

## Using Unsealed Wall Cavities Between Garage and Living Space as Return Plenum



- View of unsealed wall cavity between garage and living space seen from the garage



- View of unsealed wall cavity between garage and living space seen from the living space

### Issue

Unsealed wall stud cavities as a return air plenum located in a wall between a garage and living space.

### Description of Implementation Error

Building cavities are not practical to seal, and therefore remain unsealed, but they are used instead of conventional ductwork to return air from the conditioned space to the conditioning equipment whether it is from a furnace or air conditioner.

### Risks

The practice of using unsealed building cavities as ductwork may result in indoor air quality issues. The negatively pressurized cavities will draw air through any cracks to try to alleviate the pressure difference. This means that the return system will suck on the walls—and any contaminants that might be in the walls *or in the garage*—and redistribute them to the living space. By negatively pressuring the walls in a hot-humid climate, warm humid air could be drawn into the walls from the exterior, and condensation is likely to occur on the cooler air-conditioned surfaces.

### Required Corrections

Only fully ducted and sealed returns should be used but it is also important that the air conditioning equipment should also be sealed, especially when located in a vented crawlspace or attic. Air sealing should ideally be done with mastic, or (second choice) tape meeting UL 181A or 181B.<sup>1</sup> Pressure testing of the entire ducting system and conditioning equipment will determine the amount and location of air leakage with a fan and manometer.

<sup>1</sup> BSC (May 2009). "Info-603: Duct Sealing". Building Science Corporation, <http://www.buildingscience.com/documents/information-sheets/hvac-plumbing-and-electrical/information-sheet-duct-sealing?topic=doctypes/information-sheets/6-hvac-plumbing-and-electrical/>. Accessed March 22, 2011.

## **References**

BSI-039: Five Things<sup>2</sup>

Built Wrong From the Start<sup>3</sup>

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<sup>2</sup> Lstiburek, Joseph. (April 2010). "BSI-039: Five Things." Building Science Corporation, <http://www.buildingscience.com/documents/insights/bsi-039-five-things/>. Accessed March 22, 2011.

<sup>3</sup> Lstiburek, Joseph. (April/May 2004). "Built Wrong from the Start." Fine Homebuilding, <http://www.buildingscience.com/documents/published-articles/pa-built-wrong-from-start/view>. Accessed March 22, 2011.