Building Diagnostics
& Property Science

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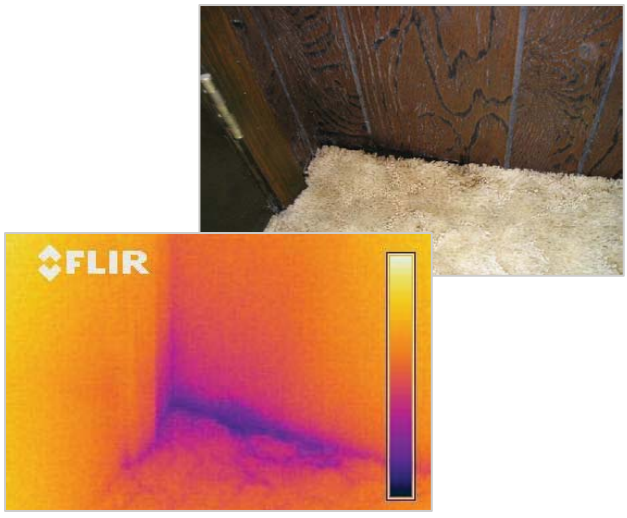
TECHNICAL BULLETIN

Using Infrared Thermography to Assess Moisture Problems

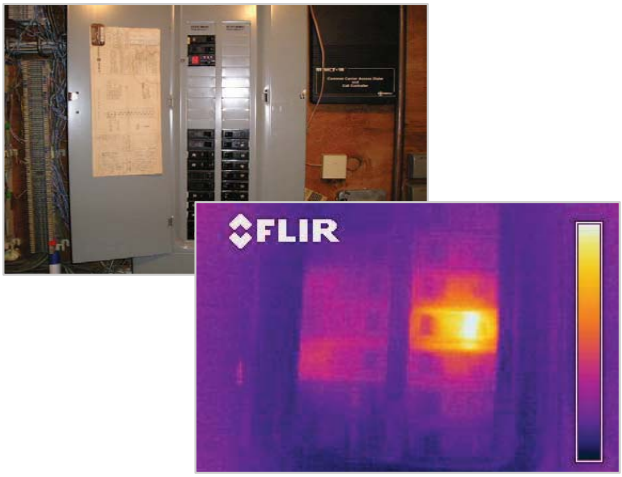
By: Josh Bhate, President

Building Diagnostics & Property Science is one of the only Birmingham area company that uses infrared thermography to detect and assess moisture damage and energy efficiency conditions during pre-purchase inspections or investigations in occupied buildings. ***By spotting thermal anomalies in the infrared images, we are able to pinpoint areas where moisture is concealed inside of walls, roof covers are leaking and electrical circuits are overheating or expensive energy loss is occurring through the building envelope.***

Moisture Penetration Problems: The use of infrared thermography makes it possible to find areas of hidden moisture within a building where mold growth is likely to occur. The two photos below show how thermal images are used during moisture assessments. The Owner complained of a strong mildew odor in the building and claimed there was not any water leakage.



***By using infrared thermography we are able to pinpoint the location of water penetration into the wall and show area of saturation*.** Further investigation revealed hidden fungal amplification both inside of the wall and under the carpeting. The problems were corrected and the odors were alleviated.



Electrical and Fire Hazard Problems: It was noticed during a commercial inspection of an office/ warehouse that lights were flickering when other lights were turned on. ***By looking at the electrical distribution panel we were able to easily spot the problem circuit.*** Further investigation revealed that the circuit breaker was undersized for the intended application and was double tapped. This presented a fire hazard and shock hazard.

Roof Inspections: In addition to moisture and construction defect investigation, ***infrared thermography is an excellent tool for use in a proactive building maintenance program***. By performing annual low slope roof scans, building owners can save potentially tens of thousands of dollars by repairing damaged roof membranes as opposed to complete replacement. By maintaining the roof in this fashion, it can also reduce the risk of mold infestation and the liabilities involved in such problems.

Basement Waterproofing Problems: Another area where Building Diagnostics is using infrared thermography is in basement waterproofing. Owners are often sold expensive waterproofing jobs which may not be needed. With the average cost of $125 -175 per linear foot for an exterior basement waterproofing job, consumers could save thousands of dollars by using infrared technology.

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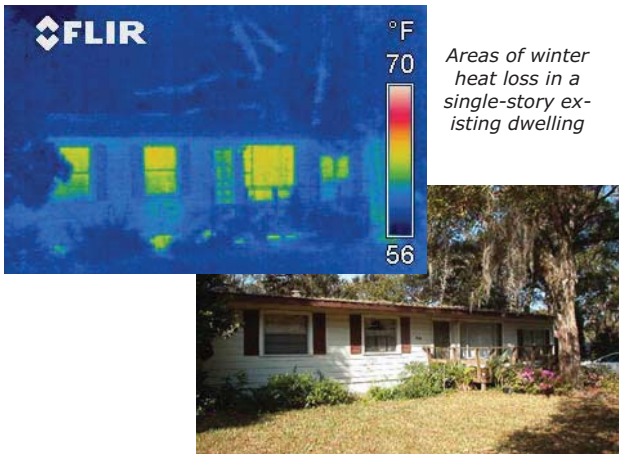
Energy Management Inspections

Infrared scanning to determine construction factors can pinpoint areas of heat gain and loss that were impossible to find using previously available methods. **Performing infrared scanning with thermal imagers gives us data that allows us to advise owners on ways to increase the efficiency of the building, as well as pinpoint areas of maximum concern.** Most of the problems we find are based in the following four areas:

1.Building envelope construction and insulation
2.Infiltration affected by the HVAC system
3.HVAC system supply leaks
4.HVAC system return leaks

1. BUILDING ENVELOPE CONSTRUCTION & INSULATION

Most existing buildings and quite a few of the new ones built today have areas that could be greatly improved. This home looks cozy enough in this winter setting, but infrared shows areas of significant heat loss through the windows, doors, and even under the floor level in the crawl space. Ceiling insulation here appears adequate, but floor insulation is lacking.

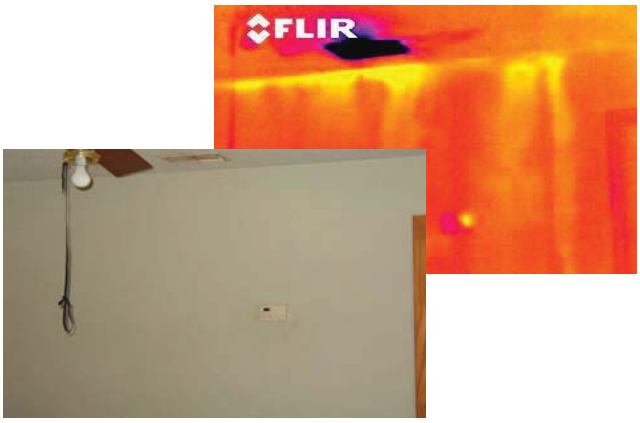


Areas of winter heat loss in a single-story existing dwelling

Ceiling penetrations can also be a significant heat gain or loss areas if numerous and not adequately sealed.

***2.* INFILTRATION AFFECTED BY THE HVAC SYSTEM**

Pressure variances inside the building, i.e., pressurization or depressurization, can greatly affect the running time of the HVAC system. Since the HVAC is the largest energy user in the modern building, extended running time can be a significant factor in energy consumption.

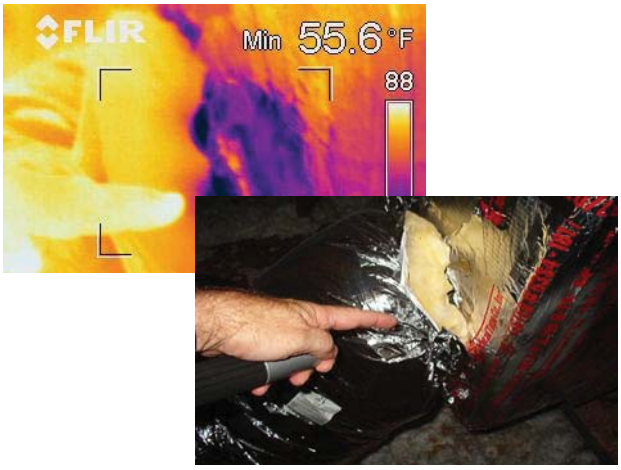


3. HVAC SYSTEM SUPPLY LEAKS

HVAC system supply leaks are one of the most significant problems causing higher energy usage in today's buildings. The leaks in a ductwork system outside the conditioned space allow air to be lost to the outside and will depressurize the entire building. This adulteration of the conditioned space can be significant enough to greatly extend the running time of the unit.

4. HVAC RETURN SYSTEM LEAKS

Return system leaks can greatly increase the amount of time that the HVAC system runs. If the return ducts are in the attic space, hot, moist air can be drawn into the system, causing extended running times. The infrared shows the temperature of the coil that is visible inside the air handler at 44.2°F. The air in the attic was over 80°F. This leak was found by scanning the plenum with the infrared thermal imaging camera and noting the cold spot.



Building Diagnostics & Property Sciences is a leading forensic inspection company, specializing in building science, indoor air quality, building code interpretation, construction defect investigation and expert case documentation and preparation.