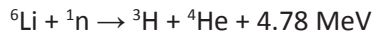


# THERMAL NEUTRON DETECTOR

## EJ-426

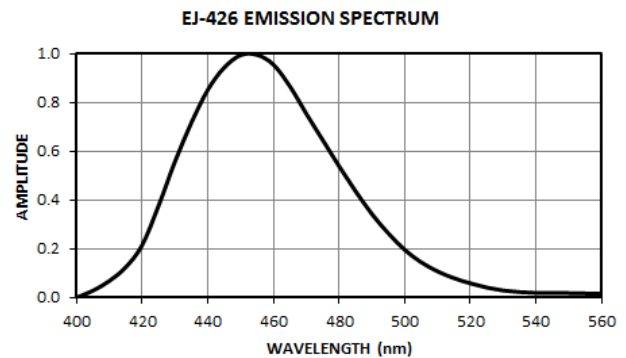
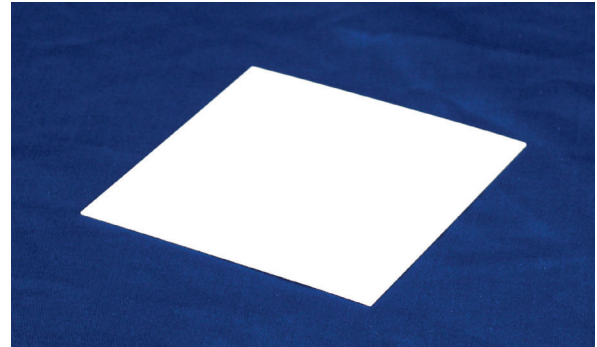
EJ-426 is an efficient detector for thermal neutrons with low sensitivity to gamma radiation. The detector has the form of a flat, white, thin sheet consisting of a homogeneous matrix of fine particles of lithium-6-fluoride ( ${}^6\text{LiF}$ ) and zinc sulfide phosphor ( $\text{ZnS:Ag}$ ) compactly dispersed in a colorless binder. The lithium is enriched in  ${}^6\text{Li}$  to a minimum of 95 atom percent.

The neutron detection process employs the nuclear reaction  ${}^6\text{Li} (n, \alpha) {}^3\text{H}$ :



with a cross section of 941 barns for 0.025 eV neutrons. The resulting triton and alpha particle are detected by ZnS:Ag phosphor with the broad blue fluorescent spectrum shown below. The decay time of the prompt scintillation component is 200 ns.

EJ-426 sheets can be manufactured in a large variety of sizes and formulas and are usually supplied with a support backing. Most types are heat formable. The tables below present the product variations currently available.



DETECTION PROPERTIES			
Screen Type		EJ-426-0	EJ-426HD2
${}^6\text{LiF:ZnS}$ Mass Ratio		1:3	1:2
${}^6\text{Li}$ Density (atoms/cm <sup>3</sup> )		$8.81 \times 10^{21}$	$1.39 \times 10^{22}$
Theoretical N <sup>TH</sup> Efficiency	0.32 mm thick	0.23	0.34
	0.50 mm thick	0.34	0.48

### STANDARD PRODUCT SPECIFICATIONS

When requesting EJ-426, please specify the desired formula, matrix thickness, backing material, and sheet size. Standard options are listed in the table on the left. Custom formulations and variations are also available. The maximum sheet size is 400mm x 500mm.

#### EXAMPLE

**Product Number:** EJ-426-0-PE  
**Description:** Phosphor matrix with 1:3  ${}^6\text{LiF}$  to ZnS mass ratio on 0.25 mm thick clear polyester sheet.  
**Sheet Size:** 0.32 mm thick x 100 mm x 100 mm

FORMULA		
EJ-426-0		
EJ-426HD2		
MATRIX THICKNESS		
0.32 mm		
0.50 mm		
BACKING		
MATERIAL TYPE	DESCRIPTION	SUFFIX
Aluminum Foil	50 $\mu\text{m}$ thick foil	(none)
Clear Polyester Sheet	0.25 mm thick sheet	-PE
	Laminated between two 0.25 mm thick sheets	-PE2
Aluminized Mylar	0.12 mm thick sheet	-AM
Pure Aluminum	0.5mm thick plate	-PA
High Reflective Aluminum	0.4mm thick plate	-A

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