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# Assessing HVAC Leak Damage with Infrared

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## ABSTRACT

Infrared assesses the amount of unseen damage water can cause to building materials from leaks. Infrared is especially helpful in locating those leaks caused from HVAC systems components. Most water leak damage is visible, or some traces of it to alert a homeowner or contractor to a leak problem, but not always. And, not always to the severity and extent the whole problem may encompass. There can be noticeable and then unnoticeable issues associated with these HVAC leaks. Infrared gives the homeowner, property manager, or contractor the best possible edge in identifying any water leak issues associated with HVAC systems. Especially, since most HVAC systems are hidden and enclosed behind walls, or jammed into tight closet spaces.

## INTRODUCTION

We will look at some HVAC leak examples and show you what infrared see's that you won't. Infrared is what will give you and your IR leak detection services the edge in accurately demonstrating to your client where these HVAC water damage locations occur, so that they can properly correct these messy and aggravating water situations.

## INFRARED SHOWS A LEAK PROBLEM

One of the best finds I had on an HVAC leak was from a contractor who knew he had a leak somewhere in the HVAC system of one of his new construction homes where the homeowner had already moved in. He knew he had a problem because of an unexplained loss in refrigerant pressure. The house was large, in an affluent suburb just outside of Boston, and I couldn't find any source of a leak in the system with the infrared. I went over the system on paper one more time with the contractor only to find out he had forgotten a separate supply line that ran behind a bedroom closet wall. The IR image below shows the closet baseboard where the HVAC supply line was located behind it, near the closet floor. The closet was unlit and items covering the baseboard had to be removed. There were no visible signs of a water issue. The contractor pulled the baseboard and found the system leak behind this section of the baseboard.

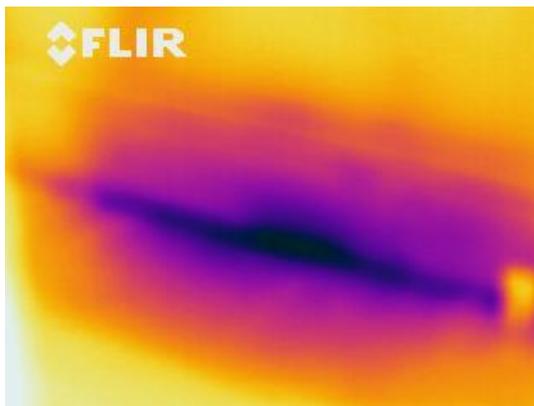


Fig. 1. HVAC system leak behind closet baseboard.

In buildings where condo units and apartments are either built new or carved out of a larger rehabbed space we find HVAC units in all types of confined spaces to maximize that units living area. Figure 2 shows an HVAC supply line leak running over the top of the entry hallway above the ceiling. The HVAC unit is in a tightly enclosed closet space on the right side of this IR image. In figure 3 we see how the leak ran down the opposite side wall causing more damage which was invisible until located with the infrared camera. And, a moisture meter confirmed the moisture in the building material, the moisture meter reading was included in is client report. Figure 4 shows the only side of the HVAC unit visible as seen from the hallway. The insulated lines on the right shows the moisture build up under the insulation jacket. Also there is a water build up in the condensate pan on the lower right of the IR image.

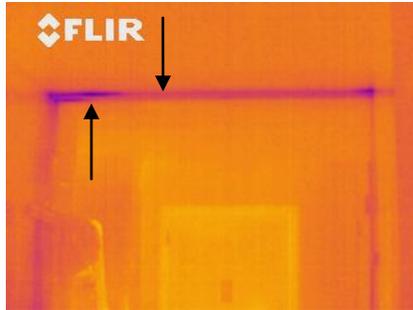


Fig. 2.

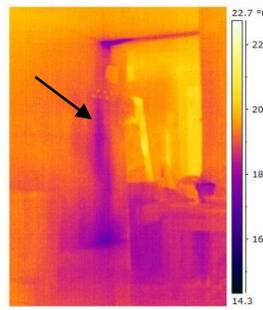


Fig. 3.

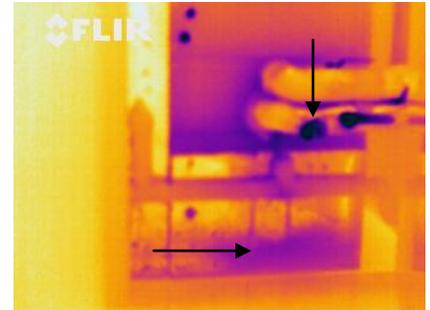


Fig. 4.

Ceilings spaces containing HVAC units present leak opportunities of their own. We see these in private residences and in commercial spaces. The image below on the left (fig. 5.) was in a large condo unit in the ceiling on the second floor. You could not see this water stain yet visually, though eventually you would have. To fix this issue the contractor used a larger condensate drain line and an alarm for high water in the condensate pan was installed. In figure 6 another HVAC ceiling unit had moisture trapped between the insulation jacket and the unit piping. Leaks from this HVAC area (fig. 6.) stained the ceiling panels leading to the discovery of water issues associated with this HVAC unit. Figure 7 shows a ceiling unit HVAC system with the IR telling us there is water at the base of the unit in the condensate pan. There was no drain line for this pan, it's just holding water in the pan above the ceiling tiles.

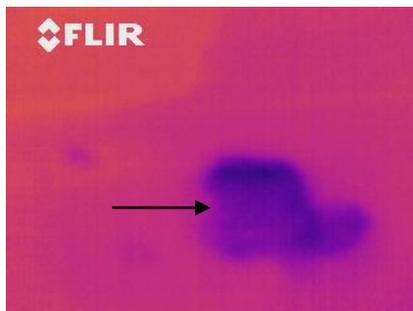


Fig. 5.

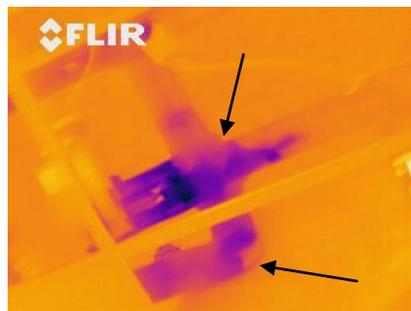


Fig. 6.



Fig. 7.

Air conditioning water production is three pints per hour per ton of cooling capacity. So a three ton system will produce a bit less than nine pints of water per hour. It is important condensate pans are adequately drained and drain lines are of a large enough diameter for the water to drain properly. When they are not water issues develop from the HVAC system.

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## SUMMARY

One of the best Infrared HVAC Applications is for leak damage assessments of HVAC Systems. Infrared easily locates water in building materials from HVAC mechanical units and makes detection and location of these water related HVAC issues a sure thing. HVAC supply lines can be located in many undetectable areas as mentioned earlier in this paper. The wall area behind a baseboard makes finding a leak very difficult, but with infrared you have a better chance at finding these water problem locations. HVAC mechanical units are placed in cramped locations in buildings and this makes it difficult to service and maintain them. Supply lines are concealed in walls and ceilings and when they leak Infrared can show these supply line locations easily and accurately. Ceilings are other places we find housing HVAC unit systems and when these systems have issues anybody underneath them can get wet. We find that condensate drains and pans need attention so that they work and drain properly, infrared will help with this issue.

A properly working HVAC System should provide you with reliable quality, dependability, efficiency and living comfort in its performance of service. Leaks mean there's a repair or maintenance problem and when you use Infrared to diagnose HVAC leaks you give yourself the best chances of locating all of your leak sources quickly, accurately and non-intrusively.

## REFERENCES

Franapfel, Ed; Kleinfeld, Jack A.; "Analysis of HVAC Systems and Building Performance Utilizing IR Physical Measurements and CFD Modeling"; pp 219-229; Inframation 2005 Proceedings; Vol. 6; ITC 108 A 2005-06-01

Ask, Andrew C.; "H2N0: Mechanical Systems and Moisture Control"; 2008; Building Science Corporation

Lyon Jr., Bernard R.; "Infrared thermography for HVACR Trainers and Technicians"; 2010 ITC Manual

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## ABOUT THE AUTHOR

Dave is an ITC Level III Thermographer and OGI certified. He is the owner of **SAWYER INFRARED**, a Boston based Infrared Inspection and Optical Gas Imaging Company and has been doing infrared consulting professionally since 2003.

For more information on Infrared Inspection Services and OGI visit Dave's company webpage at [sawyerinfrared.com](http://sawyerinfrared.com) and view the videos there, and on his attached YouTube page. You can contact him at [dave@sawyerinfrared.com](mailto:dave@sawyerinfrared.com).

*goodIR to you!*

