EX-301 MID-RANGE MEMBRANE

INSTRUCTIONS

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1 About the EX-301 Mid-Range Membrane

The EX-301 is a special purpose mid-range membrane foil assembly which may be used to verify the linearity of the E-BAM mass calculation system. The mass calculation of the E-BAM is inherently linear in nature, and therefore it is unnecessary to audit a mid range point in the vast majority of applications. The EX-301 is provided only as a convenience to certain customers who may be required to perform the check by local regulations.

The E-BAM unit comes with a standard span membrane with a mass of approximately 0.800 mg/cm^2. This is used by the operator to periodically verify the span of the unit by comparing the measured value of the film to the stored value in the E-BAM. The EX-301 kit allows the user to periodically perform an additional span point check at about 0.500 mg/cm^2.

The EX-301 membrane is a fragile assembly and must be handled very carefully. Any puncture or damage to the foil surface will render the part useless. Any dirt or contamination on the foil surface will be measured as mass and will also invalidate the measurement. This assembly must be protected and stored in a safe location away from heat and direct sunlight.

2 Mid-Range Span Check Procedure

It is assumed that operators will already be familiar with Span Mass Audit procedure found in the E-BAM Operation manual. This procedure follows the same general sequence but has a slight variation to accommodate the different foil value.

Notes:

- The Mid-Range Foil shipped from the factory does not have a set factory determined value; it must be measured and calculated using your E-BAM.
- The E-BAM unit must be powered on and warmed up for at least one hour before performing the test. The pump does not need to be running during warm-up. Each span test takes about 10 minutes to complete. The zero test must be performed as part of each test cycle.

Operators should have access to the Zero, Mid-Range, and Span foils before beginning the following steps:

1. Perform a span check with the standard span membrane. Verify that the standard span test passes. *Do not proceed with the mid-range span test if the E-BAM is not reading the standard membrane correctly*. If the E-BAM passes the standard span check, then proceed to the next step.

   Note: If the standard span test fails, then there is something wrong with the unit such as a dirty membrane or a dirty or damaged PMT window. Consult the E-BAM manual for guidance or contact the Met One Instruments, Inc. service department for assistance.

2. Go to the Span Mass Audit screen located in the Test Menu and begin the test sequence.
3. After the Zero Test completes, observe and record the Span value.

4. Enter the Average Mid-Range Mass value in place of the Span value.
    a. If the foil has been used previously and the Average Mid-Range Mass value is known, enter that value instead and skip to step 7.
    b. If this is the first time the Mid-Range Foil is being tested, enter 0.500 and proceed to step 5.
5. After the span test completes, record the reported value for the Mid-Range Foil. Do not worry whether this test indicates Pass or Fail.
6. Repeat steps 4 and 5 twice more for a total of three measurements. After the third test, calculate the average value of the three results and record this as the Average Mid-Range Mass value. Go to step 4, section a.
7. At the end of the test the measured Mass should be within 5% of the Average Mid-Range Mass value. If not, repeat steps 2-6. If the test still fails, then there is something wrong with the unit such as a dirty membrane or a dirty or damaged PMT window. Consult the E-BAM manual for guidance or contact the Met One Instruments, Inc. service department for assistance.
8. Repeat the span test using the original Span Foil (being certain to restore the original value recorded in step 3). After the test, return the Zero, Mid-Range, and Span foils to their protective packaging.
9. Resume normal sampling operations.

NOTE: The most common cause for an E-BAM failing a span audit is dirt or damage on the span membrane foil. If this is OK, then the window of the PMT beta detector is probably dirty with debris from the sample stream. Contact the Met One Instruments, Inc. service department for directions.

Do not attempt to remove or access the beta source under any circumstances. Any changes to the beta source geometry will void the calibration of the monitor. Maintenance and repairs to the beta source may only be performed at the Met One Instruments, Inc. factory.

E-BAM Membrane Foil Mid-Range Linearity Check

Test Results Record:

Test Performed By: _____

Test Date: _____

E-BAM Serial Number: _____

Standard Span Foil Test: **Pass** ☐ **Fail:** ☐

Measured Span of Standard Foil: _____ mg/cm2 (Optional)

Expected Mass of Mid-Range Foil: _____ mg/cm^2

Measured Mid-Range Mass, Test 1: _____ mg/cm^2

Measured Mid-Range Mass, Test 2: _____ mg/cm^2

Measured Mid-Range Mass, Test 3: _____ mg/cm^2

Average Mid-Range Mass: _____ mg/cm^2

Difference from Expected Value: _____ mg/cm^2

Difference %: _____ %