

ASHRAE Standard 62 — The Next Generation

ASHRAE Standard 62, "Ventilation for Acceptable Indoor Air Quality," is probably the most important indoor air standard in the world. It goes far beyond simply specifying ventilation rates (although many use it just for that). As the basis for good design practice and building operation, it is invariably cited in lawsuits involving problem buildings and occupant health problems.

Now, even before the world has really figured out how to use the standard, a revision is in progress. Dr. Gene Tucker, an engineer at the US EPA's Office of Research and Development, presented a proposed revision outline to the members of the Standing Standard Project Committee (SSPC) 62, the ASHRAE committee responsible for the standard. The committee met at the ASHRAE meeting in Chicago on January 24. After a lengthy discussion, the outline, which incorporated comments previously received from committee members, was approved.

Dr. Tucker has been studying indoor air pollution sources and methods for IAQ control at EPA since 1984. He has presented several papers addressing indoor air pollution sources and IAQ control at major international conferences. His interests include source control, ventilation, and air cleaning. The outline of the proposed standard revision reflects Tucker's understanding of the importance of source control in achieving good IAQ.

Source Control Emphasized

The revised standard (if it follows the outline) will emphasize the control of indoor air pollution sources. It

will reward building designers and owners who implement source control strategies and penalize those who don't. It will do this by having tables for "minimum ventilation rates" and "additional ventilation rates."

The revised standard's table of minimum ventilation rates for commercial and institutional buildings will be similar to that found in Standard 62-1989. However, the proposed revision will also have "additional ventilation rates" that must be added to minimum ventilation rates if a designer does not consider sources in the design. These additional ventilation rates will be listed for sources with "potentially high emission rates of contaminants," according to Tucker. (In fact, this is no different from what is implied in the current standard's Indoor Air Quality Procedure.) These additional ventilation rates could significantly increase the total design minimum ventilation rates above those contained in the current standard.

Emissions-based Ventilation Rates

According to the outline, maximum emission rates would be specified for listed source types such as floor coverings, wall coverings, organic solvents, furniture, office machines, smoking, and unvented space heaters. These specified emission rates would be the maximum allowable at minimum ventilation rates. The proposal would exempt "certified low-emission products" although there were no details provided.

New testing methods and programs must be developed and adopted for various types of materials and products for this provision to be implemented. An approach similar

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to the Carpet and Rug Institute's (CRI) for "green label" carpets might work. A different type of emissions testing program operated by Underwriters Laboratory measures ozone emissions from photocopiers. For architectural coatings where most of the VOCs contained in the bulk product evaporate (off-gas) as the product cures, the certification might be based on the total VOC content of the bulk product. A labeling program already exists in California and several other states that requires measurement of total VOCs in paints, adhesives, and other architectural coatings. We expect the EPA to help develop the standards and, probably, review the performance of laboratories doing the testing.

Tucker did not describe the details of the proposed basis for determining additional ventilation rates other than for purposes of explaining the approach. Default values for additional ventilation will be based on assumptions about the source strengths. The default values for additional ventilation could be quite high if committee members assume that the source strengths are high for the important pollution source products, materials, and activities in a space. Using these additional ventilation rate values will require more capacity in HVAC systems and more energy to operate them. However, source control can result in ventilation requirements that will be roughly equal to the values in the current standard. Thus, the standard, if adopted along the lines outlined above, will generate even more motivation for the designer to consider trade-offs between additional ventilation and management of sources. The standard will also generate more source emissions testing and source control measures by industry and their customers respectively.

Important Differences Between the Standards

The outline contains some important differences compared to the existing standard. It has separate sections for commercial-institutional buildings and residential buildings. This is a response to many comments on the existing standard and the experience of several SSPC62 committee members with ASHRAE's Standard 90 on energy conservation. The outline also addresses buildings with and without mechanical ventilation systems, an expansion on the guidance provided in Standard 62-1989.

The outline includes new sections on "Documentation of Design and Operation Guidelines," and "Operating and Maintenance Procedures." There has been much discussion in ASHRAE about both these topics. Documentation is mentioned, even required, by the current version of the standard, but there is no guidance provided in terms of what is to be documented or what is to be done with it. Some guidance exists in ASHRAE's Guideline 1, Commissioning HVAC Systems, but even that guidance is sketchy at best. Operation and maintenance problems are constantly referred to as major contributors to IAQ

problems at conferences and meetings on IAQ. It is not yet clear what the revised ventilation standard might say about the subject, but it is clear that there is a need to address the subject.

Comments

Some of the SSPC62 members were concerned that the approach proposed by Tucker was too cumbersome for designers. In effect, Tucker has proposed that indoor air contaminant loads be considered when determining required ventilation rates. While the general methodology exists for doing this, most of the data necessary do not. However, there is a very rapid movement by many building industry components to initiate emissions testing programs of various sorts. The data will be far more abundant by the time the standard is revised and gets through the normal adoption procedure; realistically speaking, this will be no less than three years from now.

The approach Tucker has proposed is not new at all in terms of the way buildings are designed to handle thermal or structural loads. Constant and variable loads are calculated, estimated, predicted, or determined by whatever means is appropriate and feasible. Then the mechanical system or structural system is sized to handle these loads based on what we know about the performance of the systems. The same principle must be applied to pollution loads if air quality is to be truly acceptable by design. The proposed revision does just that.

Stay Tuned

Next month we will present the proposed revision outline in detail and a comparison to the existing Standard 62 outline.

For More Information

ASHRAE has two mechanisms for interested parties to stay informed of the committee's activities. One is to request that your name be placed on the "Interested Persons" list for SSPC62. Individuals on this list receive notices when a draft revision or addendum to the document is available for public review and notices of any special meetings of the project committee between society meetings. There is no charge for being on this list.

Another option is the Committee Information Mailing List (CIML) subscription. CIML subscribers get project committee rosters, meeting agenda and minutes, working and public review drafts, and other items which are circulated to the full committee membership. The general intent is to supply the basic materials which are distributed to the full committee during the development of the standard or guideline.

There is an annual fee for this subscription which runs from July 1 to June 30 each year. The fee is based on an

estimate of the amount of material involved. The fee for the July 1992 - June 1993 year is \$80 for SSPC62.

lanta, 1791 Tullie Circle NE, Atlanta, GA 30329, 404-636-8400, ext. 503, or fax 404-321-5478.

If you are interested in subscribing, contact Sara Deppen of the Standards staff at ASHRAE headquarters in At-

Ventilation

Ventilation for IAQ in Hot, Humid Climates

We've heard engineers and others say that the major cause of IAQ problems in the southeastern US is microbial contamination due to inadequate moisture control. The problems are not limited to moisture in fibrous linings in air distribution ducts. They also include high humidity throughout the space and, sometimes, inside the exterior walls.

In Florida, both outdoor humidities and temperatures are high nearly all year long. Outdoor air requires conditioning, both for temperature and humidity, to achieve comfortable, healthy indoor environments. When Floridians go from 5 to 15 cfm/person to implement ASHRAE Standard 62, it means conditioning a lot more outdoor air during most of the year.

* Now we've been told that there are no package rooftop air handlers available that can meet ASHRAE Standard 62-1989 minimum outside air supply requirements and handle the latent loads experienced in Florida and other hot, humid climates. Can this be true? We asked a couple of people we thought should know.

Carrier Corp. Says 'Can Do'

We first talked to Katherine Hammack, Sr. Product Manager of United Technologies Carrier in Farmington, Connecticut. She told us that there is a problem, but it isn't the equipment. "You're talking about people who want to close their eyes and grab something," Hammack said. "If you're talking about a standard, off-the-shelf unit, yes." However, she indicated that the loads can certainly be handled by adding cooling coils. She said that the Carrier units are designed to accept the additional cooling coils and that the cooling coils are stock items in the Carrier catalog.

But, not so fast. Hammack suggested we call a Carrier sales representative in Florida, and we did. Ron Kessner answered our call, and what he told us did not support Hammack's claims for Carrier's equipment. He said that the package units could not accommodate the extra coils and that they usually recommend split systems — separate chillers/condensers and air handlers. That way the chilled water (or other fluid) is brought to the air handler in the required quantity. Kessner said that with Florida's

loads, no more than 40% outdoor air could be conditioned and delivered indoors by the package rooftop units under worst-case design conditions.

Frustrated by the conflicting answers, we called Denny Chamberland of Carrier's Syracuse office. He ran some sample design conditions through his computer for the 20-ton and 50-ton rooftop units at 10%, 20%, and 50% outside air. His computer runs showed that the issue is actually sizing the unit properly, but that there certainly is no truth to the notion that roof top package units can't do it. Of course, it makes a difference how many cfm one runs through the units. Obviously, a small volumetric air flow will be easier to handle than a large one. The real problem is sizing the units for the loads they must handle and the outside air delivery required of them. Too many designers simply use old rules of thumb for air-conditioning tonnage regardless of the actual interior loads or outside air requirements.

We have not checked with other manufacturers, but we understand that Trane is planning to come out with a more flexible standard product line. Obviously, no manufacturer who wants to stay competitive in the southeastern US (or other humid area) can afford to ignore this issue.

Moisture in Walls

Moisture in the walls is a completely different issue. It tends to occur due to the fact that the inside is cooler and drier than the outside. Thus, moisture tends to migrate through the wall from the outside in. In a few unfortunate cases, it has created enormous mold problems after condensing behind the drywall or vinyl wall covering. Some large public buildings have been evacuated, lawsuits abound, and the world is taking note.

The hotel and motel industry is increasingly concerned about mold. In problem properties, molds have been found on the back side of vinyl wall coverings. The adhesive is an excellent nutrient, apparently, and the moisture entering from the outside cannot penetrate past the vinyl. The answer is locating the vapor toward the moisture source - outside, in Florida.