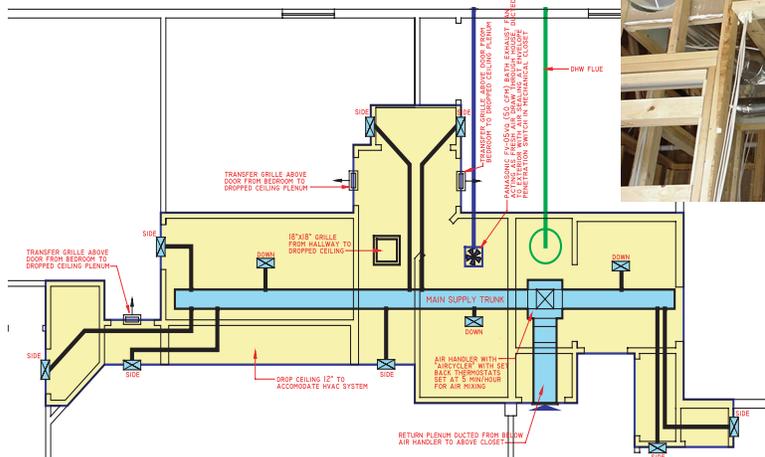


If ever there was a place on earth suited to Building America high performance homes, it would have to be a severe cold climate such as Minneapolis, Minnesota. The term 'severe' may seem, well, a little severe but consider this—folks in the winter here worry about their tires freezing out-of-round overnight!

Pulte-Minnesota has been working with BSC and Building America since 1996. They have been a key partner in several applied building research projects, including basement insulation, [controlled ventilation](#) (see "Measurement of Ventilation Rates and Inter-zonal Distribution In Single Family Homes"), and advanced duct distribution. They know how to design and construct a home as a system. Take the Oakbrooke Patio Homes featured in this case study.

How do you design a duct system in a single story slab-on-grade home for optimum comfort, health, and energy efficiency, *and* save money in the process? First, you can't do it by just looking at the ducts alone. Optimizing the performance of the thermal envelope is required, but it opens up opportunities. A tight, well-insulated envelope in combination with high performance windows means that supply registers can go virtually anywhere. And given the choice, why not group them around the core hallway of the home in a dropped ceiling plenum?

Second, combine this duct system with a continuous exhaust fan and periodic air handler cycling, and the air conditioning ducts double as effective and efficient distribu-



tion of fresh air ventilation. Now, that's systems thinking at Pulte-Minnesota.

Not that there are no details to work out. The air sealing of the dropped plenum involves quite a few trades—framer, drywaller, HVAC, and even the electrician (the dropped plenum is a pretty tempting highway to run wiring, but one that most codes take issue with!). That's why Building America is about both design and construction, and a coordinated approach at the job site.

There are other synergies with a systems approach. Efficient framing means more than just 30% less lumber in exterior walls. It means all that lumber is now replaced with insulation. It means more uniform wall temperatures and fewer opportunities for drywall movement and cracking.

Pulte-Minnesota has over 150 homes in six developments in the Building America program. The program has been an important part of their success, as well as several other production builders in a part of the country where recorded temperature extremes range from -34°F to +108°F!

U.S. Department of Energy



Program Partner

See the [Oakbrooke Patio Homes Energy Analysis](#) for more information about energy savings.



Oakbrooke Patio Homes

Minneapolis, Minnesota
Pulte Homes

1,280 - 1,740 sq. ft., 1 - 3 bedroom, 2 bath
\$189,000 - \$234,000

Key Features

- All ducts in conditioned space
- Simplified, centralized duct distribution
- Detailed air sealing in combination with a polyethylen vapor retarder
- Spectrally selective, low-e windows
- Transfer ducts (sized and designed for pressure equalization and aesthetics)
- Controlled ventilation — continuous exhaust with AirCycler™ control

Cost Summary for Building America Metrics

• Advanced framing	- \$ 250
• High performance windows	+ \$ 250
• Controlled ventilation system	+ \$ 150
• Power vented gas water heater	+ \$ 300
• Simplified duct distribution	- \$ 250
• Downsize air conditioner by 1.0 ton	- \$ 350
TOTAL PREMIUM	- \$ 150

Key Partners/Products

- Shelter Source (www.sheltersource.com)