

**CERTIFICATION TEST OF  
PAINT OVERSPRAY ARRESTOR  
FOLLOWING EPA METHOD 319**

**Mach 2 System**

**Prepared by:  
M.K. Owen and J.T. Hanley  
Center for Engineering and Environmental Technology  
Research Triangle Institute  
Research Triangle Park, NC 27709  
(RTI Project 6300-35)**

**Prepared for:  
Chemco Manufacturing Company, Inc  
3175 Mac Arthur Blvd.  
Northbrook, IL 60062**

**October 1998**

## **Introduction**

Under contract with Chemco Manufacturing Company, the Research Triangle Institute (RTI) evaluated the fractional aerosol filtration efficiency of the Mach 2 paint overspray arrestor system. The tests were conducted in accordance with EPA's Method 319: "Determination of Filtration Efficiency for Paint Overspray Arrestors" which was published March 27, 1998 in the Federal Register as part of the National Emission Standards for Hazardous Air Pollutants (NESHAP) for Aerospace Manufacturing and Rework Facilities. The NESHAP specifies that Method 319 be used to certify the efficiency of filters for meeting the filtration efficiency requirements of the NESHAP.

## **Physical Description of Paint Overspray Arrestor**

The test arrestor system consisted of a pocket filter preceded by a flat panel filter. The pocket filter had 2 pockets and nominal dimensions of 24" x 24" x 15". The flat panel had nominal dimensions of 24" x 24" x 1". The pocket filter was green and the flat panel was white.

## **Test Series**

Table 1 outlines the test series. All the tests were performed at a nominal face velocity of 120 feet per minute with the arrestors in their initial (i.e., clean) condition. In accordance with the proposed Method 319, the following series of tests were performed:

- Triplicate tests using a liquid-phase aerosol challenge
- Triplicate tests using a solid-phase aerosol challenge
- "No-filter" control tests (one performed prior to each arrestor test)
- HEPA filter control test.

New arrestors were used for each individual test.

**TABLE 1. TEST MATRIX**

RTI Test No.	TEST			Challenge Aerosol
	No-Filter	Test Arrestor	HEPA Filter	
10198-6	X			Solid-Phase
10298-1		X		
10298-2	X			
10298-3		X		
10298-4	X			
10298-5		X		
10598-3			X	
10298-6	X			Liquid-Phase
10298-7		X		
10298-8	X			
10298-9		X		
10598-1	X			
10598-2		X		

## **Test Method**

Fractional efficiency was computed from upstream and downstream aerosol concentration measurements performed with a high resolution optical particle counter (Climet Instruments Model 500) covering the particle diameter size range from 0.3 to 10  $\mu\text{m}$  in 15 particle-sizing channels. The efficiency tests were conducted at a nominal face velocity of 120 feet per minute (corresponding to a volumetric flow of 480 cfm) and used polydisperse challenge aerosols of solid-phase potassium chloride and liquid-phase oleic acid. The pressure drop measurements were performed with an inclined manometer at the test air flow. Additional details on the test procedure are provided in Appendix B.

## **Results**

Tables 2 and 3, and the figures which follow, summarize the fractional filtration efficiency measurements for the solid and liquid-phase tests, respectively. Upstream and downstream particle count data for each test are provided in Appendix A.

The pressure drop across each test arrestor at the 120 feet per minute test velocity is shown in Table 4.

Table 5 summarizes the NESHAP filtration efficiency requirements for two stage (applicable to existing sources) and three stage (applicable to new sources) paint arrestors.

## **Conclusion**

Based on the filtration efficiency results from the Method 319 test, the Mach 2 System overspray arrestor does meet the Aerospace NESHAP filtration efficiency requirements for existing facilities.