

**WORCESTER POLYTECHNIC INSTITUTE
HEALTH PHYSICS PROCEDURE HP-03
SURVEY INSTRUMENT CALIBRATION**

1. PURPOSE:

To calibrate survey instruments either by source calibration or by electronic calibration.

2. FREQUENCY:

This procedure shall be performed at regular intervals as recommended in the instrument's technical manual.

3. MATERIALS, TOOLS, AND EQUIPMENT:

3.1. Form(s):

3.1.1. Worcester Polytechnic Institute Survey Instrument Calibration (HPF_01)

3.1.2. Survey Instrument Calibration Schedule/Database (Calibration Schedule)

3.2. Source Calibration

3.2.1. Gamma radiation source (i.e.: Cs-137, Co-60, etc.)

3.2.2. Source rod

3.2.3. Stand

3.2.4. Meter stick or another appropriate instrument

3.3. Electronic Calibration

3.3.1. Coaxial Cable

3.3.2. Ludlum Model 500 pulser or equivalent

4. PRECAUTIONS:

4.1. Ensure that all appropriate health physics precautions are followed throughout the procedure.

4.2. Utilize the concepts of time, distance, and shielding to maintain dose as low as reasonably achievable.

5. INSTRUCTIONS:5.1. Source Calibration (For instruments that measure **Dose Rates**)

- 5.1.1. Select two dose rates on each scale of the meter (1/4 and 3/4 scale).
- 5.1.2. Calculate the distance between the front of the source and the geometric center of the detector for each dose rate selected.
- 5.1.3. Carefully remove the radiation source from its shielding using the source rod.
- 5.1.4. Place the source rod on the stand.
- 5.1.5. Measure the first distance calculated in step 5.1.2.
- 5.1.6. Wait for a stabilized reading.
- 5.1.7. Record the dose rate indicated on the detector (initial reading).
- 5.1.8. If necessary, adjust the survey meter per the detector's owner's manual.
- 5.1.9. Record the final reading (if any adjustments were made).
- 5.1.10. Repeat steps 5.1.5. through 5.1.9. for each of the remaining distances.

5.2. Electronic Calibration (For instruments that measure **counts per unit time**)

- 5.2.1. Disconnect the GM tube from the survey meter.
- 5.2.2. Connect a coaxial cable between the pulser and the survey meter.
- 5.2.3. Turn on the pulser and the survey meter.
- 5.2.4. Adjust the high voltage (HV) on the survey meter so that 900 volts is read on the pulser.
- 5.2.5. Set the pulser to a 40 MV negative pulse.
- 5.2.6. Select two points on each scale of the survey meter (1/4 and 3/4 scale).
- 5.2.7. Set the pulser to the first value selected.
- 5.2.8. Record the reading on the survey meter.

5.2.9. If necessary, adjust the survey meter per the detector's owner's manual.

5.2.10. Record the final reading (if applicable).

5.2.11. Repeat steps 5.2.7. through 5.2.10. for each of the remaining values.

5.2.12. Turn off the pulser and the survey meter, reconnect the probe, and verify the meter's response using a check source.

5.2.13. Record all results obtained.

6. RESTORATION:

None

7. REFERENCES:

7.1. Ludlum Instruction Manual

NOTE: Alternately, instruments may be calibrated by an outside agency.