

PRODUCT APPLICATION GUIDE

A technical bulletin for engineers, contractors and students in the air movement and control industry.

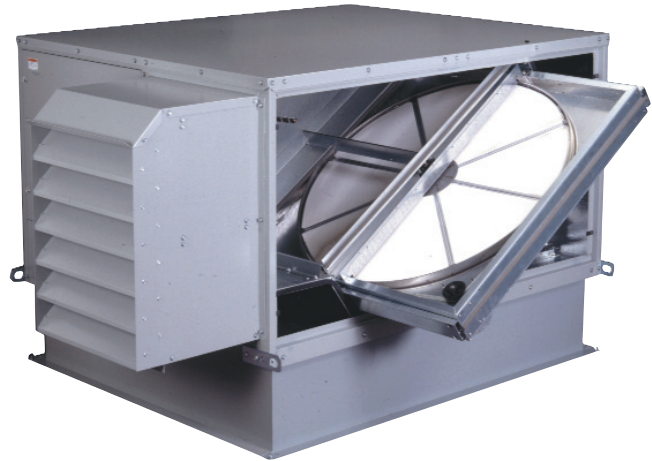
Fire Safety Standards and Energy Recovery Ventilators

The subject of fire safety is an important issue for customers and the engineering community. The following will serve as a guide to the fire safety issue including factual information about the codes and standards governing the use of energy recovery products in buildings in the United States.

Energy recovery ventilators shall be listed for safety by an industry recognized 3rd party testing agency (such as UL or ETL) to appropriate standards. Energy recovery cassettes shall also be listed by an industry recognized 3rd party testing agency. As part of the listing, manufacturers are required to subscribe to the testing agency's follow-up services to ensure ongoing compliance with the standards.

Part of the testing agency investigation involves an evaluation of the fire safety of the heat wheel matrix. Because a heat wheel is an airstream component, the UL 900 fire test procedures for air filter units (a pre-existing airstream test procedure) is used. This test evaluates both flammability and smoke density under conditions simulating actual use in an airstream. Manufacturers in compliance with fire safety standards will be able to provide a listing card upon request that states they have successfully evaluated their energy recovery wheels for fire safety. For reference, copies of the listing card and test report for the Greenheck wheels are provided. The actual performance of the wheels is shown on the listing card and the maximum permissible ratings are stated in the report.

Energy recovery wheels and equipment shall comply with NFPA. A careful reading of the standard yields the following from section 2-2.4.2 Appliances: "Materials used in the



Greenheck's Commercial Energy Recovery Unit

manufacturing...shall meet the requirements of 2-3.3.1 and 2-3.3.2. Listing by a testing laboratory shall be sufficient evidence of compliance with this requirement."

Manufacturers' products are accepted for installation in accordance with NFPA 90A by virtue of their listing for safety, including flammability and smoke density. Note also that section 2-2.2.1 requires Electrostatic Cleaners to be listed in accordance with UL standards and Section 2-2.2.2 requires air filters to be rated for flammability in accordance with UL 900. Greenheck is in compliance with both the letter and the spirit of NFPA 90A as are any other manufacturers that meet the guidelines described. A manufacturer's attention to safety standards and an industry recognized 3rd party agency listing are evidence of a commitment to safety for customers, the engineering community, and the public.

Flame Exposure Test Method:

Two samples of the 16 inch diameter heat wheel used in Model 502, representing the smaller wheel used in Model 501, along with the hub and spoke assembly for the wheel, was subjected to this test as outlined in Standard UL 900—Test Performance of Air Filter Units.

The samples were mounted in a sheet metal adapter plate with a hole provided in the center to effectively seal off the cross sectional area of the 21 by 21 inch test duct.

The samples were mounted in the 8 ft. long test duct and subjected to the flames from two gas burners for a 3 minute test period. The test airflow was adjusted to an average of 100 ft./min. as measured at the discharge end of the duct, so as to provide an average approach velocity in the duct at the face of the filter of 220 ft./min.

The flames produced beyond the discharge face of the filter as well as the relative amount of smoke produced by the filter were monitored during each test.

Flame Exposure Test Results:

Test Sample	Smoke Density (in. ²)	Flame Extension Downstream Beyond Discharge Face of Filter Unit (in.)
1	0.11 (+)	0
2	0.46 (+)	2–6 (++)

+ Maximum permissible 9.0 in.² for Class 2 filters as measured below the smoked density time curve.

++ Maximum distance permissible for Class 2 filters would be the length of the test duct (8 ft.) beyond the test sample.

During testing of Sample No. 1, the polystyrene media immediately began to melt and curl up around the outer perimeter. By two minutes into the

test, the media has formed into an irregularly shaped ball and fell to the test duct floor. The plastic core charred but did not flame during the test.

During testing of Sample No. 2, the polystyrene media immediately began to curl up around the outer perimeter and flamed. By two minutes into the test, the media has formed into a ball, fell to the test duct floor and continued to flame after the test was completed. The plastic core charred but did not flame during the test.