

OL 750-NVG

Technical Performance and Applications

For display testing, the OL 750-NVG system is the most cost effective equipment available, beating all competitive systems in a price or performance comparison.

The financial restraints of today often result in users settling for a compromise between price and performance. It is rare that the best system is also the lowest price, yet this is true of

the OL 750-NVG.

The OL 750-NVG uses state-of-the-art technology, saving on costs while increasing performance. This can be illustrated by considering MIL-L-85762A in relation to:

- Sensitivity
- Speed
- Dynamic range
- Polarization effects
- Actual results
- Price

Sensitivity

The sensitivity of a system reflects its ability to measure low light levels. MIL-L-85762A defines the acceptable values for spectroradiometer sensitivity levels at 10 nm bandpass. However, the specification does not define spot size or integration time to be used in this test - both of which affect the result.

Previous systems have achieved these sensitivity levels only by using long scan times or large spot sizes, placing measurements at smaller spot sizes

outside the required specifications. At one-hundredth of a second integration time the OL 750-NVG not only exceeds the sensitivity specification, generally by orders of magnitude, but does so even at the minimum spot size of 0.007 inches (0.178 mm) diameter required for broad band photometers.

Figure 1 shows the sensitivity of the OL 750-NVG at the 10:1 signal-to-noise level defined in MIL-L-85762A. As can be seen, all spot sizes may be used in measurements. Competitive systems are up to three or four decades less sensitive, placing unacceptable restrictions on the types of measurements that can be made.

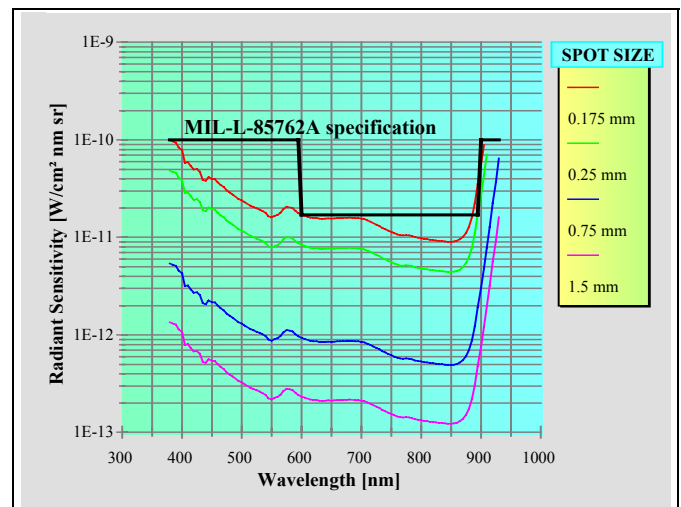


Figure 1. Sensitivities of the OL 750-NVG system at 10:1 signal-to-noise (at 0.01 s integration time) when measuring different spot sizes.

Speed

Since older systems can take hours to produce a result, any increases in speed are generally welcomed by users. In fact, speed and sensitivity are often related. MIL-L-85762A states that the minimum acceptable spectroradiometric accuracy of $\pm 5\%$ at each wavelength. Since the signal-to-noise, and hence the accuracy, is limited by the integration time, more sensitive systems can use shorter integration times to achieve the same result. The OL 750-NVG goes beyond the merely "acceptable" by exceeding this accuracy under all conditions and integration times as short as one-hundredth of a second, making it the best - and fastest - system available anywhere.

Signal-to-noise is not the only limit to accuracy: amplifier gain, blocking and ND filter changes are also required to maintain peak performance at all wavelengths. Ignoring these can decrease the accuracy of results to the level where there is no advantage to increased speed. Speed increases are not therefore a simple result of moving the grating faster, but is an optimization of all components while maintaining the specified performance. The OL 750-NVG is fully optimized, allowing top-quality scans to be run in one minute or less.

Dynamic Range

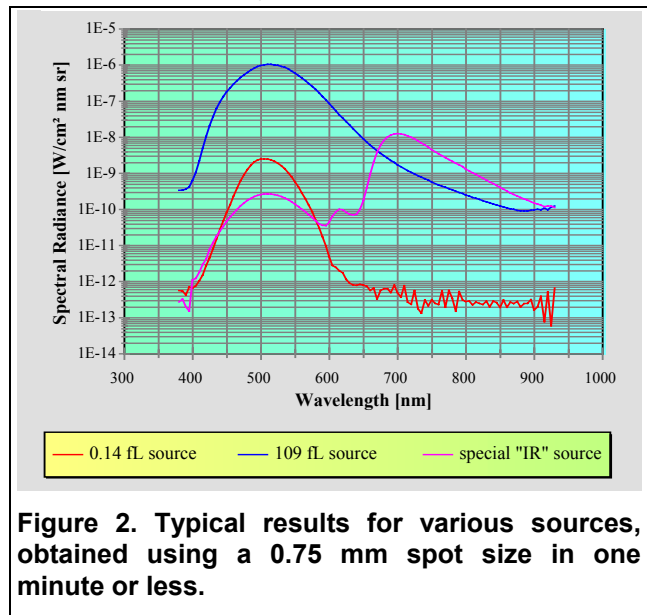
The NVIS class A relative response values vary over 4 decades (1×10^{-4} to 1), and those of NVIS class B vary over 5 decades (1×10^{-5} to 1). In each case, typical sources will have low light levels at those wavelengths that are weighted highest. If a system does not exhibit more than 5 decades of dynamic range it will produce errors in the NVISa and NVISb results which will fail good sources. The OL 750-NVG uses quality detectors with four fully characterized, signal selectable, ND filters to give 10 decades of dynamic range - enough to give good results on the weakest sources without saturating on the strongest.

Polarization Sensitivity

All monochromators include polarizing optics: slits, gratings, lenses, filters and PMT envelopes. This makes the system more sensitive to some polarizations than to others. Errors are introduced since calibration sources are typically unpolarized, whereas display sources are sometimes highly polarized. Uniquely, the OL 750-NVG incorporates special depolarization optics to reduce this effect to negligible levels - well below the 1% specified in MIL-L-85762A.

Results

Ultimately, a system is only as good as the results it generates for the most difficult sources to be measured. As previously explained, this would correspond to small spot sizes, fast integration times and large dynamic ranges. Figure 2 shows some typical results that may be obtained in one minute or less. Although these sources spanned many decades of dynamic range, they could be easily measured without re-optimizing the system, indicating the tremendous versatility of the OL 750-NVG.



Price

Optronic Laboratories offers both single (OL 750S-NVG) and double (OL 750D-NVG) monochromator based systems. Prices for these complete systems are substantially less than those of competitors. In addition to this lower cost, the OL Series 750-NVG systems include many standard features that are optional or not available from competitors. Options available with the OL 750-NVG system include:

- **Stand Alone Photometer operation** for instant luminance values without realignment.
- **Fiber Optic coupling** for enhanced flexibility and restricted spaces
- **Cart-based system integration** for easy movement between sites
- **OL Series 455 Integrating Sphere Calibration Standards** for greatest accuracy.