



ULTRA-VIOLET PRODUCTS

Headquarter Offices: UVP, Inc.
2066 W. 11th Street, Upland, CA 91786
Tel: (800) 452-6788 or (909) 946-3197
E-Mail: uvp@uvp.com

Application Bulletin

UVP-AB-111

European Operations: Ultra-Violet Products Ltd.
Unit 1, Trinity Hall Farm Estate, Nuffield Rd,
Cambridge, CB4 1TG UK Tel: 44(0)1223-42002
E-Mail: uvp@uvp.co.uk

ANALYSIS OF MIDRANGE ULTRAVIOLET TUBES USED IN TRANSILLUMINATORS FOR VISUALIZATION OF STAINED DNA

The most common use of an ultraviolet transilluminator in the laboratory today is to fluorescently visualize Ethidium Bromide stained DNA. The choice of ultraviolet wavelength is critical to achieve the greatest amount of fluorescence while avoiding damage to the DNA. For most applications, what is known as “midrange” ultraviolet is the wavelength of choice.

A popular misconception put forth by many marketers of ultraviolet transilluminators is to identify certain spectral peaks of the midrange UV tubes used in transilluminators to state that the units provide a better fluorescence response due to this specific peak. The common spectral peaks used are 300nm, 302nm, 310nm and 312nm (nanometers). While UVP has always used 302nm, UVP has been careful to state that this is only an arbitrary reference used to identify its midrange ultraviolet tubes.

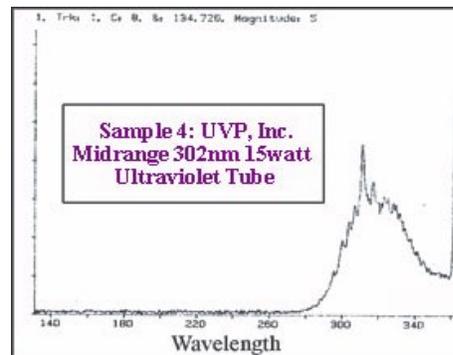
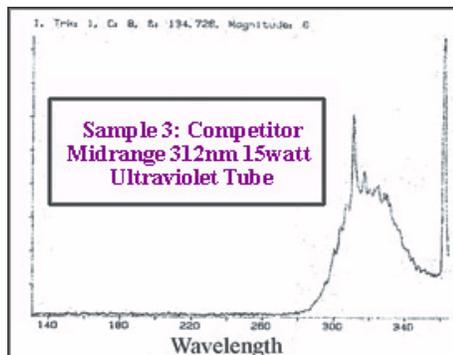
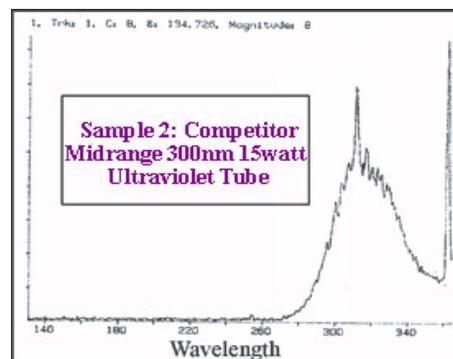
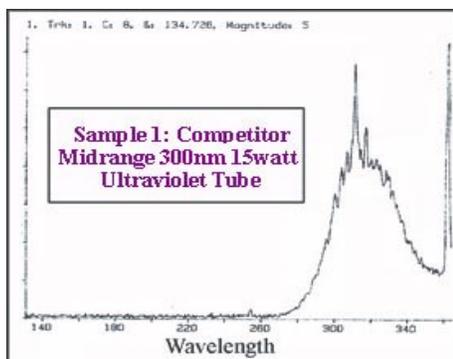
In general, the manufacture of midrange tubes requires the use of specialized phosphor. The inside of the fluorescent tube is coated with a thin layer of this specialized phosphor. This phosphor then emits a waveshifted range of spectral radiation when acted upon by 254nm ultraviolet. The 254nm UV radiation is generated in all fluorescent style tubes to activate the specialized phosphor. The emission spectra that results is a bell curve with spectral peaks. It is this phenomena that gives rise to the use of specific peaks to identify a midrange ultraviolet tube.

The charts below show the spectral output curves and peaks of different marketers “midrange” ultraviolet tubes. The data reflects that all are the same.

Equipment Used: OMA Optical Multichannel Analyzer by EG&G Model 1460

Testing Method: Each tube was mounted into an operating fixture positioning the tube at approximately one meter from the light collecting aperture of the OMA.

The tube was turned on and allowed to warm up for approximately 15 minutes. Room lamps were turned off and the aperture shutter was opened to allow the tube emission scan. Testing was performed in accordance with the normal operating procedures of the OMA to obtain spectral scan data.



Ultraviolet intensities are not reflected in the sample data shown.