EJ-444
DUAL PHOSPHOR THIN SCINTILLATOR

This consists of a thin EJ-212 plastic scintillator with a layer of silver activated zinc sulfide phosphor (ZnS:Ag) applied to one side. The primary use of EJ-444 is the detection of alpha and beta particles in health physics instrumentation. A non-coated plastic scintillator may also be used for this purpose, but the amplitudes of the alpha and beta pulses are sufficiently similar to make it difficult to separate the two by simple counting electronics making use of counting windows. In contrast, the ZnS:Ag layer on the EJ-444 is made just thick enough to fully stop all common alpha particles while allowing many low energy betas to pass into the plastic scintillator layer for detection there. C-14 betas may be detected with moderate efficiency.

The plastic scintillator component is usually kept quite thin in order to minimize gamma sensitivity, and the standard thickness in EJ-444 is 0.25mm (0.010"). Hence, even energetic betas such as from P-32 and SrY-90 generate pulses grouped in a fairly narrow amplitude region that is below the amplitudes of over 95% of the alpha pulses generated in the ZnS:Ag layer. The EJ-444 alpha detection efficiency is essentially the same as achieved with bare plastic scintillator.

To give an indication of the beta detection efficiencies of EJ-444, counting comparisons were made between bare 0.25mm EJ-212 and EJ-444 made with an identical EJ-212 component. The bare plastic scintillator is considered to be a reliable reference for maximum detection of the radioactive particles investigated. The results are highly uniform from batch to batch, and the typical values are presented below:

Radiation Type	Relative Efficiency EJ-444 count ÷ EJ-212 Count
C-14 Beta (Emax=156KeV)	77%
Tc-99 Beta (Emax=294KeV)	88%
SrY-90 Betas (Emax=544KeV,2.3 MeV)	96%

EJ-444 is also available using EJ-212 with greater thicknesses of which 0.5mm and 1 mm are typical. It is available in a wide variety of sizes of discs and rectangles. Sheets up to 250mm x 250mm are available in the standard 0.25mm thickness and up to 300mm x 300mm for greater thicknesses. Custom sizes can be supplied.

Specifications

EJ-212	
Emission Maximum	423nm
Light output	65% of anthracene
Density	1.02 g/cc
Scintillation Decay Time	2.4 ns

ZnS:Ag	
Emission Maximum	450nm
Light output	300% of anthracene
Phosphor layer density	3.25 ± 0.25 mg/sq.cm.
Scintillation Decay Time	200 ns

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