

## LIGHT GUIDES

Numerous light guides have been fabricated by Eljen Technology to meet a wide variety of light collection applications for scintillators. Light guides are always custom made for each customer's needs. One general rule to remember when considering using light guides: Light guides usually improve the uniformity of light collection but always reduce the average signal amplitude. Light guide types fabricated by Eljen include, but are not limited to, the following general types.

Adiabatic Light Guides consisting of an array of strips adapting the edges of scintillator plates to a single phototube. These generally apply best on wide scintillators and are the most expensive.

Fishtail Light Guides consisting of a single solid element providing a smooth adaption of a rectangular cross section to a round PMT face.

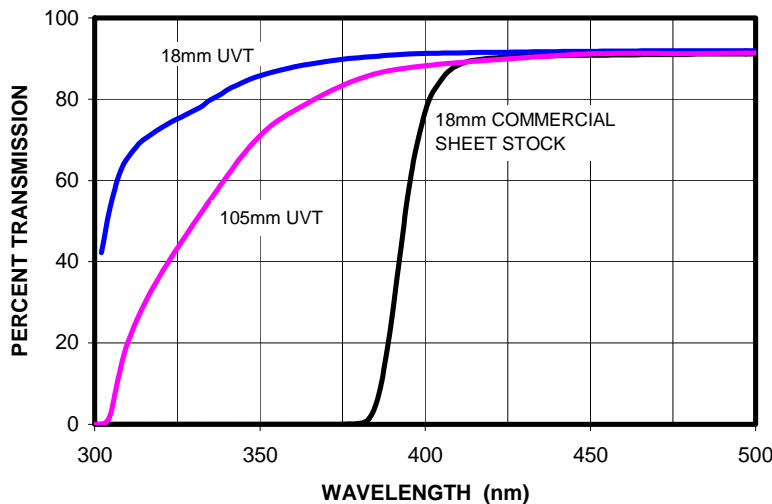
Flat Trapezoid Light Guides with a flat triangular PMMA sheet terminated at the PMT end by a cylindrical rod or disc for effective PMT mounting.

These are fabricated from cast acrylic materials (polymethylmethacrylate, PMMA). Two types of PMMA are employed. The most commonly used PMMA material is commercial quality cast sheet generally stocked in standard thicknesses up to about four inches. The second PMMA type is ultra-violet transmitting, commonly referred to as UVT. Eljen normally stocks cast UVT sheet in common inch thicknesses up to 1" thick. UVT rod stock up to 4" diameter is also normally stocked.

### PMMA General Properties

Specific Gravity, 20°C .....	1.19
Refractive Index, $n_D$ (589nm).....	1.492
Refractive Index (436nm) .....	1.502
Softening Point .....	96°C
No. of H Atoms per cm <sup>3</sup> .....	$5.73 \times 10^{22}$
No. of C Atoms per cm <sup>3</sup> .....	$3.58 \times 10^{22}$
No. of O Atoms per cm <sup>3</sup> .....	$1.43 \times 10^{22}$
No. of Electrons per cm <sup>3</sup> .....	$3.86 \times 10^{23}$

**OPTICAL TRANSMISSION OF CAST ACRYLIC SHEET  
COMMERCIAL GRADE vs. UVT GRADE  
REFERENCE: AIR**



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