

## Photonic Curing Filter Set for PulseForge® R&D Tools

*Convenient, easy to use filter inserts for spectrum specific photonic curing!*

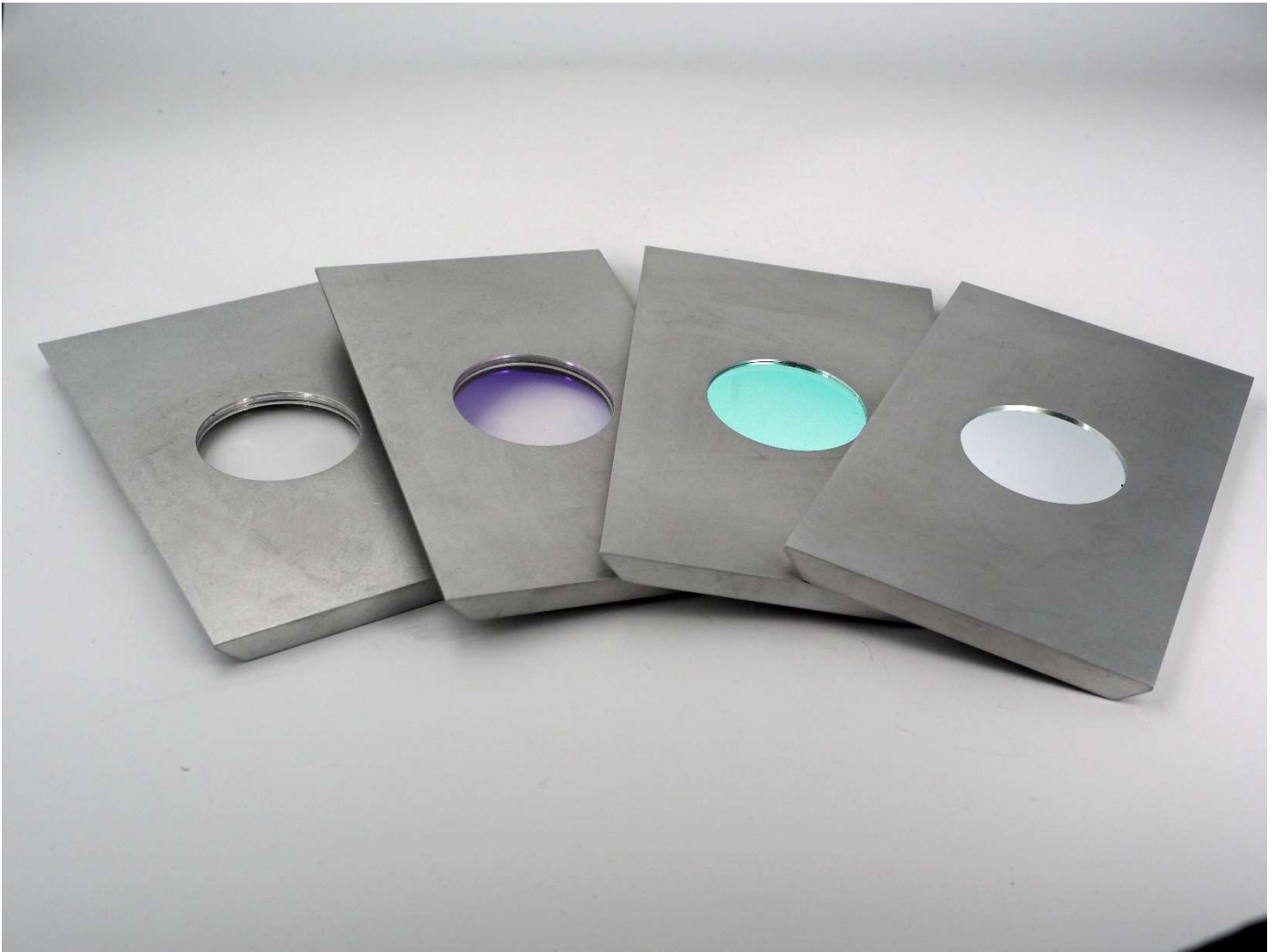


Figure 1. NovaCentrix offers an in-line family of filters for spectrum specific photonic curing for all PulseForge R&D platforms.

A typical flashlamp emission spectrum is broadband and includes UV, visible, and NIR emission (~250nm – 1500nm). For some applications, it is desirable to remove portions of the spectrum. For example, a temperature sensitive substrate may absorb a portion of the beam even if it is nominally transparent. By removing the portion of the beam that is preferentially absorbed by the substrate, the level of curing of a selectively printed thin film can be increased without damaging the substrate. The effect is that performance can be increased, sometimes dramatically, within the same platform. Until now, experimenting in different spectral bands has been an expensive proposition as custom high-power rated filters can often cost thousands of dollars each.

NovaCentrix now offers a photonic curing filter set enabling a researcher to do photonic curing in multiple spectral bands with high quality, dichroic filters in a convenient, cost effective format. Changing out a filter takes just seconds!

The filter set includes: Four 50mm diameter filters:

1. Fused silica blank (for full-spectrum processing)
2. Visible block filter (475-750nm removed)
3. Visible pass filter (400-750nm notch filter)
4. NIR pass filter (>700nm longpass filter)

Each filter is a high-quality, dichroic OD4 filter rated for high power and is recessed within a solid aluminum cover plate (Figure 1). It is locked in with a steel retaining ring that allows for handling with minimal possibility for contact with the filter surface. As the filter surface faces towards the inside of the PulseForge tool, and not the sample, the filter can be kept clean during processing. A box of lens wipes is also provided in the event the filter becomes dirty.

Figure 2 shows the measured transmission versus wavelength for each filter for an identical PulseForge pulse condition.

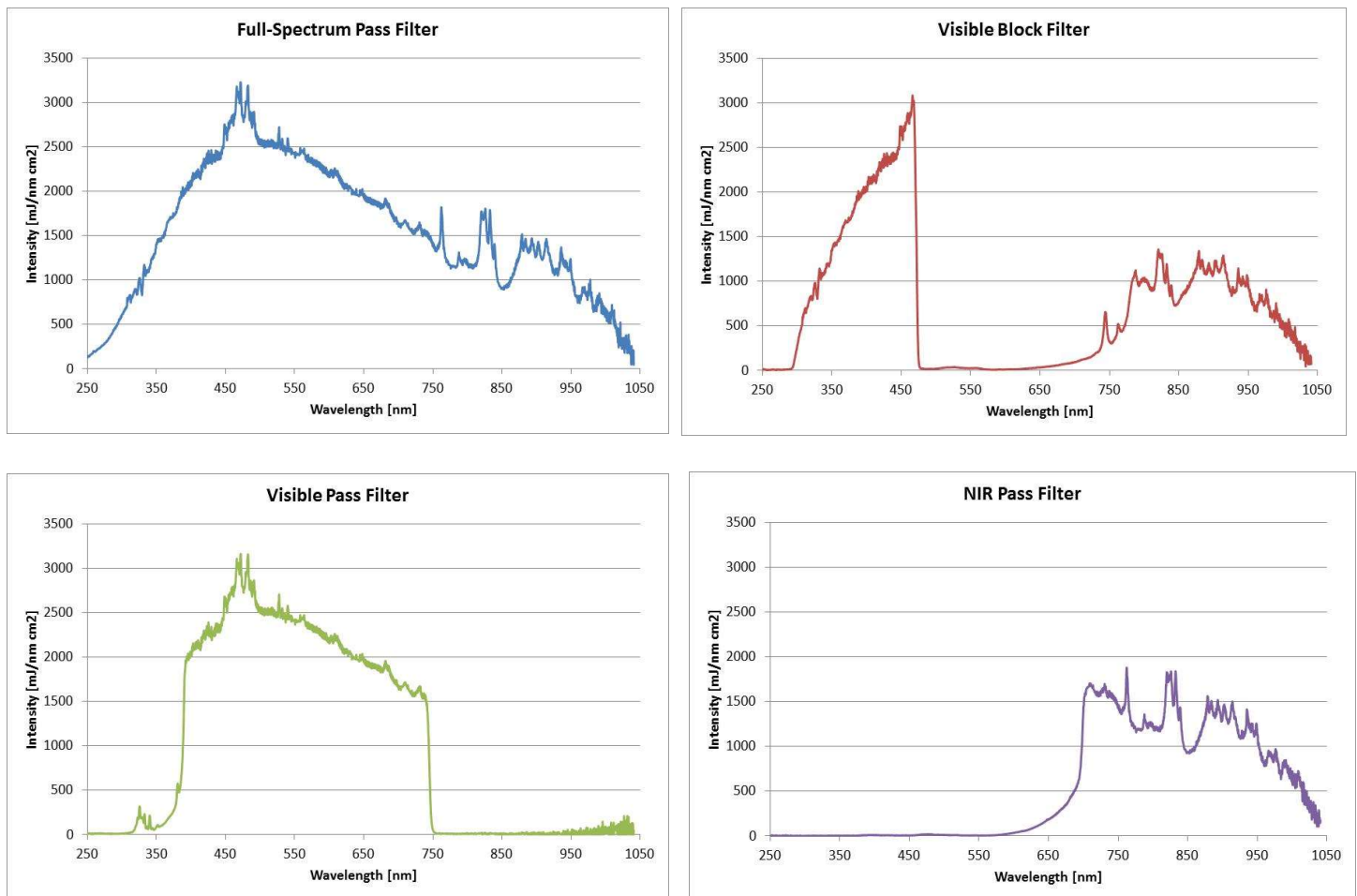


Figure 2. Measured transmission versus wavelength for each filter for an identical PulseForge pulse condition.

Figure 3 shows the measured transmission through all four filters for comparison using the same PulseForge condition.

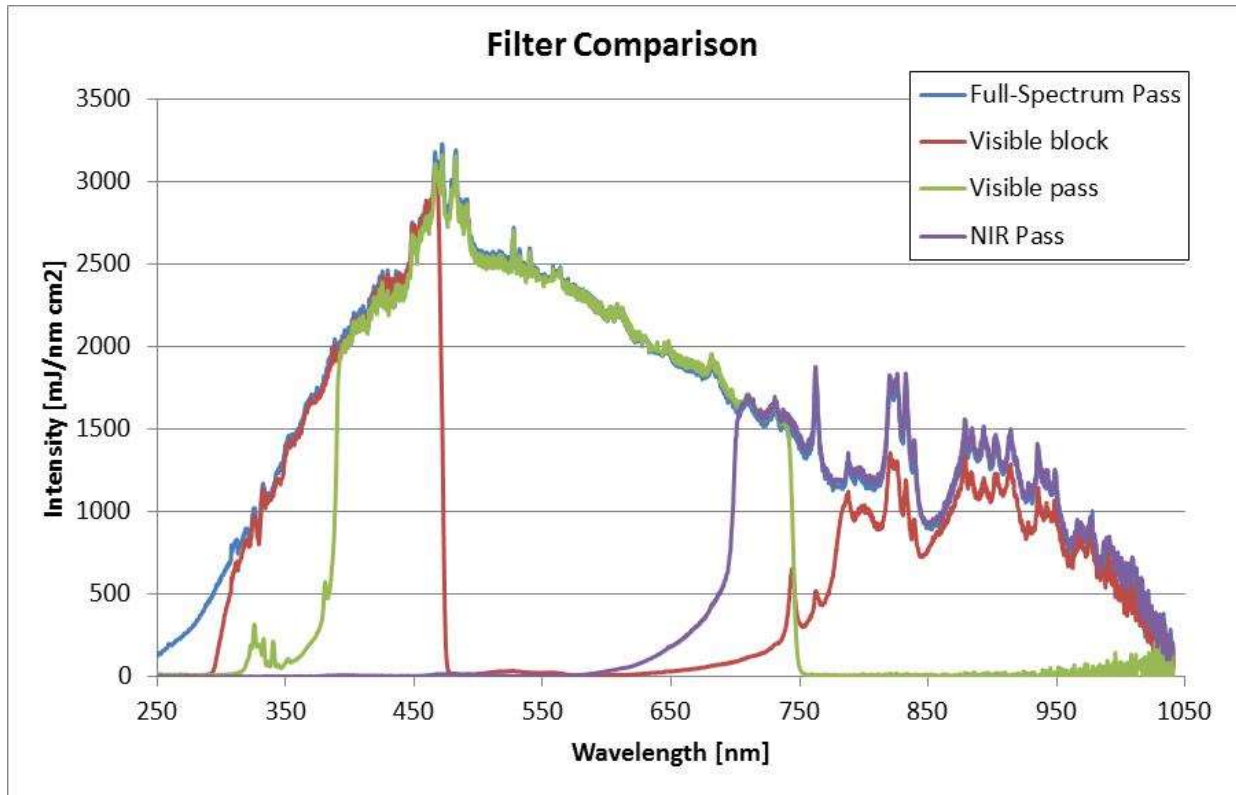


Figure 3. Comparative measured transmission versus wavelength for each filter for a typical PulseForge pulse condition.

Each filter is integrated into a beveled aluminum plate that can be directly substituted for the quartz window of any PulseForge® R&D system including the PulseForge® 1200, PulseForge® 1300, and the PulseForge® Invent™. As all PulseForge R&D systems have a NIST-traceable integrated bolometer to quantitatively measure the energy emitted, this capability is retained with this accessory as each filter is located such that bolometry can be performed directly through the filter! The energy measurement from the bolometry can be directly entered into NovaCentrix's SimPulse™ photonic curing simulation software to estimate the temperature in a user-defined thin film stack as a function of depth and time –another NovaCentrix first!

The filter packs are available for the PulseForge 1200, the PulseForge 1300, and the PulseForge Invent in both 150mm and 300mm variants.