ORNL TYPE TEST SUMMARY

Eberline Beta Particulate Monitor
AMS-4

Description: The AMS-4 is a microprocessor-based radiation detection instrument designed to detect and monitor airborne beta-emitting particulate matter. Five AMS-4s were tested; three using the radial-entry head, and two using the in-line head.

Ranges Tested: N/A

Updated: March 5, 1997

General Comments:

1. Confidence intervals used to ascertain whether results are conclusive or inconclusive are determined using the 0.95 quantile of the student's t distribution (95% confidence interval).
2. An additional radial type AMS-4 was evaluated during February and March of 1997. Results obtained have been included with the previously evaluated radial AMS-4.

ELECTRONIC and MECHANICAL REQUIREMENTS and TESTS

Line Noise: Results were acceptable for each monitor tested during and after exposure to 100 kHz ring waves at 2.5 kV and 6 kV. Combination wave tests were not performed.

INTERFERING RESPONSES TEST RESULTS

Radio Frequency/Microwave Fields: Each monitor had acceptable results when exposed to 140, 915, and 2450 MHz fields at 20 (+10,-0) volts/meter. Two of the three radial-entry type monitors had acceptable results when exposed to the frequency scan of 0.1 to 1000 MHz at 20 (+10,-0) volts/meter. The other radial-head monitor had observable susceptibility to frequencies during the scan. Additional information is available upon request.
All in-line type monitors were susceptible at frequencies from 40 to 80 MHz. Additional information is available upon request.

Electric Fields: Each monitor had acceptable results when exposed to an electrostatic field of 5000 volts/meter, and electric fields of 60 and 400 Hz at 40 volts/meter.

Magnetic Fields: Results from each orientation tested were acceptable for three of the four instruments when exposed to 10 Gauss (10 Oersted) DC and 1.26 Gauss (100 amp/meter and 60 Hz) AC. One of the monitors tested had erratic results when exposed to the 10 Gauss DC field.

ENVIRONMENTAL FACTORS

Temperature: Of the three radial-entry AMS-4s tested, one had acceptable results at temperatures from -10 to 50 °C (+14 to 122 °F). The other AMS-4s had observable susceptibility to temperatures below 10 °C. Observations included "Detector Fail" and/or high count rates. Additional information is available upon request.

Of the two in-line entry AMS-4s, one had acceptable mean responses at each test temperature. Test data obtained at 40, 50, and 0 °C indicated that although each mean was in tolerance, results at these temperatures were inconclusive. The other in-line AMS-4 had out-of-tolerance means at 10 and 0 °C. All results could be considered inconclusive because the low value of each confidence interval was below the low limit of the acceptance range. Readings obtained at various temperatures during the in-line AMS-4 evaluation were somewhat erratic. This could be attributable to the level of radiation used to perform the test.

Temperature Shock: Of the two radial-entry AMS-4s tested, one had acceptable results when exposed to rapid temperature changes of 22 to -10, -10 to 22, 22 to 50 and 50 to 22 (° C). The other AMS-4 had observable susceptibility to the changes. Specific results are available upon request.

Of the two in-line entry AMS-4s, one had acceptable mean responses throughout the test. The other in-line AMS-4 had unacceptable mean responses after being shocked from 22 to -10, and after being shocked from 22 to 50 and 50 to 22. Results could be considered inconclusive because of erratic readings obtained during the test.

Humidity: Of the three radial-entry AMS-4s tested, two had acceptable results at 40 and 95% relative humidity at 22 ± 2 °C. The other AMS-4 became erratic at 95% and indicated "detector fail" upon return to 40%. Of the two in-line entry AMS-4s, one had acceptable results at each test parameter. The other in-line AMS-4 became slightly erratic at 95% relative humidity and due to statistical variations, its results could be considered inconclusive. It was acceptable upon return to 40% relative humidity.

Reviewed By:_____ Date:_____