



Trusted
radiation
protection.

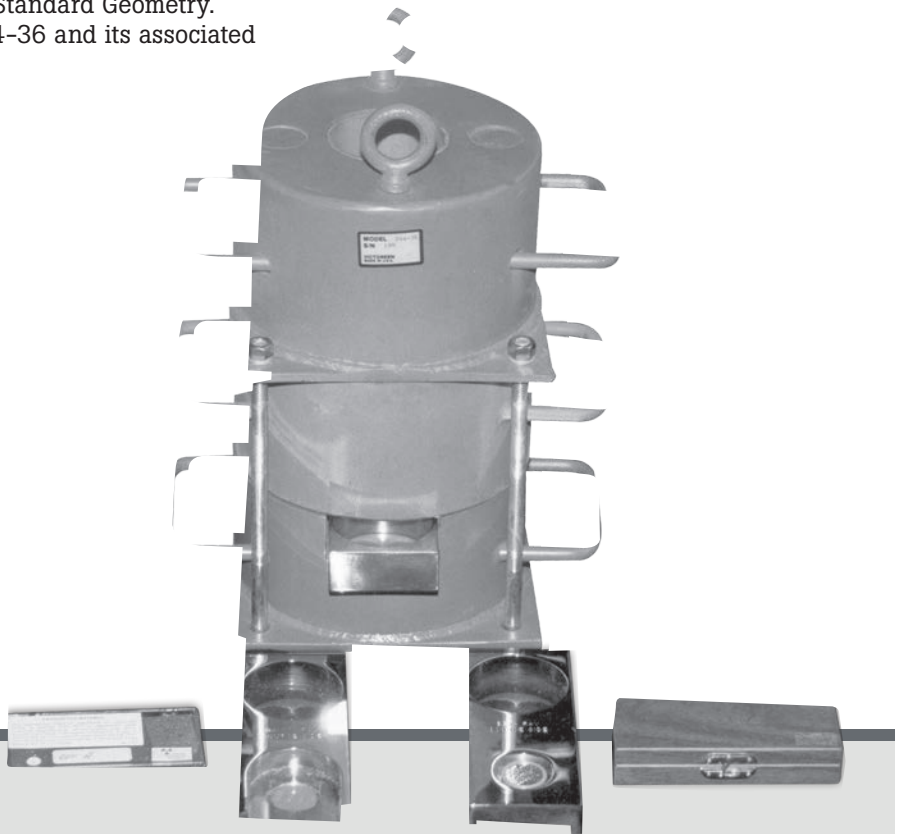
844-36

Process Monitor Calibration Fixture

Process radiation monitor detectors consist of a scintillation crystal that converts the incident radiation into a light pulse, a photomultiplier tube (PMT) to amplify the light into a useable electronic pulse, and a preamplifier to condition and transmit the pulses received to a pulse counting and display device. The high voltage applied to the PMT directly affects the gain of the detector. The gain and low discriminator settings directly affect the efficiency of the detector. Because the gain of the PMT used in today's scintillation detectors decreases with age, it is necessary to periodically re-adjust the detector high voltage to ensure that the gain the detector is currently operating at is the same as the gain the detector was operating at when the detector's primary calibration was performed. The frequency of re-calibration is a function of the individual application. However, we recommend performance at 18- to 36-month intervals.

Although not as critical, due to its wide high voltage-operating region, similar re-calibrations are also required for process Geiger-Mueller (GM) detectors. The 844-36 Process Monitor Calibration Fixture permits field re-calibration of scintillation and GM detectors and is referred to as a Standard Geometry. The 844-36 and its associated

reference point sources may be used as a secondary standard to perform NIST traceable field re-calibrations of process monitor scintillation and GM detectors. The 844-36 and associated reference sources are used to field calibrate pulse



Key features

- Reproducible calibration geometry
- 2 inches of 4 pi lead shielding to reduce background response
- Reversible source drawer for Beta and Gamma scintillation detector calibration
- Scintillation detector dead time verification drawer available
- GM detector adaptors available
- Disassembles easily for field transportation

mode detectors. The 844-36 consists of three lead-filled “doughnuts” clamped together with four bolts, to provide a lead shielded cylinder, into which a scintillation detector or a GM detector (when installed in the appropriate adapter) may be inserted. The assembled calibration fixture provides two inches of lead shielding to minimize the detector response induced by ambient background radiation. At the bottom of the fixture, a removable slide drawer is provided to permit installation and withdrawal of reference calibration disc sources. The drawer is reversible, with one side machined for Beta sources and the other side machined for Gamma sources. An optional Tau drawer, machined to accept the two sources required to measure detector dead time, is also available. A stop is provided in the fixture to position the detector at a fixed, reproducible distance from the reference disc source. To perform a field re-calibration, the detector is inserted into the 844-36, the appropriate calibration disc source is inserted into the slide drawer, and the counts from the detector for a fixed time period are recorded. To achieve a 1 % counting error, the counting time should be long enough to yield a minimum of 10,000 counts. A number of field calibration sources are available for both Beta and Gamma detectors. For GM detectors, the detector is inserted into a Lucite adapter designed for the detector, the reference source is inserted into a cavity in the adapter, and the adapter, with GM detector and reference source, is inserted into the 844-36. In this case, the 844-36 functions as a shield, to reduce ambient background radiation.

Technical specifications

Dimensions (*w x d x h*)
10.5 in x 8.3 in x 13.6 in
(26.67 cm x 21.08 cm x 34.54 cm), overall

Weight
180 lb (approx.)

Power requirements
None

Environmental

- Operating temperature:
32 °F to 122 °F (0 to 50 °C)
- Storage temperature:
32 °F to 122 °F (0 to 50 °C)
- Relative humidity:
0 to 95 %, non-condensing

Maximum pressure
Atmospheric

Available options
844-36T Calibration Fixture with Tau source holder, Tau source spacer and spacer removal rod

Gamma disc sources

844-13-6 ¹³⁷Cs
0.5 μCi (approx.)

844-13-7 ¹³³Ba
0.5 μCi (approx.)

844-13-8 ⁶⁰Co
0.3 μCi (approx.)

844-36-15 ¹³³Ba (set of 3)
0.015, 0.15, 1.5 μCi (approx.)

844-36-16 ¹³⁷Cs(set of 3)
0.004, 0.04, 4.0 μCi (approx.)

Beta disc sources

844-13-9 ⁹⁰Sr
0.1 μCi (approx.)

844-13-11 ¹⁴C
0.15 μCi (approx.)

844-36-17 ¹³⁷Cs (set of 3)
0.01, 0.1, 1 μCi (approx.)

Tau disc sources

844-13-16* ⁹⁰Sr (set of 2)
20.0 μCi (approx.)

Ordering information

Model

844-36: Process Monitor Calibration Fixture



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