

Summary: The name and design of our OTL-38-equivalent product line of standard and mini fluorescence reference targets – Concentration Sensitivity, Depth Sensitivity, and Resolution – have been updated to the new “Q800” product line. **The overall design remains largely unchanged** with new changes implemented to 1) maximize the usability of the targets 2) Improve targeted optical properties and 3) minimize manufacturing variability.



Q800 Product Line: Modifications from the OTL-38-equivalent product line

The form factor of our targets remains unchanged: The form factor and size of targets in the Q800 product line both for standard and mini sizes have not changed. These sizes are in alignment with our other product lines.

The fluorescent material formulation remains the same: The base fluorophore remains the same; hence, both the Q800 and OTL-38-equivalent product lines share the same fluorescence excitation–emission properties. In the original OTL-38-equivalent product line, concentrations were reported based on equivalence to pafolacianine (OTL-38) in phosphate buffered saline (PBS). Through fluorescence spectroscopy measurements, these concentrations were found to be equivalent to our 3D-printed fluorescent material utilizing the Q800-01 fluorophore with a $\sim 3.33\times$ factor. Thus, a reported OTL-38-equivalent product-line concentration of 1000 nM corresponded to 300 nM of Q800-01 fluorophore. New look-up tables will be made available for the Q800 product line to facilitate direct comparisons to pafolacianine, IRDye®800CW, and other related fluorophores.

Optical property changes: The Q800 product line’s optical absorption (μ_a) and reduced scattering (μ_s') coefficients have been adjusted to more closely match lung optical properties using our latest characterization techniques.

Q800 product line optical properties: $\mu_a \sim 0.04 \text{ mm}^{-1}$ $\mu_s' \sim 1.2 \text{ mm}^{-1}$ @ 800 nm

OTL-38-equivalent product line optical properties: $\mu_a \sim 0.06 \text{ mm}^{-1}$ $\mu_s' \sim 1.26 \text{ mm}^{-1}$ @ 800 nm

Concentration Sensitivity target change: The well concentrations have been updated to maximize the linearity range of the target at clinically-relevant fluorescence levels as shown in Table 1. The Q800 product-line concentration values now directly reflect the concentration of Q800-01 fluorophore rather than the equivalent pafolacianine (OTL-38) concentration.

Table 1: Updated Concentration Values

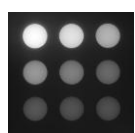
Well #	Q800	Q38 (Q800-equivalent)
1	600 nM	1000 nM (300 nM)
2	300 nM	300 nM (90 nM)
3	100 nM	100 nM (30 nM)
4	60 nM	60 nM (18 nM)
5	30 nM	30 nM (9 nM)
6	10 nM	10 nM (3 nM)
7	3 nM	3 nM (0.9 nM)
8	1 nM	1 nM (0.3 nM)
9	Control	Control

Depth Sensitivity target change: The concentration of the fluorescent material beneath the non-fluorescent depth material has been changed from 300 nM to 600 nM of Q800-01 fluorophore. The Q800 product-line concentration values now directly reflect the amount of Q800-01 fluorophore rather than the equivalent pafolacianine (OTL-38) concentration.

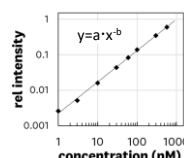
Resolution target change: The concentration of the fluorescent material has been changed from 300 nM to 600 nM of the Q800-01 fluorophore. The Q800 product-line concentration values now directly reflect the amount of Q800-01 fluorophore rather than the equivalent pafolacianine (OTL-38) concentration.

Q800 Concentration Sensitivity Target

600 – 1 nM, 0 nM

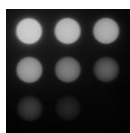


FL Image

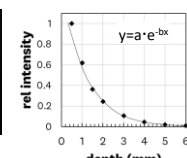


Q800 Depth Sensitivity Target

0.5 – 6.0 mm depth

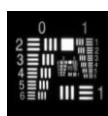


FL Image



Q800 Resolution Target - USAF 1951

288 lp/mm ($\sim 2\mu\text{m}$)



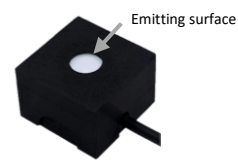
FL Image

Largest feature size:
Group 0 element 1
1 lp/mm | 500 $\mu\text{m}/\text{line}$

Smallest feature size:
Group 7 element 6
228.1 lp/mm | 2.19 $\mu\text{m}/\text{line}$

800 nm Radiometric Emitter Target

0.1 – 100 $\mu\text{W} \cdot \text{cm}^{-2} \cdot \text{str}^{-1}$



FL Image

