18003
 HAS SUCCESSFULLY COMPLETED THE
 REQUIREMENTS AND TESTING PROCEDURES
 FOR THE CERTIFICATION OF:

 **Energy Loss Thermologist**
 KENTUCKY THERMAL INSTITUTE



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THERMOLOGIST #18003
 HAS SUCCESSFULLY COMPLETED THE
 REQUIREMENTS AND TESTING PROCEDURES
 FOR THE CERTIFICATION OF:

 **BUILDING SCIENCE THERMOLOGIST**
 KENTUCKY THERMAL INSTITUTE



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