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 #:	BB9-132
Angular weighting centroid angle $\bar{\theta}$ (assumed):	124°
Angular weighting spread $\Delta\theta$ (assumed):	41°
Spectral weighting centroid wavelength $\bar{\lambda}$ (from manufacturer):	407, 439, 485, 507, 527, 594, 651, 715, 878nm
NIST-traceable beads (cat #: 3100A) lot #:	199582
NIST-traceable beads, certified diameter:	100 ± 6nm

Certification

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

This certifies the following specifications for this scattering sensor:

	407nm	439nm	485nm
Scale Factor [m^{-1} sr^{-1} $counts^{-1}$]:	1.45E-05	1.45E-05	1.27E-05
Dark Counts [counts]:	43.8	54.0	49.2
Instrument Resolution [counts]:	0.4	0.3	0.6
Instrument Resolution [m^{-1} sr^{-1}]:	5.82E-06	4.32E-06	7.05E-06
Approximate best case accuracy (Considering the assumptions above*):	±2.3%	±2.3%	±2.2%
Water temperature during characterization		23.0°C	
Certification date:		11/19/2018	
Expiration date:		11/19/2019	

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SUNSTONE SCIENTIFIC

Certification

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

This certifies the following specifications for this scattering sensor:

	507nm	527nm	594nm
Scale Factor [m^{-1} sr^{-1} $counts^{-1}$]:	9.74E-06	8.72E-06	5.11E-06
Dark Counts [counts]:	62.5	55.3	54.0
Instrument Resolution [counts]:	0.5	1.1	1.0
Instrument Resolution [m^{-1} sr^{-1}]:	4.46E-06	9.64E-06	5.15E-06
Approximate best case accuracy (Considering the assumptions above*):	±2.2%	±2.3%	±2.2%

Water temperature during characterization 23.0°C

Certification date: 11/19/2018
Expiration date: 11/19/2019

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Certification

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

This certifies the following specifications for this scattering sensor:

	651nm	715nm	878nm
Scale Factor [m^{-1} sr^{-1} $counts^{-1}$]:	3.95E-06	3.16E-06	2.55E-06
Dark Counts [counts]:	51.8	54.2	52.5
Instrument Resolution [counts]:	0.6	0.4	0.6
Instrument Resolution [m^{-1} sr^{-1}]:	2.23E-06	1.36E-06	1.49E-06
Approximate best case accuracy (Considering the assumptions above*):	±2.2%	±2.2%	±2.1%

Water temperature during characterization: 23.0°C

Certification date: 11/19/2018
Expiration date: 11/19/2019

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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.