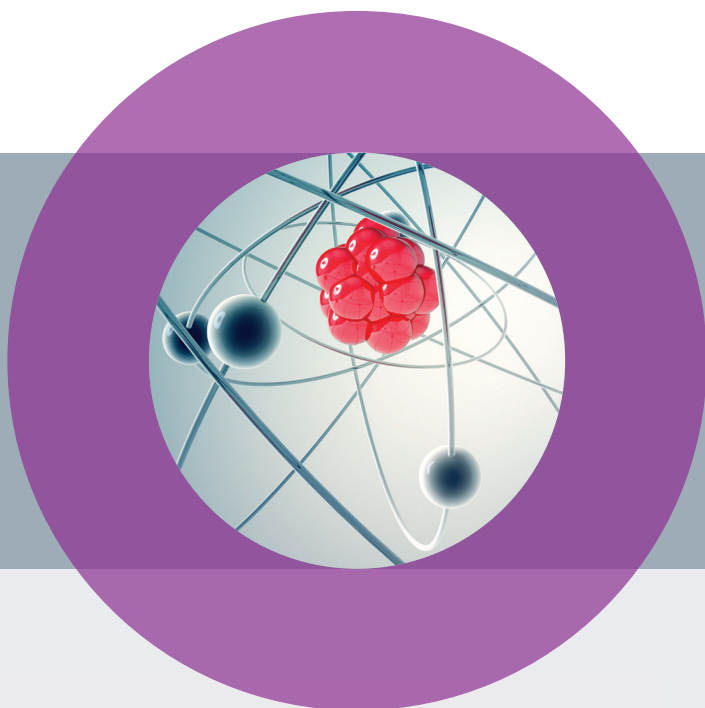


# Neutron Screens

## Lithium-6 based screens for detection and imaging of thermal neutrons

Our specialist neutron screens offer excellent gamma discrimination and sensitivity for high performance in both neutron detection and imaging applications.



### product range

Neutron screens are available in three formulations: the standard ND is a blue emitting screen with unique low sensitivity to background gamma; the green emitting NDg is ideal for CCD imaging, while the NDFast has been specifically designed for high rate applications. Neutron efficiency is determined by the ZnS:6LiF mass ratio and by the thickness of the screens. Typically a higher thickness and a lower ZnS:6LiF ratio will provide a greater capture efficiency but a lower light output. This however will depend on incoming neutron flux and on the detector setup. The detection of thermal neutrons is based on the nuclear reaction  ${}^6\text{Li} (n, \alpha) {}^3\text{H}$ :



### specification

*Physical Properties of NDFast, ND and NDg Screens*

Screen Type	NDFast	ND	NDg
Formulation	${}^6\text{LiF ZnO:Zn}$	${}^6\text{LiF ZnS:Ag}$	${}^6\text{LiF ZnS:Cu, Al}$
Phosphor Type	Particulate blend	Particulate blend	Particulate blend
Emission colour	Green	Blue	Green
Peak Emission	505nm	450nm	530nm
Decay to 10%	$3.5\mu\text{s}$	$80\mu\text{s}$	$85\mu\text{s}$
Afterglow	Ultra low	Low level	Low level
X-ray Absorption	Very low	Very low	Low
UV Absorption	<390nm (Broad Band)	Broad band	>220nm into visible

**shapes**

The screens can be manufactured in a range of shapes from flat sheets to more complex designs such as ridge/grooved tiles and conformed cylindrical surfaces. Most types of screens are heat formable.

**ZnS/6LiF mass ratio**

The following mass ratios are available: 4:1 for maximum light output; 2:1 for maximum 6Li density and detection efficiency.

**dimensions**

The neutron detection screens are readily available up to 500mm x 500mm but larger sizes can be manufactured to special order.

**substrates**

Scintacor neutron detection screens are available either on a 250 um white polyester substrate or free standing (i.e. without any substrate). Additional substrates are available on demand.

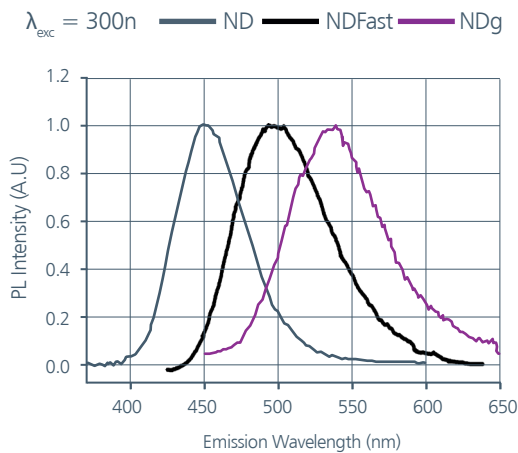
**construction**

A wide range of mountings and support materials are available, such as aluminium plates. Wall thickness, tolerances can be agreed on demand.

**performance**

Performance achieved with ND Screen in a detector for the replacement of He-3 tubes		DNDO NDRP Requirement
Neutron Efficiency: $e_{abs,n}$ (cps/ng $^{252}\text{Cf}$ )*	3.26	> 2.75
Gamma Discrimination: $e_{int,gn}$ (20 mR/hr)	$3.05 \times 10^{-8}$	< $10^{-7}$
GARRn	1.019	$0.9 < \text{GARRn} < 1.1$

\* For 2:1 ZnS:Ag /6 Li ratio, 300µm thickness



**applications**

- Fissile material detection in radiation portal monitors
- Thermal neutron detection in high energy physics
- Neutron radiography in non-destructive testing
- Neutron Dosimetry
- Crystallography

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