

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 #:	BB3B 1651
Angular weighting centroid angle $\bar{\theta}$ (assumed):	124°
Angular weighting spread $\Delta\theta$ (assumed):	41°
Spectral weighting centroid wavelength $\bar{\lambda}$ (from manufacturer):	412, 595, 715nm
NIST-traceable beads (cat #: 3100A) lot #:	170408
NIST-traceable beads, certified diameter:	100 ± 3nm

Certification

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

This certifies the following specifications for this scattering sensor:

	412nm	595nm	715nm
Scale Factor [$\text{m}^{-1} \text{sr}^{-1} \text{ counts}^{-1}$]:	1.22E-05	5.45E-06	3.38E-06
Dark Counts [counts]:	52.2	45.6	39.5
Instrument Resolution [counts]:	3.5	2.6	2.2
Instrument Resolution [$\text{m}^{-1} \text{sr}^{-1}$]:	4.27E-05	1.42E-05	7.43E-06
Approximate best case accuracy (Considering the assumptions above*):	±2.1%	±2.1%	±2.2%

Certification date: 3/2/2018

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