Forced air distribution systems (duct systems) typically are installed out of sight for aesthetic reasons, most often in unconditioned areas such as an attic or crawlspace. Any leakage of air to or from the duct system (duct leakage) in unconditioned space not only loses energy, but impacts home and equipment durability and indoor air quality. An obvious solution to this problem is to bring the duct system into the interior of the house, either by sealing the area where the ducts are installed (sealed attic or crawlspace) or by building an interior cavity or chase above the ceiling plane (raised ceiling or fur-up chase) or below the ceiling plane (dropped ceiling or fur-down) for the duct system. This case study examines one Building America’s Builder Partner’s implementation of an inexpensive, quick and effective method of building a fur-down or dropped ceiling chase.

An interior duct system is built inside a homes’ thermal and air barrier. A dropped ceiling or fur-down chase places the duct system below the ceiling plane of the house in a framed chase built beside and below the duct system. Sealing the ceiling of the chase from the attic above is the most difficult and necessary part of this operation; if poorly executed the chase will be better connected to the attic than the interior of the house, defeating the main purpose of the technique, eliminating duct leakage to the outside.

By designing the chase’s path to avoid intersecting load-bearing walls, sealing of the chase’s top plane, or ceiling, is fairly easy. Non-load bearing walls need to be constructed to leave a gap of ¾” between the top plate of the wall and the bottom chord of the attic trusses. This ¾” space allows the chase’s ceiling drywall to extend beyond the borders of the chase over the top plates of the walls.
Lessons Learned

- Team meetings on site after the home has been “dried in” with the objective of minimizing the need to alter or redo work due to lack of knowledge of the requirements are very important to insure quality work from all involved sub-contractors.
- Constant vigilance is needed by job-site supervisor to insure proper implantation of system.
- There are additional costs for materials, or additional framing and drywall. A more expensive duct system (duct-board versus flex-duct) may be required due to space limitations.
- Payback is impacted by other efficiency improvements, depending on the expense of the method employed. Therefore, cost benefits are seldom the sole motivation for implementation).

Looking Ahead

Interior duct work is mandated by the new Challenge Home Program. This method represents one of the easier and less expensive methods of constructing a functioning interior duct system. There is significant cost savings with this method compared to a foam sealed attic, and a significant labor savings when compared to a raised ceiling or fur-up chase system. Therefore it is expected that this method of interior duct construction will gain in popularity in the future.