

Zoning Systems: Selling Comfort

Once limited to commercial buildings, residential zoning offers builders a way to reduce equipment requirements—and gives clients better control over their indoor environment.

If you haven't installed zoning in a forced air heating or cooling system yet, chances are you will. According to Ron Reinhardt of Research Products Corp., makers of the "Perfect Temp" zoning control system, the overall growth in sales of zoning equipment is between 25 and 30 percent per year. "It's the fastest growing accessory in the HVAC industry," he says. And the demand is particularly strong among buyers of custom homes.

The reasons for this growth are energy savings and comfort. The people who make zoning equipment for forced air heating systems claim that their products can reduce a home's heating and cooling bills by up to 25 percent. But while such claims are tough to verify (we couldn't find any objective studies to back them up), contractors who use zoning seem sold on the idea. Take Milton Kornegay.

Kornegay is president of Autumn Air Co., a Houston, Texas, HVAC firm that specializes in exclusive custom homes. His company recently installed an HVAC system for a home with 10,000 sq. ft. of floor space. The owner's previous residence had 14 tons of air conditioning; this one had 32 tons. But the cooling bill hardly went up. The reason, he says, was thoughtful zoning.

The savings are a matter of common sense. A forced-air zoning system consists of a series of thermostat-controlled motorized dampers that work together to maintain different parts of the house at different temperatures. All thermostats are wired back to a central controller that operates the heating equipment and dampers, as needed. Dampers are installed directly in the HVAC ductwork. They're normally held open with a spring, and can be closed to cut off the supply of conditioned air to the zoned space. That means you're not unnecessarily heating or cooling rooms that don't need it.

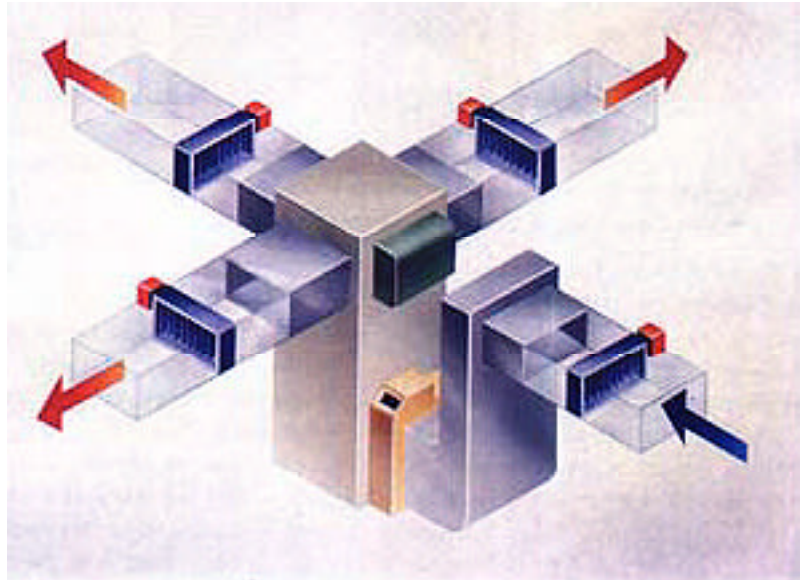
Comfort may be an even more compelling reason to zone. Homes that can benefit include those with sprawling floor plans, multiple levels, lots of glass, vaulted ceilings, open stairways or exposures that face the sun. Finished attics or basements warrant their own zone, as does a room with an indoor pool or hot tub.

HOW THEY WORK

The simplest zoning schemes put each floor of a house on its own zone, but this may be inadequate for many homes. "The thermostat has to be located in an area that best represents the general load characteristics of the home," notes Phil Kimble, a sales manager for Enerstat. "But no one lives in the hall."

According to Kimble there can be as much as six or seven degrees variation from one room to another. Installing thermostats in various parts of the home allows homeowners to fine-tune each room or area of a home.

Some zoning schemes can get quite elaborate. Kornegay's Houston house included thermostats in the downstairs living, dining, and work areas, as well as in each bedroom. And while this strategy won't be appropriate for every home, a scaled-down version can work for almost any project.



A basic three-zone forced-air system with electronic damper in the return duct, and other dampers to adjust airflow from the plenum.



Honeywell's "W180" panel can handle more than ten separate climate control zones.

ADVANTAGES TO CLIENTS

Kornegay describes how he might outfit a four-bedroom home with one zone for the common area and a separate zone in each bedroom—a total of five zones. By the time the occupants get up in the morning, the programmable thermostat in the common area has preconditioned the space for them. As they head for the breakfast table, the bedrooms turn themselves down. The whole house goes into setback mode until the occupants start arriving home in the afternoon, when the heat to the common areas is turned back up. At bedtime, the common area turns itself down, and each bedroom sets itself

to the nighttime temperature that's comfortable for the person who sleeps there. The only exception to this scheme is the guest bedroom. Kornegay outfits these with traditional slide thermostats.

"We try to get to know the customer's needs," says Kornegay. "Do they like it colder in the master suite while keeping the kids' bedrooms warmer? If there's a home office, we'll usually try to set that up on a zone. Zoning is especially appropriate for people who do a lot of entertaining." The normal air conditioning systems designed are for one or two people, "he says. "If you bring in 25 to 30 people, it can't keep up." But given the proper controls, a zoning system lets you cut off cool air to the other parts of the house and redirect it to the entertainment area.

DUCT SYSTEM

The most important aspect of zoning is the design of the duct system. Honeywell's guidelines give two basic approaches.

On two or three-zone systems, each additional trunk line should be sized to handle 60 to 70 percent of the total airflow. that will prevent high static pressure and high velocity when two or three zones are calling, the ducts wont be so big that air pressure and velocity drop too low. A four-zone or larger system should be sized to handle the total airflow when all zones are open.

Depending on the system, builders may need to include a "dump zone," where excess heating or cooling can be exhausted when all demands have been met. This is especially needed for small spaces in homes with large equipment. "A five-ton air conditioner blows 2,000 GEM," says Kornegay. "You don't want all that capacity pumped into a 500- to 600-sq. ft. space." Instead, Kornegay installs a bypass to recirculate the excess capacity through the air handler. Manufacturers provide specific guidelines on where and when to install bypasses

WILL CLIENTS PAY?

Of course comfort doesn't come without a price. Reinhardt estimates that dividing a 2,000- to 3,000-sq. ft. home into two or three zones can add \$1,500 to construction costs. According to Kornegay, most people consider zoning worth the added cost. "If the builder lets us talk with the homeowner, the homeowner always goes for it," he says, "because we're making their home more livable." Even less affluent homeowners are becoming receptive. "We come in, and for less than \$2,000 can make a customer's home much more comfortable," Komegay explains.

Homebuyers are starting to expect a high level of comfort. Dennis Belk, a division manager for Dobson Builders in Greenville, South Carolina, says that customer demand has led his company to include zoning on all the homes he builds. "Almost every time I sit down to write a contract with a homebuyer," he notes, "the first thing they want added to their home is zone heating and air conditioning." Dobson has now made zoning a standard feature even on homes under \$120,000.

Some contractors are understandably skittish about installing complex zoning systems, because of reliability questions about the moving parts. But systems such as Honeywell's TrolA-Temp and Research Products' PerfectTemp have proven their reliability in the field. Kornegay uses these products exclusively and describes them as extremely reliable. Ken Atkisson, an HVAC contractor from Holly, Michigan, has used Honeywell's Trol-A-Temp zoning system for nine years with virtually no failures. "I have had trouble with only one motor in one damper."



The "PerfectTemp" zoning system from Research Products Corp. needs no bypass dampers, making it less expensive to install than earlier systems

Hydronic Systems: Zoning With Mixing Valves

ZONING CAN BE ACCOMPLISHED easily with in-floor and other forms of hydronic heating. For instance, a radiant slab can act as one zone, while the other zones are fitted with wall or baseboard radiators. Mixing valves regulate the water temperature in each zone just a faucet valve adjusts the kitchen tap. While standard, wall-mounted thermostats can be used to control each zone, you can also get thermostatic valves that mount directly on the radiators.

Hydronic heating systems cost more to install than hot air systems, but proponents say they're less expensive to operate, heat a home more evenly, cause fewer drafts and run more quietly.

A number of heat sources are available for hydronic systems, including heat pumps, electric furnaces and oil-fired boilers. But the most prevalent is the gas-fired boiler. Gas-fired boilers come with efficiencies up to the mid-90 percent range, and are available in models that supply both heat and domestic hot water.



Energy Kinetics "System 2000" gas fired boiler includes a boiler and an attached water tank.

Radiant Panels: Spot Zoning

For hard-to-heat spaces such as sunrooms or garage apartments, radiant panels offer a cost effective heat in three or four minutes.

One such system, the "Enerjoy People heater" from SSHC, Inc., comes in one-inch thick panels - in 1 foot increments.

"We offer the units with a programmable line - voltage thermostat that can be set on a two-day schedule," says company spokesman Richard Watson. "It's a quick solution. Say you have a dining room with a lot of glass. With a couple of heat panels you don't lose a great view."

The list price for a 2-ft. x 8-ft. X 1-in. Panel is about \$250, big enough for a 15 x 15 -ft. Room , Watson says. That size unit draws about 800 watts.

"Custom builders use them in combination with forced air and other systems," Watson says. "The larger the house ,the more you need special treatment to balance certain areas."



A ceiling-mounted radiant panel.