GREENHECK
Energy Recovery Application
ERA/111-04
PRODUCT APPLICATION GUIDE
A technical bulletin for engineers, contractors and students in the air movement and control industry.

ASHRAE Standard 62 Addendum y – Acceptable Cross Leakage for Energy Recovery Applications

With addendum y of ASHRAE Standard 62-2001 (Ventilation for Acceptable Indoor Air Quality), HVAC system designers now have clear-cut parameters for allowable ERV cross leakage/cross contamination. This article communicates some of the key elements of this addendum.

Probably the most common question from specifying engineers on this topic is: "How much ERV cross leakage is acceptable when the exhaust air is from a rest room?" As defined by addendum y, the answer is 10%.

Air Classification

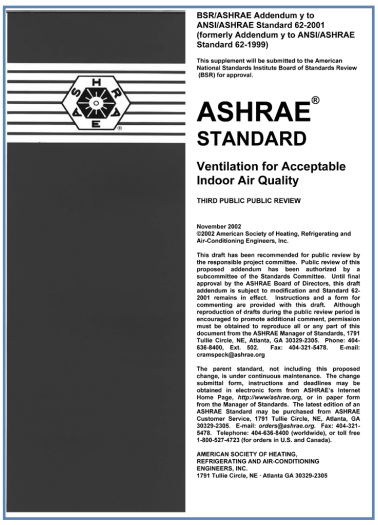
As a starting point, air is classified with respect to contaminant and odor intensity. In doing so, four classes of air have been defined as follows:

Class 1: Air with low contaminant concentration and inoffensive odor and sensory-irritation intensity, suitable for recirculation or transfer to any space.

Examples: office spaces, classrooms, assembly rooms, churches, corridors.

Class 2: Air with moderate contaminant concentration, mildly offensive odors or sensory-irritation intensity, suitable for recirculation or transfer to any space with Class 2 or Class 3 air that is utilized for the same or similar purpose and involves the same or similar pollutant sources. Class 2 air is not suitable for recirculation or transfer to spaces with Class 1 air, or dissimilar spaces with Class 2 or Class 3 air.

Examples: rest rooms, swimming pools, dining rooms, locker rooms, beauty salons, warehouses.


BSR/ASHRAE Addendum y to ANSI/ASHRAE Standard 62-2001 (formerly Addendum y to ANSI/ASHRAE Standard 62-1999)

This supplement will be submitted to the American National Standards Institute Board of Standards Review (BSR) for approval.

ASHRAE® STANDARD

Ventilation for Acceptable Indoor Air Quality

THIRD PUBLIC PUBLIC REVIEW

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This draft has been recommended for public review by the responsible project committee. Public review of this proposed addendum has been authorized by a subcommittee of the Standards Committee. Until final approval by the ASHRAE Board of Directors, this draft addendum is subject to modification and Standard 62-2001 remains in effect. Instructions and a form for commenting are provided with this draft. Although reproduction of drafts during the public review period is encouraged to promote additional comment, permission must be obtained to reproduce all or any part of this document from the ASHRAE Manager of Standards, 1791 Tullie Circle, NE, Atlanta, GA 30329-2305. Phone: 404-636-8400, Ext. 502. Fax: 404-321-5478. E-mail: cramspeck@ashrae.org

The parent standard, not including this proposed change, is under continuous maintenance. The change submittal form, instructions and deadlines may be obtained in electronic form from ASHRAE's Internet Home Page, http://www/ashrae.org, or in paper form from the Manager of Standards. The latest edition of an ASHRAE Standard may be purchased from ASHRAE Customer Service, 1791 Tullie Circle, NE, Atlanta, GA 30329-2305. E-mail: orders@ashrae.org. Fax: 404-321-5478. Telephone: 404-636-8400 (worldwide), or toll free 1-800-527-4723 (for orders in U.S. and Canada).

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Class 3: Air with significant contaminant concentration or significant offensive odor or sensory-irritation intensity that is suitable for recirculation with the same space. Class 3 air is not suitable for recirculation or transfer to any other space.

Examples: kitchens, dry cleaners, laboratories, pet shops.

Class 4: Air with highly objectionable fumes or gases or potentially containing dangerous particles, bioaerosols, or gases at a concentration high enough to be considered harmful, not suitable for recirculation or transfer to any other space.

Examples: paint spray booths, laboratory fume exhaust, kitchen grease exhaust.

Energy Recovery Re-designation

Now that we understand the air classification system, we can move on to the portion of this addendum that addresses energy recovery, which states:

Class 2 air may be re-designated as Class 1 air in the process of recovering energy when it is diluted with outdoor air such that no more than 10% of the resulting airstream is Class 2 air. Class 3 air may be re-designated as Class 1 air in the process of recovering energy when it is diluted with outdoor air such that no more than 5% of the resulting airstream is Class 3 air.

This means that you may recover energy from rest room exhaust (Class 2) air to pre-condition outdoor air for a Class 1 space (i.e., classroom or office space) as long as the energy recovery cross leakage is no greater than 10%. The same logic applies to recovering energy from Class 3 air, with the cross leakage limit reduced to 5%.

More Efficient HVAC Design

The language in ASHRAE 62-2004 is extremely important because it enables specifying engineers to be comfortable designing higher efficiency systems. ASHRAE's official endorsement of the practice of "recirculating" a small amount of Class 2 air encourages the practice of recovering energy from rest room exhaust air. Now, total enthalpy energy recovery wheels with ARI certified cross leakage ratings may confidently be specified for rest room applications, maximizing total energy recovery while keeping code officials satisfied.

Another energy efficiency benefit of the ASHRAE language is that energy wheel purge sections are not necessary for Class 2 air, and may not be necessary for Class 3 air. This is important because a wheel purge option typically increases the ERV horsepower by 50% to 75%. With good energy recovery wheel designs limiting cross leakage to less than 5% without a purge option, engineers can have very low cross leakage and a highly efficient ERV system.

ARI Certification

Going hand-in-hand with addendum y is the ARI 1060 certification program for rating air-to-air heat exchangers for ERV equipment. In addition to rating thermal performance, ARI 1060 also certifies cross leakage performance.

With respect to ASHRAE 62, the critical ARI certified rating to evaluate is EATR — Exhaust Air Transfer Ratio. EATR identifies the percentage of exhaust air that is transferred to the outdoor air stream during energy recovery. When recovering energy from a rest room (or other Class 2 airstream), the EATR value shall not exceed 10%.

All ARI certified data can be found at www.ariprimenet.org.

Summary

ASHRAE 62-2004 provides clear and much needed clarification to airstream recirculation issues and defines air classification categories. With respect to recovering energy from exhaust air, the amount of acceptable exhaust air cross leakage is now clearly quantified based on the contaminant concentrations of the exhaust air.

As a result, specifying engineers may apply the benefits offered by addendum y to increase the efficiency of HVAC systems. Higher system efficiency will likely come in the form of broader application of total enthalpy ERVs — without the need for energy consuming purge sections.

To be help ensure compliance to ASHRAE Standard 62, specifications should include language that requires ARI 1060 certified performance such that the EATR ratings do not exceed the ASHRAE 62-2004 limits for the application.