Sunstone Scientific LLC

NIST Traceable Calibration for Scattering Sensor

1. DESCRIPTION

The scattering sensor is calibrated to provide accurate and reproducible measurements of the volume scattering function (VSF) with an angular weighting defined by a centroid angle $\bar{\theta}$ and full-width-half-maximum (FWHM) spread $\Delta\theta$. Details of the calibration methodology can be found in Twardowski et al. (2012) and Sullivan et al. (2013).

2. PHYSICAL DATA

Sensor serial #:	BBFL2b 200
Angular weighting centroid angle $\bar{\theta}$ (assumed):	124°
Angular weighting spread $\Delta\theta$ (assumed):	41°
Spectral weighting centroid wavelength $\bar{\lambda}$ (from manufacturer):	660nm
NIST-traceable beads (cat #: 3100A) lot #:	170408
NIST-traceable beads, certified diameter:	100 ± 3nm

Certification

$\beta(\theta_c)$ [$m^{-1}sr^{-1}$] = Scale Factor x (Raw Counts – Dark Counts)

This certifies the following specifications for this scattering sensor:

Scale Factor for 660nm:	3.81E-06 m^{-1} sr^{-1} $counts^{-1}$
Dark Counts for 660nm:	48.1 counts
Instrument Resolution for 660nm:	1.0 counts
Instrument Resolution for 660nm:	3.81E-06 m^{-1} sr^{-1}
Approximate worst case accuracy for 660nm (Considering the assumptions above*):	±2.0%
Certification date:	3/2/2018

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*Based on estimated accuracy of theoretical computation, accuracy of experimental calibration result, and assuming exact geometric consistency between sensors of the same model.