

WORKING IN THE ZONE:

Manual ZR Takes on Zoning Design and Installation

By Michael Maynard



For the homeowner with a zoned HVAC system, there's nothing like knowing that comfortable cool air in the summer and warm air in the winter goes only to those rooms occupied at a particular time of day. A family feels more comfortable in the home, more comfortable about the cost efficiency of such a system, and they can, literally, breathe easier. But for many contractors, designing a zoned system from the ground up or retrofitting zoning into an existing system can cause them to break out in a cold sweat.

Properly designing and installing zone control systems requires the contractor to fit the specific requirements of the homeowner. While zoning equipment manufacturers have encouraged proper design and installation techniques through courses and design guides (based on their products), and technical

schools have offered coursework in this area, there has never been a comprehensive reference manual for contractors to rely on for guidance or advice.

The Air Conditioning Contractors of America's (ACCA) Manual J (*Residential Load Calculation*) and Manual D (*Residential Duct Design*) were written before the growth of zoning solutions and only briefly touched on it—not enough to provide a contractor with specific information on its design and installation. But for those who have been searching for such a resource, your wait is almost over: Say hello to Manual ZR, a new guide to be published shortly.

Filling a void in zoning education

Manual ZR is organized for contractors who need a sound resource for designing and install-

ing zone systems. When a question arises—whether the contractor is planning a job or is already on the job—Manual ZR is designed to have the information they need. “It’s designed to help the contractor do a much better, quality installation to achieve the goals of the customer,” says Warren Lupson, AHRI’s Director of Education, and a representative to the ACCA Technical Committee.

Organizing the proper methods of zoning and encouraging the development of design and installation best practices had been topics among zoning manufacturers since the Zoning Marketing Alliance (ZMA) was formed in 2002. Once the ZMA was folded into the AHRI Zone Control System Technology (ZCST) product section, it prompted greater discussions about getting the message out regarding zoning products in general.

Meanwhile, ACCA had developed its Quality Contractor programs and its success in recognizing “best practices” in zoning gave AHRI a natural partner. “The ACCA manuals have been an important part of the HVAC industry for years,” says one major manufacturer, “and when they recognized the need for more information on zoning, the match with the goals of the AHRI Zone Controls section seemed well aligned.”

The section became a contributing sponsor in helping ACCA develop Manual ZR. Two representatives from the ZCST Engineering Committee served on the review committee and assisted in the development of much of the manual’s content.

A comprehensive approach to zoning design and installation

The end result is a guide that includes: General Guidance; Zone Damper Systems; Zoning with Multi-Split Equipment; Zoning with Distributed Equipment; and Advanced Topics and Related Guidance, which includes appendices.

General Guidance for Zoned Systems provides an overview of understanding zoning issues as they pertain to the structure, the equipment, and the occupants. It summarizes the benefits of zoning, the zoning methods and equipment options, guidance on how to produce a zone plan, and load calculations for zoned systems.

The manual’s section on zone damper systems includes the types of zone damper systems, equipment and components used for air zoning, zone damper system design, and managing excess air. The issues around zoning with multi-split equipment are also addressed, providing contractors with a greater understanding of ductless split-coil

cooling systems and ductless split-coil heat pump systems that have two or more indoor units.

Issues pertaining to zoning with distributed equipment and how they apply to the one-piece-of-equipment-per-zone concept are also

included, with sections related to the system capabilities and arrangements around ductless single-split equipment and single-package equipment, convective and radiant heat and, for a very large home or compound, central chiller and boiler with air handlers.



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There is also a series of appendices highlighting expanded support for some of the concepts and guidance within the manual, including duct system design, balancing zone damper systems and condensation calculations.

Another important key to the credibility of Manual ZR will be its eventual designation as an ANSI standard. Lupson says that having ANSI approval is important to the credibility of the final product. “It’s about peer review from just about every angle you can possibly think of. It’s an open, precise way of knowing if something is good, bad, or indifferent before it’s ever released,” he says.

An important component in the education process

Manual ZR is not intended for the contractor who is just starting out in zoning or for the DIYer. Instead, the manual is designed for contractors with duct design and equipment selection experience. Manufacturer and wholesaler training and education will remain an essential part of how contractors learn about equipment and proper zoning techniques, as will the courses taught by trade and technical schools. But Manual ZR will fill some significant gaps in the learning process.

“What was lacking was a more thorough discussion of air flow as opposed to product education,” says a manufacturer. “The issues with airflow today are substantial.” Multiple stage equipment and new air flow strategies create opportunities for targeting areas of service and accommodating the changing requirements of residential systems, he points out.

Another major manufacturer says he hopes Manual ZR will help legitimize zoning among those

who don’t believe it to be a viable option. “The manual confirms much of what my company has stated for over 50 years when my dad began selling the first motorized dampers, registers, and diffusers for forced air zoning,” he says.

When he was a contractor, Lupson says, a Manual ZR would have helped tremendously. “Sometimes my zoning jobs didn’t work out the way I expected them to,” he says. “If I had a manual like this, I would have had a better understanding of design and the impact of any retrofit changes,” he says.

One contractor feels there are too many HVAC contractors who are afraid to take on zoning, which is another issue that he hopes Manual ZR’s publication will address. “In my opinion, if a homeowner asked a contractor to install zoning, more often than not that contractor would add a separate system of mini-splits,” he says. He points to a consumer survey in which more than 60 percent of homeowners would buy zoning. “The problem is most contractors simply don’t offer it.”

Other contractors agree. A mini-split may not be ideal for a space, one says, but contractors with inadequate zoning installation training may prefer to install what they know—even if it isn’t right for the space—rather than risk trying something unfamiliar. “They are doing what they know how to do,” says the manufacturer. “They really don’t care that the mini-split is too big for the space being conditioned. They really don’t mind charging for a second install and the maintenance on two systems going forward.”

Even for those contractors who do zoning, the zoning design in new construction is typically handed

down by the developer-builder and there’s a lack of information on the use pattern or the needs of the occupant, the manufacturer adds. “Historically, I hear few contractors happy with the layout of the supply and returns called for in most new construction projects. Most of these systems were designed based on ease of installation and cost.”

On the retrofit side, contractors must be knowledgeable about air flow, and manufacturers must be flexible on the application of their products. “In the field, creativity and attention to system demands are key skills for a successful retrofit contractor application,” one manufacturer says. This is where the majority of the zoning opportunities exist today, he adds.

A new appreciation for meeting customer needs

Zoning addresses many issues that are near the top of homeowner concerns: comfort, energy savings, and convenience. They’re no longer as willing to accept hot or cold spots in rooms; rather, they want better ways to cut their energy bills, and they don’t want to think about how it all comes together. What also makes zoning an attractive option is the way people use their homes today with finished basements, bonus rooms, and home offices. Those applications need to be conditioned differently if homeowners want to be productive using that space for a new purpose.

“Homeowners wouldn’t have to be uncomfortable in their home or office if contractors would just install zoning on every installation,” says another manufacturer. He uses the example of lighting to make his point. “Just like you have a light switch in every room, why not a thermostat? The cost to heat and cool your homes is a lot more

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than lighting, so why waste it in zones you're not using or that might already be comfortable?"

He notes that the sales of zoning systems over the last few years have declined, a trend that mirrors the decline of the housing market. While zoning has grown as more zoning manufacturers have gotten into the market, the manufacturer says that it is still less than 4% of the shipment of HVAC systems. "Miniscule if you consider the number of homes in the country with forced air," he says.

"The person who ends up reading this manual understands that zoning is a very good option for them and makes sure that their customer is comfortable," Lupson says. "Zoning is one of those things that people can do to increase comfort in their house, and save energy."

As consumers take greater control in making decisions about their home comfort and they become more aware of zone options, they will press contractors on this issue. As consumers drive zoning sales from the bottom up, the challenge for manufacturers will be to raise awareness from the top down. Manual ZR can help to fill the gap in the middle, supplementing the other training and educational programs.

"Manual ZR is important because it means our products are recognized as important tools for contractors. That point is clear," says a manufacturer. "The implementation of that tool remains subject to the products we develop and our ability to engineer solutions that speak to the opportunities contractors see to serve their customers."

One major Midwest manufacturer, for example, has a two-day course with hands-on training using zone dynamics in its manufacturing facility. In addition, the manufacturer trains with its distributor partners and offers webinars and downloadable literature. "We are committed to contractor education and increasing the opportunities for business our contractors see in this difficult recovering economy," says one of its representatives.

Another major East Coast manufacturer said his company has led training sessions for contractors, engineers, and wholesalers for more than 35 years. He says the zoning industry has fallen short in how they train contractors. "I've taught about the controls and duct design. It's sad that so many in our industry are only focused on the box: the basic furnace and the air conditioning unit," he says. "Very few contractors will look to

the duct system, after the installation, to improve the performance, comfort, and energy savings of the overall system."

While Manual ZR will provide real value to contractors on zoning designs and installations, the most important element remains in understanding the customer's needs. Too often, one manufacturer says, contractors start solving issues before they have fully communicated with the customer. "I am confident that those contractors who care about customers will learn the proper methods, use some of the Manual ZR theories and continue to solve customer issues," he says.

"The book is being produced to make sure that a good product is available to the end user and that everybody involved has a good understanding of what needs to be done, what should happen, and what will happen if they take a short cut," Lupson says.

Manual ZR will be available within the next six months.

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