

## Applications: Designing Low Cost Inspection Process for LED's

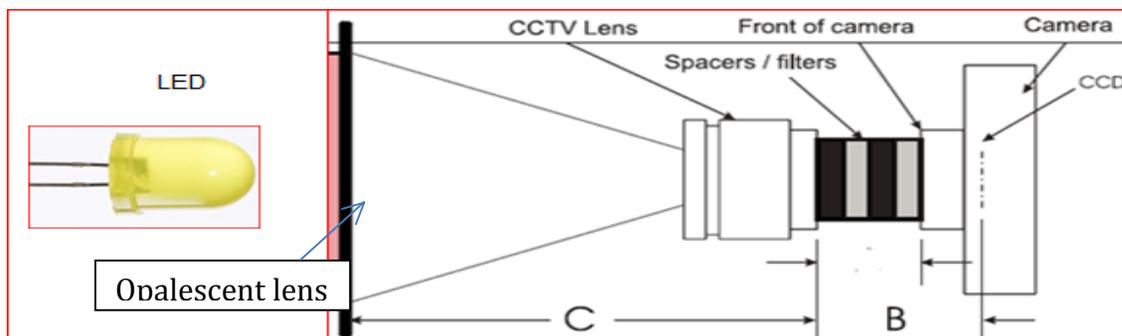
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In this application, our customer manufactures encoders that incorporate LED's (light emitting diodes) that have a collimating lens attached. The LED's produce between 850nm and 880nm at 2mW to 15mW, the beam sizes range from ¼" to ½". Until now, a laser power meter has been used to verify the output wattage. Shinning the beam on graph paper has been used to verify the beam size visually.

The application is to design a low cost inspection process that will detail and record data on batches of incoming LED's for beam quality.

We have two options for testing large beams:

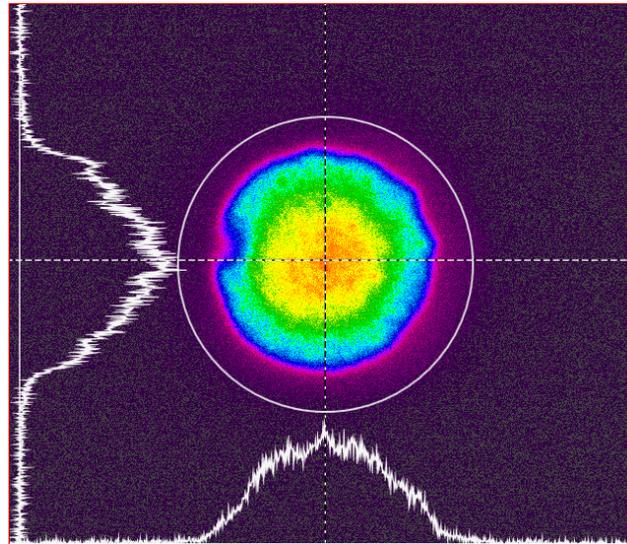
1. [BGP-USB- L11058](#) profiling camera with a 24mm X 35mm array, that will directly profile large beams.
2. [BGP-USB-SP620](#) profiling camera with a 5.4mm X 7.1mm array and 25mm CCTV lens attached to indirectly profiler the large beam shinning on a 2" opalescent lens. Figure 1 below is a simulation of the setup.



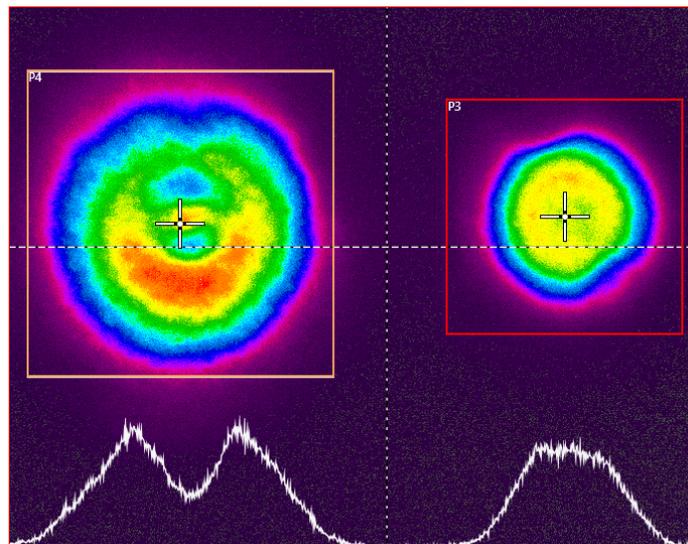
*Figure 1. LED, 2" opalescent lens, 25mm CCTV lens, and SP620 profiling camera.*

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For the onsite demonstration, we tested the setup in Figure 1 using the SP620 with the CCTV lens, we imaged the front side of the 2” opalescent lens to profile the beams scatter light on the backside of the opalescent lens. The instant we imaged the first LED the customer determined this was the best solution for their application and it met the budget allotted to developing a test procedure. Figures 2 and 3 are examples of two tests we conducted.



*Figure 2. Acceptable distribution of light from a single LED.*



*Figure 3. Two LED's side by side simultaneously.*

With [BeamGage](#) software that was included with the SP620 package, we are able to adjust the optical scaling to compensate for the CCTV lens, apply multiple software apertures to isolate multiple beams and compare, and setup pass fail criteria's to identify acceptable LED's. With the 2" area of the opalescent lens, multiple LED's can be tested simultaneously to save labor hours.

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