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Calibration and Testing Procedure

Model: 54 and 54-1

Dial: none

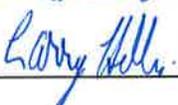
Revision 0

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Model 54 (-1) Calibration and Testing

1. Gather sources and Model 54(-1) calibration/testing source fixture

- a. Model 54 Calibration/Testing Source fixture
 - i. Part Number = 4540-352
- b. Desired Calibration Source
 - i. A source of the desired isotope in the desired range of 2X – 10X background

2. Perform HV calibration using FOM HV Calibration Tool

- a. Use the source(s) to perform an HV calibration
- b. Navigate to the HV – FOM window
- c. Setup the FOM determination parameters as follows
 - i. Background Count Time = 60 seconds
 - ii. Source Count Time = 60 seconds
 - iii. All detectors selected
 - iv. Enter the appropriate source size in DPM
 - v. HV Start = 650
 - vi. HV End = 950
 - vii. HV Increment = 25

NOTE: The above numbers are guidelines that may be adjusted

- d. Ensure all sources and other items that may cause background fluctuation are clear of the area
- e. Place the calibration fixture inside the Model 54
- f. Start the HV – FOM determination
- g. When background counting is complete, place source in Model 54 as prompted and continue
- h. Once complete, set the HV for each detector at the recommended HV value
NOTE: High Voltage may be set at a value other than the recommended HV value presented by the FOM HV tool. The value presented is a guideline, not a requirement.
- i. Save the associated report

Model 54 (-1) Calibration and Testing

3. Determine Efficiency

- a. Use the source(s) to perform an efficiency determination
- b. Navigate to the Efficiencies window
- c. Set up the Efficiencies Calibration with the below parameters
 - i. Background Count Time = 60 seconds
 - ii. Source Count Time = 60 seconds
 - iii. All detectors selected (including Sum Channel)

NOTE: The above numbers are guidelines that may be adjusted

- d. On the Sources tab enter the source(s) data as one of the available sources and save
- e. On the Efficiencies tab select the newly saved source and the Free Air configuration
- f. Ensure all sources and other items that may cause background fluctuation are clear of the area
- g. Place the calibration fixture inside the Model 54
- h. Start the efficiency test
- i. When background counting is complete, place source in Model 54 as prompted and continue

4. Save Efficiency Report

- a. Once all sources' efficiency calibrations are complete, save the associated report

5. Set Isotope Mix to 100% of the first source

6. Note Sum Channel Efficiency [E]

- a. Found under the Efficiencies tab on the Efficiencies window
- b. Also found under the Calculations tab on the Radiological setup window

Model 54 (-1) Calibration and Testing

7. Acquire Background Count

- a. Press the Update button on the Setup Menu

8. Acquire Activity Estimate

- a. Acquire activity estimate from scaler window using the first source

9. Fill out Model 54(-1) Activity Estimate Worksheet

- a. It is recommended that a laptop or tablet be taken to the instrument being calibrated to allow for easy data entry
- b. The worksheet is located at
[http://www.ludlums.com/images/stories/Calibration-Worksheets/M54-1 Calibration Testing Worksheet for Customers.xlsx](http://www.ludlums.com/images/stories/Calibration-Worksheets/M54-1%20Calibration%20Testing%20Worksheet%20for%20Customers.xlsx)
- c. Calculations are preformed automatically
 - i. Determine source activity in decays per second (also becquerels) [S]
 - ii. Note Activity Estimate value in dps [A_E]
 - iii. Determine Activity Error in dps [$S - A_E = A_X$]
 - iv. Determine Gross Activity in dps [$G_C / E = G_A$]
 - v. Determine error as a percentage of total counts/decays [$A_X / G_A * 100\% = R$]
 - vi. Acceptable Error Range is $\pm 5\%$

10. Acquire Background Count

- a. Press the Update button on the Setup Menu

11. Perform Source Check using the first source

12. Set Isotope Mix to 100%

13. Repeat the process for all sources

Model 54 (-1) Calibration and Testing

14. Save and Print Worksheets

- a. Once all sources' Activity Estimate and Source Check Worksheets are completed, save a copy of the Excel file and print a copy if desired

15. Set the Isotope Mix to the desired operating mix

16. Perform six normal operating count checks

- a. Perform three counts with a desired test source
- b. Perform three empty chamber counts
- c. Ensure all counts and associated contamination checks give appropriate results (alarm when source in chamber, clean otherwise)

17. Save Reports

- a. If all tests are passed, save the System Setup and Calibration reports

18. Collect Saved Model 54(-1) Unit Data

- a. Collect saved data as desired

19. Complete Calibration Paperwork

- a. Complete any desired additional calibration paperwork

20. Save Calibration and Checkout Data to Network

- a. Save data according to company requirements