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Integrated Scintillation Detectors

In this integral design, the photomultiplier tube (PMT) is optically coupled directly to the scintillator. The scintillator is mounted in a container (usually aluminum), and a mu-metal magnetic shield is fitted over the PMT. The scintillator container and mu-metal shield are sealed together to form a low-mass and light-tight housing for the detector.

This design usually yields better and more consistent energy resolution than others. Therefore, these detectors of choice for spectroscopy and radioisotope assay.

Advantages –

- Compact assembly with SiPM
- Direct PMT-to-crystal mounting
- PMT is matched and tested with scintillator
- Consistent, superior energy resolution

Options –

- End well and through well geometries
- Scintillator containers of low-background stainless steel or copper
- Thin aluminum or beryllium radiation entrance windows
- PMTs selected for low background, premium resolution, fixed HV use, or gain matching
- Special flanges, mounting fixtures or other modifications
- Integrated, low-background voltage divider and preamplifier bases
- Square, hexagonal or other cross-sections

Other Configurations –

- Waterproofed assemblies
- Ruggedized and high-temperature detectors
- Detectors with side or end wells
- Assemblies using thin crystals for low-energy gamma and X-ray detection



Design Notes –

- Design suitalbe for NaI(Tl), CsI, LaBr3(Ce), CLLB, BGO and other scintillation materials
- The detector package is hermetically sealed when the scintillation crystals is hygroscopic such as NaI(Tl).
- The maximum scintillator size is 127mm (5″) in diameter or on the diagonal.

Integrated Scintillation Detectors

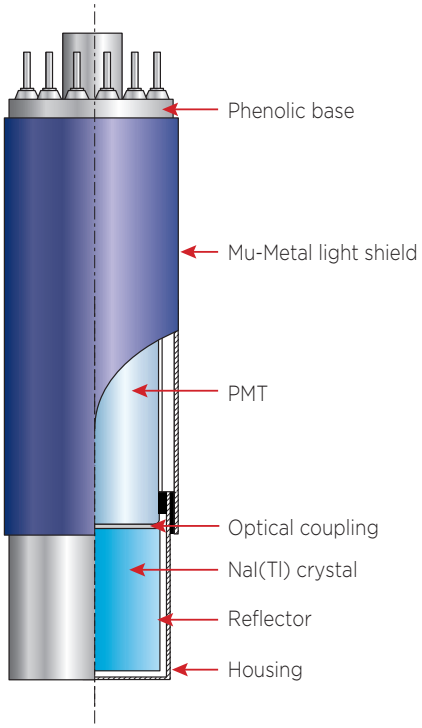
Popular Configurations –

Solid detectors (2M2/2) are commonly used for gamma ray spectroscopy, radon canister counting, thyroid uptake measurements, and health physics applications.

The end well (2MW2/2) configuration is the most efficient and is used for radioimmunoassay, wipes and sample counting. Detectors can be built with a wide range of well sizes.

Through-side well detectors (2MWS2/2) are ideal when space is limited and is the second most efficient configuration; and are ideal for radioimmunoassay and fuel rod monitoring.





Typical construction:

- 14 Pin Phenolic Base JEDEC B-14-38
- Mu-Metal Light Shield .020" [0.508] thick
- Light Sensor
- Scintillation Crystal
- Aluminum Housing .020' [0.508] thick
- Well Liner .010" [0.254] thick

Note: configuration is historically known as:

Bicron Monoline example model 2M2/2

Crismatec Scintibloc example model 51S51

Harshaw example model 8S8/2

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Saint-Gobain Crystals

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