

Gamma-Neutron Scintillation Detector

CLYC

Dual Mode Detection

Room Temperature Operation

Single Scintillation Material

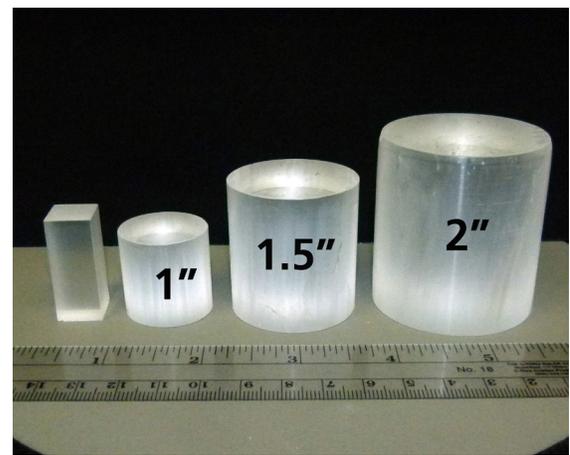
The Science Behind the Technology

 **RMD**
A Dynasil Company

CLYC Scintillation Standard Detectors



Hermetic Package



CLYC Crystals

CLYC

$\text{Cs}_2\text{LiYCl}_6:\text{Ce}$ -- CLYC-- scintillation crystals have been developed by RMD for the detection of neutrons and gamma photons. With cylindrically-shaped scintillators, the most popular package styles are the hermetic package with one end window and the scintillation crystal packaged with a photomultiplier tube (PMT). In the photomultiplier tube configuration, the scintillation crystal is permanently attached to the photomultiplier tube, and both are provided in a single housing.

Lithium Isotope Enrichment

Primary interest in CLYC scintillators focuses on a CLYC material enriched in the ^6Li isotope to maximize thermal neutron sensitivity. In the models below, this is indicated as "CLYC". In these ^6Li enriched models, the lithium element is enriched to at least 95% ^6Li with the balance of the lithium isotope as ^7Li .

We also offer a "C⁷LYC" scintillator that is depleted in the ^6Li isotope and is enriched in the ^7Li isotope to suppress thermal neutron reactions. This is useful for applications of fast neutron spectroscopy based on ^{35}Cl reactions. In the model numbers below, this is indicated as C⁷LYC. In these models, the lithium element is enriched to at least 99% ^7Li with the balance as ^6Li .

CLYC Scintillation Standard Detectors



CLYC

Model Numbers	Scintillation Material	Crystal Shape and Crystal Dimensions	Energy Resolution	Package Style
CLYC-25-PHI-25-S-114 C7LYC-25-PHI-25-S-115	CLYC ⁶ Li Enriched ⁷ Li enriched	Cylindrical 25 mm diameter, 25 mm length	< 5 % FWHM at 662keV line of ¹³⁷ Cs	Sealed Package
CLYC-25-PHI-25-P-118 C7LYC-25-PHI-25-P-119	CLYC ⁶ Li Enriched ⁷ Li enriched	Cylindrical 25 mm diameter, 25 mm length	< 5 % FWHM at 662keV line of ¹³⁷ Cs	Scintillation Crystal is permanently mounted to a photomultiplier tube.
CLYC-38-PHI-38-S-114 C7LYC-38-PHI-38-S-115	CLYC ⁶ Li Enriched ⁷ Li enriched	Cylindrical 38 mm diameter, 38mm length	< 5 % FWHM at 662keV line of ¹³⁷ Cs	Sealed Package
CLYC-38-PHI-38-P-118 C7LYC-38-PHI-38-P-119	CLYC ⁶ Li Enriched ⁷ Li enriched	Cylindrical 38 mm diameter, 38mm length	< 5 % FWHM at 662keV line of ¹³⁷ Cs	Scintillation Crystal is permanently mounted to a photomultiplier tube.
CLYC-50-PHI-50-S-114 C7LYC-50-PHI-50-S-115	CLYC ⁶ Li Enriched ⁷ Li enriched	Cylindrical 50 mm diameter, 50mm length	< 5 % FWHM at 662keV line of ¹³⁷ Cs	Sealed Package
CLYC-50-PHI-50-P-118 C7LYC-50-PHI-50-P-119	CLYC ⁶ Li Enriched ⁷ Li enriched	Cylindrical 50 mm diameter, 50mm length	< 5 % FWHM at 662keV line of ¹³⁷ Cs	Scintillation Crystal is permanently mounted to a photomultiplier tube.

Electrical Base on the Photomultiplier Tube

PMT models terminate in mechanically-rigid, electrical pins at the end of the PMT. We also offer a PMT base that connects to the pins of the PMT configuration. Two base models are available.

The “positive high voltage base” model is typically chosen and allows an external, positive high voltage on the anode and a ground voltage on the photocathode. As an alternative, we offer a “negative high voltage base” model that allows a negative high voltage on the photocathode and a ground voltage on the anode. If ordering a base, specify either a “positive high-voltage base”, or a “negative high-voltage base”.

Additional Scintillator Shapes and Electronics

CLYC scintillation crystal are available in custom scintillator dimensions and shapes upon request. Support in electronics for pulse height analysis (PHA) and pulse shape discrimination (PSD) is also available.

Note 1: The energy resolution is obtained at 22°C with an appropriate photomultiplier tube and integration time constant on the pulse height electronics. The recommended photomultiplier tube is Hamamatsu Type R6231-100. Test conditions and data are supplied with each crystal, and each crystal/PMT shipment.

Note 2: The above scintillation crystal contains enrichment of the ⁶lithium isotope and is subject to U.S. Dept. of Commerce export controls. The scintillation crystal is supplied only to identified customers. For export orders, a verifiable customer identity and statement of use are required.