

ILT1700 Flash Measurement Considerations using the SED033 Detector.

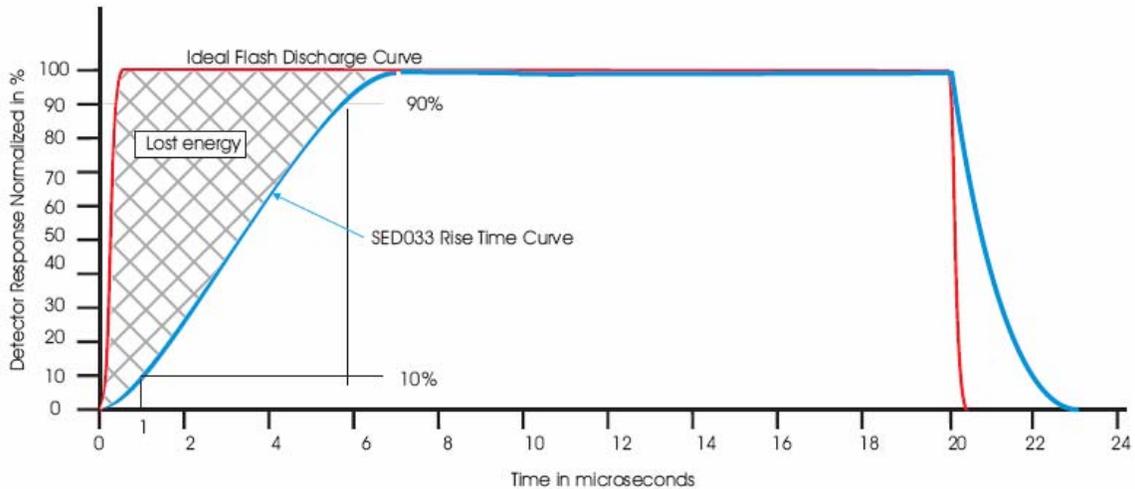
Measuring the energy from a flash is complicated by the fact that the energy from the flash source is emitted in a brief time frame, typically in the microsecond to millisecond range.

The ILT1700 meter, by design can accurately measure photon energy from pulsed light sources as long as the light source rise time and duration are longer than that of the ILT1700 meter/detector combination. When used with the SED033 detector you can obtain accurate readings of a flashing source provided you are careful to use the meter/detector combination within its specified operating conditions.

For example; a user desires to measure the energy from an Ideal Xenon flash tube with a flash duration of 20 microseconds. The rise time of the flash tube light output is 1 microsecond.

The published response time of the ILT1700 meter with SED033 detector is conservatively rated at 5 microseconds. This is defined as the time it takes the detector output to rise from 10% to 90% of its maximum for a given illumination on its active area. A graph of the Ideal flash tube light output (red line) and the ILT1700 response (blue line) is shown below

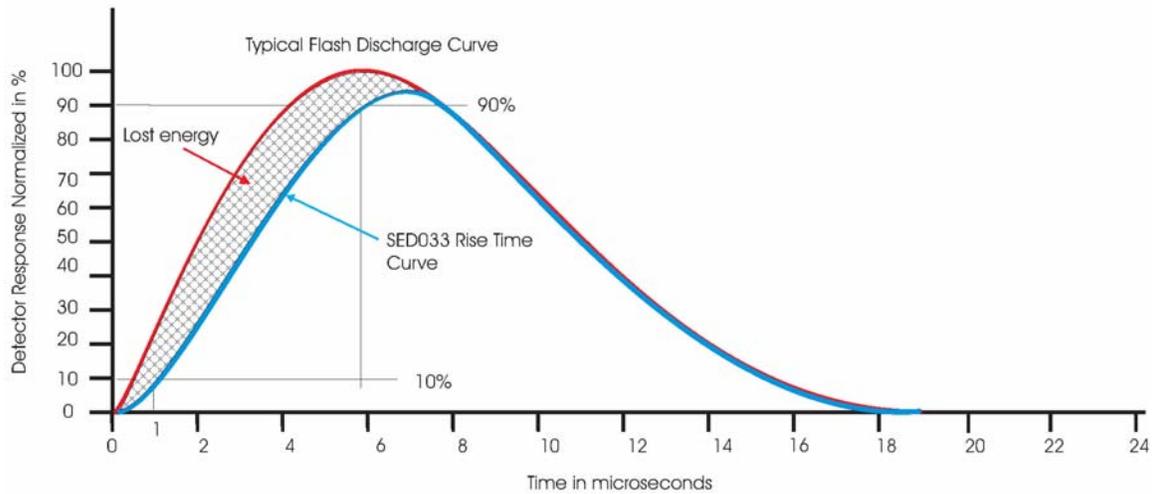
Figure 1. Ideal flash energy profile and detector response



The slower 5 microsecond response time of the ILT1700 meter/detector causes the detector to miss part of the light output as shown by the hatched area to the left of the detector response line. This slowness is an inherent function of the SED033 detector.

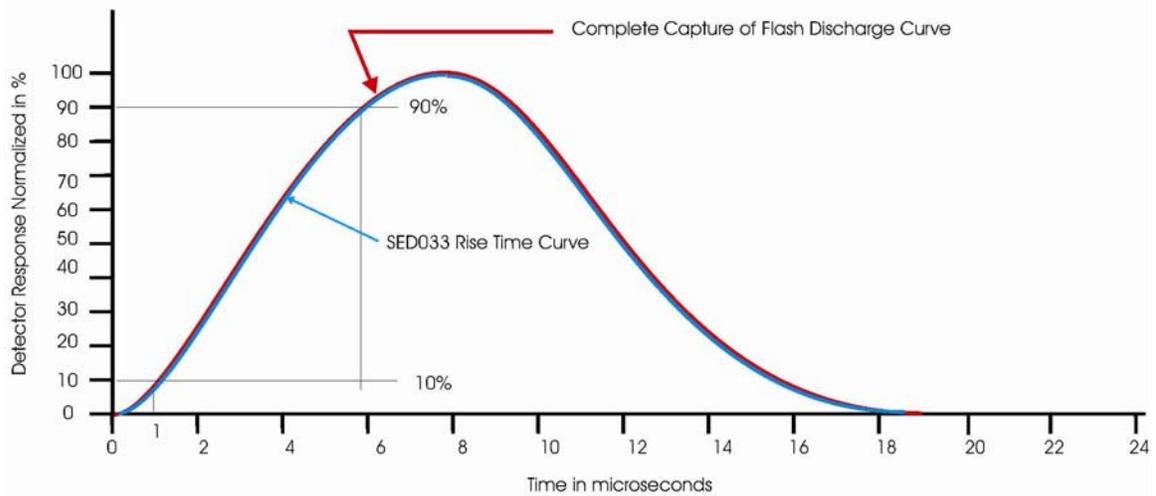
Now consider Figure 2 with a slower and more typical Flash energy output. The same detector can now more closely follow the rise time of the flash pulse, resulting in less light output missed, and a more accurate reading.

Figure 2. Typical flash energy profile and detector response



In Figure 3, the flash rise time is even slower still, resulting in a complete capture of all flash energy by the detector. This results in the most accurate reading of all.

Figure 3. Slower flash energy profile and detector response



It follows, therefore, that the ILT1700 meter/ SED033 detector combination can accurately measure the desired spectral energy in a flash discharge as long as the discharge rise time is longer than 5 microseconds. Shorter flash rise times will result in missed energy and readings with poorer degrees of accuracy.

For additional flash measurement considerations, see section 3.3.2 of the ILT1700 Instruction Manual.