

# FAST TIMING PLASTIC SCINTILLATOR

## EJ-232, EJ-232Q

**EJ-232** plastic scintillator is intended for very fast timing applications or when very high pulse pair resolution is required. Due to the small emission wavelength, the optical mean free path of this scintillator is approximately 10 cm. Therefore, to achieve the best light collection and to optimize the timing performance, EJ-232 should be used in a small size with the largest scintillator dimension less than 10 cm to minimize photon scattering effects. The use of light guides is best avoided.

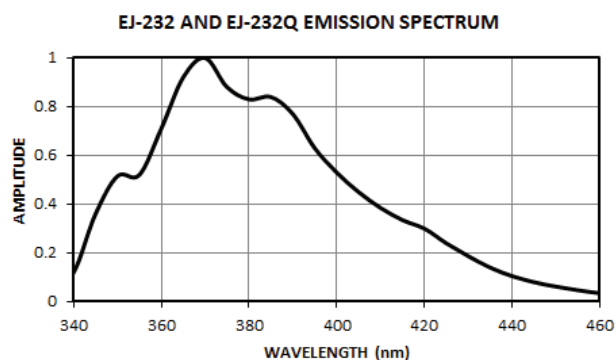
**EJ-232Q** plastic scintillator is a quenched variant of EJ-232 specifically formulated for ultra-fast counting applications. The introduction of small amounts of benzophenone to EJ-232 significantly shortens the timing properties for purposes of achieving very high counting rates or improved coincidence timing. The

quenching does not affect the emission spectrum but does reduce the scintillation efficiency (see table below). While it is recommended to keep the scintillator size and shape small in order to achieve the best timing performance, it is not recommended to use EJ-232Q in thin films (thicknesses  $\leq 3$  mm) due to the vapor pressure of benzophenone.



PROPERTIES	EJ-232	EJ-232Q (% BENZOPHENONE)				
		0.5	1.0	2.0	3.0	5.0
Light Output (% Anthracene)	55	19	11	5	4	3
Scintillation Efficiency (photons/1 MeV e <sup>-</sup> )	8,400	2,900	1,700	770	610	460
Wavelength of Maximum Emission (nm)	370	370	370	370	370	370
Rise Time (ps)	350	110	105	100	100	100
Decay Time (ps)	1,600	700	700	700	700	700
Pulse Width, FWHM (ps)	1,300	360	290	260	240	220
H Atoms per cm <sup>3</sup> ( $\times 10^{22}$ )	5.13	5.12	5.12	5.12	5.12	5.12
C Atoms per cm <sup>3</sup> ( $\times 10^{22}$ )	4.66	4.66	4.66	4.66	4.66	4.66
Electrons per cm <sup>3</sup> ( $\times 10^{23}$ )	3.30	3.38	3.38	3.38	3.38	3.38
Density (g/cm <sup>3</sup> )	1.023	1.023	1.023	1.023	1.023	1.023

Polymer Base	Polyvinyltoluene
Refractive Index	1.58
Softening Point	75°C
Vapor Pressure	Vacuum-compatible
Coefficient of Linear Expansion	$7.8 \times 10^{-5}$ below 67°C
Temperature Range	-20°C to 60°C
Light Output (L.O.) vs. Temperature	At 60°C, L.O. = 95% of that at 20°C No change from -60°C to 20°C



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