A checklist for ducted heating and cooling equipment

Your home can be heated or cooled using electricity, gas, geothermal energy, solar energy or a combination of each. Radiant floor heating systems are an inherently efficient way to heat because there is no heat lost through duct work. Ductless minisplits are also very efficient systems that are becoming more common. However, ducted forced air heating systems can a be very efficient option if designed and installed properly. The checklist below should be considered when installing any type of ducted system.

■ A room-by-room Manual J heat loss/heat gain calculation must be completed. Maximum over sizing limit for air conditioners and heat pumps is 15 percent. This will make sure you are not paying for more capacity than you need and it will ensure the system will properly dehumidify the home and run efficiently.

■ Heat pumps and air conditioners have a Seasonal Energy Efficiency Ratios (SEER) rating of at least 14 and a Heating Season Performance Factor (HSPF) of at least eight. Gas Furnaces for heat, or back up heat, should have a rating of at least 90 AFUE (Annual Fuel Utilization Efficiency). The higher the number the better.

■ Locate ductwork and the mechanical unit in the conditioned space if possible. All ductwork should have an insulating value of R-8. Ductwork should be designed using Manual D.

■ Consider using rigid metal ductwork for increased durability and indoor air quality. Rigid metal is easy to clean and will not trap dust or absorb moisture. Building cavities, such as floor joists, should not be used as part of the forced air supply or return system.

■ All joints/seams in the air distribution system are sealed using fiberglass mesh tape and duct mastic. This includes duct connection to metal boots (in sub floor), trunk lines and air handler units. Insulating liner of ducts must also be sealed with mastic.

■ Indoor and outdoor HVAC units are "matched" according to the ARI Directory or the manufacturer's listing.

■ Correct charge of refrigerant has been installed per manufacturer's specifications.

■ Registers and diffusers have proper throw and spread to keep rooms properly conditioned as the load specifies.

■ Duct dampers should be installed and accessible on supply vents. These dampers will make it possible to adjust the flow and spread of air from the registers.

■ Ducts should be sealed and then tested by a Home Energy Rater to have no more than 5 percentage leakage.

■ If you are installing an all-electric heat pump, make sure to install an outdoor thermostat to control when the electric heat strips power on, this will maximize your efficiency.

■ Install a programmable thermostat.

Air sealing checklist

Air sealing is a crucial part of building a healthy, energy efficient home. Below is a checklist of items to make sure to seal when building or renovating a conventional stick frame home. A leaky home will decrease the r-value of your insulation effectiveness, create unwanted drafts and comfort issues, plus bring moisture and pollutants into a home. "Seal it tight and insulate it right"!

■ Seal around windows and exterior doors with backer rod, caulk, or non-expanding spray foam.

■ Seal all electrical, plumbing and HVAC penetrations between conditioned and unconditioned space with caulk or spray foam.

■ Seal the bottom plate and the top plate of exterior walls and walls to the attic with caulk or sill seal.

■ Seal band joists with caulk, spray foam, or gasketing between top plate and band joist and between band joist and sub-floor. Any penetrations in the band joist must be sealed with caulk or spray foam. Any joists or other cavities that span from conditioned to unconditioned spaces must be blocked off and air sealed.

■ Block, cap, and seal any chase ways that would allow unconditioned air to enter into the conditioned building envelope.

■ Exterior walls behind tub and shower enclosures should be insulated. Prior to installing the tub or shower, a rigid and durable air barrier should be installed to be in direct contact with the insulation.

■ Install insulation wind baffles to block wind washing at all attic eave bays in roof assemblies with soffit vents.

■ For cantilevered floor systems or floors above a garage an air barrier must block any exposed edges of insulation.

■ For fireplace cavities on exterior walls, a rigid air barrier must be fully aligned with the insulated framing in the framed shaft behind the fireplace and any gaps are fully sealed with foam, caulk or tape.

■ For porch roofs, a rigid air barrier must be installed at the intersection of the porch roof and exterior wall.

James Pader photo

■ For dropped ceilings, a rigid air barrier must be fully aligned with insulated framing and any gaps are fully sealed with caulk or foam.

■ Recessed light fixtures, if installed in insulated cavities such as the ceiling between the house and the attic, should be rated IC (Insulation Contact) AND air-tight. Once installed they should be sealed to the drywall with gasket, caulk or foam.

■ All holes or penetrations in the building envelope shall be sealed with a material capable of stopping airflow such as caulk, foam or rigid material. Fibrous insulation does not stop airflow.

– by Maggie Leslie