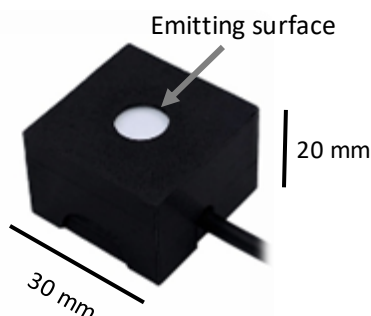
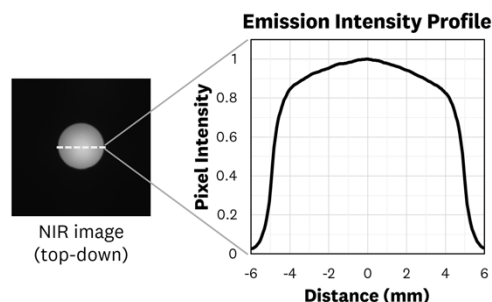
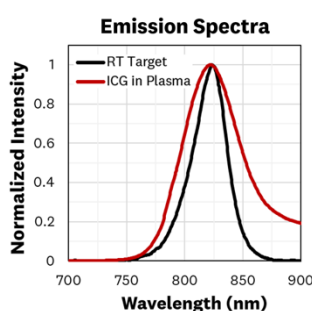
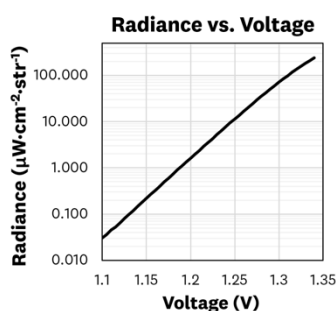


Radiometric-Emitter Target

Fully characterized target: radiance, spectrum, and emission profile



- Solid-state emitter allows for stable radiometric output (adjustable from $\sim 0.1 - 100 \mu\text{W}/(\text{cm}^2 \text{str})$) that mimics NIR fluorescence emission
- Designed to help track the photobleaching of our fluorescent targets
- Decouples the fluorescence imaging from laser excitation, allowing for system optimization and quantitative characterization workflows
- Available for ICG, 800 nm, 700 nm channel fluorophores and custom wavelengths



Using fluorescent targets with high-irradiance systems

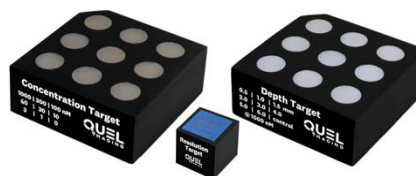
High-irradiance imaging systems ($>5 \text{ mW}/\text{cm}^2$) require additional considerations due to the accelerated photobleaching of fluorescent targets. Excitation exposure should generally be limited to extend the life of the fluorescence imaging targets.

We recommend that high-irradiance systems use single-snapshot imaging with our reference targets to limit the photobleaching and radiant exposure. The use of our visualization phantoms and radiometric target are recommended for regular use with these systems.

Visualization, alignment, and initial characterization



Single snapshot imaging of reference targets



Visit our website to see the **application note** on how to monitor system imaging performance and photobleaching using the radiometric emitter target.



Shelf-stability and photobleaching of fluorescence targets

Overview and Shelf stability



- QUEL Imaging's fluorescent targets and phantoms provide reliable system characterization and visualization with matching fluorophore spectral characteristics and tissue-mimicking optical properties.
- Our fluorescent targets are shelf stable (≥ 1 year) when stored in room temperature conditions

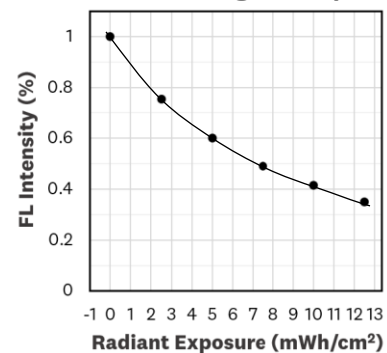
Photobleaching of fluorescent targets

QUEL Imaging uses organic fluorophores to mimic the spectra of FDA approved fluorescence guidance surgery compounds like indocyanine green (ICG). This provides the advantage of mimicking the excitation-emission properties of these compounds but introduces radiant exposure photobleaching.

Fluorescence photobleaching vs. radiant exposure characterization of our ICG-01 product line are shown in the figure to the right, and the table below provides the radiant exposure thresholds required for 10%, 25%, and 50% photobleaching of the fluorescent material.

Photobleaching %	10%	25%	50%
785nm Radiant Exposure (mW·h/cm ²)	1.01	2.55	7.29

Photobleaching vs. exposure



Photobleaching of targets must be considered when performing system characterization measurements

Photobleaching rates for our Q700 and Q800 product lines are currently being evaluated. Please contact us for more information at info@quelimaging.com

Calculating system-specific photobleaching rates

System-specific irradiance will vary the photobleaching rate of the fluorescent targets, where high-irradiance systems produce a faster photo-decay of the embedded fluorophores. The table below provides photobleaching times estimated for systems with varying excitation irradiances for our ICG-01 product line.

System Irradiance	Total exposure time for photobleaching (%) targets at system-specific irradiance		
	10%	25%	50%
1 mW/cm ²	61 min	150 min	440 min
10 mW/cm ²	6.1 min	15 min	44 min
25 mW/cm ²	2.4 min	6.1 min	17 min

Photobleaching times depend on a system's excitation irradiance. High irradiance systems require additional considerations when using QUEL Imaging's targets

To address the photobleaching of our fluorescent targets, the use of our **radiometric-emitting target** and **visualization phantoms** are recommended (see back). The radiometric target enables the monitoring of target photobleaching and provides fluorescence mimicking emission that is decoupled from the excitation source. See the application note linked below for a detailed use-case. The visualization phantoms facilitate the use of targets within high irradiance systems.

Visit our website to see the **application note** on how to monitor system imaging performance and photobleaching using the radiometric emitter target.

