THE ENVIRONMENTAL TECHNOLOGY VERIFICATION PROGRAM

ETV

U.S. Environmental Protection Agency

Research Triangle Institute

ETV Joint Verification Statement

TECHNOLOGY TYPE:	**PAINT OVERSPRAY ARRESTOR**	
APPLICATION:	**CONTROL OF PARTICLE EMISSIONS FROM AEROSPACE PAINT SPRAYING FACILITIES**	
TECHNOLOGY NAME:	**Riga-Flo 200**	
COMPANY:	**Farr Company**	
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The U.S. Environmental Protection Agency (EPA) has created the Environmental Technology Verification (ETV) Program to facilitate the deployment of innovative or improved environmental technologies through performance verification and dissemination of information. The goal of the ETV Program is to further environmental protection by substantially accelerating the acceptance and use of improved and cost-effective technologies. ETV seeks to achieve this goal by providing high quality, peer reviewed data on technology performance to those involved in the design, distribution, financing, permitting, purchase, and use of environmental technologies.

ETV works in partnership with recognized standards and testing organizations; stakeholder groups which consist of buyers, vendor organizations, permitters, and other interested parties; and with the full participation of individual technology developers. The program evaluates the performance of innovative technologies by developing test plans that are responsive to the needs of stakeholders, conducting field or laboratory tests (as appropriate), collecting and analyzing data, and preparing peer reviewed reports. All evaluations are conducted in accordance with rigorous quality assurance protocols to ensure that data of known and adequate quality are generated and that the results are defensible.

The Air Pollution Control Technology (APCT) program, one of 12 technology areas under ETV, is operated by the Research Triangle Institute (RTI), in cooperation with EPA's National Risk Management Research Laboratory. APCT has recently evaluated the performance of paint overspray arrestors used primarily in the aerospace industry. This verification statement provides a summary of the test results for the Farr Riga-Flo 200.

VERIFICATION TEST DESCRIPTION

All tests were performed in accordance with the APCT "Generic Verification Protocol for Paint Overspray Arrestors." The protocol incorporates all requirements of EPA Method 319: Determination of Filtration Efficiency for Paint Overspray Arrestors. [Method 319 is part of the National Emission Standards for Hazardous Air Pollutants (NESHAP) for Aerospace Manufacturing and Rework Facilities and was published in the *Federal Register* on March 27, 1998 (40 CFR Part 63).] The protocol also includes requirements for quality management, quality assurance, procedures for product selection, auditing of the test laboratories, and test reporting format.

Filtration efficiency is computed from aerosol concentrations measured upstream and downstream of an arrestor installed in a laboratory test rig. The aerosol concentrations upstream and downstream of the arrestor are measured with an aerosol analyzer that simultaneously counts and sizes the particles in the aerosol stream. The aerosol analyzer covers the particle diameter size range from 0.3 to 10 µm in a series of contiguous sizing channels. Each sizing channel covers a narrow range of particle diameters. By taking the ratio of the downstream to upstream particle counts on a channel by channel basis, the filtration efficiency is computed for each of the sizing channels.

The following series of tests were performed at a face velocity of 120 fpm (0.61 m/s):

- Three arrestors were tested using a liquid-phase aerosol challenge,
- Three arrestors were tested using a solid-phase aerosol challenge,
- Seven "no-filter" control tests (one performed prior to each arrestor and reference filter test),
- One HEPA filter control test, and
- One reference filter control test.

TECHNOLOGY DESCRIPTION

As shown in Figure 1, the Farr Riga-Flo 200 is a rigid cell arrestor with nominal dimensions of 24 x 24 x 12 in. (0.61 x 0.61 x 0.30 m). The arrestor has a metal frame, and the filter media color is yellow. The label is white with green printing and is about 5 x 8 in. (0.13 x 0.20 m) in size. The label includes the following information: Farr Riga-Flo-200, 24 x 24 x 12, Part No. 09026003. There is an arrow indicating flow direction.

VERIFICATION OF PERFORMANCE

Verification testing of the Farr Riga-Flo 200 was performed October 5-8, 1999, at the test facilities of RTI. For ready comparison, the filtration efficiency requirements of the NESHAP are tabulated with the test results in Tables 1 through 4. The test results indicate that the tested arrestor met the requirements listed in Tables 1 and 2 for existing sources and those in Tables 3 and 4 for new sources. The pressure drop across the tested arrestors at 120 fpm (0.61 m/s) ranged from 0.14 to 0.25 in. H_2O (35 to 62 Pa) for the six arrestors tested.

The APCT quality assurance officer has reviewed the test results and the quality control data and has concluded that the data quality objectives given in the generic verification protocol have been attained.

In accordance with the generic verification protocol, this Verification Statement is applicable to paint overspray arrestors manufactured between the publication date of the Verification Statement (3/17/2000) and 12 months thereafter.

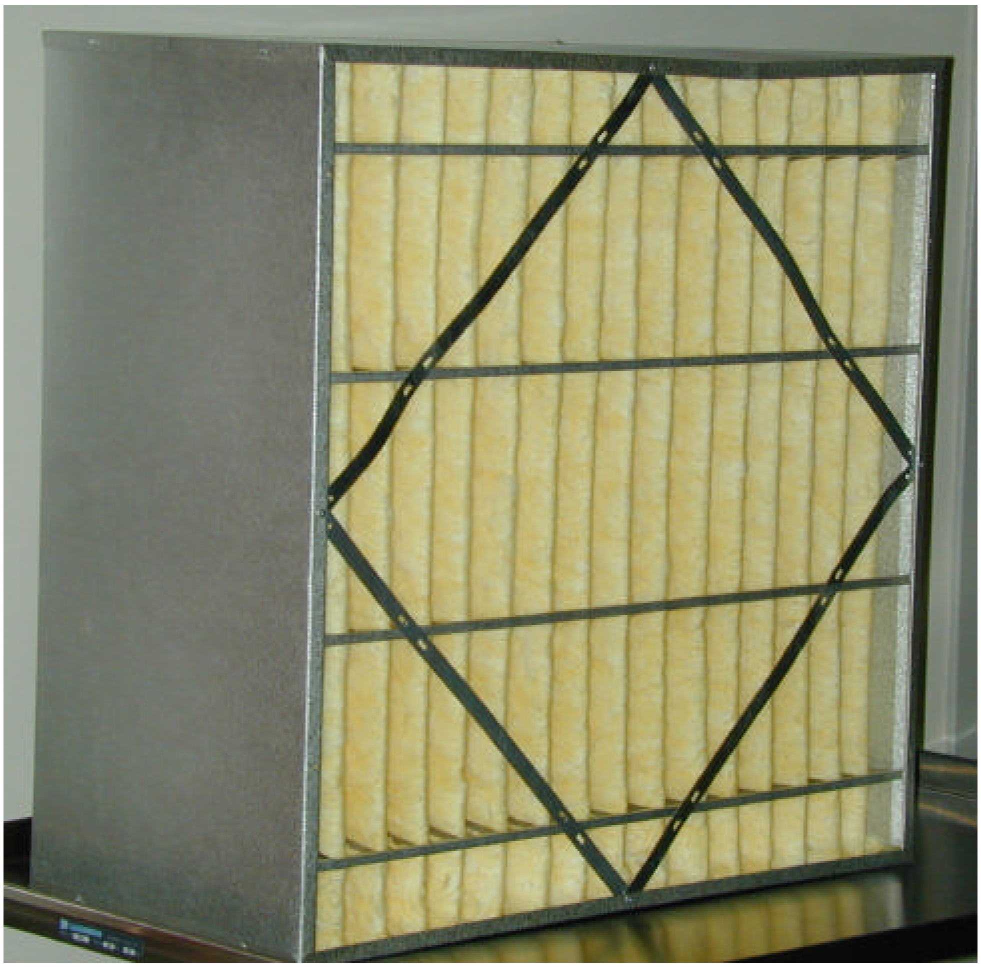

Figure 1. Photograph of the Farr Riga-Flo 200 paint overspray arrestor.

**TABLE 1. EXISTING SOURCES*:
LIQUID-PHASE CHALLENGE AEROSOL PARTICLES**

Aerodynamic particle diameter range, µm	Filtration efficiency requirement, %	Filtration efficiency achieved, %
> 5.7	> 90	99
> 4.1	> 50	99
> 2.2	> 10	99

**TABLE 2. EXISTING SOURCES*:
SOLID-PHASE CHALLENGE AEROSOL PARTICLES**

Aerodynamic particle diameter range, µm	Filtration efficiency requirement, %	Filtration efficiency achieved, %
> 8.1	> 90	>99
> 5.0	> 50	>99
> 2.6	> 10	99

**TABLE 3. NEW SOURCES*:
LIQUID-PHASE CHALLENGE AEROSOL PARTICLES**

Aerodynamic particle diameter range, µm	Filtration efficiency requirement, %	Filtration efficiency achieved, %
> 2.0	> 95	99
> 1.0	> 80	95
> 0.42	> 65	82

**TABLE 4. NEW SOURCES*:
SOLID-PHASE CHALLENGE AEROSOL PARTICLES**

Aerodynamic particle diameter range, µm	Filtration efficiency requirement, %	Filtration efficiency achieved, %
> 2.5	> 95	99
> 1.1	> 85	95
> 0.70	> 75	88

*A new source is any affected source that commenced construction after October 29, 1996. An existing source is any affected source that is not new.

This verification statement addresses two aspects of paint overspray arrestor performance: filtration efficiency and pressure drop. Users of this technology may wish to consider other performance parameters such as service life and cost when selecting a paint overspray arrestor for their use.

As stated in Section 1.3 of Method 319, "for a paint arrestor system or subsystem which has been tested by this method, adding additional filtration devices to the system or subsystem shall be assumed to result in an efficiency of at least that of the original system without additional testing."

/S/ 3/8/00

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E. Timothy Oppelt Date
Director
National Risk Management Research Laboratory
Office of Research and Development
United States Environmental Protection Agency

/S/ 3/10/00

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Jack R. Farmer Date
Program Manager
Air Pollution Control Technology Program
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