July 1999

# Environmental Technology Verification Report

## Paint Overspray Arrestor Purolator Products Air Filtration Co. D95084415, DMK80-4404, and PB2424

Prepared by


Research Triangle Institute

Under a Cooperative Agreement with


U.S. Environmental Protection Agency

July 1999

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# Purolator Products Air Filtration Co. D95084415, DMK80-4404, and PB2424

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## Notice

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**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**

**Office of Research and Development**

**Washington, D.C. 20460**

# ENVIRONMENTAL TECHNOLOGY VERIFICATION PROGRAM

# VERIFICATION STATEMENT

| | | | |
|---|---|---|---|
| **TECHNOLOGY TYPE:** | **PAINT OVERSPRAY ARRESTOR** | | |
| **APPLICATION:** | **CONTROL OF PARTICLE EMISSIONS FROM AEROSPACE PAINT SPRAYING FACILITIES** | | |
| **TECHNOLOGY NAME:** | **Purolator D95084415, DMK80-4404, and PB2424** | | |
| **COMPANY:** | **Purolator Products Air Filtration Co.** | | |
| **ADDRESS:** | **880 Facet Rd.**<br>**Henderson, NC 27536** | **PHONE:**<br>**FAX:** | **(252) 492-1141, x4201**<br>**(252) 492-6157** |
| **WEB SITE:** | **www.purolator.com** | | |
| **EMAIL:** | **justtom@inet4u.com** | | |

## PROGRAM DESCRIPTION

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 and permitters, 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 Purloator Products Air Filtration Company D95084415, DMK80-4404, and PB2424.

## 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 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,
- Six "no-filter" control tests (one performed prior to each arrestor test),
- One high efficiency particulate air (HEPA) filter control test, and
- One reference filter control test.

## TECHNOLOGY DESCRIPTION

The Purolator D95084415, DMK80-4404, and PB2424 arrestor system consists of three filters. The D95084415 is an eight-pocket bag filter with nominal dimensions of 24 x 24 x 15 in. (0.61 x 0.61 x 0.38 m). It has a metal frame, and the filter media is blue upstream and white downstream. Its label is white, ½ x 7 in. (1.27 x 17.8 cm) in size, and is affixed to the metal frame. The label includes the following information: Purolator Products Air Filtration Company, Model - D95084415K, Size - 24 x 24 x 15 in. (0.61 x 0.61 x 0.38 m), and an arrow indicating flow direction.

The DMK80-4404, Mark 80D, is a pleated panel filter with nominal dimensions of 24 x 24 x 4 in. (0.61 x 0.61 x 0.10 m). The filter media is blue with 22 pleats. Text imprinted on the cardboard frame includes the following information: Purolator Pleated Filter, Mark 80D, Medium Efficiency Panel Air Filter, Purolator Products Air Filtration Company, airflow direction, 24 x 24 x 4 in. (0.61 x 0.61 x 0.10 m) nominal size, 23 3/8 x 23 3/8 x 3 3/4 in. (0.59 x 0.59 x 0.095 m), exact size.

The PB2424, Prebond Pad, is a flat panel filter, with nominal dimensions of 25 x 25 x 2 in. (0.64 x 0.64 x 0.05 m). The media is white and tackified. The white, lightweight cardboard label, with a string attached, was 3 ½ x 6 ½ in. (8.9 x 16.5 cm) and stated Pre-bond Pad Part # PB2424. There is no label indication of the flow direction or filter orientation, so the industry standard orientation with the more porous side upstream was used.

## VERIFICATION OF PERFORMANCE

Verification testing of the arrestor was performed from March 29 through 31, 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 exceeded the requirements listed in Tables 1 and 2 for existing sources and those listed in Tables 3 and 4 for new sources. The pressure drop across the tested arrestors at 120 fpm (0.61 m/s) ranged from 0.22 to 0.26 in. $H_2O$ (55 to 65 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.

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.

In accordance with the generic verification protocol, this verification report is valid for 12 months after the publication date 8/11/99.

**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 | 97 |
| > 0.42 | > 65 | 90 |

**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 | 99 |
| > 0.70 | > 75 | 98 |

*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.

*Original Signed By*
*E. Timothy Oppelt*
*7/27/99*

E. Timothy Oppelt Date
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**Availability of Verification Statement and Report**

Copies of the public Verification Statement and Verification Report are available from the following:

1. **Research Triangle Institute**
   P.O. Box 12194
   Research Triangle Park, NC 27709-2194

   Web site: http://etv.rti.org/apct/index.html
   or http://www.epa.gov/etv *(click on partners)*

2. **USEPA / APPCD**
   MD-4
   Research Triangle Park, NC 27711

   Web site: http://www.epa.gov/etv/library.htm *(electronic copy)*
   http://www.epa.gov/ncepihom/

## Abstract

Paint overspray arrestors (POAs) were evaluated by the Air Pollution Control Technology (APCT) pilot of the Environmental Technology Verification (ETV) Program. The performance factor verified was the particle filtration efficiency as a function of size for particles smaller than 10 µm. The APCT ETV Program developed a generic verification protocol for testing filtration efficiency that is based on EPA Method 319. The protocol was developed by RTI, reviewed by a technical panel of experts, and approved by EPA. The protocol addresses several issues that Method 319 does not cover, including periodic testing, acquisition of POAs for testing, and product definition. A Test/Quality Assurance Plan was prepared which addresses the test procedure and quality assurance and quality control requirements for obtaining verification data of sufficient quantity and quality to satisfy the data quality objectives.

RTI performed tests on Purolator Products Air Filtration Co.'s D95084415, DMK80-4404, and PB2424 during the period March 29-31, 1999. Filter efficiencies were determined. For ready comparison, the filtration efficiency requirements of the National Emission Standards for Hazardous Air Pollutants (NESHAP) are tabulated with the test results. The results indicate that the D95084415, DMK80-4404, and PB2424 exceeded the NESHAP requirements for new and existing sources.

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## List of Abbreviations and Acronyms

| | |
|---|---|
| APCT | Air Pollution Control Technology |
| APPCD | Air Pollution Prevention and Control Division |
| cfm | cubic feet per minute |
| cm | centimeter |
| DQO | data quality objective |
| EPA | U.S. Environmental Protection Agency |
| ETV | Environmental Technology Verification |
| ETVR | Environmental Technology Verification Report |
| fpm | feet per minute |
| HEPA | high efficiency particulate air |
| in. | inch |
| mm | millimeter |
| m/s | meters per second |
| NESHAP | National Emission Standards for Hazardous Air Pollutants |
| Pa | pascal |
| POA | paint overspray arrestor |
| QA | quality assurance |
| RTI | Research Triangle Institute |
| µm | micrometer |

**Acknowledgments**

RTI acknowledges the support of all those who helped plan and conduct the verification activities. In particular, we would like to thank Ted Brna, EPA Project Manager, and Paul Groff, EPA Project Quality Manager, of EPA' s National Risk Management Research Laboratory in Research Triangle Park, NC. Finally we would like to acknowledge the assistance and participation of Tom Justice of Purolator Products Air Filtration Co.

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## SECTION 1
## INTRODUCTION

The U. S. Environmental Protection Agency (EPA) has created the Environmental Technology Verification (ETV) Program to facilitate the deployment of innovative or improved technologies through performance verification and information dissemination. The ETV Program is intended to assist and inform those involved in the design, distribution, permitting, and purchase of environmental technologies.

The U.S. EPA's partner in the Air Pollution Control Technology (APCT) Program is Research Triangle Institute (RTI). The APCT Program, with the full participation of the technology developer, develops plans, conducts tests, collects and analyzes data, and reports findings. The evaluations are conducted according to a rigorous protocol and quality assurance and quality control oversight. The APCT Program verifies the performance of commercial-ready technologies used to control air pollutant emissions, with an emphasis on technologies for controlling particulate matter, volatile organic compounds, nitrogen oxides, and hazardous air pollutants. The Program develops standardized verification protocols and test plans, conducts independent testing of technologies, and prepares verification test reports and statements for broad dissemination.

## SECTION 2
## VERIFICATION TEST DESCRIPTION

The paint overspray arrestor was tested in accordance with the APCT "Generic Verification Protocol for Paint Overspray Arrestors"[1] and the "Test/QA Plan for Paint Overspray Arrestors."[2] This protocol incorporates all requirements of EPA Method 319: Determination of Filtration Efficiency for Paint Overspray Arrestors. Method 319[3] is part of the National Emission Standards for Hazardous Air Pollutants (NESHAP) for Aerospace Manufacturing and Rework Facilities.[4] The protocol also includes requirements for quality management, quality assurance, procedures for product selection, auditing of the test laboratories, and reporting format.

Filtration efficiency was 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 arrestors were measured with an aerosol analyzer that simultaneously counts and sizes the particles in the aerosol stream. The aerosol analyzer covered the particle diameter size range from 0.3 to 10 µm in a series of contiguous sizing channels. Each sizing channel covered a narrow range of particle diameters. For example, channel 1 may cover from 0.3 to 0.4 µm, channel 2 from 0.4 to 0.5 µm, and channel 15 from 7 to 10 µm. By taking the ratio of the downstream to upstream counts on a channel by channel basis, the filtration efficiency was computed for each of the sizing channels.

The upstream and downstream aerosol measurements were made while a test aerosol was injected into the air stream upstream of the arrestor [ambient aerosol is removed with high efficiency particulate air (HEPA) filters on the inlet of the test rig]. This test aerosol spanned the particle size range from 0.3 to 10 µm and provided a sufficient upstream concentration in each of the sizing channels to allow accurate calculation of filtration efficiencies up to 99%.

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,

- C "No-filter" control tests (one performed prior to each arrestor test) ,
- C One HEPA filter control test, and
- C One reference filter control test.

The test series is exhibited in Table 1. Additional details on the test procedure are provided in Appendix A.

**TABLE 1. TEST SERIES**

| RTI Test No. | TYPE OF TEST | | | | Challenge Aerosol |
|---|---|---|---|---|---|
| | No-Filter | Test Arrestor | HEPA Filter | Reference Filter | |
| 03299904 | X | | | | Solid-Phase |
| 03299905 | | | | X | |
| 03299906 | X | | | | |
| 03299907 | | X | | | |
| 03299908 | X | | | | |
| 03299909 | | X | | | |
| 03309901 | X | | | | |
| 03319903 | | X | | | |
| 03199907 | | | X | | |
| 03309903 | X | | | | Liquid-Phase |
| 03309904 | | X | | | |
| 03309905 | X | | | | |
| 03309906 | | X | | | |
| 03319901 | X | | | | |
| 03319902 | | X | | | |

## 2.1 SELECTION OF TESTED PAINT OVERSPRAY ARRESTORS

The test arrestors (D95084415, DMK80-4404, and PB2424) were supplied to the test laboratory directly from the manufacturer (Purolator Products Air Filtration Co.) with a letter signed by Tom Justice, Vice President of Operations, attesting that the arrestors were selected in an unbiased manner and have not been treated in any manner different from the arrestors they offer to the public. The PB2424s were in stock and an order was placed to ship these filters from the manufacturing plant to the corporate office and then to RTI. The other two items were ordered by a third party, manufactured, then diverted to RTI. The manufacturer supplied the test laboratory with 18 arrestors; from these 18, the test laboratory randomly selected six for testing.

# SECTION 3
# DESCRIPTION OF ARRESTOR

The Purolator D95084415, DMK80-4404, and PB2424 arrestor system consists of three filters. The D95084415 is an eight-pocket bag filter with nominal dimensions of 24 x 24 x 15 in. (0.61 x 0.61 x 0.38 m). It has a metal frame, and the filter media is blue upstream and white downstream. Its label is white, ½ x 7 in. (1.27 x 17.8 cm) in size, and is affixed to the metal frame. The label includes the following information: Purolator Products Air Filtration Company, Model - D95084415K, Size - 24 x 24 x 15 in. (0.61 x 0.61 x 0.38 m), and an arrow indicating flow direction.

The DMK80-4404, Mark 80D, is a pleated panel filter with nominal dimensions of 24 x 24 x 4 in. (0.61 x 0.61 x 0.10 m). The filter media is blue with 22 pleats. Text imprinted on the cardboard frame includes the following information: Purolator Pleated Filter, Mark 80D, Medium Efficiency Panel Air Filter, Purolator Products Air Filtration Company, airflow direction, 24 x 24 x 4 in. (0.61 x 0.61 x 0.10 m) nominal size, 23 3/8 x 23 3/8 x 3 3/4 in. (0.59 x 0.59 x 0.095 m), exact size.

The PB2424, Prebond Pad, is a flat panel filter, with nominal dimensions of 25 x 25 x 2 in. (0.64 x 0.64 x 0.05 m). The media is white and tacky. The white, lightweight cardboard label, with a string attached, was 3 ½ x 6 ½ in. (8.9 x 16.5 cm) and stated Pre-bond Pad Part # PB2424. There is no label indication of the flow direction or filter orientation, so the industry standard orientation with the more porous side upstream was used.

# SECTION 4
# VERIFICATION OF PERFORMANCE

## 4.1 QUALITY ASSURANCE

The verification tests were conducted in accordance with an approved Test/Quality Assurance (QA) Plan.[2] As part of the Test/QA Plan, periodic audits are performed of the testing laboratory to ensure compliance with Method 319 facilities, equipment, and procedures. Additionally, the test results were reviewed by APCT personnel to ensure they

met data quality objectives of Method 319, the Test Protocol, and the Test/QA Plan. Certificates of Calibration for the optical particle counter and the airflow reference device are provided in Appendix B.

## 4.2 RESULTS

Tables 2 and 3, and Figures 1 through 4, 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 C.

The initial (new condition) pressure drop across each test arrestor at the 120 fpm (0.61 m/s) test velocity [for a flowrate of 480 cfm (0.23 $m^3/s$)] is shown in Table 4. This pressure drop ranged from 0.22 to 0.26 in. $H_2O$ (55 to 65 Pa) for the six arrestors tested.

Tables 5-8 present the filtration efficiency requirements of the Aerospace NESHAP and the corresponding efficiencies measured for the tested arrestor system. The test results indicate that the tested arrestor exceeded the requirements listed in Tables 5 and 6 for existing sources and those listed in Tables 7 and 8 for new sources.

## 4.3 LIMITATIONS

This verification report 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.

In accordance with the generic verification protocol, this verification report and the associated verification statement are valid for 12 months after the publication date.

# SECTION 5
# REFERENCES


1. Generic Test Protocol for Verification Testing of Paint Overspray Arrestors, Research Triangle Institute, Research Triangle Park, NC, October 1998.

2. Test/QA Plan for Paint Overspray Arrestors, Research Triangle Institute, Research Triangle Park, NC, February 1999.

3. Method 319: Determination of Filtration Efficiency for Paint Overspray Arrestors. *Code of Federal Regulations*, Appendix A to 40 CFR Part 63.

4. National Emission Standards for Hazardous Air Pollutants for Aerospace Manufacturing and Rework Facilities. *Code of Federal Regulations*, Title 40, Part 63, Subpart GG (40 CFR 63.741).

**TABLE 2. SUMMARY OF SOLID-PHASE TEST RESULTS**

Filtration Efficiency (%) at Indicated Size Range

| OPC Channel Number | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Min. Diam. (um) | | 0.45 | 0.59 | 0.73 | 0.80 | 1.02 | 1.44 | 1.86 | 2.28 | 2.85 | 3.13 | 4.25 | 5.66 | 7.07 | 7.77 | 9.88 |
| Max. Diam. (um) | | 0.59 | 0.73 | 0.80 | 1.02 | 1.44 | 1.86 | 2.28 | 2.85 | 3.13 | 4.25 | 5.66 | 7.07 | 7.77 | 9.88 | 14.10 |
| Geo. Mean Diam (um) | | 0.52 | 0.66 | 0.77 | 0.90 | 1.21 | 1.64 | 2.06 | 2.55 | 2.98 | 3.65 | 4.91 | 6.33 | 7.41 | 8.76 | 11.81 |
| Purolator 3-stage | | | | | | | | | | | | | | | | |
| Run #1 | 03299907 | 97 | 98 | 99 | 99 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Run #2 | 03299909 | 96 | 98 | 99 | 99 | 99 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Run #3 | 03319903 | 96 | 98 | 99 | 99 | 99 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Average | | 97 | 98 | 99 | 99 | 99 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

Interpolated Efficiency Values (%) for Two-Stage Criteria:

| | |
|---|---|
| 2.60 um (> 10% required): | 100 |
| 5.00 um (> 50% required): | 100 |
| 8.10 um (> 90% required): | 100 |

Interpolated Efficiency Values (%) for Three-Stage Criteria:

| | |
|---|---|
| 0.70 um (> 75% required): | 98 |
| 1.10 um (> 85% required): | 99 |
| 2.50 um (> 95% required): | 100 |

HEPA Filter Control Test (applicable to both solid and liquid phase conditions)

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Run #1 | 03199907 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

Reference Filter QA Test

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Current | 03299905 | 2 | 2 | 4 | 6 | 8 | 15 | 26 | 45 | 62 | 76 | 89 | 93 | 93 | 93 | 92 |
| Baseline | 03189903 | 1 | 3 | 4 | 5 | 8 | 15 | 26 | 44 | 61 | 75 | 90 | 94 | 94 | 95 | 95 |
| Difference | | 1 | -1 | 0 | 1 | -1 | -1 | 0 | 1 | 0 | 0 | -1 | -1 | -1 | -2 | -2 |
| Acceptable (< 10%) | | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes |

| "No Filter" Control Tests | | Penetration For Each Size Range | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Run #1 | 03299906 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 1.00 | 1.00 | 1.03 | 1.00 | 0.94 | 0.97 | 0.96 |
| Run #2 | 03299908 | 1.00 | 1.00 | 0.99 | 0.99 | 1.00 | 1.01 | 0.99 | 1.00 | 1.01 | 1.02 | 1.02 | 1.00 | 0.98 | 1.02 | 1.01 |
| Run #3 | 03309901 | 1.01 | 1.01 | 1.00 | 1.02 | 1.02 | 1.03 | 1.01 | 1.02 | 1.03 | 1.04 | 1.03 | 0.97 | 0.99 | 0.83 | 0.93 |

**TABLE 3. SUMMARY OF LIQUID- PHASE TEST RESULTS**

Filtration Efficiency (%) at Indicated Size Range

| OPC Channel Number | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Min. Diam. (um) | | 0.28 | 0.37 | 0.47 | 0.52 | 0.66 | 0.94 | 1.22 | 1.51 | 1.88 | 2.07 | 2.83 | 3.77 | 4.71 | 5.18 | 6.60 |
| Max. Diam. (um) | | 0.37 | 0.47 | 0.52 | 0.66 | 0.94 | 1.22 | 1.51 | 1.88 | 2.07 | 2.83 | 3.77 | 4.71 | 5.18 | 6.60 | 9.43 |
| Geo. Mean Diam (um) | | 0.32 | 0.418 | 0.49 | 0.58 | 0.78 | 1.07 | 1.36 | 1.68 | 1.97 | 2.42 | 3.26 | 4.21 | 4.94 | 5.85 | 7.89 |
| Purolator 3-stage | | | | | | | | | | | | | | | | |
| Run #1 | 03309904 | 87 | 89 | 91 | 92 | 94 | 97 | 98 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Run #2 | 03309906 | 89 | 91 | 92 | 93 | 96 | 98 | 99 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Run #3 | 03319902 | 89 | 91 | 92 | 93 | 96 | 98 | 99 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Average | | 89 | 90 | 92 | 93 | 95 | 97 | 99 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

Interpolated Efficiency Values (%) for Two-Stage Criteria:

| | |
|---|---|
| 2.20 um (> 10% required): | 100 |
| 4.10 um (> 50% required): | 100 |
| 5.70 um (> 90% required): | 100 |

Interpolated Efficiency Values (%) for Three-Stage Criteria:

| | |
|---|---|
| 0.42 um (> 65% required): | 90 |
| 1.00 um (> 80% requried): | 97 |
| 2.00 um (> 95% required): | 100 |

| "No Filter" Control Tests | | Penetration For Each Size Range | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Run #1 | 03309903 | 0.99 | 0.99 | 0.99 | 1.00 | 1.00 | 0.99 | 1.00 | 0.99 | 1.00 | 1.00 | 1.01 | 0.97 | 0.94 | 0.86 | 0.72 |
| Run #2 | 03309905 | 0.98 | 0.99 | 0.98 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 1.00 | 1.00 | 1.01 | 0.99 | 0.93 | 0.93 | 0.77 |
| Run #3 | 03319901 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 | 1.01 | 1.02 | 1.00 | 1.01 | 1.01 | 1.01 | 0.99 | 1.05 | 1.06 |

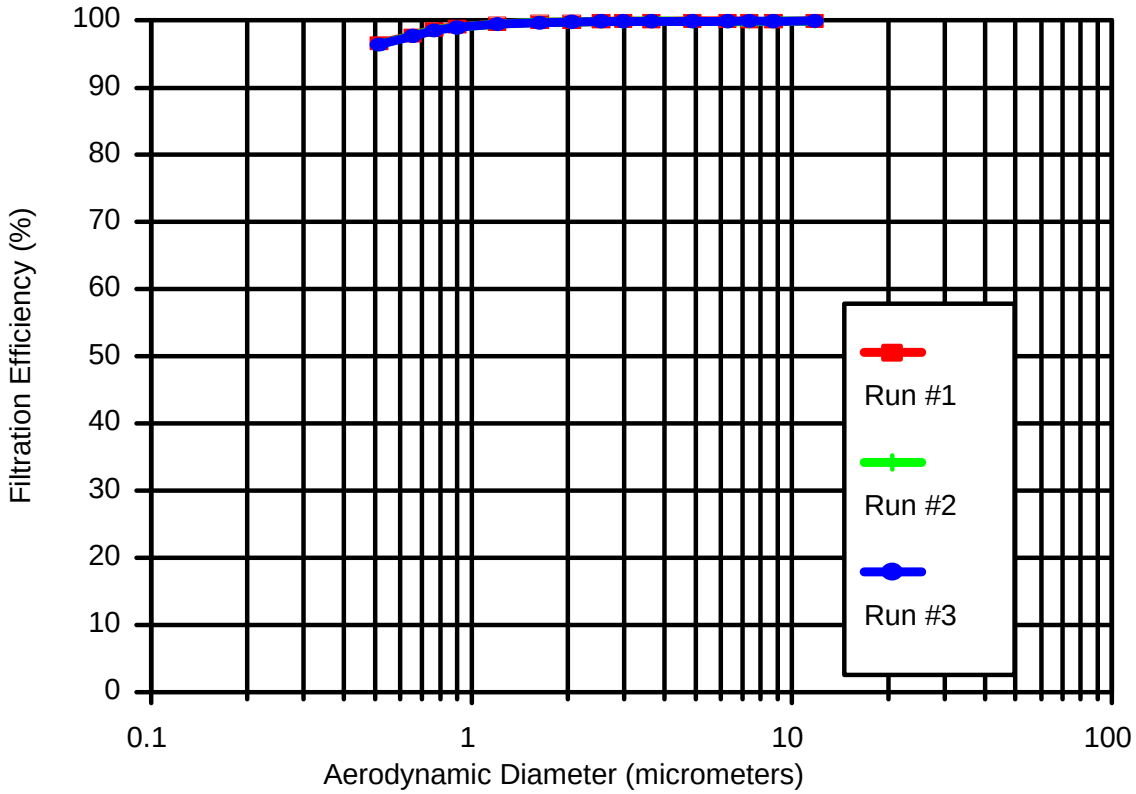



Figure 1. Triplicate solid-phase particle removal efficiency curves for Purolator D95084415, DMK80-4404, and PB2424 paint overspray arrestor.

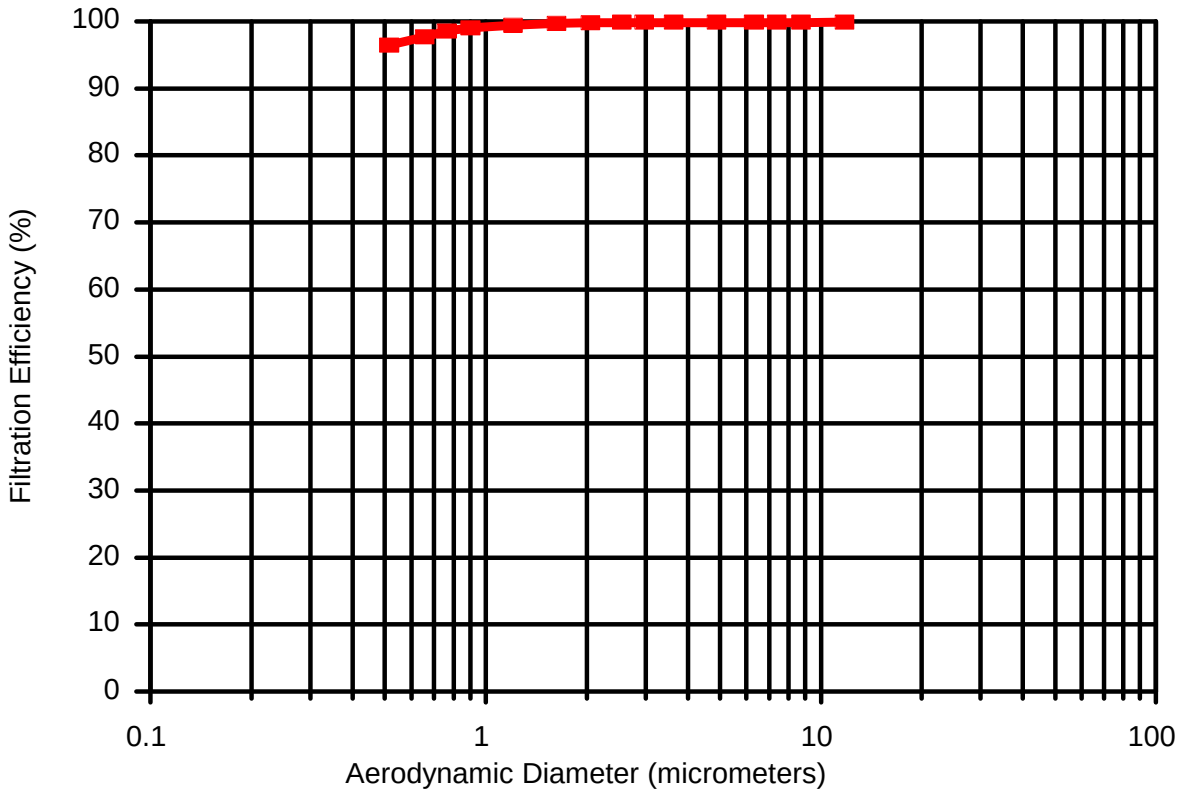



Figure 2. Average of the solid-phase particle removal efficiency curves for Purolator D95084415, DMK80-4404, and PB2424 paint overspray arrestor.

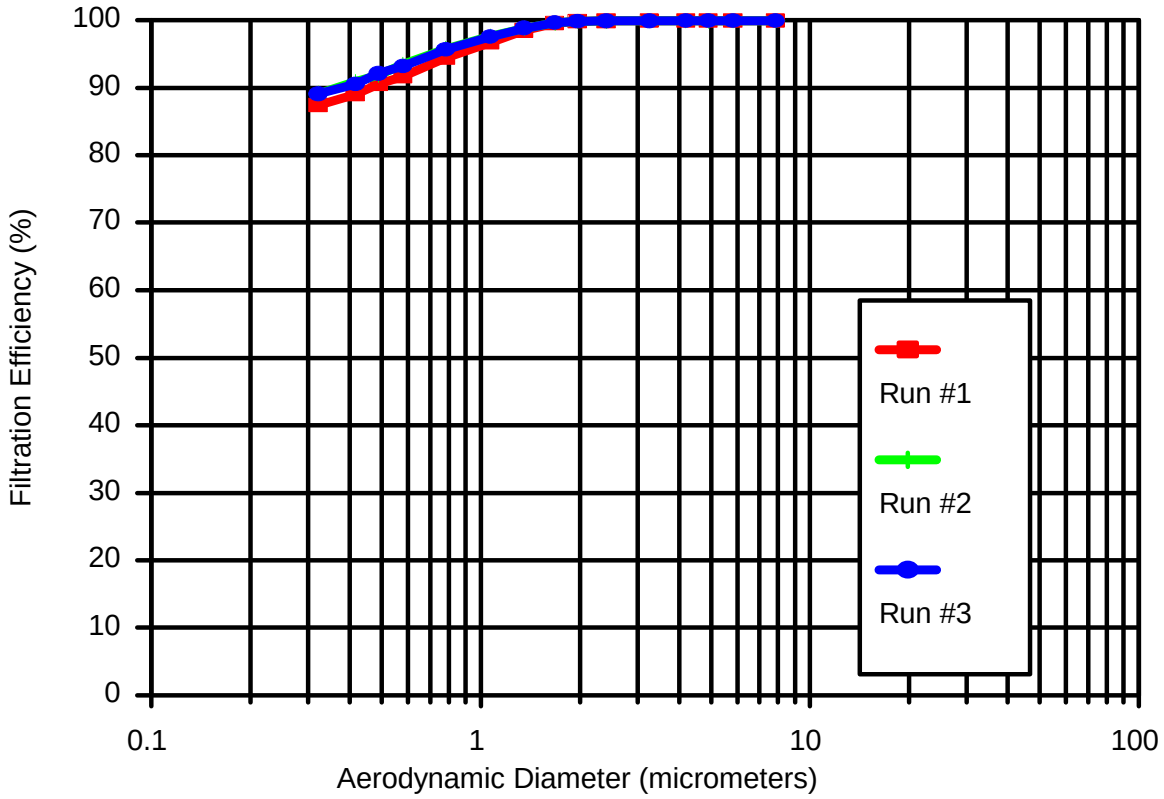



Figure 3. Triplicate liquid-phase particle removal efficiency curves for Purolator D95084415, DMK80-4404, and PB2424 paint overspray arrestor.

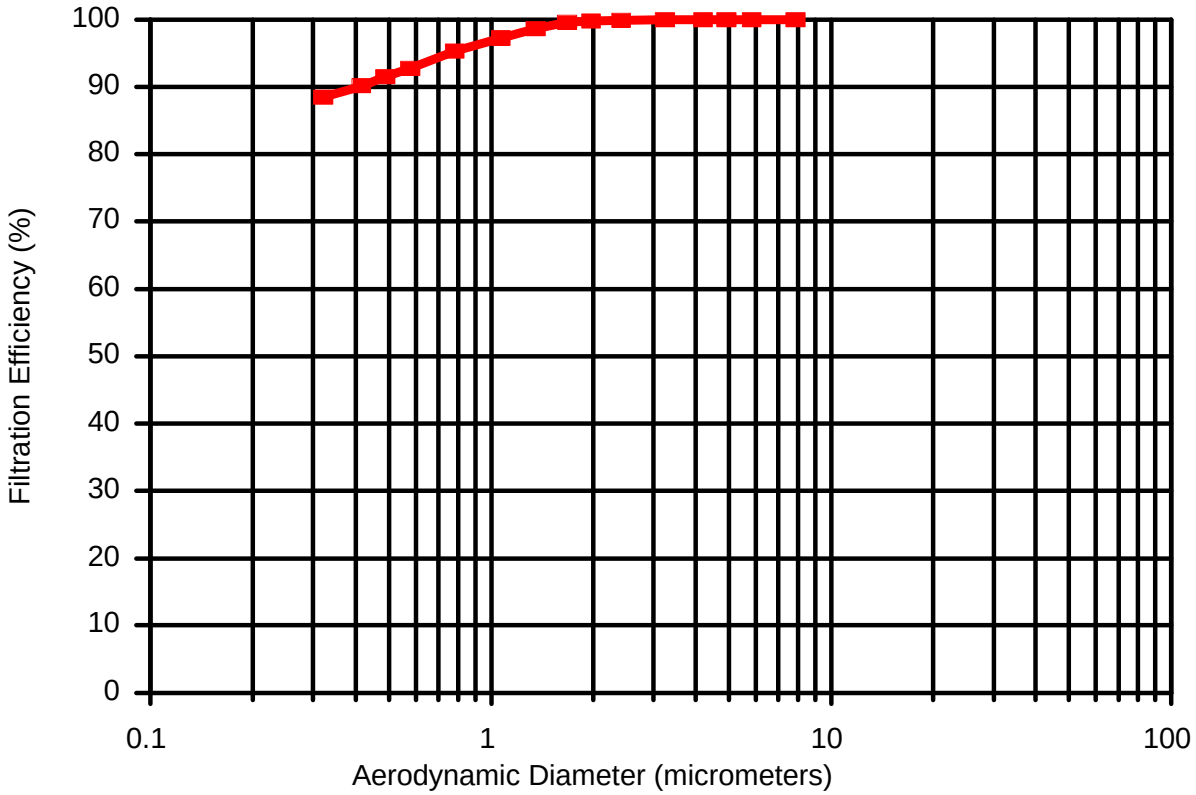



Figure 4. Average of the liquid-phase particle removal efficiency curves for Purolator D95084415, DMK80-4404, and PB2424 paint overspray arrestor.

**TABLE 4**

**SUMMARY OF PRESSURE DROP MEASUREMENTS**

| Test No. | Initial Pressure Drop (inch $H_2O$) |
|---|---|
| 03299907 | 0.23 |
| 03299909 | 0.24 |
| 03319903 | 0.23 |
| 03309904 | 0.26 |
| 03309906 | 0.23 |
| 03319902 | 0.22 |

**TABLE 5. 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 6. 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 7. 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 | 97 |
| > 0.42 | > 65 | 90 |

**TABLE 8. 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 | 99 |
| > 0.70 | > 75 | 98 |

*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.

## Appendix A

## DESCRIPTION OF THE TEST RIG AND METHODOLOGY

### TEST DUCT

The tests were conducted in RTI's air cleaner test facility (Figure A-1). The test rig's ducting was primarily of 24 x 24 in. (0.61 x 0.61m) cross section and made of 14-gauge stainless steel. The blower is rated at 15 hp (11 kW) with a flow capacity of 3000 cfm (1.4 $m^3/s$) at 13 in. $H_2O$ (3200 Pa). The inlet and outlet filter banks consist of two 24 x 24 x 2 in. (0.61 x 0.61 x 0.05 m) prefilters and two 24 x 24 x 12 in. (0.61 x 0.61 x 0.30 m) high efficiency particulate air (HEPA) filters rated at 2000 cfm (0.9 $m^3/s$) each. The system operates at positive pressure to minimize infiltration of room air.

To mix the test aerosol with the air stream, an orifice plate and mixing baffle were located immediately downstream of the aerosol injection point and upstream of the test arrestor. An identical orifice plate and mixing baffle were added after the 180° bend. The latter downstream orifice served two purposes. It straightened out the flow after going around the bend, and it mixed any aerosol that penetrated the air cleaning device. Mixing the penetrating aerosol with the air stream is necessary to obtain a representative downstream aerosol measurement.

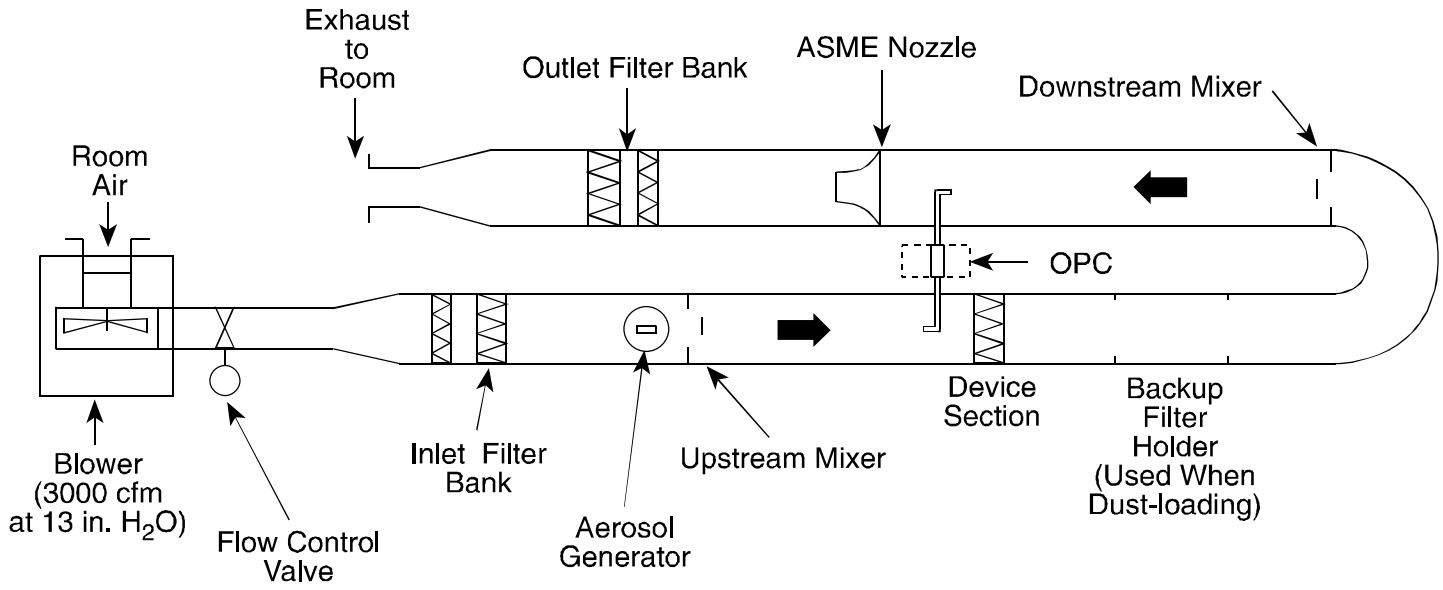
### AIRFLOW

Airflow was measured with a 4 in. (0.1 m) ID American Society of Mechanical Engineers (ASME) flow nozzle. The nominal velocity through the arrestor was computed by dividing the volumetric flow by the nominal face area of the device. Airflow was manually controlled by a 14 in. (0.36 m) diameter butterfly valve.

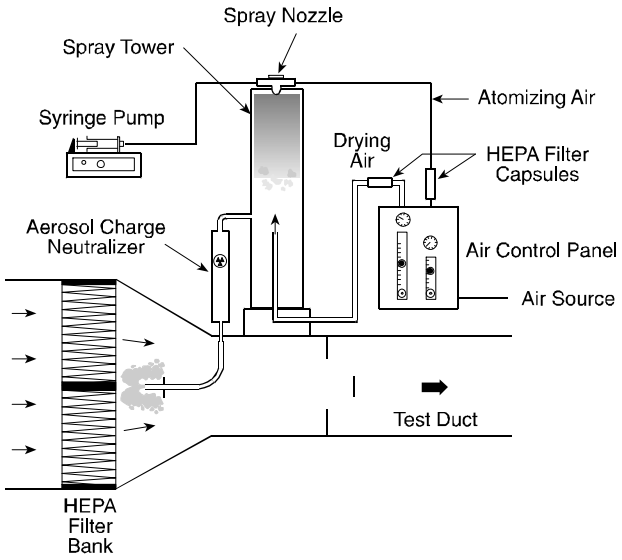
### OPTICAL PARTICLE COUNTER (OPC)

Aerosol concentrations were measured with a Climet Instruments Model 226 OPC. This OPC uses a white-light illumination source and has a wide collection angle for the scattered light. The OPC's sampling rate was 0.25 cfm (0.00012 $m^3/s$).

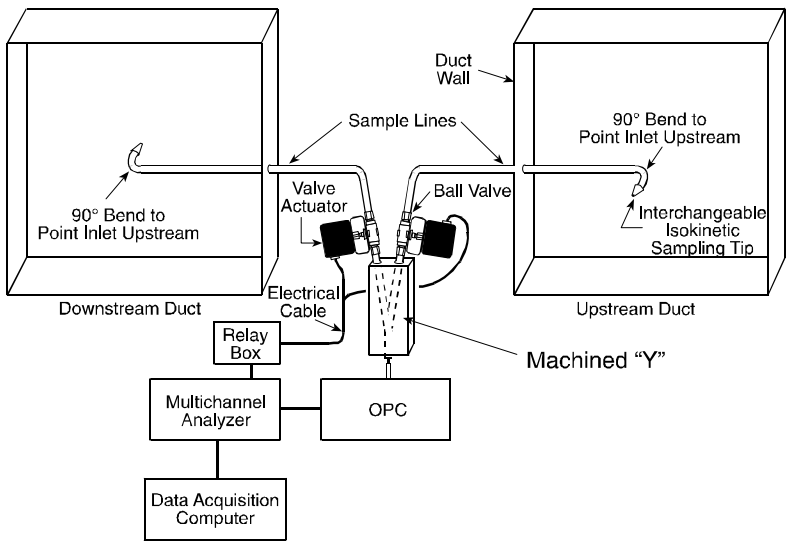
The output of the OPC was input to a Climet Instruments Model 8040 multichannel analyzer equipped with Model 05872005 and 05872006 input boards. These boards provide 16 sizing channels covering the range from 0.3 to 10 µm. The 8040 was also equipped with a Model CI-298 sequential interface board. This interface provides a contact closure at the end of each sample and also provides a 15-sec delay in particle counting after each sample. The contact closure was used to control the operation of electromechanical valve actuators in the upstream and downstream sample lines. The 15-sec delay allows time for the new sample to be acquired.




**Overview of Test Duct Configuration (Top View)**




**Aerosol Generation System (Side View)**




**Aerosol Sampling System (End View)**

**Figure A-1. Schematic illustration of the fractional efficiency test rig.**

## AEROSOL GENERATION

Two types of challenge aerosols were used: liquid- and solid-phase. The selection of liquid- or solid-phase challenge aerosol particles is important because for some types of paint arrestors significantly different filtration efficiencies will be achieved depending upon the phase of the challenge aerosol particles. (This is due to particle "bounce" associated with solid-phase particles.) The liquid-phase challenge aerosol is oleic acid, a non-toxic, low-volatility liquid. The solid-phase aerosol is potassium chloride (KCl) generated from an aqueous solution. KCl was selected as the solid-phase aerosol because of its relatively high water solubility, high deliquescence humidity (85% relative humidity), known crystalline structure (facilitates complete drying), and low toxicity. The KCl solution was prepared by combining 0.66 lb (300 g ) of KCl with 0.035 $ft^3$ (1 L) of distilled water. Both oleic acid and KCl are compatible with accurate measurement by the optical particle counter.

The oleic acid or the KCl solution was nebulized using a two-fluid (air and liquid) air atomizing nozzle (Spray Systems 1/4 J siphon spray nozzle) as illustrated in Figure A-1 (aerosol generation system). The nozzle was positioned at the top of a 12 in. (0.30 m) diameter, 51 in. (1.3 m) tall transparent acrylic spray tower. The tower served two purposes. It allowed the salt droplets to dry by providing an approximate 40 sec. mean residence time, and it allowed larger-sized particles (of either KCl or oleic acid) to fall out of the aerosol. After generation, the aerosol passed through a TSI Model 3054 aerosol neutralizer (Kr-85 radioactive source) to neutralize any electrostatic charge on the aerosol (electrostatic charging is an unavoidable consequence of most aerosol-generation methods).

The KCl solution or oleic acid was fed to the atomizing nozzle at 1.2 mL/min ($4.2 \times 10^{-5}$ $ft^3$/min) by means of a pump. Varying the operating air pressure of the generator allows control of the mean diameter of the challenge aerosol.

## AEROSOL SAMPLING SYSTEM

The aerosol sampling lines were 0.55 in. (14 mm) ID stainless steel lines and used gradual bends [radius of curvature = 2.25 in. (57 mm)] when needed. These dimensions were chosen to minimize particle losses in the sample lines. A custom-made "Y" fitting connected the upstream and downstream lines to the OPC. The two branches of the "Y" merged gradually to minimize particle loss in the intersection of the "Y" due to centrifugal or impaction forces.

Immediately above the "Y," electrically actuated ball valves were installed in each branch (Parker Model EA Electro-Mechanical Valve Actuator). The opening and closing of the valves were automatically controlled by the OPC's sequential sampling interface board. The valves take approximately 2 sec. to complete an opening or closing maneuver.

Isokinetic sampling nozzles of the appropriate entrance diameter were placed on the ends of the sample probes to maintain isokinetic sampling for all the test flow rates.

**TEST PROCEDURES**

The aerosol penetration of the test device was calculated from the average of 10 upstream and 10 downstream samples taken sequentially (i.e., one upstream, one downstream, one upstream, one downstream, . . . until 10 each were obtained). This sequential sampling scheme was selected to minimize the effect of aerosol generator variability. Each sample was 2 minutes in duration. The sampling also included background upstream and downstream measurements at the beginning and end of each test. The test sequence was as follows:

1. Warm up OPC and install proper sample tips for isokinetic sampling.
2. Install air cleaner test device and bring test duct to desired flow rate.
3. With the aerosol generator off, obtain five measurements of the upstream and downstream background particle counts.
4. Turn on the aerosol generator and allow it to run for a minimum of 10 minutes to stabilize.
5. After the stabilization period, obtain 10 upstream and 10 downstream particle counts using a repeated upstream-downstream sampling sequence until 10 each are obtained.
6. Turn off the aerosol generator. Wait 10 minutes, then obtain five additional upstream and downstream background measurements.

**CONTROL TESTS:**

In addition to evaluating the test arrestor, 0 and 100% penetration control tests and a reference filter control test were conducted to ensure that reliable measurements are obtained. The 100% penetration test was a relatively stringent test of the adequacy of the overall duct, sampling, measurement and aerosol generation system. These tests were performed as normal penetration tests except that the paint arrestor was not used. A perfect system would yield a measured penetration of 1 at all particle sizes. Deviations from 1 can occur due to particle losses in the duct, differences in the degree of aerosol uniformity (i.e., mixing) at the upstream and downstream probes, and differences in particle-transport efficiency in the upstream and downstream sampling lines. Results from the 100% penetration tests were used during data analysis to correct penetration measurements obtained during the arrestor tests.

The 0% penetration test was performed by using a HEPA filter rather than a paint arrestor. This test confirmed the adequacy of the instrument response time and sample line lag. The 0% penetration test was performed on a monthly basis.

The reference filter control test consisted of performing a solid-phase efficiency test on the same filter during each ETV test. The reference filter data from each test were compared to the original, baseline reference filter data to determine if there was any substantial change in the test system between the tests.

**DATA ANALYSIS**

*Nomenclature*

$U$ = Upstream particle count
$D$ = Downstream particle count
$U_b$ = Upstream background count
$D_b$ = Downstream background count
$P_o$ = observed penetration = $\bar{D}/\bar{U}$

$P_{100}$ = 100% penetration value determined from the control tests
P = Penetration corrected for $P_{100}$ value
Overbar: denotes arithmetic mean of quantity

Analysis of each test involves the following quantities:

- $P_{100}$ value for each sizing channel from the blank (no-filter) test,
- 2 upstream background values,
- 2 downstream background values,
- 10 upstream values with aerosol generator on, and
- 10 downstream values with aerosol generator on.

Using the values associated with each sizing channel, the penetration associated with each particle sizing channel was calculated as:

$$P = \{(\bar{D} - \bar{D}_b) / (\bar{U} - \bar{U}_b)\} / P_{100} \quad .$$

Filtration efficiency was then calculated as:

$$\text{Filtration Efficiency (\%)} = 100\ (1 - P).$$

**DEFINITION OF PARTICLE DIAMETER**

Over the 0.3 to 10 µm diameter size range, the "aerodynamic" particle diameter is often of more significance than the physical diameter (as measured by the OPC) relative to aerosol filtration and aerosol deposition within the human respiratory tract. The aerodynamic diameter ($D_{Aero}$) is related to the physical diameter ($D_{Physical}$) by:

$$D_{Aero} \quad ' \quad D_{Physical} \sqrt{\frac{?_{Particle}}{?_o} \quad \frac{CCF_{Physical}}{CCF_{Aero}} \quad \frac{1}{?}}$$

where

$?_{Particle}$ is the density of the particle in $g/cm^3$.

$?_o$ is unit density of 1 $g/cm^3$.

$CCF_{Physical}$ is the Cunningham Correction Factor at $D_{Physical}$.

$CCF_{Aero}$ is the Cunningham Correction Factor at $D_{Aero}$.

? is the dynamic shape factor.

For oleic acid droplets having a density of 0.89 $g/cm^3$ and being spherical (? = 1), the aerodynamic diameter will be about 6% smaller than the measured diameter.

KCl has a density of 1.98 $g/cm^3$. The KCl particles form from the evaporation of aqueous solution droplets. Because KCl has an inherent cubic crystalline structure, it is expected that the KCl particles will be cubic or relatively compact cubic clusters; however, their actual shape, or range of shapes, is unknown. Because the shape factor is

unknown, the shape factor for KCl is assigned a value of 1 and the diameter is termed the "nominal" aerodynamic diameter.

The aerodynamic diameters associated with the 15 OPC sizing channels are tabulated in Table A-1 for oleic acid and KCl. Also listed is the physical diameter size range for each channel based on the manufacturer's calibration curve using monodisperse polystyrene latex (PSL) spheres.

**Table A-1. Physical and Aerodynamic Sizing Channels for the Calibration and Test Aerosols**

| | Particle Diameter Size Range (μm)* | | |
|---|---|---|---|
| | PSL | OLEIC ACID | KCl |
| OPC Channel Number | Physical Diameter | Aerodynamic Diameter | Nominal Aerodynamic Diameter |
| 1 | 0.3 - 0.4 | 0.28 - 0.37 | 0.45 - 0.59 |
| 2 | 0.4 - 0.5 | 0.37 - 0.47 | 0.59 - 0.73 |
| 3 | 0.5 - 0.55 | 0.47 - 0.52 | 0.73 - 0.80 |
| 4 | 0.55 - 0.7 | 0.52 - 0.66 | 0.80 - 1.02 |
| 5 | 0.7 - 1.0 | 0.66 - 0.94 | 1.02 - 1.44 |
| 6 | 1.0 - 1.3 | 0.94 - 1.22 | 1.44 - 1.86 |
| 7 | 1.3 - 1.6 | 1.22 - 1.51 | 1.86 - 2.28 |
| 8 | 1.6 - 2 | 1.51 - 1.88 | 2.28 - 2.85 |
| 9 | 2 - 2.2 | 1.88 - 2.07 | 2.85 - 3.13 |
| 10 | 2.2 - 3 | 2.07 - 2.83 | 3.13 - 4.25 |
| 11 | 3 - 4 | 2.83 - 3.77 | 4.25 - 5.66 |
| 12 | 4 - 5 | 3.77 - 4.71 | 5.66 - 7.07 |
| 13 | 5 - 5.5 | 4.71 - 5.18 | 7.07 - 7.77 |
| 14 | 5.5 - 7 | 5.18 - 6.60 | 7.77 - 9.88 |
| 15 | 7 - 10 | 6.60 - 9.43 | 9.88 - 14.1 |

*The particle diameter size ranges are defined as greater than the indicated lower limit and less than or equal to the indicated upper limit.

# APPENDIX B

## Certificates of Calibration

# Certificate of Traceability

## 8500D-II THERMOANEMOMETER

**Model No. 8500D-II** **Serial No. 3810** **Part No. 634493200**

Certificate Number: **1046** Date: **26-Oct-98** P.O. **00329** Order/RMA: **104538**

Customer Number:

*Calibration Standards Information*

*The following standards and equipment were used as references for this calibration.*

| Tested By | Date Tested | Inst. No. | Cal. Due | NIST Test Numbers |
|---|---|---|---|---|
| LOZADA | 10/23/98 | 747 | 4/9/00 | 259340;257602;258909;258599;260222;811/258622; |
| | | 746 | 4/9/00 | 811/258522;811/260178; |
| | | 922 | 6/8/00 | 836/259947-98 ; |
| | | 881 | 11/16/98 | 811/257078 ; 247770 ; 253806 ; 811/255474 ; 253699 ; USN22783C ; Chem. Const. ; 254227 ; 811/254736 ; 811/251992 ; 251971 ; 811/251741 ; 811/253662 ; 811/256216 ; 611802 ; |
| | | 857 | 6/8/00 | 836/259947-98 ; ; |
| | | 794 | 3/18/99 | |
| | | 666 | 2/21/00 | 811/255765 ; 251971 ; 811/259304-98 ; 811/257773 ; 256216 ; ; |
| | | 399 | 11/12/98 | P-8531A ; P-8531B ; 38126 ; 254160 ; 255302 ; |
| | | 326 | 2/4/99 | P-8531A ; P-8531B ; 38126 ; 254160 ; 259009 ; |
| | | 319 | 11/12/98 | P-8531A ; P-8531B ; 38126 ; 254160 ; 255302 ; |
| | | 301 | 12/11/98 | 836/257126-96 ; |



Reviewed by

26-Oct-98

Date

ALNOR
A TSI® Company

**Alnor Instrument Company**
7555 N. Linder Avenue, Skokie, IL 60077
Tel. 847-677-3500 Fax. 847-677-3539

Meriam Instrument
a Scott Fetzer company

FILE NO. 040FB:001-19
PAGE 1 OF 1

LETTER OF CERTIFICATION
LAMINAR FLOW ELEMENT

CUSTOMER NAME: RESEARCH TRIANGLE INST

CUSTOMER ORDER NUMBER: 00161

MERIAM ORDER NUMBER: 772900

Meriam Instrument certifies that the completed LFE unit has been calibrated and correlated at several points of flow rate using a Meriam Standard, which is controlled per the calibration system requirements of ANSI Z540-1 and traceable to the National Institute of Standards and Technology. The collective uncertainty of the measurement standards has a 1:1 ratio to the acceptable tolerance for the flow rate being calibrated.

The total rss uncertainty of the completed laminar flow unit is +/- .72 % of reading.

CUSTOMER ID NO.: 013716

MODEL NO.: 50MH10-8 SERIAL NO.: 758860-K1

FLOW CURVE/TABLE NO.: 30624

DATE OF CALIBRATION 11-11-1998 BY GEORGE ROBOTKAY

AS RECEIVED CONDITION: √ In Tolerance ____Out of Tolerance ____NA

AS LEFT CONDITION : √ In Tolerance ____Out of Tolerance ____NA

CALIBRATION INTERVAL: TO BE DETERMINED BY CUSTOMER BASED ON USAGE OF LFE.

| FLOW STANDARD SERIAL NO. | DATE OF LAST CAL | DATE OF NEXT CAL |
|---|---|---|
| WMMC2-6 | JAN 1998 | JAN 1999 |

The LFE unit listed hereon has been successfully calibrated in accordance with Meriam Instrument Procedure A-35822.

QUALITY ASSURANCE INSPECTOR
MERIAM INSTRUMENT

Jack Weigand
QUALITY ASSURANCE MANAGER
MERIAM INSTRUMENT

10920 Madison Avenue • Cleveland, Ohio 44102 • (216) 281-1100 • FAX (216) 281-0228
www.meriam.com

# CLIMET INSTRUMENTS COMPANY

1320 WEST COLTON AVE., REDLANDS, CA 92374 • PHONE: (909) 793-2788 • FAX: (909) 793-1738


## CERTIFICATE OF CALIBRATION

### INSTRUMENT CALIBRATED

MODEL: 226 aerosol particle counter, S/N 61882

CONTROL NUMBER: LC503501

DATE CALIBRATED: 2/4/99 NEXT CALIBRATION: 8/4/99

RECOMMENDED CALIBRATION INTERVAL: 6 months

L. Sparks
CALIBRATED BY

Jan R. Custer
APPROVED BY

### TRACEABILITY STATEMENT

This instrument has been calibrated in accordance with ISO 10012-1/ANSI Z540-1 (which replaces MIL-STD-45662A) and relevant portions of Federal Standards 209, ASTM F-50, F322, and F328.

Temperature and Relative Humidity are not controlled during calibration because of the wide operating range of the instrument. The operating limits of this instrument are:

TEMPERATURE: 30°F TO 122°F
HUMIDITY: 0-100%, non-condensing

All test equipment used in the calibration of Climet Instruments' products is calibrated at six-month intervals by an outside calibration service. Calibration certificates for each piece of test equipment are on file at Climet; copies will be supplied if requested.

Calibration traceability to a National Measurement Standard (NMS) is established by using mono-disperse latex spheres as a calibration standard. These spheres are sized by methods traceable, by lot number, to the National Institute of Science and Technology.

**APPENDIX C**

**Fractional Efficiency Data Sheets**

Key to notation used in the following tables:

| | |
|---|---|
| Diam. | Particle Diameter (µm) |
| U. Bckgrnd: | The upstream background particle counts measured with the aerosol generator off. |
| Upstream: | The upstream particle counts measured with the aerosol generator on. |
| D. Bckgrnd: | The downstream background particle counts measured with the aerosol generator off. |
| Downstream: | The downstream particle counts measured with the aerosol generator on. |
| Meas. Penetration: | The penetration computed as: |

$$Meas.\ Penetration = \frac{(\ Downstream\ \ \&\ \ D.\ Bckgrnd\ )}{(\ Upstream\ \ \&\ \ U.\ Bckgrnd\ )}$$

| | |
|---|---|
| P100 Correction Values: | Penetration values measured with no filter in the test section. These values are used to correct subsequent penetration measurements for particle losses within the test duct and sampling system. |
| Corrected Penetration: | The measured penetration corrected by the P100 values: |

$$Corrected\ Penetration = \frac{Meas.Penetration}{P100\ \ Correction\ \ Values}$$

| | |
|---|---|
| Corrected Efficiency (%): | 100 x ( 1 - Corrected Penetration ) |
| DQO | Data Quality Objective |

Test No. 03299904
No Filter
Solid-Phase

Particle Counts per Indicated OPC Channel (1-Minute Samples @ 7.1 L/min)

| OPC Channel Number | | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Min. Diam. (um) | | | | | | 0.45 | 0.59 | 0.73 | 0.80 | 1.02 | 1.44 | 1.86 | 2.28 | 2.85 | 3.13 | 4.25 | 5.66 | 7.07 | 7.77 | 9.88 |
| Max. Diam. (um) | | | | | | 0.59 | 0.73 | 0.80 | 1.02 | 1.44 | 1.86 | 2.28 | 2.85 | 3.13 | 4.25 | 5.66 | 7.07 | 7.77 | 9.88 | 14.10 |
| Geo. Mean Diam (um) | | | | | | 0.52 | 0.66 | 0.77 | 0.90 | 1.21 | 1.64 | 2.06 | 2.55 | 2.98 | 3.65 | 4.91 | 6.33 | 7.41 | 8.76 | 11.81 |
| ENTER DATA BELOW | | | | | | | | | | | | | | | | | | | | |
| U. Bckgrnd | 1 | 01 | 03-29-1999 | 09:31:34 | 01:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Upstream | 1 | 01 | 03-29-1999 | 09:39:28 | 01:00 | 10550 | 15720 | 5151 | 9104 | 13430 | 8282 | 10930 | 10210 | 2555 | 5375 | 3038 | 940 | 137 | 251 | 157 |
| Upstream | 1 | 01 | 03-29-1999 | 09:41:58 | 01:00 | 10440 | 15600 | 4987 | 9032 | 13570 | 8395 | 10610 | 9886 | 2459 | 5151 | 2959 | 945 | 161 | 248 | 154 |
| Upstream | 1 | 01 | 03-29-1999 | 09:44:28 | 01:00 | 10370 | 15250 | 4851 | 8994 | 13330 | 8075 | 10380 | 10050 | 2452 | 5043 | 3057 | 940 | 172 | 273 | 159 |
| Upstream | 1 | 01 | 03-29-1999 | 09:46:58 | 01:00 | 10360 | 15500 | 4861 | 8785 | 13170 | 8143 | 10540 | 9876 | 2419 | 5259 | 3062 | 1022 | 169 | 245 | 164 |
| Upstream | 1 | 01 | 03-29-1999 | 09:49:28 | 01:00 | 10240 | 15410 | 4874 | 8745 | 13340 | 8217 | 10260 | 9922 | 2451 | 5209 | 3049 | 1058 | 162 | 282 | 171 |
| Upstream | 1 | 01 | 03-29-1999 | 09:51:58 | 01:00 | 10160 | 15040 | 4985 | 8709 | 12960 | 8107 | 10340 | 9964 | 2416 | 5326 | 3187 | 1017 | 162 | 266 | 153 |
| Upstream | 1 | 01 | 03-29-1999 | 09:54:28 | 01:00 | 10100 | 15190 | 4832 | 8761 | 13240 | 7927 | 10300 | 9858 | 2386 | 5097 | 3044 | 983 | 127 | 271 | 167 |
| Upstream | 1 | 01 | 03-29-1999 | 09:56:58 | 01:00 | 10620 | 15840 | 5006 | 9490 | 13840 | 8390 | 10880 | 10490 | 2630 | 5361 | 3288 | 1104 | 172 | 273 | 219 |
| Upstream | 1 | 01 | 03-29-1999 | 09:59:28 | 01:00 | 10360 | 15440 | 4867 | 8976 | 13280 | 8438 | 10580 | 10110 | 2455 | 5218 | 3271 | 1044 | 165 | 287 | 170 |
| Upstream | 1 | 01 | 03-29-1999 | 10:01:58 | 01:00 | 10490 | 15650 | 4920 | 9147 | 13890 | 8393 | 10600 | 10100 | 2413 | 5377 | 3142 | 1106 | 160 | 295 | 194 |
| U. Bckgrnd | 1 | 01 | 03-29-1999 | 10:09:59 | 01:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| ENTER DATA BELOW | | | | | | | | | | | | | | | | | | | | |
| D. Bckgrnd | 2 | 01 | 03-29-1999 | 09:32:49 | 01:00 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-29-1999 | 09:40:43 | 01:00 | 10300 | 15410 | 5052 | 9035 | 13260 | 8165 | 10640 | 10080 | 2460 | 5158 | 3183 | 988 | 153 | 261 | 152 |
| Downstream | 2 | 01 | 03-29-1999 | 09:43:13 | 01:00 | 10480 | 15440 | 5047 | 9051 | 13480 | 8232 | 10650 | 9789 | 2485 | 5285 | 3041 | 967 | 152 | 264 | 157 |
| Downstream | 2 | 01 | 03-29-1999 | 09:45:43 | 01:00 | 10440 | 15260 | 4931 | 9053 | 13250 | 8190 | 10420 | 9964 | 2510 | 5293 | 3097 | 1006 | 154 | 250 | 175 |
| Downstream | 2 | 01 | 03-29-1999 | 09:48:13 | 01:00 | 10300 | 15330 | 4897 | 8942 | 13340 | 8072 | 10260 | 10090 | 2534 | 5356 | 3160 | 1038 | 169 | 246 | 170 |
| Downstream | 2 | 01 | 03-29-1999 | 09:50:43 | 01:00 | 10260 | 15320 | 4891 | 8967 | 13190 | 8080 | 10380 | 9940 | 2535 | 5344 | 3069 | 964 | 151 | 241 | 190 |
| Downstream | 2 | 01 | 03-29-1999 | 09:53:13 | 01:00 | 10200 | 15270 | 4827 | 8998 | 13120 | 8020 | 10380 | 10020 | 2554 | 5184 | 3217 | 995 | 174 | 258 | 170 |
| Downstream | 2 | 01 | 03-29-1999 | 09:55:43 | 01:00 | 10190 | 15080 | 4855 | 9013 | 13540 | 8046 | 10500 | 9958 | 2549 | 5356 | 3250 | 1064 | 164 | 270 | 183 |
| Downstream | 2 | 01 | 03-29-1999 | 09:58:13 | 01:00 | 10360 | 15180 | 4995 | 9209 | 13770 | 8241 | 10640 | 10090 | 2519 | 5371 | 3184 | 1110 | 168 | 270 | 166 |
| Downstream | 2 | 01 | 03-29-1999 | 10:00:43 | 01:00 | 10500 | 15660 | 4850 | 9240 | 13860 | 8252 | 10660 | 10180 | 2560 | 5421 | 3284 | 1087 | 169 | 299 | 167 |
| Downstream | 2 | 01 | 03-29-1999 | 10:03:13 | 01:00 | 10210 | 15200 | 4897 | 8946 | 13310 | 8022 | 10050 | 9904 | 2597 | 5249 | 3205 | 1144 | 166 | 271 | 144 |
| D. Bckgrnd | 2 | 01 | 03-29-1999 | 10:11:14 | 01:00 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Meas. Penetration | | | | | | 1.00 | 0.99 | 1.00 | 1.01 | 1.00 | 0.99 | 0.99 | 1.00 | 1.03 | 1.01 | 1.02 | 1.02 | 1.02 | 0.98 | 0.98 |
| P100 correction values | | | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Corrected Penetration | | | | | | 1.00 | 0.99 | 1.00 | 1.01 | 1.00 | 0.99 | 0.99 | 1.00 | 1.03 | 1.01 | 1.02 | 1.02 | 1.02 | 0.98 | 0.98 |
| Corrected Efficiency (%) | | | | | | 0 | 1 | 0 | -1 | 0 | 1 | 1 | 0 | -3 | -1 | -2 | -2 | -2 | 2 | 2 |
| Data Acceptance Criteria: | | | | | | | | | | | | | | | | | | | | |
| Total Challenge Counts for Each Channel: | | | | | | 103690 | 154640 | 49334 | 89743 | 134050 | 82367 | 105420 | 100466 | 24636 | 52416 | 31097 | 10159 | 1587 | 2691 | 1708 |
| Data Quality Objective: | | | | | | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 |
| Does this meet DQO: | | | | | | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Standard Deviation of Penetration for Each Channel : | | | | | | 0.02 | 0.02 | 0.03 | 0.03 | 0.03 | 0.02 | 0.03 | 0.02 | 0.03 | 0.03 | 0.04 | 0.09 | 0.11 | 0.09 | 0.14 |
| Data Quality Objective: | | | | | | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | < 0.30 | < 0.30 | < 0.30 | < 0.30 | < 0.30 | < 0.30 |
| Does this meet DQO: | | | | | | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Maximum observed particle concentration (#/cc): | | | | | | 13.8 | | | | | | | | | | | | | | |
| Data Quality Objective: max. allowable conc. (#/cc): | | | | | | < 23 | | | | | | | | | | | | | | |
| Does this meet the DQO: | | | | | | Yes, (applies to all channels) | | | | | | | | | | | | | | |

Test No. 03299905
Arrestor
Solid-Phase

Particle Counts per Indicated OPC Channel (1-Minute Samples @ 7.1 L/min)

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OPC Channel Number | | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| Min. Diam. (um) | | | | | | 0.45 | 0.59 | 0.73 | 0.80 | 1.02 | 1.44 | 1.86 | 2.28 | 2.85 | 3.13 | 4.25 | 5.66 | 7.07 | 7.77 | 9.88 |
| Max. Diam. (um) | | | | | | 0.59 | 0.73 | 0.80 | 1.02 | 1.44 | 1.86 | 2.28 | 2.85 | 3.13 | 4.25 | 5.66 | 7.07 | 7.77 | 9.88 | 14.10 |
| Geo. Mean Diam (um) | | | | | | 0.52 | 0.66 | 0.77 | 0.90 | 1.21 | 1.64 | 2.06 | 2.55 | 2.98 | 3.65 | 4.91 | 6.33 | 7.41 | 8.76 | 11.81 |
| ENTER DATA BELOW | | | | | | | | | | | | | | | | | | | | |
| U. Bckgrnd | 1 | 01 | 03-29-1999 | 10:30:41 | 01:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Upstream | 1 | 01 | 03-29-1999 | 10:39:34 | 01:00 | 10600 | 15810 | 5097 | 9334 | 13570 | 8370 | 10840 | 10200 | 2505 | 5275 | 3200 | 1032 | 165 | 307 | 208 |
| Upstream | 1 | 01 | 03-29-1999 | 10:42:04 | 01:00 | 10520 | 15970 | 4964 | 9001 | 13480 | 8207 | 10570 | 10110 | 2395 | 5164 | 3000 | 1039 | 156 | 261 | 197 |
| Upstream | 1 | 01 | 03-29-1999 | 10:44:34 | 01:00 | 10190 | 15250 | 4989 | 8931 | 13160 | 8223 | 10380 | 10010 | 2498 | 5270 | 3001 | 1024 | 168 | 285 | 173 |
| Upstream | 1 | 01 | 03-29-1999 | 10:47:04 | 01:00 | 10280 | 15000 | 5109 | 8951 | 13310 | 8055 | 10390 | 9874 | 2349 | 5254 | 3188 | 1030 | 193 | 265 | 193 |
| Upstream | 1 | 01 | 03-29-1999 | 10:49:34 | 01:00 | 10210 | 15240 | 4873 | 8894 | 13150 | 7908 | 10390 | 9748 | 2398 | 5254 | 3210 | 1035 | 187 | 295 | 217 |
| Upstream | 1 | 01 | 03-29-1999 | 10:52:04 | 01:00 | 10060 | 14770 | 4702 | 8660 | 13150 | 7913 | 10200 | 9851 | 2476 | 5216 | 3127 | 1100 | 167 | 298 | 197 |
| Upstream | 1 | 01 | 03-29-1999 | 10:54:34 | 01:00 | 10160 | 15030 | 4909 | 8728 | 13100 | 7879 | 10200 | 9977 | 2465 | 5165 | 3140 | 1088 | 158 | 317 | 180 |
| Upstream | 1 | 01 | 03-29-1999 | 10:57:04 | 01:00 | 9783 | 14460 | 4692 | 8623 | 12770 | 7931 | 9907 | 9867 | 2463 | 5137 | 3161 | 1078 | 191 | 300 | 208 |
| Upstream | 1 | 01 | 03-29-1999 | 10:59:34 | 01:00 | 10320 | 15290 | 4912 | 9399 | 13610 | 8143 | 10380 | 10170 | 2476 | 5283 | 3394 | 1089 | 165 | 292 | 203 |
| Upstream | 1 | 01 | 03-29-1999 | 11:02:04 | 01:00 | 10180 | 14940 | 4874 | 8892 | 13400 | 8196 | 10250 | 10150 | 2557 | 5398 | 3212 | 1099 | 196 | 275 | 232 |
| U. Bckgrnd | 1 | 01 | 03-29-1999 | 11:10:00 | 01:00 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ENTER DATA BELOW | | | | | | | | | | | | | | | | | | | | |
| D. Bckgrnd | 2 | 01 | 03-29-1999 | 10:31:56 | 01:00 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-29-1999 | 10:40:49 | 01:00 | 10440 | 15270 | 4803 | 8804 | 12330 | 7091 | 7841 | 5659 | 995 | 1320 | 357 | 90 | 11 | 19 | 19 |
| Downstream | 2 | 01 | 03-29-1999 | 10:43:19 | 01:00 | 10240 | 15130 | 4739 | 8415 | 12230 | 6877 | 7620 | 5341 | 979 | 1198 | 363 | 93 | 15 | 25 | 19 |
| Downstream | 2 | 01 | 03-29-1999 | 10:45:49 | 01:00 | 10150 | 14950 | 4700 | 8558 | 12300 | 6972 | 7713 | 5521 | 930 | 1310 | 398 | 78 | 16 | 18 | 19 |
| Downstream | 2 | 01 | 03-29-1999 | 10:48:19 | 01:00 | 9928 | 14670 | 4762 | 8435 | 12150 | 6842 | 7667 | 5473 | 1026 | 1408 | 335 | 74 | 9 | 32 | 17 |
| Downstream | 2 | 01 | 03-29-1999 | 10:50:49 | 01:00 | 9778 | 14390 | 4643 | 8295 | 11990 | 6712 | 7552 | 5417 | 934 | 1237 | 336 | 80 | 15 | 24 | 19 |
| Downstream | 2 | 01 | 03-29-1999 | 10:53:19 | 01:00 | 9763 | 14560 | 4639 | 8283 | 12030 | 6653 | 7556 | 5535 | 1011 | 1345 | 377 | 87 | 15 | 21 | 11 |
| Downstream | 2 | 01 | 03-29-1999 | 10:55:49 | 01:00 | 9982 | 14620 | 4622 | 8489 | 12150 | 6836 | 7480 | 5399 | 944 | 1273 | 406 | 79 | 12 | 19 | 12 |
| Downstream | 2 | 01 | 03-29-1999 | 10:58:19 | 01:00 | 9938 | 14360 | 4642 | 8478 | 12320 | 6818 | 7631 | 5501 | 980 | 1279 | 322 | 60 | 14 | 17 | 16 |
| Downstream | 2 | 01 | 03-29-1999 | 11:00:49 | 01:00 | 10030 | 14700 | 4788 | 8613 | 12390 | 6724 | 7638 | 5573 | 964 | 1235 | 325 | 52 | 8 | 9 | 14 |
| Downstream | 2 | 01 | 03-29-1999 | 11:03:19 | 01:00 | 9972 | 14550 | 4704 | 8513 | 12450 | 6642 | 7750 | 5657 | 921 | 1261 | 308 | 69 | 12 | 11 | 2 |
| D. Bckgrnd | 2 | 01 | 03-29-1999 | 11:11:15 | 01:00 | 7 | 6 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| Meas. Penetration | | | | | | 0.98 | 0.97 | 0.96 | 0.95 | 0.92 | 0.84 | 0.74 | 0.55 | 0.39 | 0.25 | 0.11 | 0.07 | 0.07 | 0.07 | 0.07 |
| P100 correction values | | | | | | 1.00 | 0.99 | 1.00 | 1.01 | 1.00 | 0.99 | 0.99 | 1.00 | 1.03 | 1.01 | 1.02 | 1.02 | 1.02 | 0.98 | 0.98 |
| Corrected Penetration | | | | | | 0.98 | 0.98 | 0.96 | 0.94 | 0.92 | 0.85 | 0.74 | 0.55 | 0.38 | 0.24 | 0.11 | 0.07 | 0.07 | 0.07 | 0.08 |
| Corrected Efficiency (%) | | | | | | 2 | 2 | 4 | 6 | 8 | 15 | 26 | 45 | 62 | 76 | 89 | 93 | 93 | 93 | 92 |
| Data Acceptance Criteria: | | | | | | | | | | | | | | | | | | | | |
| Total Challenge Counts for Each Channel: | | | | | | 102303 | 151760 | 49121 | 89413 | 132700 | 80825 | 103507 | 99957 | 24582 | 52416 | 31633 | 10614 | 1746 | 2895 | 2008 |
| Data Quality Objective: | | | | | | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 |
| Does this meet DQO: | | | | | | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Standard Deviation of Penetration for Each Channel : | | | | | | 0.03 | 0.04 | 0.03 | 0.03 | 0.02 | 0.02 | 0.02 | 0.01 | 0.02 | 0.01 | 0.01 | 0.01 | 0.02 | 0.02 | 0.03 |
| Data Quality Objective: | | | | | | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | < 0.30 | < 0.30 | < 0.30 | < 0.30 | < 0.30 | < 0.30 |
| Does this meet DQO: | | | | | | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Maximum observed particle concentration (#/cc): | | | | | | 13.7 | | | | | | | | | | | | | | |
| Data Quality Objective: max. allowable conc. (#/cc): | | | | | | < 23 | | | | | | | | | | | | | | |
| Does this meet the DQO: | | | | | | Yes, (applies to all channels) | | | | | | | | | | | | | | |

Test No. 03299906
No Filter
Solid-Phase

Particle Counts per Indicated OPC Channel (1-Minute Samples @ 7.1 L/min)

| OPC Channel Number | | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Min. Diam. (um) | | | | | | 0.45 | 0.59 | 0.73 | 0.80 | 1.02 | 1.44 | 1.86 | 2.28 | 2.85 | 3.13 | 4.25 | 5.66 | 7.07 | 7.77 | 9.88 |
| Max. Diam. (um) | | | | | | 0.59 | 0.73 | 0.80 | 1.02 | 1.44 | 1.86 | 2.28 | 2.85 | 3.13 | 4.25 | 5.66 | 7.07 | 7.77 | 9.88 | 14.10 |
| Geo. Mean Diam (um) | | | | | | 0.52 | 0.66 | 0.77 | 0.90 | 1.21 | 1.64 | 2.06 | 2.55 | 2.98 | 3.65 | 4.91 | 6.33 | 7.41 | 8.76 | 11.81 |
| ENTER DATA BELOW | | | | | | | | | | | | | | | | | | | | |
| U. Bckgrnd | 1 | 01 | 03-29-1999 | 11:26:52 | 01:00 | 2 | 3 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Upstream | 1 | 01 | 03-29-1999 | 11:35:52 | 01:00 | 11180 | 16700 | 5362 | 9546 | 14390 | 8831 | 11320 | 10540 | 2692 | 5587 | 3249 | 1068 | 173 | 284 | 208 |
| Upstream | 1 | 01 | 03-29-1999 | 11:38:22 | 01:00 | 11130 | 17030 | 5330 | 9710 | 14550 | 8879 | 11440 | 10740 | 2627 | 5509 | 3288 | 1137 | 177 | 291 | 209 |
| Upstream | 1 | 01 | 03-29-1999 | 11:40:52 | 01:00 | 11160 | 16450 | 5258 | 9636 | 14640 | 8751 | 11330 | 10630 | 2581 | 5497 | 3252 | 1129 | 207 | 276 | 180 |
| Upstream | 1 | 01 | 03-29-1999 | 11:43:22 | 01:00 | 10930 | 16190 | 5167 | 9556 | 13890 | 8656 | 11100 | 10360 | 2449 | 5226 | 3235 | 1032 | 201 | 304 | 198 |
| Upstream | 1 | 01 | 03-29-1999 | 11:45:52 | 01:00 | 10950 | 16820 | 5257 | 9612 | 14070 | 8658 | 11150 | 10330 | 2582 | 5350 | 3267 | 1088 | 150 | 273 | 189 |
| Upstream | 1 | 01 | 03-29-1999 | 11:50:52 | 01:00 | 10210 | 15310 | 4856 | 8948 | 13510 | 8190 | 10480 | 9927 | 2532 | 5298 | 3253 | 1082 | 181 | 317 | 235 |
| Upstream | 1 | 01 | 03-29-1999 | 11:53:22 | 01:00 | 10500 | 15470 | 5003 | 9129 | 13330 | 8121 | 10660 | 10290 | 2584 | 5226 | 3259 | 1215 | 191 | 324 | 201 |
| Upstream | 1 | 01 | 03-29-1999 | 11:55:52 | 01:00 | 10220 | 15350 | 4870 | 9099 | 13580 | 8232 | 10560 | 10120 | 2423 | 5435 | 3178 | 1107 | 197 | 315 | 204 |
| Upstream | 1 | 01 | 03-29-1999 | 11:58:22 | 01:00 | 10720 | 15660 | 5126 | 9180 | 13940 | 8503 | 10740 | 10480 | 2597 | 5588 | 3344 | 1141 | 203 | 310 | 202 |
| Upstream | 1 | 01 | 03-29-1999 | 12:09:50 | 01:00 | 10050 | 14680 | 4771 | 8792 | 12920 | 8022 | 10400 | 10230 | 2558 | 5410 | 3257 | 1209 | 212 | 312 | 224 |
| U. Bckgrnd | 1 | 01 | 03-29-1999 | 12:17:16 | 01:00 | 2 | 0 | 2 | 0 | 2 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ENTER DATA BELOW | | | | | | | | | | | | | | | | | | | | |
| D. Bckgrnd | 2 | 01 | 03-29-1999 | 11:28:07 | 01:00 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-29-1999 | 11:37:07 | 01:00 | 11080 | 16670 | 5326 | 9508 | 14250 | 8707 | 11250 | 10480 | 2604 | 5486 | 3437 | 1109 | 184 | 291 | 193 |
| Downstream | 2 | 01 | 03-29-1999 | 11:39:37 | 01:00 | 10980 | 16160 | 5107 | 9468 | 14170 | 8583 | 10990 | 10430 | 2622 | 5485 | 3295 | 1127 | 161 | 264 | 184 |
| Downstream | 2 | 01 | 03-29-1999 | 11:42:07 | 01:00 | 10850 | 16670 | 5168 | 9629 | 14320 | 8824 | 11340 | 10480 | 2627 | 5456 | 3369 | 1107 | 189 | 243 | 188 |
| Downstream | 2 | 01 | 03-29-1999 | 11:44:37 | 01:00 | 10800 | 16020 | 5134 | 9212 | 13730 | 8419 | 10840 | 10180 | 2503 | 5316 | 3301 | 1023 | 188 | 285 | 183 |
| Downstream | 2 | 01 | 03-29-1999 | 11:47:07 | 01:00 | 10630 | 15660 | 4987 | 9163 | 13380 | 8356 | 10560 | 10050 | 2415 | 5113 | 3195 | 1017 | 167 | 278 | 181 |
| Downstream | 2 | 01 | 03-29-1999 | 11:52:07 | 01:00 | 10760 | 15680 | 5125 | 9395 | 13700 | 8483 | 10700 | 10270 | 2551 | 5539 | 3423 | 1141 | 190 | 307 | 204 |
| Downstream | 2 | 01 | 03-29-1999 | 11:54:37 | 01:00 | 10470 | 15690 | 4937 | 9102 | 13780 | 8259 | 10840 | 10480 | 2455 | 5579 | 3432 | 1187 | 181 | 318 | 205 |
| Downstream | 2 | 01 | 03-29-1999 | 11:57:07 | 01:00 | 10580 | 15370 | 4917 | 9243 | 13640 | 8304 | 10810 | 10250 | 2632 | 5437 | 3412 | 1120 | 171 | 300 | 181 |
| Downstream | 2 | 01 | 03-29-1999 | 11:59:37 | 01:00 | 10280 | 15380 | 4941 | 9166 | 13700 | 8417 | 10850 | 10290 | 2582 | 5459 | 3470 | 1164 | 168 | 298 | 219 |
| Downstream | 2 | 01 | 03-29-1999 | 12:11:05 | 01:00 | 9867 | 14600 | 4688 | 8693 | 12930 | 7639 | 10190 | 9951 | 2508 | 5515 | 3313 | 1198 | 186 | 339 | 238 |
| D. Bckgrnd | 2 | 01 | 03-29-1999 | 12:18:31 | 01:00 | 10 | 0 | 0 | 0 | 0 | 8 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Meas. Penetration | | | | | | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 1.00 | 1.00 | 1.03 | 1.00 | 0.94 | 0.97 | 0.96 |
| P100 correction values | | | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Corrected Penetration | | | | | | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 1.00 | 1.00 | 1.03 | 1.00 | 0.94 | 0.97 | 0.96 |
| Corrected Efficiency (%) | | | | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | -3 | 0 | 6 | 3 | 4 |
| Data Acceptance Criteria: | | | | | | | | | | | | | | | | | | | | |
| Total Challenge Counts for Each Channel: | | | | | | 107050 | 159660 | 51000 | 93208 | 138820 | 84843 | 109180 | 103647 | 25625 | 54126 | 32582 | 11208 | 1892 | 3006 | 2050 |
| Data Quality Objective: | | | | | | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 |
| Does this meet DQO: | | | | | | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Standard Deviation of Penetration for Each Channel : | | | | | | 0.05 | 0.06 | 0.05 | 0.04 | 0.05 | 0.05 | 0.05 | 0.03 | 0.04 | 0.04 | 0.03 | 0.08 | 0.11 | 0.11 | 0.12 |
| Data Quality Objective: | | | | | | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | < 0.30 | < 0.30 | < 0.30 | < 0.30 | < 0.30 | < 0.30 |
| Does this meet DQO: | | | | | | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Maximum observed particle concentration (#/cc): | | | | | | 14.4 | | | | | | | | | | | | | | |
| Data Quality Objective: max. allowable conc. (#/cc): | | | | | | < 23 | | | | | | | | | | | | | | |
| Does this meet the DQO: | | | | | | Yes, (applies to all channels) | | | | | | | | | | | | | | |

Test No. 03299907
Arrestor
Solid-Phase

Particle Counts per Indicated OPC Channel (1-Minute Samples @ 7.1 L/min)

| OPC Channel Number | | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Min. Diam. (um) | | | | | | 0.45 | 0.59 | 0.73 | 0.80 | 1.02 | 1.44 | 1.86 | 2.28 | 2.85 | 3.13 | 4.25 | 5.66 | 7.07 | 7.77 | 9.88 |
| Max. Diam. (um) | | | | | | 0.59 | 0.73 | 0.80 | 1.02 | 1.44 | 1.86 | 2.28 | 2.85 | 3.13 | 4.25 | 5.66 | 7.07 | 7.77 | 9.88 | 14.10 |
| Geo. Mean Diam (um) | | | | | | 0.52 | 0.66 | 0.77 | 0.90 | 1.21 | 1.64 | 2.06 | 2.55 | 2.98 | 3.65 | 4.91 | 6.33 | 7.41 | 8.76 | 11.81 |
| ENTER DATA BELOW | | | | | | | | | | | | | | | | | | | | |
| U. Bckgrnd | 1 | 01 | 03-29-1999 | 13:01:01 | 01:00 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| Upstream | 1 | 01 | 03-29-1999 | 13:09:12 | 01:00 | 10610 | 15690 | 5020 | 8922 | 13250 | 7955 | 10440 | 9835 | 2423 | 5067 | 2964 | 985 | 156 | 248 | 176 |
| Upstream | 1 | 01 | 03-29-1999 | 13:11:42 | 01:00 | 10300 | 15390 | 4893 | 8997 | 13080 | 7990 | 10520 | 9621 | 2390 | 5045 | 3024 | 940 | 145 | 263 | 173 |
| Upstream | 1 | 01 | 03-29-1999 | 13:14:12 | 01:00 | 10390 | 15400 | 4914 | 8903 | 13040 | 8104 | 10280 | 9552 | 2429 | 5033 | 3218 | 968 | 148 | 288 | 172 |
| Upstream | 1 | 01 | 03-29-1999 | 13:16:42 | 01:00 | 10130 | 14900 | 4659 | 8510 | 12710 | 7740 | 10110 | 9481 | 2262 | 4830 | 2957 | 921 | 158 | 259 | 204 |
| Upstream | 1 | 01 | 03-29-1999 | 13:19:12 | 01:00 | 10160 | 15200 | 4907 | 8928 | 12790 | 8004 | 10310 | 9754 | 2386 | 4930 | 3062 | 1002 | 196 | 282 | 189 |
| Upstream | 1 | 01 | 03-29-1999 | 13:21:42 | 01:00 | 10110 | 15250 | 4808 | 8910 | 13170 | 8152 | 10380 | 9986 | 2372 | 5172 | 3173 | 1015 | 162 | 289 | 209 |
| Upstream | 1 | 01 | 03-29-1999 | 13:24:12 | 01:00 | 10210 | 15020 | 4959 | 8916 | 13360 | 8018 | 10420 | 10040 | 2424 | 5338 | 3141 | 1071 | 172 | 277 | 212 |
| Upstream | 1 | 01 | 03-29-1999 | 13:26:42 | 01:00 | 10100 | 14930 | 4890 | 8932 | 13320 | 7954 | 10320 | 10130 | 2524 | 5294 | 3249 | 1057 | 194 | 292 | 194 |
| Upstream | 1 | 01 | 03-29-1999 | 13:29:12 | 01:00 | 10050 | 14990 | 4903 | 8631 | 12970 | 7774 | 10140 | 9717 | 2484 | 5107 | 3246 | 1066 | 198 | 280 | 187 |
| Upstream | 1 | 01 | 03-29-1999 | 13:31:42 | 01:00 | 9929 | 14270 | 4794 | 8619 | 12620 | 7664 | 10160 | 9661 | 2413 | 5064 | 3111 | 1043 | 174 | 287 | 219 |
| U. Bckgrnd | 1 | 01 | 03-29-1999 | 13:41:26 | 01:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ENTER DATA BELOW | | | | | | | | | | | | | | | | | | | | |
| D. Bckgrnd | 2 | 01 | 03-29-1999 | 13:02:16 | 01:00 | 4 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-29-1999 | 13:10:27 | 01:00 | 339 | 344 | 52 | 78 | 53 | 15 | 18 | 9 | 1 | 6 | 0 | 0 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-29-1999 | 13:12:57 | 01:00 | 386 | 371 | 74 | 78 | 72 | 24 | 12 | 11 | 0 | 5 | 3 | 0 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-29-1999 | 13:15:27 | 01:00 | 331 | 348 | 58 | 88 | 62 | 21 | 17 | 7 | 0 | 2 | 3 | 1 | 0 | 1 | 0 |
| Downstream | 2 | 01 | 03-29-1999 | 13:17:57 | 01:00 | 382 | 331 | 63 | 80 | 65 | 22 | 18 | 6 | 3 | 3 | 2 | 1 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-29-1999 | 13:20:27 | 01:00 | 292 | 313 | 58 | 75 | 46 | 13 | 13 | 9 | 1 | 6 | 2 | 1 | 2 | 0 | 0 |
| Downstream | 2 | 01 | 03-29-1999 | 13:22:57 | 01:00 | 309 | 323 | 47 | 75 | 57 | 21 | 19 | 11 | 0 | 6 | 1 | 0 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-29-1999 | 13:25:27 | 01:00 | 314 | 286 | 57 | 75 | 56 | 16 | 12 | 11 | 1 | 4 | 4 | 0 | 0 | 1 | 0 |
| Downstream | 2 | 01 | 03-29-1999 | 13:27:57 | 01:00 | 346 | 316 | 58 | 77 | 58 | 14 | 20 | 5 | 3 | 4 | 3 | 2 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-29-1999 | 13:30:27 | 01:00 | 349 | 354 | 81 | 88 | 66 | 18 | 17 | 15 | 1 | 6 | 3 | 1 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-29-1999 | 13:32:57 | 01:00 | 361 | 360 | 65 | 89 | 66 | 15 | 13 | 10 | 2 | 3 | 0 | 1 | 0 | 0 | 1 |
| D. Bckgrnd | 2 | 01 | 03-29-1999 | 13:42:41 | 01:00 | 2 | 0 | 0 | 1 | 0 | 3 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Meas. Penetration | | | | | | 0.03 | 0.02 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| P100 correction values | | | | | | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 1.00 | 1.00 | 1.03 | 1.00 | 0.94 | 0.97 | 0.96 |
| Corrected Penetration | | | | | | 0.03 | 0.02 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Corrected Efficiency (%) | | | | | | 97 | 98 | 99 | 99 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Data Acceptance Criteria: | | | | | | | | | | | | | | | | | | | | |
| Total Challenge Counts for Each Channel: | | | | | | 101989 | 151040 | 48747 | 88268 | 130310 | 79355 | 103080 | 97777 | 24107 | 50880 | 31145 | 10068 | 1703 | 2765 | 1935 |
| Data Quality Objective: | | | | | | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 |
| Does this meet DQO: | | | | | | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Standard Deviation of Penetration for Each Channel : | | | | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Data Quality Objective: | | | | | | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | < 0.30 | < 0.30 | < 0.30 | < 0.30 | < 0.30 | < 0.30 |
| Does this meet DQO: | | | | | | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Maximum observed particle concentration (#/cc): | | | | | | 13.3 | | | | | | | | | | | | | | |
| Data Quality Objective: max. allowable conc. (#/cc): | | | | | | < 23 | | | | | | | | | | | | | | |
| Does this meet the DQO: | | | | | | Yes, (applies to all channels) | | | | | | | | | | | | | | |

Test No. 03299908
No Filter
Solid-Phase

Particle Counts per Indicated OPC Channel (1-Minute Samples @ 7.1 L/min)

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OPC Channel Number | | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| Min. Diam. (um) | | | | | | 0.45 | 0.59 | 0.73 | 0.80 | 1.02 | 1.44 | 1.86 | 2.28 | 2.85 | 3.13 | 4.25 | 5.66 | 7.07 | 7.77 | 9.88 |
| Max. Diam. (um) | | | | | | 0.59 | 0.73 | 0.80 | 1.02 | 1.44 | 1.86 | 2.28 | 2.85 | 3.13 | 4.25 | 5.66 | 7.07 | 7.77 | 9.88 | 14.10 |
| Geo. Mean Diam (um) | | | | | | 0.52 | 0.66 | 0.77 | 0.90 | 1.21 | 1.64 | 2.06 | 2.55 | 2.98 | 3.65 | 4.91 | 6.33 | 7.41 | 8.76 | 11.81 |
| ENTER DATA BELOW | | | | | | | | | | | | | | | | | | | | |
| U. Bckgrnd | 1 | 01 | 03-29-1999 | 13:58:19 | 01:00 | 1 | 2 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Upstream | 1 | 01 | 03-29-1999 | 14:06:05 | 01:00 | 10390 | 15560 | 4946 | 9150 | 13350 | 8131 | 10600 | 10020 | 2448 | 5242 | 3124 | 1106 | 192 | 278 | 181 |
| Upstream | 1 | 01 | 03-29-1999 | 14:08:35 | 01:00 | 10290 | 15080 | 4806 | 8793 | 13230 | 7894 | 10310 | 9825 | 2439 | 5029 | 3033 | 1003 | 176 | 301 | 184 |
| Upstream | 1 | 01 | 03-29-1999 | 14:11:05 | 01:00 | 10360 | 15250 | 4905 | 8883 | 12920 | 7974 | 10480 | 9828 | 2406 | 5099 | 2987 | 976 | 150 | 268 | 170 |
| Upstream | 1 | 01 | 03-29-1999 | 14:13:35 | 01:00 | 10320 | 15300 | 4864 | 8760 | 13200 | 8095 | 10330 | 9589 | 2301 | 5013 | 3058 | 970 | 154 | 237 | 185 |
| Upstream | 1 | 01 | 03-29-1999 | 14:16:05 | 01:00 | 10070 | 15230 | 4930 | 8841 | 13290 | 7998 | 10490 | 9775 | 2405 | 4995 | 3144 | 1020 | 170 | 242 | 191 |
| Upstream | 1 | 01 | 03-29-1999 | 14:18:35 | 01:00 | 9981 | 14570 | 4683 | 8850 | 12760 | 7730 | 10180 | 9816 | 2429 | 5155 | 3030 | 1092 | 167 | 282 | 180 |
| Upstream | 1 | 01 | 03-29-1999 | 14:21:05 | 01:00 | 9757 | 14790 | 4573 | 8670 | 12940 | 8026 | 10310 | 9967 | 2629 | 5273 | 3317 | 1066 | 184 | 325 | 187 |
| Upstream | 1 | 01 | 03-29-1999 | 14:23:35 | 01:00 | 9922 | 14560 | 4736 | 8591 | 12740 | 7740 | 10030 | 9913 | 2534 | 5241 | 3260 | 1082 | 192 | 319 | 185 |
| Upstream | 1 | 01 | 03-29-1999 | 14:26:05 | 01:00 | 9878 | 14540 | 4686 | 8831 | 12750 | 7722 | 10130 | 9785 | 2454 | 5225 | 3103 | 1090 | 180 | 331 | 210 |
| Upstream | 1 | 01 | 03-29-1999 | 14:28:35 | 01:00 | 9971 | 14430 | 4649 | 8577 | 12920 | 7650 | 10140 | 9714 | 2339 | 5117 | 3163 | 1066 | 176 | 286 | 211 |
| U. Bckgrnd | 1 | 01 | 03-29-1999 | 14:40:05 | 01:00 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ENTER DATA BELOW | | | | | | | | | | | | | | | | | | | | |
| D. Bckgrnd | 2 | 01 | 03-29-1999 | 13:59:34 | 01:00 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-29-1999 | 14:07:20 | 01:00 | 10290 | 15160 | 4792 | 8780 | 13150 | 8071 | 10380 | 9759 | 2339 | 5257 | 3069 | 988 | 155 | 282 | 187 |
| Downstream | 2 | 01 | 03-29-1999 | 14:09:50 | 01:00 | 10310 | 15670 | 4750 | 8920 | 13380 | 8178 | 10330 | 10000 | 2579 | 5309 | 3131 | 996 | 171 | 304 | 189 |
| Downstream | 2 | 01 | 03-29-1999 | 14:12:20 | 01:00 | 10540 | 15340 | 5000 | 8859 | 13250 | 8200 | 10510 | 9919 | 2463 | 5191 | 3108 | 1000 | 132 | 265 | 160 |
| Downstream | 2 | 01 | 03-29-1999 | 14:14:50 | 01:00 | 10140 | 15180 | 4771 | 8824 | 12830 | 7962 | 10270 | 9670 | 2354 | 5115 | 3086 | 1031 | 179 | 272 | 181 |
| Downstream | 2 | 01 | 03-29-1999 | 14:17:20 | 01:00 | 10110 | 15190 | 4842 | 8955 | 13090 | 8077 | 10420 | 9759 | 2379 | 5164 | 3059 | 992 | 154 | 298 | 203 |
| Downstream | 2 | 01 | 03-29-1999 | 14:19:50 | 01:00 | 9959 | 14420 | 4696 | 8596 | 12920 | 7921 | 10260 | 10050 | 2523 | 5318 | 3334 | 1111 | 194 | 319 | 194 |
| Downstream | 2 | 01 | 03-29-1999 | 14:22:20 | 01:00 | 9689 | 14400 | 4628 | 8479 | 12660 | 7779 | 9712 | 9970 | 2527 | 5221 | 3162 | 1109 | 181 | 306 | 210 |
| Downstream | 2 | 01 | 03-29-1999 | 14:24:50 | 01:00 | 9885 | 14450 | 4597 | 8558 | 12690 | 7938 | 10050 | 9750 | 2511 | 5379 | 3326 | 1067 | 173 | 288 | 186 |
| Downstream | 2 | 01 | 03-29-1999 | 14:27:20 | 01:00 | 9841 | 14380 | 4700 | 8467 | 12710 | 7687 | 10060 | 9826 | 2425 | 5332 | 3182 | 1168 | 174 | 286 | 183 |
| Downstream | 2 | 01 | 03-29-1999 | 14:29:50 | 01:00 | 9895 | 14570 | 4706 | 8676 | 13120 | 7889 | 10180 | 9811 | 2488 | 5297 | 3254 | 1054 | 190 | 307 | 206 |
| D. Bckgrnd | 2 | 01 | 03-29-1999 | 14:41:20 | 01:00 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Meas. Penetration | | | | | | 1.00 | 1.00 | 0.99 | 0.99 | 1.00 | 1.01 | 0.99 | 1.00 | 1.01 | 1.02 | 1.02 | 1.00 | 0.98 | 1.02 | 1.01 |
| P100 correction values | | | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Corrected Penetration | | | | | | 1.00 | 1.00 | 0.99 | 0.99 | 1.00 | 1.01 | 0.99 | 1.00 | 1.01 | 1.02 | 1.02 | 1.00 | 0.98 | 1.02 | 1.01 |
| Corrected Efficiency (%) | | | | | | 0 | 0 | 1 | 1 | 0 | -1 | 1 | 0 | -1 | -2 | -2 | 0 | 2 | -2 | -1 |
| Data Acceptance Criteria: | | | | | | | | | | | | | | | | | | | | |
| Total Challenge Counts for Each Channel: | | | | | | 100939 | 149310 | 47778 | 87946 | 130100 | 78960 | 103000 | 98232 | 24384 | 51389 | 31219 | 10471 | 1741 | 2869 | 1884 |
| Data Quality Objective: | | | | | | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 |
| Does this meet DQO: | | | | | | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Standard Deviation of Penetration for Each Channel : | | | | | | 0.03 | 0.04 | 0.04 | 0.03 | 0.03 | 0.03 | 0.03 | 0.02 | 0.05 | 0.03 | 0.05 | 0.08 | 0.13 | 0.13 | 0.10 |
| Data Quality Objective: | | | | | | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | < 0.30 | < 0.30 | < 0.30 | < 0.30 | < 0.30 | < 0.30 |
| Does this meet DQO: | | | | | | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Maximum observed particle concentration (#/cc): | | | | | | 13.4 | | | | | | | | | | | | | | |
| Data Quality Objective: max. allowable conc. (#/cc): | | | | | | < 23 | | | | | | | | | | | | | | |
| Does this meet the DQO: | | | | | | Yes, (applies to all channels) | | | | | | | | | | | | | | |

Test No. 03299909
Arrestor or No Filter
Solid-Phase

Particle Counts per Indicated OPC Channel (1-Minute Samples @ 7.1 L/min)

| | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OPC Channel Number | | | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| Min. Diam. (um) | | | | | | | 0.45 | 0.59 | 0.73 | 0.80 | 1.02 | 1.44 | 1.86 | 2.28 | 2.85 | 3.13 | 4.25 | 5.66 | 7.07 | 7.77 | 9.88 |
| Max. Diam. (um) | | | | | | | 0.59 | 0.73 | 0.80 | 1.02 | 1.44 | 1.86 | 2.28 | 2.85 | 3.13 | 4.25 | 5.66 | 7.07 | 7.77 | 9.88 | 14.10 |
| Geo. Mean Diam (um) | | | | | | | 0.52 | 0.66 | 0.77 | 0.90 | 1.21 | 1.64 | 2.06 | 2.55 | 2.98 | 3.65 | 4.91 | 6.33 | 7.41 | 8.76 | 11.81 |
| ENTER DATA BELOW | | | | | | | | | | | | | | | | | | | | | |
| U. Bckgrnd | 1 | 01 | 03-29-1999 | 15:29:09 | 01:00 | | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Upstream | 1 | 01 | 03-29-1999 | 15:38:10 | 01:00 | | 10850 | 16050 | 5118 | 9378 | 13990 | 8592 | 11040 | 10470 | 2449 | 5246 | 3249 | 1149 | 160 | 288 | 188 |
| Upstream | 1 | 01 | 03-29-1999 | 15:40:40 | 01:00 | | 10770 | 16400 | 5315 | 9390 | 14100 | 8607 | 11330 | 10620 | 2608 | 5573 | 3233 | 1030 | 191 | 300 | 211 |
| Upstream | 1 | 01 | 03-29-1999 | 15:43:10 | 01:00 | | 10890 | 16220 | 5208 | 9577 | 14210 | 8659 | 11220 | 10450 | 2595 | 5479 | 3265 | 1026 | 167 | 306 | 209 |
| Upstream | 1 | 01 | 03-29-1999 | 15:45:40 | 01:00 | | 10970 | 16030 | 5166 | 9296 | 13820 | 8441 | 11110 | 10400 | 2471 | 5395 | 3364 | 1200 | 190 | 282 | 179 |
| Upstream | 1 | 01 | 03-29-1999 | 15:48:10 | 01:00 | | 10770 | 15850 | 5129 | 9540 | 14020 | 8590 | 11180 | 10680 | 2656 | 5568 | 3477 | 1154 | 218 | 319 | 239 |
| Upstream | 1 | 01 | 03-29-1999 | 15:50:40 | 01:00 | | 10780 | 16240 | 5189 | 9354 | 14130 | 8627 | 11320 | 10960 | 2732 | 5593 | 3453 | 1180 | 191 | 334 | 236 |
| Upstream | 1 | 01 | 03-29-1999 | 15:53:10 | 01:00 | | 10710 | 15650 | 5025 | 9283 | 13790 | 8586 | 11150 | 10730 | 2668 | 5655 | 3480 | 1227 | 170 | 357 | 234 |
| Upstream | 1 | 01 | 03-29-1999 | 15:55:40 | 01:00 | | 10360 | 15530 | 4889 | 9241 | 13940 | 8375 | 10940 | 10560 | 2612 | 5492 | 3386 | 1198 | 183 | 329 | 229 |
| Upstream | 1 | 01 | 03-29-1999 | 15:58:10 | 01:00 | | 10360 | 15610 | 4853 | 9282 | 13680 | 8281 | 10880 | 10720 | 2579 | 5574 | 3527 | 1167 | 205 | 337 | 215 |
| Upstream | 1 | 01 | 03-29-1999 | 16:00:40 | 01:00 | | 10380 | 15660 | 5097 | 9101 | 13650 | 8155 | 10940 | 10450 | 2610 | 5584 | 3378 | 1156 | 195 | 362 | 214 |
| U. Bckgrnd | 1 | 01 | 03-29-1999 | 16:09:41 | 01:00 | | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| ENTER DATA BELOW | | | | | | | | | | | | | | | | | | | | | |
| D. Bckgrnd | 2 | 01 | 03-29-1999 | 15:30:24 | 01:00 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-29-1999 | 15:39:25 | 01:00 | | 394 | 415 | 80 | 103 | 88 | 26 | 22 | 14 | 2 | 2 | 1 | 3 | 1 | 1 | 0 |
| Downstream | 2 | 01 | 03-29-1999 | 15:41:55 | 01:00 | | 336 | 295 | 66 | 77 | 61 | 18 | 14 | 8 | 2 | 5 | 5 | 0 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-29-1999 | 15:44:25 | 01:00 | | 338 | 317 | 57 | 75 | 62 | 23 | 17 | 10 | 4 | 3 | 1 | 1 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-29-1999 | 15:46:55 | 01:00 | | 342 | 326 | 49 | 89 | 70 | 22 | 15 | 13 | 3 | 6 | 5 | 1 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-29-1999 | 15:49:25 | 01:00 | | 389 | 360 | 69 | 108 | 56 | 23 | 13 | 18 | 2 | 3 | 3 | 0 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-29-1999 | 15:51:55 | 01:00 | | 465 | 359 | 76 | 103 | 81 | 24 | 14 | 10 | 1 | 7 | 2 | 0 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-29-1999 | 15:54:25 | 01:00 | | 405 | 354 | 75 | 93 | 86 | 21 | 24 | 9 | 2 | 3 | 3 | 2 | 1 | 0 | 0 |
| Downstream | 2 | 01 | 03-29-1999 | 15:56:55 | 01:00 | | 405 | 359 | 69 | 95 | 82 | 24 | 22 | 16 | 1 | 2 | 3 | 1 | 0 | 1 | 1 |
| Downstream | 2 | 01 | 03-29-1999 | 15:59:25 | 01:00 | | 408 | 395 | 81 | 116 | 70 | 30 | 8 | 10 | 2 | 2 | 2 | 1 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-29-1999 | 16:01:55 | 01:00 | | 343 | 369 | 92 | 112 | 74 | 18 | 10 | 15 | 3 | 3 | 5 | 2 | 1 | 0 | 1 |
| D. Bckgrnd | 2 | 01 | 03-29-1999 | 16:10:56 | 01:00 | | 2 | 1 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Meas. Penetration | | | | | | | 0.04 | 0.02 | 0.01 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| P100 correction values | | | | | | | 1.00 | 1.00 | 0.99 | 0.99 | 1.00 | 1.01 | 0.99 | 1.00 | 1.01 | 1.02 | 1.02 | 1.00 | 0.98 | 1.02 | 1.01 |
| Corrected Penetration | | | | | | | 0.04 | 0.02 | 0.01 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Corrected Efficiency (%) | | | | | | | 96 | 98 | 99 | 99 | 99 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Data Acceptance Criteria: | | | | | | | | | | | | | | | | | | | | | |
| Total Challenge Counts for Each Channel: | | | | | | | 106840 | 159240 | 50989 | 93442 | 139330 | 84913 | 111110 | 106040 | 25980 | 55159 | 33812 | 11487 | 1870 | 3214 | 2154 |
| Data Quality Objective: | | | | | | | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 |
| Does this meet DQO: | | | | | | | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Standard Deviation of Penetration for Each Channel : | | | | | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Data Quality Objective: | | | | | | | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | < 0.30 | < 0.30 | < 0.30 | < 0.30 | < 0.30 | < 0.30 |
| Does this meet DQO: | | | | | | | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Maximum observed particle concentration (#/cc): | | | | | | | 14.2 | | | | | | | | | | | | | | |
| Data Quality Objective: max. allowable conc. (#/cc): | | | | | | | < 23 | | | | | | | | | | | | | | |
| Does this meet the DQO: | | | | | | | Yes, (applies to all channels) | | | | | | | | | | | | | | |

Test No. 03309901
No Filter
Solid-Phase

Particle Counts per Indicated OPC Channel (1-Minute Samples @ 7.1 L/min)

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OPC Channel Number | | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| Min. Diam. (um) | | | | | | 0.45 | 0.59 | 0.73 | 0.80 | 1.02 | 1.44 | 1.86 | 2.28 | 2.85 | 3.13 | 4.25 | 5.66 | 7.07 | 7.77 | 9.88 |
| Max. Diam. (um) | | | | | | 0.59 | 0.73 | 0.80 | 1.02 | 1.44 | 1.86 | 2.28 | 2.85 | 3.13 | 4.25 | 5.66 | 7.07 | 7.77 | 9.88 | 14.10 |
| Geo. Mean Diam (um) | | | | | | 0.52 | 0.66 | 0.77 | 0.90 | 1.21 | 1.64 | 2.06 | 2.55 | 2.98 | 3.65 | 4.91 | 6.33 | 7.41 | 8.76 | 11.81 |
| ENTER DATA BELOW | | | | | | | | | | | | | | | | | | | | |
| U. Bckgrnd | 1 | 01 | 03-30-1999 | 09:13:53 | 01:00 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Upstream | 1 | 01 | 03-30-1999 | 09:25:25 | 01:00 | 10830 | 15700 | 5119 | 9351 | 13650 | 8493 | 10890 | 10770 | 2567 | 5497 | 3076 | 951 | 167 | 280 | 168 |
| Upstream | 1 | 01 | 03-30-1999 | 09:27:55 | 01:00 | 10730 | 15950 | 5174 | 9263 | 13800 | 8543 | 10920 | 10750 | 2687 | 5528 | 3055 | 966 | 135 | 258 | 181 |
| Upstream | 1 | 01 | 03-30-1999 | 09:30:25 | 01:00 | 10530 | 15670 | 5160 | 8890 | 13370 | 8284 | 10830 | 10410 | 2497 | 5418 | 2957 | 990 | 178 | 239 | 171 |
| Upstream | 1 | 01 | 03-30-1999 | 09:32:55 | 01:00 | 10440 | 15610 | 4922 | 9201 | 13410 | 8339 | 10690 | 10350 | 2540 | 5337 | 3015 | 907 | 141 | 283 | 177 |
| Upstream | 1 | 01 | 03-30-1999 | 09:35:25 | 01:00 | 10380 | 15430 | 4938 | 9026 | 13220 | 8198 | 10530 | 10340 | 2488 | 5298 | 2941 | 938 | 129 | 268 | 168 |
| Upstream | 1 | 01 | 03-30-1999 | 09:37:55 | 01:00 | 9492 | 13930 | 4606 | 8233 | 12130 | 7399 | 9677 | 9425 | 2402 | 4830 | 2799 | 963 | 123 | 274 | 144 |
| Upstream | 1 | 01 | 03-30-1999 | 09:40:25 | 01:00 | 10450 | 14930 | 4906 | 8893 | 13280 | 8019 | 10370 | 10420 | 2675 | 5394 | 3145 | 1041 | 125 | 282 | 182 |
| Upstream | 1 | 01 | 03-30-1999 | 09:42:55 | 01:00 | 10400 | 15330 | 4962 | 8882 | 13160 | 7960 | 10370 | 10200 | 2608 | 5353 | 3052 | 1022 | 182 | 275 | 172 |
| Upstream | 1 | 01 | 03-30-1999 | 09:45:25 | 01:00 | 10130 | 14930 | 4770 | 8706 | 12970 | 7793 | 10300 | 10070 | 2561 | 5330 | 3059 | 978 | 157 | 260 | 179 |
| Upstream | 1 | 01 | 03-30-1999 | 09:47:55 | 01:00 | 10420 | 15440 | 4878 | 8794 | 13450 | 8116 | 10670 | 10400 | 2502 | 5349 | 3047 | 951 | 146 | 296 | 172 |
| U. Bckgrnd | 1 | 01 | 03-30-1999 | 10:00:37 | 01:00 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ENTER DATA BELOW | | | | | | | | | | | | | | | | | | | | |
| D. Bckgrnd | 2 | 01 | 03-30-1999 | 09:15:08 | 01:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-30-1999 | 09:26:40 | 01:00 | 10910 | 15880 | 5211 | 9252 | 13960 | 8695 | 10940 | 10690 | 2652 | 5729 | 3149 | 953 | 135 | 225 | 164 |
| Downstream | 2 | 01 | 03-30-1999 | 09:29:10 | 01:00 | 10690 | 15820 | 5142 | 9437 | 14020 | 8493 | 10800 | 10490 | 2624 | 5671 | 3069 | 921 | 132 | 211 | 174 |
| Downstream | 2 | 01 | 03-30-1999 | 09:31:40 | 01:00 | 10740 | 15820 | 5017 | 9262 | 13450 | 8156 | 10700 | 10450 | 2724 | 5614 | 3073 | 923 | 159 | 215 | 178 |
| Downstream | 2 | 01 | 03-30-1999 | 09:34:10 | 01:00 | 10390 | 15670 | 4900 | 9133 | 13250 | 8210 | 10460 | 10270 | 2595 | 5425 | 3176 | 933 | 160 | 251 | 150 |
| Downstream | 2 | 01 | 03-30-1999 | 09:36:40 | 01:00 | 10460 | 15330 | 4883 | 8913 | 13170 | 8269 | 10460 | 10240 | 2543 | 5255 | 2966 | 898 | 135 | 201 | 132 |
| Downstream | 2 | 01 | 03-30-1999 | 09:39:10 | 01:00 | 10250 | 15150 | 4866 | 8872 | 13180 | 8221 | 10430 | 10610 | 2626 | 5523 | 3182 | 939 | 164 | 256 | 137 |
| Downstream | 2 | 01 | 03-30-1999 | 09:41:40 | 01:00 | 10300 | 15340 | 4693 | 9140 | 13420 | 8023 | 10510 | 10550 | 2604 | 5619 | 3149 | 946 | 147 | 246 | 152 |
| Downstream | 2 | 01 | 03-30-1999 | 09:44:10 | 01:00 | 10200 | 15100 | 4805 | 8899 | 13480 | 8230 | 10410 | 10630 | 2702 | 5591 | 3175 | 1028 | 143 | 203 | 148 |
| Downstream | 2 | 01 | 03-30-1999 | 09:46:40 | 01:00 | 10320 | 15220 | 4876 | 9180 | 13480 | 8471 | 10640 | 10380 | 2565 | 5563 | 3083 | 941 | 157 | 229 | 178 |
| Downstream | 2 | 01 | 03-30-1999 | 09:49:10 | 01:00 | 10540 | 15190 | 4850 | 9170 | 13910 | 8499 | 10700 | 10620 | 2693 | 5616 | 2997 | 925 | 131 | 215 | 174 |
| D. Bckgrnd | 2 | 01 | 03-30-1999 | 10:01:52 | 01:00 | 1 | 0 | 0 | 2 | 2 | 0 | 0 | 3 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| Meas. Penetration | | | | | | 1.01 | 1.01 | 1.00 | 1.02 | 1.02 | 1.03 | 1.01 | 1.02 | 1.03 | 1.04 | 1.03 | 0.97 | 0.99 | 0.83 | 0.93 |
| P100 correction values | | | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Corrected Penetration | | | | | | 1.01 | 1.01 | 1.00 | 1.02 | 1.02 | 1.03 | 1.01 | 1.02 | 1.03 | 1.04 | 1.03 | 0.97 | 0.99 | 0.83 | 0.93 |
| Corrected Efficiency (%) | | | | | | -1 | -1 | 0 | -2 | -2 | -3 | -1 | -2 | -3 | -4 | -3 | 3 | 1 | 17 | 7 |
| Data Acceptance Criteria: | | | | | | | | | | | | | | | | | | | | |
| Total Challenge Counts for Each Channel: | | | | | | 103802 | 152920 | 49435 | 89239 | 132440 | 81144 | 105247 | 103135 | 25527 | 53334 | 30146 | 9707 | 1483 | 2715 | 1714 |
| Data Quality Objective: | | | | | | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 |
| Does this meet DQO: | | | | | | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Standard Deviation of Penetration for Each Channel : | | | | | | 0.04 | 0.04 | 0.05 | 0.04 | 0.04 | 0.05 | 0.04 | 0.04 | 0.04 | 0.05 | 0.04 | 0.05 | 0.17 | 0.09 | 0.12 |
| Data Quality Objective: | | | | | | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | < 0.30 | < 0.30 | < 0.30 | < 0.30 | < 0.30 | < 0.30 |
| Does this meet DQO: | | | | | | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Maximum observed particle concentration (#/cc): | | | | | | 13.9 | | | | | | | | | | | | | | |
| Data Quality Objective: max. allowable conc. (#/cc): | | | | | | < 23 | | | | | | | | | | | | | | |
| Does this meet the DQO: | | | | | | Yes, (applies to all channels) | | | | | | | | | | | | | | |

Test No. 03319903
Arrestor
Solid-Phase

Particle Counts per Indicated OPC Channel (1-Minute Samples @ 7.1 L/min)

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OPC Channel Number | | | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| Min. Diam. (um) | | | | | | | 0.45 | 0.59 | 0.73 | 0.80 | 1.02 | 1.44 | 1.86 | 2.28 | 2.85 | 3.13 | 4.25 | 5.66 | 7.07 | 7.77 | 9.88 |
| Max. Diam. (um) | | | | | | | 0.59 | 0.73 | 0.80 | 1.02 | 1.44 | 1.86 | 2.28 | 2.85 | 3.13 | 4.25 | 5.66 | 7.07 | 7.77 | 9.88 | 14.10 |
| Geo. Mean Diam (um) | | | | | | | 0.52 | 0.66 | 0.77 | 0.90 | 1.21 | 1.64 | 2.06 | 2.55 | 2.98 | 3.65 | 4.91 | 6.33 | 7.41 | 8.76 | 11.81 |
| ENTER DATA BELOW | | | | | | | | | | | | | | | | | | | | | |
| U. Bckgrnd | 1 | 01 | 03-31-1999 | 11:57:35 | 01:00 | | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Upstream | 1 | 01 | 03-31-1999 | 12:08:55 | 01:00 | | 10010 | 14780 | 4753 | 8365 | 12640 | 7589 | 10200 | 9619 | 2261 | 4836 | 2928 | 966 | 157 | 220 | 128 |
| Upstream | 1 | 01 | 03-31-1999 | 12:11:25 | 01:00 | | 10290 | 14770 | 4751 | 8439 | 12590 | 7661 | 10440 | 9551 | 2342 | 4879 | 2875 | 936 | 162 | 227 | 152 |
| Upstream | 1 | 01 | 03-31-1999 | 12:13:55 | 01:00 | | 9930 | 14800 | 4660 | 8244 | 12590 | 7816 | 10170 | 9698 | 2279 | 4871 | 2898 | 1002 | 148 | 228 | 146 |
| Upstream | 1 | 01 | 03-31-1999 | 12:16:25 | 01:00 | | 10160 | 15280 | 4844 | 8317 | 12620 | 7945 | 10270 | 9502 | 2315 | 4789 | 2808 | 954 | 169 | 225 | 137 |
| Upstream | 1 | 01 | 03-31-1999 | 12:18:55 | 01:00 | | 10300 | 14990 | 4843 | 8657 | 12750 | 7954 | 10420 | 9544 | 2266 | 5011 | 3005 | 962 | 149 | 249 | 152 |
| Upstream | 1 | 01 | 03-31-1999 | 12:21:25 | 01:00 | | 9488 | 13960 | 4485 | 7907 | 11850 | 7131 | 9683 | 8834 | 2070 | 4524 | 2766 | 928 | 153 | 232 | 168 |
| Upstream | 1 | 01 | 03-31-1999 | 12:23:55 | 01:00 | | 9885 | 14270 | 4599 | 8149 | 12230 | 7600 | 9902 | 9222 | 2176 | 4762 | 2862 | 915 | 145 | 212 | 143 |
| Upstream | 1 | 01 | 03-31-1999 | 12:26:25 | 01:00 | | 9586 | 14390 | 4462 | 8249 | 11860 | 7443 | 9970 | 9051 | 2228 | 4730 | 2847 | 932 | 181 | 242 | 160 |
| Upstream | 1 | 01 | 03-31-1999 | 12:28:55 | 01:00 | | 9642 | 14040 | 4407 | 7988 | 11700 | 7333 | 9723 | 8903 | 2050 | 4607 | 2768 | 923 | 166 | 219 | 153 |
| Upstream | 1 | 01 | 03-31-1999 | 12:31:25 | 01:00 | | 9754 | 14470 | 4578 | 8161 | 12130 | 7633 | 9890 | 9152 | 2250 | 4895 | 2893 | 965 | 123 | 234 | 179 |
| U. Bckgrnd | 1 | 01 | 03-31-1999 | 12:45:40 | 01:00 | | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ENTER DATA BELOW | | | | | | | | | | | | | | | | | | | | | |
| D. Bckgrnd | 2 | 01 | 03-31-1999 | 11:58:50 | 01:00 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-31-1999 | 12:10:10 | 01:00 | | 402 | 396 | 90 | 88 | 90 | 24 | 21 | 24 | 4 | 3 | 3 | 1 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-31-1999 | 12:12:40 | 01:00 | | 395 | 367 | 89 | 97 | 63 | 30 | 18 | 9 | 1 | 5 | 1 | 0 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-31-1999 | 12:15:10 | 01:00 | | 363 | 332 | 57 | 88 | 62 | 21 | 26 | 10 | 0 | 5 | 4 | 5 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-31-1999 | 12:17:40 | 01:00 | | 338 | 316 | 54 | 63 | 68 | 26 | 27 | 18 | 6 | 3 | 4 | 2 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-31-1999 | 12:20:10 | 01:00 | | 321 | 324 | 52 | 70 | 48 | 20 | 16 | 6 | 1 | 7 | 3 | 0 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-31-1999 | 12:22:40 | 01:00 | | 309 | 316 | 50 | 81 | 77 | 10 | 14 | 16 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-31-1999 | 12:25:10 | 01:00 | | 327 | 329 | 65 | 79 | 58 | 15 | 19 | 15 | 1 | 4 | 3 | 0 | 0 | 1 | 0 |
| Downstream | 2 | 01 | 03-31-1999 | 12:27:40 | 01:00 | | 363 | 335 | 72 | 88 | 76 | 27 | 23 | 7 | 4 | 6 | 2 | 0 | 1 | 0 | 0 |
| Downstream | 2 | 01 | 03-31-1999 | 12:30:10 | 01:00 | | 389 | 365 | 74 | 89 | 84 | 31 | 22 | 9 | 3 | 3 | 1 | 0 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-31-1999 | 12:32:40 | 01:00 | | 358 | 335 | 72 | 95 | 69 | 18 | 23 | 9 | 4 | 5 | 2 | 0 | 0 | 1 | 0 |
| D. Bckgrnd | 2 | 01 | 03-31-1999 | 12:46:55 | 01:00 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Meas. Penetration | | | | | | | 0.04 | 0.02 | 0.01 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| P100 correction values | | | | | | | 1.01 | 1.01 | 1.00 | 1.02 | 1.02 | 1.03 | 1.01 | 1.02 | 1.03 | 1.04 | 1.03 | 0.97 | 0.99 | 0.83 | 0.93 |
| Corrected Penetration | | | | | | | 0.04 | 0.02 | 0.01 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Corrected Efficiency (%) | | | | | | | 96 | 98 | 99 | 99 | 99 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Data Acceptance Criteria: | | | | | | | | | | | | | | | | | | | | | |
| Total Challenge Counts for Each Channel: | | | | | | | 99045 | 145750 | 46382 | 82476 | 122960 | 76105 | 100668 | 93076 | 22237 | 47904 | 28650 | 9483 | 1553 | 2288 | 1518 |
| Data Quality Objective: | | | | | | | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 |
| Does this meet DQO: | | | | | | | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Standard Deviation of Penetration for Each Channel : | | | | | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Data Quality Objective: | | | | | | | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | < 0.30 | < 0.30 | < 0.30 | < 0.30 | < 0.30 | < 0.30 |
| Does this meet DQO: | | | | | | | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Maximum observed particle concentration (#/cc): | | | | | | | 12.9 | | | | | | | | | | | | | | |
| Data Quality Objective: max. allowable conc. (#/cc): | | | | | | | < 23 | | | | | | | | | | | | | | |
| Does this meet the DQO: | | | | | | | Yes, (applies to all channels) | | | | | | | | | | | | | | |

Test No. 03199907
HEPA
Solid-Phase

Particle Counts per Indicated OPC Channel (1-Minute Samples @ 7.1 L/min)

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OPC Channel Number | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Min. Diam. (um) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Max. Diam. (um) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Geo. Mean Diam (um) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ENTER DATA BELOW | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| U. Bckgrnd | 1 | 01 | 03-19-1999 | 15:11:42 | 01:00 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | |
| Upstream | 1 | 01 | 03-19-1999 | 15:34:44 | 01:00 | 9558 | 14460 | 4529 | 8619 | 12920 | 7855 | 10470 | 9988 | 2389 | 5321 | 3340 | 1174 | 206 | 321 | 220 | | | | | | | | | | | |
| Upstream | 1 | 01 | 03-19-1999 | 15:37:14 | 01:00 | 9784 | 14750 | 4659 | 8822 | 12880 | 8039 | 10430 | 10150 | 2448 | 5317 | 3422 | 1194 | 229 | 361 | 232 | | | | | | | | | | | |
| Upstream | 1 | 01 | 03-19-1999 | 15:39:44 | 01:00 | 10100 | 14900 | 4827 | 8789 | 13110 | 8021 | 10580 | 9856 | 2371 | 5123 | 3179 | 1093 | 172 | 296 | 197 | | | | | | | | | | | |
| Upstream | 1 | 01 | 03-19-1999 | 15:42:14 | 01:00 | 9926 | 14660 | 4826 | 8672 | 13010 | 7868 | 10500 | 9587 | 2309 | 5132 | 3218 | 1092 | 188 | 290 | 218 | | | | | | | | | | | |
| Upstream | 1 | 01 | 03-19-1999 | 15:44:44 | 01:00 | 9948 | 14910 | 4765 | 8825 | 12960 | 8107 | 10550 | 9900 | 2368 | 5199 | 3165 | 1131 | 187 | 316 | 237 | | | | | | | | | | | |
| Upstream | 1 | 01 | 03-19-1999 | 15:47:14 | 01:00 | 9782 | 14550 | 4628 | 8573 | 12630 | 7937 | 10340 | 9606 | 2306 | 5071 | 3154 | 1040 | 185 | 273 | 231 | | | | | | | | | | | |
| Upstream | 1 | 01 | 03-19-1999 | 15:49:44 | 01:00 | 9777 | 14490 | 4571 | 8414 | 12700 | 7857 | 10320 | 9575 | 2303 | 4991 | 3260 | 1107 | 205 | 306 | 235 | | | | | | | | | | | |
| Upstream | 1 | 01 | 03-19-1999 | 15:52:14 | 01:00 | 9655 | 14440 | 4469 | 8363 | 12640 | 7587 | 10110 | 9601 | 2210 | 5105 | 3077 | 1103 | 171 | 304 | 211 | | | | | | | | | | | |
| Upstream | 1 | 01 | 03-19-1999 | 15:54:44 | 01:00 | 9846 | 14680 | 4671 | 8496 | 12920 | 7871 | 10060 | 9577 | 2335 | 4940 | 3279 | 1100 | 176 | 300 | 202 | | | | | | | | | | | |
| Upstream | 1 | 01 | 03-19-1999 | 15:57:14 | 01:00 | 9861 | 14680 | 4627 | 8797 | 13030 | 7914 | 10530 | 9722 | 2318 | 5114 | 3173 | 1093 | 184 | 318 | 186 | | | | | | | | | | | |
| U. Bckgrnd | 1 | 01 | 03-19-1999 | 16:06:17 | 01:00 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | |
| ENTER DATA BELOW | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D. Bckgrnd | 2 | 01 | 03-19-1999 | 15:12:57 | 01:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | |
| Downstream | 2 | 01 | 03-19-1999 | 15:35:59 | 01:00 | 4 | 7 | 4 | 3 | 4 | 7 | 9 | 6 | 2 | 4 | 1 | 1 | 0 | 2 | 0 | | | | | | | | | | | |
| Downstream | 2 | 01 | 03-19-1999 | 15:38:29 | 01:00 | 9 | 9 | 2 | 2 | 6 | 3 | 7 | 1 | 3 | 4 | 1 | 0 | 0 | 0 | 0 | | | | | | | | | | | |
| Downstream | 2 | 01 | 03-19-1999 | 15:40:59 | 01:00 | 8 | 6 | 1 | 6 | 4 | 9 | 3 | 9 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | | | | | | | | | | | |
| Downstream | 2 | 01 | 03-19-1999 | 15:43:29 | 01:00 | 3 | 3 | 0 | 5 | 11 | 2 | 2 | 5 | 1 | 0 | 2 | 0 | 1 | 0 | 0 | | | | | | | | | | | |
| Downstream | 2 | 01 | 03-19-1999 | 15:45:59 | 01:00 | 9 | 11 | 3 | 10 | 8 | 1 | 7 | 6 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | | | | | | | | | | | |
| Downstream | 2 | 01 | 03-19-1999 | 15:48:29 | 01:00 | 16 | 19 | 9 | 13 | 8 | 5 | 3 | 2 | 0 | 3 | 2 | 0 | 0 | 0 | 0 | | | | | | | | | | | |
| Downstream | 2 | 01 | 03-19-1999 | 15:50:59 | 01:00 | 7 | 5 | 0 | 2 | 7 | 4 | 0 | 1 | 2 | 3 | 2 | 0 | 0 | 0 | 0 | | | | | | | | | | | |
| Downstream | 2 | 01 | 03-19-1999 | 15:53:29 | 01:00 | 3 | 5 | 3 | 5 | 8 | 3 | 4 | 4 | 0 | 1 | 3 | 0 | 0 | 0 | 0 | | | | | | | | | | | |
| Downstream | 2 | 01 | 03-19-1999 | 15:55:59 | 01:00 | 2 | 7 | 2 | 6 | 6 | 9 | 5 | 4 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | | | | | | | | | | | |
| Downstream | 2 | 01 | 03-19-1999 | 15:58:29 | 01:00 | 6 | 6 | 2 | 3 | 2 | 4 | 4 | 2 | 0 | 2 | 3 | 0 | 0 | 0 | 1 | | | | | | | | | | | |
| D. Bckgrnd | 2 | 01 | 03-19-1999 | 16:07:32 | 01:00 | 3 | 5 | 0 | 0 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | | | | | | | | | | | |
| Meas. Penetration | | | | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | | | | | | | | | |
| P100 correction values | | | | | | 1.01 | 1.00 | 0.98 | 0.99 | 1.00 | 1.00 | 0.99 | 1.01 | 1.03 | 1.03 | 1.03 | 1.04 | 0.94 | 1.00 | 0.97 | | | | | | | | | | | |
| Corrected Penetration | | | | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | | | | | | | | | |
| Corrected Efficiency (%) | | | | | | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | | | | | | | | | | | |
| Data Acceptance Criteria: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Challenge Counts for Each Channel: | | | | | | 98237 | 146520 | 46572 | 86370 | 128800 | 79056 | 103890 | 97562 | 23357 | 51313 | 32267 | 11127 | 1903 | 3085 | 2169 | | | | | | | | | | | |
| Data Quality Objective: | | | | | | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | | | | | | | | | | | |
| Does this meet DQO: | | | | | | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | | | | | | | | | | | |
| Standard Deviation of Penetration for Each Channel : | | | | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | -0.01 | | | | | | | | | | | |
| Data Quality Objective: | | | | | | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | < 0.30 | < 0.30 | < 0.30 | < 0.30 | < 0.30 | < 0.30 | | | | | | | | | | | |
| Does this meet DQO: | | | | | | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | | | | | | | | | | | |
| Maximum observed particle concentration (#/cc): | | | | | | 13.1 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Data Quality Objective: max. allowable conc. (#/cc): | | | | | | < 23 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Does this meet the DQO: | | | | | | Yes, (applies to all channels) | | | | | | | | | | | | | | | | | | | | | | | | | |

Test No. 03309903
No Filter
Liquid-Phase

Particle Counts per Indicated OPC Channel (1-Minute Samples @ 7.1 L/min)

| OPC Channel Number | | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Min. Diam. (um) | | | | | | 0.28 | 0.37 | 0.47 | 0.52 | 0.66 | 0.94 | 1.22 | 1.51 | 1.88 | 2.07 | 2.83 | 3.77 | 4.71 | 5.18 | 6.60 |
| Max. Diam. (um) | | | | | | 0.37 | 0.47 | 0.52 | 0.66 | 0.94 | 1.22 | 1.51 | 1.88 | 2.07 | 2.83 | 3.77 | 4.71 | 5.18 | 6.60 | 9.43 |
| Geo. Mean Diam (um) | | | | | | 0.32 | 0.42 | 0.49 | 0.58 | 0.78 | 1.07 | 1.36 | 1.68 | 1.97 | 2.42 | 3.26 | 4.21 | 4.94 | 5.85 | 7.89 |
| ENTER DATA BELOW | | | | | | | | | | | | | | | | | | | | |
| U. Bckgrnd | 1 | 01 | 03-30-1999 | 11:47:44 | 01:00 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Upstream | 1 | 01 | 03-30-1999 | 11:58:04 | 01:00 | 10110 | 15710 | 5711 | 10230 | 15570 | 11220 | 19210 | 14300 | 2950 | 7188 | 4131 | 1138 | 174 | 253 | 128 |
| Upstream | 1 | 01 | 03-30-1999 | 12:00:34 | 01:00 | 10060 | 15860 | 5655 | 10530 | 15520 | 11300 | 19290 | 13830 | 2896 | 7158 | 4183 | 1134 | 181 | 251 | 141 |
| Upstream | 1 | 01 | 03-30-1999 | 12:03:04 | 01:00 | 10540 | 16110 | 5800 | 10610 | 15680 | 11460 | 19190 | 14260 | 2881 | 7179 | 4213 | 1086 | 149 | 269 | 165 |
| Upstream | 1 | 01 | 03-30-1999 | 12:05:34 | 01:00 | 10000 | 15330 | 5494 | 10000 | 14890 | 10900 | 18530 | 13180 | 2707 | 6880 | 4029 | 1032 | 158 | 242 | 145 |
| Upstream | 1 | 01 | 03-30-1999 | 12:08:04 | 01:00 | 10430 | 16180 | 5760 | 10620 | 15670 | 11270 | 19180 | 13880 | 2966 | 7060 | 4315 | 1135 | 192 | 244 | 148 |
| Upstream | 1 | 01 | 03-30-1999 | 12:10:34 | 01:00 | 10460 | 16010 | 5741 | 10560 | 15540 | 11400 | 19180 | 13660 | 2959 | 7058 | 4245 | 1111 | 163 | 251 | 157 |
| Upstream | 1 | 01 | 03-30-1999 | 12:13:04 | 01:00 | 10470 | 16090 | 5664 | 10380 | 15630 | 11610 | 19160 | 13270 | 2853 | 7059 | 4059 | 1051 | 185 | 211 | 105 |
| Upstream | 1 | 01 | 03-30-1999 | 12:15:34 | 01:00 | 10550 | 16410 | 5796 | 10580 | 15850 | 11830 | 19500 | 13610 | 2904 | 6973 | 4078 | 1079 | 171 | 222 | 131 |
| Upstream | 1 | 01 | 03-30-1999 | 12:18:04 | 01:00 | 10470 | 16080 | 5882 | 10670 | 15880 | 11690 | 19180 | 13500 | 2898 | 6990 | 4008 | 1093 | 148 | 256 | 135 |
| Upstream | 1 | 01 | 03-30-1999 | 12:20:34 | 01:00 | 10210 | 16060 | 5723 | 10370 | 15620 | 11400 | 19030 | 13180 | 2901 | 6936 | 3819 | 1009 | 150 | 240 | 127 |
| U. Bckgrnd | 1 | 01 | 03-30-1999 | 12:35:16 | 01:00 | 0 | 2 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| ENTER DATA BELOW | | | | | | | | | | | | | | | | | | | | |
| D. Bckgrnd | 2 | 01 | 03-30-1999 | 11:48:59 | 01:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-30-1999 | 11:59:19 | 01:00 | 9838 | 15250 | 5519 | 10200 | 15230 | 10810 | 18600 | 13350 | 2772 | 6888 | 4097 | 1048 | 160 | 232 | 83 |
| Downstream | 2 | 01 | 03-30-1999 | 12:01:49 | 01:00 | 10130 | 15850 | 5573 | 10320 | 15510 | 11340 | 19050 | 13690 | 2908 | 7135 | 4299 | 1083 | 167 | 235 | 102 |
| Downstream | 2 | 01 | 03-30-1999 | 12:04:19 | 01:00 | 10000 | 15640 | 5502 | 10380 | 15190 | 11030 | 18690 | 13540 | 2863 | 6951 | 4137 | 1059 | 166 | 217 | 94 |
| Downstream | 2 | 01 | 03-30-1999 | 12:06:49 | 01:00 | 10060 | 15680 | 5602 | 10280 | 15120 | 11030 | 18800 | 13740 | 2898 | 6998 | 4130 | 1062 | 148 | 185 | 87 |
| Downstream | 2 | 01 | 03-30-1999 | 12:09:19 | 01:00 | 10000 | 15660 | 5692 | 10460 | 15130 | 11060 | 18770 | 13920 | 2860 | 6869 | 4151 | 1072 | 146 | 203 | 96 |
| Downstream | 2 | 01 | 03-30-1999 | 12:11:49 | 01:00 | 10560 | 16170 | 5754 | 10820 | 16090 | 11450 | 19610 | 14520 | 2978 | 7308 | 4342 | 1082 | 165 | 220 | 121 |
| Downstream | 2 | 01 | 03-30-1999 | 12:14:19 | 01:00 | 10450 | 16290 | 5659 | 10690 | 15990 | 11760 | 19600 | 13260 | 2932 | 7085 | 4169 | 1072 | 162 | 204 | 112 |
| Downstream | 2 | 01 | 03-30-1999 | 12:16:49 | 01:00 | 10390 | 16050 | 5798 | 10430 | 15900 | 11730 | 19380 | 13280 | 2930 | 7036 | 4076 | 1013 | 157 | 196 | 119 |
| Downstream | 2 | 01 | 03-30-1999 | 12:19:19 | 01:00 | 10170 | 15840 | 5911 | 10350 | 15350 | 11440 | 18940 | 13010 | 2814 | 6869 | 4098 | 1057 | 157 | 195 | 90 |
| Downstream | 2 | 01 | 03-30-1999 | 12:21:49 | 01:00 | 10450 | 16160 | 5690 | 10710 | 15740 | 11470 | 19250 | 13350 | 2853 | 6991 | 4108 | 990 | 149 | 221 | 88 |
| D. Bckgrnd | 2 | 01 | 03-30-1999 | 12:36:31 | 01:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Meas. Penetration | | | | | | 0.99 | 0.99 | 0.99 | 1.00 | 1.00 | 0.99 | 1.00 | 0.99 | 1.00 | 1.00 | 1.01 | 0.97 | 0.94 | 0.86 | 0.72 |
| P100 correction values | | | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Corrected Penetration | | | | | | 0.99 | 0.99 | 0.99 | 1.00 | 1.00 | 0.99 | 1.00 | 0.99 | 1.00 | 1.00 | 1.01 | 0.97 | 0.94 | 0.86 | 0.72 |
| Corrected Efficiency (%) | | | | | | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | -1 | 3 | 6 | 14 | 28 |
| Data Acceptance Criteria: | | | | | | | | | | | | | | | | | | | | |
| Total Challenge Counts for Each Channel: | | | | | | 103300 | 159840 | 57226 | 104550 | 155850 | 114080 | 191450 | 136670 | 28915 | 70481 | 41080 | 10868 | 1671 | 2439 | 1382 |
| Data Quality Objective: | | | | | | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 |
| Does this meet DQO: | | | | | | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Standard Deviation of Penetration for Each Channel : | | | | | | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.04 | 0.02 | 0.04 | 0.03 | 0.02 | 0.04 | 0.05 | 0.10 | 0.09 | 0.13 |
| Data Quality Objective: | | | | | | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | < 0.10 | < 0.30 | < 0.30 | < 0.30 | < 0.30 | < 0.30 |
| Does this meet DQO: | | | | | | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Maximum observed particle concentration (#/cc): | | | | | | 17.1 | | | | | | | | | | | | | | |
| Data Quality Objective: max. allowable conc. (#/cc): | | | | | | < 23 | | | | | | | | | | | | | | |
| Does this meet the DQO: | | | | | | Yes, (applies to all channels) | | | | | | | | | | | | | | |

Test No. 03309904
Arrestor
Liquid-Phase

Particle Counts per Indicated OPC Channel (1-Minute Samples @ 7.1 L/min)

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OPC Channel Number | | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| Min. Diam. (um) | | | | | | 0.28 | 0.37 | 0.47 | 0.52 | 0.66 | 0.94 | 1.22 | 1.51 | 1.88 | 2.07 | 2.83 | 3.77 | 4.71 | 5.18 | 6.60 |
| Max. Diam. (um) | | | | | | 0.37 | 0.47 | 0.52 | 0.66 | 0.94 | 1.22 | 1.51 | 1.88 | 2.07 | 2.83 | 3.77 | 4.71 | 5.18 | 6.60 | 9.43 |
| Geo. Mean Diam (um) | | | | | | 0.32 | 0.42 | 0.49 | 0.58 | 0.78 | 1.07 | 1.36 | 1.68 | 1.97 | 2.42 | 3.26 | 4.21 | 4.94 | 5.85 | 7.89 |
| ENTER DATA BELOW | | | | | | | | | | | | | | | | | | | | |
| U. Bckgrnd | 1 | 01 | 03-30-1999 | 13:53:40 | 01:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Upstream | 1 | 01 | 03-30-1999 | 14:02:31 | 01:00 | 10240 | 15910 | 5501 | 10400 | 15890 | 11260 | 19430 | 13980 | 2949 | 7148 | 4274 | 1140 | 160 | 274 | 139 |
| Upstream | 1 | 01 | 03-30-1999 | 14:05:01 | 01:00 | 10160 | 15980 | 5697 | 10350 | 15710 | 11260 | 19130 | 13980 | 2870 | 7084 | 4419 | 1139 | 158 | 278 | 140 |
| Upstream | 1 | 01 | 03-30-1999 | 14:07:31 | 01:00 | 10460 | 15970 | 5756 | 10780 | 15940 | 11330 | 19420 | 14450 | 3107 | 7214 | 4385 | 1159 | 169 | 272 | 148 |
| Upstream | 1 | 01 | 03-30-1999 | 14:10:01 | 01:00 | 10580 | 16330 | 5703 | 10560 | 15850 | 11430 | 19390 | 14240 | 3082 | 7253 | 4320 | 1246 | 165 | 286 | 165 |
| Upstream | 1 | 01 | 03-30-1999 | 14:12:31 | 01:00 | 10470 | 15950 | 5778 | 10520 | 15820 | 11310 | 19260 | 13850 | 2950 | 7156 | 4486 | 1139 | 184 | 284 | 159 |
| Upstream | 1 | 01 | 03-30-1999 | 14:15:01 | 01:00 | 10090 | 15560 | 5582 | 10680 | 15610 | 10990 | 19000 | 14630 | 3144 | 7139 | 4635 | 1165 | 181 | 306 | 136 |
| Upstream | 1 | 01 | 03-30-1999 | 14:17:31 | 01:00 | 10210 | 15370 | 5567 | 10500 | 15490 | 10690 | 18720 | 14680 | 3105 | 7267 | 4621 | 1245 | 206 | 288 | 167 |
| Upstream | 1 | 01 | 03-30-1999 | 14:20:01 | 01:00 | 10220 | 15740 | 5498 | 10540 | 15660 | 10970 | 19130 | 14600 | 2947 | 7248 | 4453 | 1206 | 207 | 296 | 147 |
| Upstream | 1 | 01 | 03-30-1999 | 14:22:31 | 01:00 | 10290 | 15300 | 5525 | 10360 | 15300 | 10980 | 18720 | 14400 | 2924 | 7139 | 4537 | 1209 | 192 | 303 | 169 |
| Upstream | 1 | 01 | 03-30-1999 | 14:25:01 | 01:00 | 10520 | 16080 | 5737 | 10720 | 16060 | 11350 | 19660 | 15210 | 3153 | 7481 | 4638 | 1294 | 190 | 285 | 197 |
| U. Bckgrnd | 1 | 01 | 03-30-1999 | 14:35:05 | 01:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ENTER DATA BELOW | | | | | | | | | | | | | | | | | | | | |
| D. Bckgrnd | 2 | 01 | 03-30-1999 | 13:54:55 | 01:00 | 4 | 0 | 0 | 2 | 1 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-30-1999 | 14:03:46 | 01:00 | 1329 | 1730 | 571 | 908 | 848 | 353 | 267 | 57 | 1 | 6 | 1 | 1 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-30-1999 | 14:06:16 | 01:00 | 1291 | 1790 | 546 | 906 | 878 | 358 | 280 | 70 | 5 | 8 | 3 | 0 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-30-1999 | 14:08:46 | 01:00 | 1317 | 1732 | 528 | 857 | 815 | 343 | 289 | 45 | 6 | 8 | 2 | 1 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-30-1999 | 14:11:16 | 01:00 | 1289 | 1735 | 511 | 841 | 844 | 374 | 273 | 66 | 7 | 6 | 2 | 0 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-30-1999 | 14:13:46 | 01:00 | 1237 | 1633 | 519 | 822 | 836 | 333 | 284 | 54 | 4 | 8 | 4 | 0 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-30-1999 | 14:16:16 | 01:00 | 1327 | 1708 | 548 | 968 | 887 | 359 | 284 | 76 | 7 | 7 | 2 | 0 | 0 | 1 | 0 |
| Downstream | 2 | 01 | 03-30-1999 | 14:18:46 | 01:00 | 1270 | 1727 | 521 | 889 | 828 | 350 | 323 | 82 | 5 | 9 | 0 | 0 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-30-1999 | 14:21:16 | 01:00 | 1284 | 1744 | 536 | 853 | 964 | 365 | 298 | 72 | 3 | 9 | 3 | 1 | 1 | 0 | 0 |
| Downstream | 2 | 01 | 03-30-1999 | 14:23:46 | 01:00 | 1257 | 1686 | 480 | 879 | 845 | 398 | 290 | 67 | 4 | 8 | 2 | 0 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-30-1999 | 14:26:16 | 01:00 | 1300 | 1730 | 500 | 862 | 891 | 375 | 348 | 77 | 5 | 6 | 3 | 0 | 0 | 0 | 0 |
| D. Bckgrnd | 2 | 01 | 03-30-1999 | 14:36:20 | 01:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| Meas. Penetration | | | | | | 0.12 | 0.11 | 0.09 | 0.08 | 0.05 | 0.03 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| P100 correction values | | | | | | 0.99 | 0.99 | 0.99 | 1.00 | 1.00 | 0.99 | 1.00 | 0.99 | 1.00 | 1.00 | 1.01 | 0.97 | 0.94 | 0.86 | 0.72 |
| Corrected Penetration | | | | | | 0.13 | 0.11 | 0.09 | 0.08 | 0.06 | 0.03 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Corrected Efficiency (%) | | | | | | 87 | 89 | 91 | 92 | 94 | 97 | 98 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Data Acceptance Criteria: | | | | | | | | | | | | | | | | | | | | |
| Total Challenge Counts for Each Channel: | | | | | | 103240 | 158190 | 56344 | 105410 | 157330 | 111570 | 191860 | 144020 | 30231 | 72129 | 44768 | 11942 | 1812 | 2872 | 1567 |
| Data Quality Objective: | | | | | | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 |
| Does this meet DQO: | | | | | | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Standard Deviation of Penetration for Each Channel : | | | | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Data Quality Objective: | | | | | | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | < 0.10 | < 0.30 | < 0.30 | < 0.30 | < 0.30 | < 0.30 |
| Does this meet DQO: | | | | | | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Maximum observed particle concentration (#/cc): | | | | | | 17.3 | | | | | | | | | | | | | | |
| Data Quality Objective: max. allowable conc. (#/cc): | | | | | | < 23 | | | | | | | | | | | | | | |
| Does this meet the DQO: | | | | | | Yes, (applies to all channels) | | | | | | | | | | | | | | |

Test No. 03309905
No Filter
Liquid-Phase

Particle Counts per Indicated OPC Channel (1-Minute Samples @ 7.1 L/min)

| OPC Channel Number | | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Min. Diam. (um) | | | | | | 0.28 | 0.37 | 0.47 | 0.52 | 0.66 | 0.94 | 1.22 | 1.51 | 1.88 | 2.07 | 2.83 | 3.77 | 4.71 | 5.18 | 6.60 |
| Max. Diam. (um) | | | | | | 0.37 | 0.47 | 0.52 | 0.66 | 0.94 | 1.22 | 1.51 | 1.88 | 2.07 | 2.83 | 3.77 | 4.71 | 5.18 | 6.60 | 9.43 |
| Geo. Mean Diam (um) | | | | | | 0.32 | 0.42 | 0.49 | 0.58 | 0.78 | 1.07 | 1.36 | 1.68 | 1.97 | 2.42 | 3.26 | 4.21 | 4.94 | 5.85 | 7.89 |
| ENTER DATA BELOW | | | | | | | | | | | | | | | | | | | | |
| U. Bckgrnd | 1 | 01 | 03-30-1999 | 14:58:44 | 01:00 | 0 | 2 | 2 | 3 | 2 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Upstream | 1 | 01 | 03-30-1999 | 15:08:07 | 01:00 | 10430 | 15770 | 5528 | 10880 | 15750 | 11110 | 19280 | 15050 | 3018 | 7512 | 4534 | 1290 | 186 | 286 | 170 |
| Upstream | 1 | 01 | 03-30-1999 | 15:10:37 | 01:00 | 10230 | 15600 | 5657 | 10750 | 15850 | 10940 | 18990 | 15020 | 3026 | 7254 | 4647 | 1219 | 193 | 308 | 174 |
| Upstream | 1 | 01 | 03-30-1999 | 15:13:07 | 01:00 | 10140 | 15140 | 5452 | 10320 | 15520 | 10670 | 18530 | 15030 | 3090 | 7352 | 4664 | 1213 | 209 | 285 | 173 |
| Upstream | 1 | 01 | 03-30-1999 | 15:15:37 | 01:00 | 9804 | 15010 | 5514 | 10250 | 15390 | 10380 | 18560 | 15120 | 3119 | 7232 | 4544 | 1282 | 198 | 312 | 145 |
| Upstream | 1 | 01 | 03-30-1999 | 15:18:07 | 01:00 | 10070 | 15150 | 5440 | 10150 | 15220 | 10920 | 18420 | 13670 | 2976 | 6820 | 4178 | 1178 | 181 | 251 | 131 |
| Upstream | 1 | 01 | 03-30-1999 | 15:20:37 | 01:00 | 9880 | 15300 | 5588 | 10130 | 15090 | 10920 | 18810 | 13550 | 2763 | 6809 | 4147 | 1097 | 180 | 231 | 149 |
| Upstream | 1 | 01 | 03-30-1999 | 15:23:07 | 01:00 | 10300 | 15690 | 5582 | 10200 | 15540 | 11180 | 19070 | 13930 | 3001 | 7123 | 4325 | 1134 | 172 | 293 | 147 |
| Upstream | 1 | 01 | 03-30-1999 | 15:25:37 | 01:00 | 10020 | 15640 | 5624 | 10270 | 15570 | 11040 | 18800 | 13850 | 2919 | 7035 | 4313 | 1141 | 160 | 260 | 159 |
| Upstream | 1 | 01 | 03-30-1999 | 15:28:07 | 01:00 | 10450 | 15980 | 5726 | 10730 | 15860 | 11340 | 19210 | 14180 | 2956 | 7338 | 4423 | 1129 | 163 | 262 | 177 |
| Upstream | 1 | 01 | 03-30-1999 | 15:30:37 | 01:00 | 10400 | 16090 | 5940 | 10720 | 15770 | 11300 | 19440 | 14190 | 3093 | 7291 | 4393 | 1172 | 176 | 247 | 140 |
| U. Bckgrnd | 1 | 01 | 03-30-1999 | 15:46:10 | 01:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ENTER DATA BELOW | | | | | | | | | | | | | | | | | | | | |
| D. Bckgrnd | 2 | 01 | 03-30-1999 | 14:59:59 | 01:00 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-30-1999 | 15:09:22 | 01:00 | 10240 | 15440 | 5712 | 10620 | 16020 | 10900 | 18800 | 14890 | 3103 | 7503 | 4669 | 1249 | 163 | 313 | 133 |
| Downstream | 2 | 01 | 03-30-1999 | 15:11:52 | 01:00 | 9997 | 15250 | 5346 | 10240 | 15380 | 10750 | 18760 | 14470 | 3108 | 7267 | 4477 | 1150 | 186 | 259 | 130 |
| Downstream | 2 | 01 | 03-30-1999 | 15:14:22 | 01:00 | 9874 | 15150 | 5412 | 10400 | 15670 | 10620 | 18610 | 15190 | 3001 | 7413 | 4719 | 1295 | 188 | 243 | 143 |
| Downstream | 2 | 01 | 03-30-1999 | 15:16:52 | 01:00 | 10060 | 15220 | 5432 | 10170 | 15580 | 10470 | 18700 | 14920 | 3127 | 7219 | 4734 | 1264 | 189 | 262 | 137 |
| Downstream | 2 | 01 | 03-30-1999 | 15:19:22 | 01:00 | 10170 | 15640 | 5534 | 10220 | 15390 | 11130 | 18990 | 13740 | 2915 | 7078 | 4340 | 1163 | 178 | 262 | 101 |
| Downstream | 2 | 01 | 03-30-1999 | 15:21:52 | 01:00 | 9949 | 15210 | 5455 | 10270 | 15190 | 10830 | 18610 | 13440 | 2895 | 6919 | 4339 | 1139 | 159 | 233 | 115 |
| Downstream | 2 | 01 | 03-30-1999 | 15:24:22 | 01:00 | 9875 | 15640 | 5542 | 10510 | 15530 | 11120 | 18920 | 13810 | 2906 | 7064 | 4341 | 1096 | 145 | 247 | 101 |
| Downstream | 2 | 01 | 03-30-1999 | 15:26:52 | 01:00 | 10020 | 15180 | 5427 | 10300 | 15320 | 10890 | 18530 | 13830 | 3030 | 7172 | 4477 | 1086 | 176 | 233 | 116 |
| Downstream | 2 | 01 | 03-30-1999 | 15:29:22 | 01:00 | 10110 | 15530 | 5672 | 10550 | 15560 | 11250 | 19190 | 13890 | 2930 | 7324 | 4291 | 1144 | 165 | 225 | 125 |
| Downstream | 2 | 01 | 03-30-1999 | 15:31:52 | 01:00 | 9859 | 15200 | 5385 | 10170 | 15130 | 10950 | 18580 | 13600 | 2913 | 6916 | 4354 | 1130 | 148 | 274 | 102 |
| D. Bckgrnd | 2 | 01 | 03-30-1999 | 15:47:25 | 01:00 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Meas. Penetration | | | | | | 0.98 | 0.99 | 0.98 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 1.00 | 1.00 | 1.01 | 0.99 | 0.93 | 0.93 | 0.77 |
| P100 correction values | | | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Corrected Penetration | | | | | | 0.98 | 0.99 | 0.98 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 1.00 | 1.00 | 1.01 | 0.99 | 0.93 | 0.93 | 0.77 |
| Corrected Efficiency (%) | | | | | | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | -1 | 1 | 7 | 7 | 23 |
| Data Acceptance Criteria: | | | | | | | | | | | | | | | | | | | | |
| Total Challenge Counts for Each Channel: | | | | | | 101724 | 155370 | 56051 | 104400 | 155560 | 109800 | 189110 | 143590 | 29961 | 71766 | 44168 | 11855 | 1818 | 2735 | 1565 |
| Data Quality Objective: | | | | | | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 |
| Does this meet DQO: | | | | | | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Standard Deviation of Penetration for Each Channel : | | | | | | 0.03 | 0.03 | 0.03 | 0.03 | 0.02 | 0.03 | 0.02 | 0.06 | 0.05 | 0.04 | 0.06 | 0.08 | 0.12 | 0.13 | 0.13 |
| Data Quality Objective: | | | | | | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | < 0.10 | < 0.30 | < 0.30 | < 0.30 | < 0.30 | < 0.30 |
| Does this meet DQO: | | | | | | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Maximum observed particle concentration (#/cc): | | | | | | 17.1 | | | | | | | | | | | | | | |
| Data Quality Objective: max. allowable conc. (#/cc): | | | | | | < 23 | | | | | | | | | | | | | | |
| Does this meet the DQO: | | | | | | Yes, (applies to all channels) | | | | | | | | | | | | | | |

Test No. 03309906
Arrestor
Liquid-Phase

Particle Counts per Indicated OPC Channel (1-Minute Samples @ 7.1 L/min)

| OPC Channel Number | | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Min. Diam. (um) | | | | | | 0.28 | 0.37 | 0.47 | 0.52 | 0.66 | 0.94 | 1.22 | 1.51 | 1.88 | 2.07 | 2.83 | 3.77 | 4.71 | 5.18 | 6.60 |
| Max. Diam. (um) | | | | | | 0.37 | 0.47 | 0.52 | 0.66 | 0.94 | 1.22 | 1.51 | 1.88 | 2.07 | 2.83 | 3.77 | 4.71 | 5.18 | 6.60 | 9.43 |
| Geo. Mean Diam (um) | | | | | | 0.32 | 0.42 | 0.49 | 0.58 | 0.78 | 1.07 | 1.36 | 1.68 | 1.97 | 2.42 | 3.26 | 4.21 | 4.94 | 5.85 | 7.89 |
| ENTER DATA BELOW | | | | | | | | | | | | | | | | | | | | |
| U. Bckgrnd | 1 | 01 | 03-30-1999 | 16:29:04 | 01:00 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Upstream | 1 | 01 | 03-30-1999 | 16:41:49 | 01:00 | 10590 | 16090 | 5863 | 10800 | 15540 | 11590 | 19800 | 13940 | 2983 | 7269 | 4210 | 1128 | 181 | 272 | 148 |
| Upstream | 1 | 01 | 03-30-1999 | 16:44:19 | 01:00 | 10640 | 16220 | 5825 | 10600 | 16080 | 11610 | 19510 | 14310 | 2987 | 7165 | 4418 | 1126 | 193 | 304 | 164 |
| Upstream | 1 | 01 | 03-30-1999 | 16:46:49 | 01:00 | 10520 | 16040 | 5765 | 10780 | 16030 | 11720 | 19640 | 14030 | 2786 | 7219 | 4383 | 1113 | 187 | 289 | 183 |
| Upstream | 1 | 01 | 03-30-1999 | 16:49:19 | 01:00 | 10350 | 16290 | 5501 | 10590 | 15740 | 11390 | 19380 | 13760 | 2964 | 7011 | 4287 | 1161 | 164 | 268 | 138 |
| Upstream | 1 | 01 | 03-30-1999 | 16:51:49 | 01:00 | 10580 | 16540 | 5853 | 10720 | 15860 | 11620 | 19770 | 13910 | 2993 | 7264 | 4274 | 1181 | 176 | 275 | 160 |
| Upstream | 1 | 01 | 03-30-1999 | 16:54:19 | 01:00 | 9983 | 15110 | 5325 | 10070 | 15110 | 10650 | 18510 | 14140 | 2861 | 6894 | 4368 | 1222 | 153 | 260 | 156 |
| Upstream | 1 | 01 | 03-30-1999 | 16:56:49 | 01:00 | 10140 | 15550 | 5657 | 10540 | 15490 | 10780 | 18720 | 14340 | 3080 | 7364 | 4524 | 1205 | 218 | 299 | 149 |
| Upstream | 1 | 01 | 03-30-1999 | 16:59:19 | 01:00 | 10340 | 15990 | 5713 | 10900 | 16090 | 11340 | 19490 | 15070 | 3002 | 7344 | 4770 | 1267 | 195 | 312 | 163 |
| Upstream | 1 | 01 | 03-30-1999 | 17:01:49 | 01:00 | 10540 | 16290 | 5778 | 11060 | 16540 | 11620 | 19580 | 15400 | 3141 | 7710 | 4760 | 1334 | 207 | 317 | 182 |
| Upstream | 1 | 01 | 03-30-1999 | 17:04:19 | 01:00 | 10340 | 16150 | 5720 | 10980 | 15940 | 11360 | 19730 | 15070 | 3112 | 7517 | 4699 | 1227 | 192 | 318 | 181 |
| U. Bckgrnd | 1 | 01 | 03-30-1999 | 17:12:41 | 01:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ENTER DATA BELOW | | | | | | | | | | | | | | | | | | | | |
| D. Bckgrnd | 2 | 01 | 03-30-1999 | 16:27:49 | 01:00 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-30-1999 | 16:43:04 | 01:00 | 1131 | 1352 | 458 | 691 | 616 | 273 | 228 | 56 | 6 | 6 | 2 | 0 | 1 | 1 | 0 |
| Downstream | 2 | 01 | 03-30-1999 | 16:45:34 | 01:00 | 1049 | 1431 | 429 | 622 | 631 | 263 | 182 | 45 | 5 | 5 | 2 | 1 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-30-1999 | 16:48:04 | 01:00 | 1126 | 1475 | 466 | 705 | 644 | 281 | 194 | 39 | 6 | 4 | 3 | 0 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-30-1999 | 16:50:34 | 01:00 | 1145 | 1436 | 428 | 652 | 621 | 265 | 210 | 33 | 6 | 6 | 3 | 0 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-30-1999 | 16:53:04 | 01:00 | 1129 | 1496 | 442 | 677 | 682 | 246 | 198 | 37 | 7 | 10 | 0 | 1 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-30-1999 | 16:55:34 | 01:00 | 1112 | 1421 | 486 | 728 | 687 | 269 | 228 | 54 | 6 | 11 | 1 | 1 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-30-1999 | 16:58:04 | 01:00 | 1126 | 1454 | 462 | 736 | 659 | 267 | 235 | 52 | 5 | 10 | 1 | 1 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-30-1999 | 17:00:34 | 01:00 | 1121 | 1428 | 457 | 722 | 679 | 267 | 256 | 66 | 6 | 9 | 4 | 0 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-30-1999 | 17:03:04 | 01:00 | 1036 | 1400 | 443 | 695 | 709 | 296 | 221 | 80 | 4 | 11 | 2 | 1 | 1 | 0 | 0 |
| Downstream | 2 | 01 | 03-30-1999 | 17:05:34 | 01:00 | 1094 | 1423 | 432 | 724 | 672 | 255 | 233 | 54 | 3 | 8 | 3 | 0 | 0 | 0 | 0 |
| D. Bckgrnd | 2 | 01 | 03-30-1999 | 17:13:56 | 01:00 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Meas. Penetration | | | | | | 0.11 | 0.09 | 0.08 | 0.06 | 0.04 | 0.02 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| P100 correction values | | | | | | 0.98 | 0.99 | 0.98 | 0.99 | 0.99 | 0.99 | 0.99 | 0.99 | 1.00 | 1.00 | 1.01 | 0.99 | 0.93 | 0.93 | 0.77 |
| Corrected Penetration | | | | | | 0.11 | 0.09 | 0.08 | 0.07 | 0.04 | 0.02 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Corrected Efficiency (%) | | | | | | 89 | 91 | 92 | 93 | 96 | 98 | 99 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Data Acceptance Criteria: | | | | | | | | | | | | | | | | | | | | |
| Total Challenge Counts for Each Channel: | | | | | | 104023 | 160270 | 57000 | 107040 | 158420 | 113680 | 194130 | 143970 | 29909 | 72757 | 44693 | 11964 | 1866 | 2914 | 1624 |
| Data Quality Objective: | | | | | | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 |
| Does this meet DQO: | | | | | | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Standard Deviation of Penetration for Each Channel : | | | | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Data Quality Objective: | | | | | | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | < 0.10 | < 0.30 | < 0.30 | < 0.30 | < 0.30 | < 0.30 |
| Does this meet DQO: | | | | | | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Maximum observed particle concentration (#/cc): | | | | | | 17.6 | | | | | | | | | | | | | | |
| Data Quality Objective: max. allowable conc. (#/cc): | | | | | | < 23 | | | | | | | | | | | | | | |
| Does this meet the DQO: | | | | | | Yes, (applies to all channels) | | | | | | | | | | | | | | |

Test No. 03319901
No Filter
Liquid-Phase

Particle Counts per Indicated OPC Channel (1-Minute Samples @ 7.1 L/min)

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OPC Channel Number | | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| Min. Diam. (um) | | | | | | 0.28 | 0.37 | 0.47 | 0.52 | 0.66 | 0.94 | 1.22 | 1.51 | 1.88 | 2.07 | 2.83 | 3.77 | 4.71 | 5.18 | 6.60 |
| Max. Diam. (um) | | | | | | 0.37 | 0.47 | 0.52 | 0.66 | 0.94 | 1.22 | 1.51 | 1.88 | 2.07 | 2.83 | 3.77 | 4.71 | 5.18 | 6.60 | 9.43 |
| Geo. Mean Diam (um) | | | | | | 0.32 | 0.42 | 0.49 | 0.58 | 0.78 | 1.07 | 1.36 | 1.68 | 1.97 | 2.42 | 3.26 | 4.21 | 4.94 | 5.85 | 7.89 |
| ENTER DATA BELOW | | | | | | | | | | | | | | | | | | | | |
| U. Bckgrnd | 1 | 01 | 03-31-1999 | 09:17:43 | 01:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Upstream | 1 | 01 | 03-31-1999 | 09:26:44 | 01:00 | 10710 | 16810 | 6101 | 11070 | 16470 | 12010 | 20100 | 14840 | 2860 | 6927 | 4112 | 1107 | 188 | 303 | 187 |
| Upstream | 1 | 01 | 03-31-1999 | 09:29:14 | 01:00 | 10770 | 16490 | 5805 | 10830 | 16210 | 11580 | 19730 | 14720 | 3034 | 6710 | 3936 | 1089 | 165 | 279 | 156 |
| Upstream | 1 | 01 | 03-31-1999 | 09:31:44 | 01:00 | 10340 | 16360 | 6026 | 10880 | 15830 | 11520 | 19480 | 14740 | 2972 | 6772 | 4119 | 1171 | 176 | 298 | 149 |
| Upstream | 1 | 01 | 03-31-1999 | 09:34:14 | 01:00 | 10480 | 16360 | 5860 | 10940 | 16260 | 11590 | 19680 | 14860 | 2974 | 6815 | 4059 | 1204 | 173 | 266 | 146 |
| Upstream | 1 | 01 | 03-31-1999 | 09:36:44 | 01:00 | 10730 | 16710 | 5945 | 10940 | 16420 | 11760 | 19790 | 14700 | 2820 | 6964 | 3946 | 1140 | 177 | 281 | 155 |
| Upstream | 1 | 01 | 03-31-1999 | 09:39:14 | 01:00 | 10650 | 16580 | 6076 | 10840 | 16140 | 11630 | 19940 | 14380 | 2962 | 6717 | 4012 | 1170 | 169 | 280 | 157 |
| Upstream | 1 | 01 | 03-31-1999 | 09:41:44 | 01:00 | 10730 | 16820 | 6033 | 11130 | 16690 | 11840 | 20270 | 14430 | 2971 | 6875 | 3879 | 1054 | 174 | 260 | 164 |
| Upstream | 1 | 01 | 03-31-1999 | 09:44:14 | 01:00 | 11020 | 16960 | 6127 | 11360 | 16700 | 12200 | 20530 | 14840 | 2987 | 6781 | 3941 | 1112 | 208 | 250 | 141 |
| Upstream | 1 | 01 | 03-31-1999 | 09:46:44 | 01:00 | 11100 | 17120 | 6033 | 11170 | 16460 | 11980 | 20080 | 14870 | 2969 | 6852 | 4033 | 1183 | 192 | 244 | 157 |
| Upstream | 1 | 01 | 03-31-1999 | 09:49:14 | 01:00 | 10980 | 17090 | 6213 | 11310 | 16860 | 12120 | 20490 | 15440 | 3083 | 7099 | 4251 | 1163 | 220 | 305 | 151 |
| U. Bckgrnd | 1 | 01 | 03-31-1999 | 09:59:45 | 01:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ENTER DATA BELOW | | | | | | | | | | | | | | | | | | | | |
| D. Bckgrnd | 2 | 01 | 03-31-1999 | 09:18:58 | 01:00 | 3 | 0 | 1 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 0 |
| Downstream | 2 | 01 | 03-31-1999 | 09:27:59 | 01:00 | 10550 | 16680 | 5907 | 10740 | 16200 | 11790 | 19650 | 14800 | 2957 | 6733 | 4104 | 1124 | 156 | 294 | 169 |
| Downstream | 2 | 01 | 03-31-1999 | 09:30:29 | 01:00 | 10380 | 16330 | 5909 | 11020 | 16000 | 11590 | 19800 | 14950 | 2931 | 6868 | 4086 | 1119 | 180 | 291 | 146 |
| Downstream | 2 | 01 | 03-31-1999 | 09:32:59 | 01:00 | 10270 | 15890 | 5708 | 10850 | 15710 | 11470 | 19350 | 14800 | 2792 | 6750 | 3966 | 1079 | 180 | 302 | 170 |
| Downstream | 2 | 01 | 03-31-1999 | 09:35:29 | 01:00 | 10810 | 16600 | 6027 | 11130 | 16400 | 11990 | 20090 | 15320 | 3065 | 6905 | 4083 | 1194 | 200 | 321 | 176 |
| Downstream | 2 | 01 | 03-31-1999 | 09:37:59 | 01:00 | 10860 | 16640 | 6089 | 10920 | 16230 | 11950 | 20130 | 15070 | 2870 | 6945 | 4036 | 1226 | 176 | 253 | 157 |
| Downstream | 2 | 01 | 03-31-1999 | 09:40:29 | 01:00 | 10850 | 16830 | 6062 | 11070 | 16440 | 12150 | 20220 | 14820 | 2923 | 6841 | 3979 | 1130 | 187 | 284 | 174 |
| Downstream | 2 | 01 | 03-31-1999 | 09:42:59 | 01:00 | 10690 | 16880 | 6093 | 11050 | 16540 | 12060 | 20090 | 14920 | 2939 | 6970 | 3950 | 1134 | 163 | 288 | 158 |
| Downstream | 2 | 01 | 03-31-1999 | 09:45:29 | 01:00 | 10970 | 17110 | 6075 | 11290 | 16630 | 12100 | 20410 | 14760 | 2962 | 7054 | 4093 | 1090 | 189 | 276 | 156 |
| Downstream | 2 | 01 | 03-31-1999 | 09:47:59 | 01:00 | 11070 | 16760 | 6043 | 11350 | 16670 | 12290 | 20510 | 15630 | 3058 | 7184 | 4393 | 1161 | 189 | 321 | 185 |
| Downstream | 2 | 01 | 03-31-1999 | 09:50:29 | 01:00 | 10740 | 17000 | 6073 | 11220 | 16790 | 12080 | 20850 | 15860 | 3055 | 7176 | 4166 | 1196 | 197 | 301 | 172 |
| D. Bckgrnd | 2 | 01 | 03-31-1999 | 10:01:00 | 01:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Meas. Penetration | | | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 | 1.01 | 1.02 | 1.00 | 1.01 | 1.01 | 1.01 | 0.99 | 1.05 | 1.06 |
| P100 correction values | | | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Corrected Penetration | | | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 | 1.01 | 1.02 | 1.00 | 1.01 | 1.01 | 1.01 | 0.99 | 1.05 | 1.06 |
| Corrected Efficiency (%) | | | | | | 0 | 0 | 0 | 0 | 0 | -1 | -1 | -2 | 0 | -1 | -1 | -1 | 1 | -5 | -6 |
| Data Acceptance Criteria: | | | | | | | | | | | | | | | | | | | | |
| Total Challenge Counts for Each Channel: | | | | | | 107510 | 167300 | 60219 | 110470 | 164040 | 118230 | 200090 | 147820 | 29632 | 68512 | 40288 | 11393 | 1842 | 2766 | 1563 |
| Data Quality Objective: | | | | | | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 |
| Does this meet DQO: | | | | | | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Standard Deviation of Penetration for Each Channel : | | | | | | 0.03 | 0.03 | 0.03 | 0.02 | 0.03 | 0.03 | 0.03 | 0.03 | 0.04 | 0.03 | 0.04 | 0.06 | 0.12 | 0.11 | 0.11 |
| Data Quality Objective: | | | | | | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | < 0.10 | < 0.30 | < 0.30 | < 0.30 | < 0.30 | < 0.30 |
| Does this meet DQO: | | | | | | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Maximum observed particle concentration (#/cc): | | | | | | 17.9 | | | | | | | | | | | | | | |
| Data Quality Objective: max. allowable conc. (#/cc): | | | | | | < 23 | | | | | | | | | | | | | | |
| Does this meet the DQO: | | | | | | Yes, (applies to all channels) | | | | | | | | | | | | | | |

Test No. 03319902
Arrestor
Liquid-Phase

Particle Counts per Indicated OPC Channel (1-Minute Samples @ 7.1 L/min)

| OPC Channel Number | | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Min. Diam. (um) | | | | | | 0.28 | 0.37 | 0.47 | 0.52 | 0.66 | 0.94 | 1.22 | 1.51 | 1.88 | 2.07 | 2.83 | 3.77 | 4.71 | 5.18 | 6.60 |
| Max. Diam. (um) | | | | | | 0.37 | 0.47 | 0.52 | 0.66 | 0.94 | 1.22 | 1.51 | 1.88 | 2.07 | 2.83 | 3.77 | 4.71 | 5.18 | 6.60 | 9.43 |
| Geo. Mean Diam (um) | | | | | | 0.32 | 0.42 | 0.49 | 0.58 | 0.78 | 1.07 | 1.36 | 1.68 | 1.97 | 2.42 | 3.26 | 4.21 | 4.94 | 5.85 | 7.89 |
| ENTER DATA BELOW | | | | | | | | | | | | | | | | | | | | |
| U. Bckgrnd | 1 | 01 | 03-31-1999 | 10:30:34 | 01:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Upstream | 1 | 01 | 03-31-1999 | 10:40:48 | 01:00 | 10670 | 16440 | 5913 | 11200 | 16610 | 11640 | 19750 | 15670 | 3082 | 6924 | 4302 | 1191 | 198 | 297 | 166 |
| Upstream | 1 | 01 | 03-31-1999 | 10:43:18 | 01:00 | 10830 | 16350 | 6013 | 11110 | 16740 | 11570 | 19950 | 16020 | 3024 | 7186 | 4419 | 1263 | 204 | 315 | 164 |
| Upstream | 1 | 01 | 03-31-1999 | 10:45:48 | 01:00 | 10500 | 16220 | 5679 | 11170 | 16370 | 11170 | 19500 | 15990 | 3134 | 6928 | 4436 | 1294 | 193 | 308 | 176 |
| Upstream | 1 | 01 | 03-31-1999 | 10:48:18 | 01:00 | 10720 | 16080 | 5832 | 10970 | 16070 | 11050 | 19420 | 15970 | 3025 | 6893 | 4388 | 1229 | 186 | 281 | 145 |
| Upstream | 1 | 01 | 03-31-1999 | 10:50:48 | 01:00 | 10180 | 15760 | 5665 | 10820 | 15930 | 11140 | 18860 | 15470 | 3037 | 6800 | 4304 | 1115 | 185 | 318 | 171 |
| Upstream | 1 | 01 | 03-31-1999 | 10:53:18 | 01:00 | 10220 | 15780 | 5664 | 10560 | 15530 | 11320 | 18890 | 14070 | 2711 | 6372 | 3846 | 1019 | 181 | 259 | 151 |
| Upstream | 1 | 01 | 03-31-1999 | 10:55:48 | 01:00 | 10730 | 16570 | 6006 | 11040 | 16450 | 11860 | 19880 | 14760 | 2837 | 6748 | 3938 | 1054 | 181 | 276 | 176 |
| Upstream | 1 | 01 | 03-31-1999 | 10:58:18 | 01:00 | 10700 | 16490 | 5933 | 11090 | 16350 | 11670 | 19860 | 15060 | 2859 | 6950 | 4101 | 1173 | 168 | 270 | 141 |
| Upstream | 1 | 01 | 03-31-1999 | 11:00:48 | 01:00 | 10670 | 16590 | 6094 | 11000 | 16300 | 11760 | 20040 | 14890 | 2834 | 6847 | 3974 | 1133 | 169 | 279 | 157 |
| Upstream | 1 | 01 | 03-31-1999 | 11:03:18 | 01:00 | 10760 | 16800 | 6111 | 11010 | 16710 | 11810 | 19800 | 14970 | 2968 | 6765 | 3977 | 1064 | 185 | 253 | 148 |
| U. Bckgrnd | 1 | 01 | 03-31-1999 | 11:17:35 | 01:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ENTER DATA BELOW | | | | | | | | | | | | | | | | | | | | |
| D. Bckgrnd | 2 | 01 | 03-31-1999 | 10:31:49 | 01:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-31-1999 | 10:42:03 | 01:00 | 1202 | 1589 | 454 | 835 | 760 | 330 | 263 | 65 | 10 | 10 | 3 | 0 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-31-1999 | 10:44:33 | 01:00 | 1246 | 1636 | 459 | 796 | 836 | 301 | 257 | 56 | 3 | 10 | 4 | 0 | 0 | 0 | 1 |
| Downstream | 2 | 01 | 03-31-1999 | 10:47:03 | 01:00 | 1230 | 1569 | 470 | 785 | 765 | 303 | 245 | 59 | 0 | 8 | 7 | 1 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-31-1999 | 10:49:33 | 01:00 | 1165 | 1496 | 487 | 772 | 717 | 301 | 233 | 61 | 6 | 3 | 3 | 0 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-31-1999 | 10:52:03 | 01:00 | 1182 | 1522 | 454 | 791 | 742 | 285 | 258 | 72 | 8 | 7 | 6 | 1 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-31-1999 | 10:54:33 | 01:00 | 1112 | 1600 | 462 | 744 | 667 | 302 | 224 | 52 | 4 | 8 | 5 | 0 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-31-1999 | 10:57:03 | 01:00 | 1162 | 1534 | 434 | 664 | 618 | 249 | 218 | 56 | 7 | 13 | 5 | 0 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-31-1999 | 10:59:33 | 01:00 | 1127 | 1416 | 461 | 667 | 638 | 262 | 195 | 34 | 3 | 9 | 4 | 1 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-31-1999 | 11:02:03 | 01:00 | 1048 | 1498 | 452 | 743 | 630 | 271 | 198 | 39 | 3 | 2 | 3 | 1 | 0 | 0 | 0 |
| Downstream | 2 | 01 | 03-31-1999 | 11:04:33 | 01:00 | 1070 | 1501 | 472 | 673 | 692 | 253 | 194 | 40 | 4 | 11 | 0 | 1 | 0 | 0 | 0 |
| D. Bckgrnd | 2 | 01 | 03-31-1999 | 11:18:50 | 01:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Meas. Penetration | | | | | | 0.11 | 0.09 | 0.08 | 0.07 | 0.04 | 0.02 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| P100 correction values | | | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 | 1.01 | 1.02 | 1.00 | 1.01 | 1.01 | 1.01 | 0.99 | 1.05 | 1.06 |
| Corrected Penetration | | | | | | 0.11 | 0.09 | 0.08 | 0.07 | 0.04 | 0.02 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Corrected Efficiency (%) | | | | | | 89 | 91 | 92 | 93 | 96 | 98 | 99 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Data Acceptance Criteria: | | | | | | | | | | | | | | | | | | | | |
| Total Challenge Counts for Each Channel: | | | | | | 105980 | 163080 | 58910 | 109970 | 163060 | 114990 | 195950 | 152870 | 29511 | 68413 | 41685 | 11535 | 1850 | 2856 | 1595 |
| Data Quality Objective: | | | | | | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 | > 500 |
| Does this meet DQO: | | | | | | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Standard Deviation of Penetration for Each Channel : | | | | | | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Data Quality Objective: | | | | | | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | < 0.10 | < 0.30 | < 0.30 | < 0.30 | < 0.30 | < 0.30 |
| Does this meet DQO: | | | | | | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Maximum observed particle concentration (#/cc): | | | | | | 17.7 | | | | | | | | | | | | | | |
| Data Quality Objective: max. allowable conc. (#/cc): | | | | | | < 23 | | | | | | | | | | | | | | |
| Does this meet the DQO: | | | | | | Yes, (applies to all channels) | | | | | | | | | | | | | | |