



SPECIFICATIONS FOR OPTICAL ATTENUATION AND ABSORPTION INSTRUMENTS ON FIXED PLATFORMS

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Specifications for Optical Attenuation and Absorption Instruments on Fixed Platforms

Document Control Sheet

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Specifications for Optical Attenuation and Absorption Instruments on Fixed Platforms

Signature Page

This document has been reviewed and approved for release to Configuration Management.

OOI Senior Systems Engineer:



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Specifications for Optical Attenuation and Absorption Instruments on Fixed Platforms

1 General

1.1 Ocean Observatories Initiative (OOI) Overview

See “Common Specifications for Instruments on Fixed Platforms”

1.2 Document Scope and Purpose

This document provides specifications for instruments that measure the optical attenuation and absorption on fixed platforms.

The instrument shall meet the requirements in this document and those specified in the “Common Specifications for Instruments on Fixed Platforms”. Parameters specified in neither the “Common Specifications for Instruments on Fixed Platforms” nor in this document are not applicable. This instrument specification shall have precedence over the Common Specification for conflicting items.

1.3 Documents

1.3.1 Informational

The documents listed in this section are for informational purposes only and may not have been referenced in this specification.

- Consortium for Ocean Leadership, Inc. 2010, “Final Network Design”, Washington, D.C. [Online] Available: http://www.oceanleadership.org/wp-content/uploads/2009/02/1101-00000_FND_OOI_ver_2-06_Pub.pdf

1.3.2 Applicable

These documents contain requirements and specifications applicable to the instrument specified. The referenced section, requirement, or specification shall be met by the instrument specified herein.

“Common Specifications for Instruments on Fixed Platforms”

1.4 Definitions

1.4.1 Glossary and Acronyms

- **a(λ)** – Absorption coefficient at wavelength λ
- **c(λ)** – Attenuation coefficient at wavelength λ
- See “Common Specifications for Instruments on Fixed Platforms” for additional definitions.

1.4.2 Conventions

All values contained in this document are Threshold Values unless specifically stated otherwise.

The bidder shall ignore the references in angle brackets < > at the end of each specification. They are for internal OOI use only.

Specifications for Optical Attenuation and Absorption Instruments on Fixed Platforms

2 Specifications

2.1 Measurement

Values provided are threshold unless otherwise stated.

2.1.1 Optical Absorption

a) Measurement with unit(s)

Spectral absorption ($a(\lambda)/m$)

b) Minimum Value

ABSO-001 The instrument shall measure spectral absorption over a range with a minimum value of 0.05 $a(\lambda)/m$
<L2-SR-RQ-3533, L4-CG-IP-RQ-228, L4-RSN-IP-RQ-348>

c) Maximum Value

ABSO-002 The instrument shall measure spectral absorption over a range with a maximum value of 8 $a(\lambda)/m$
<L2-SR-RQ-3533, L4-CG-IP-RQ-228, L4-RSN-IP-RQ-348>

d) Accuracy

ABSO-003 The instrument shall measure spectral absorption with an accuracy within $\pm 0.01 a(\lambda)/m$ of the true value. <L2-SR-RQ-3532, L4-CG-IP-RQ-226, L4-RSN-IP-RQ-347>

e) Precision

ABSO-004 The instrument shall measure spectral absorption with a precision of 0.005 $a(\lambda)/m$ <L2-SR-RQ-3742, L4-CG-IP-RQ-514, L4-RSN-IP-RQ-567>

ABSO-005 The instrument should measure spectral absorption with a precision of $10^{-3} a(\lambda)/m$. This is an objective. <L2-SR-RQ-3743, L4-CG-IP-RQ-515, L4-RSN-IP-RQ-568>

f) Resolution

Not specified.

g) Drift

Not specified.

h) Response Times

Not specified.

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i) Sampling Frequency

ABSO-006 The instrument shall be capable of measuring optical absorption at a sampling frequency of 1 Hz. <L2-SR-RQ-3534, L4-CG-IP-RQ-231, L4-RSN-IP-RQ-349>

The typical sampling frequency will be 1 Hz.

j) Dependencies

Not specified.

k) Wavelength range

ABSO-007 The instrument shall measure spectral absorption over the wavelength range of 400 nm to 720 nm. <L2-SR-RQ-3744, L4-CG-IP-RQ-516, L4-RSN-IP-RQ-569>

ABSO-008 The instrument should measure spectral absorption over the wavelength range of 400 nm to 750 nm. This is an objective. <L2-SR-RQ-3745, L4-CG-IP-RQ-517, L4-RSN-IP-RQ-570>

l) Number of bands

ABSO-009 The instrument shall measure spectral absorption in no fewer than 7 bands over the wavelength range specified in 2.1.1.k. <L2-SR-RQ-3746, L4-CG-IP-RQ-518, L4-RSN-IP-RQ-571>

m) Spectral Bandwidth

ABSO-010 The instrument shall have spectral bandwidths of no more than 20 nm. <L2-SR-RQ-3747, L4-CG-IP-RQ-519, L4-RSN-IP-RQ-572>

2.1.2 Optical Attenuation

a) Measurement with unit(s)

Spectral attenuation ($c(\lambda)/m$)

b) Minimum Value

ATTE-001 The instrument shall measure spectral attenuation over a range with a minimum value of 0.05 $c(\lambda)/m$ <L2-SR-RQ-3537, L4-CG-IP-RQ-401, L4-RSN-IP-RQ-354>

c) Maximum Value

ATTE-002 The instrument shall measure spectral attenuation over a range with a maximum value of 15 $c(\lambda)/m$ <L2-SR-RQ-3537, L4-CG-IP-RQ-401, L4-RSN-IP-RQ-354>

d) Accuracy

ATTE-003 The instrument shall measure spectral attenuation with an accuracy within ± 0.01 $c(\lambda)/m$ of the true value. <L2-SR-RQ-3536, L4-CG-IP-RQ-399, L4-RSN-IP-RQ-353>

Specifications for Optical Attenuation and Absorption Instruments on Fixed Platforms

e) Precision

ATTE-004 The instrument shall measure spectral attenuation with a precision of 0.005 c(λ)/m. <L2-SR-RQ-3748, L4-CG-IP-RQ-520, L4-RSN-IP-RQ-573>

ATTE-005 The instrument should measure spectral attenuation with a precision of 10^{-3} c(λ)/m. This is an objective. <L2-SR-RQ-3749, L4-CG-IP-RQ-521, L4-RSN-IP-RQ-574>

f) Resolution

Not specified.

g) Drift

Not specified.

h) Response Times

Not specified.

i) Sampling Frequency

ATTE-006 The instrument shall be capable of measuring spectral attenuation at a sampling frequency of 1 Hz. <L2-SR-RQ-3538, L4-CG-IP-RQ-402, L4-RSN-IP-RQ-355>

The typical sampling frequency will be 1 Hz.

j) Dependencies

Not specified.

k) Wavelength range

ATTE-007 The instrument shall measure spectral attenuation over the wavelength range of 400 nm to 720 nm. <L2-SR-RQ-3750, L4-CG-IP-RQ-522, L4-RSN-IP-RQ-575>

ATTE-008 The instrument should measure spectral attenuation over the wavelength range of 400 nm to 750 nm. This is an objective. <L2-SR-RQ-3751, L4-CG-IP-RQ-523, L4-RSN-IP-RQ-576>

l) Number of bands

ATTE-009 The instrument shall measure spectral attenuation in no less fewer 7 bands over the wavelength range specified in 2.1.2.k. <L2-SR-RQ-3752, L4-CG-IP-RQ-524, L4-RSN-IP-RQ-577>

m) Spectral Bandwidth

ATTE-010 The instrument shall have spectral bandwidths of no more than 20 nm. <L2-SR-RQ-3753, L4-CG-IP-RQ-525, L4-RSN-IP-RQ-578>

Specifications for Optical Attenuation and Absorption Instruments on Fixed Platforms

2.2 Operational

2.2.1 Operational Depth Range

See Appendix A-1 for operational depth ranges.

2.2.2 Environmental

See “Common Specifications for Instruments on Fixed Platforms”

2.2.3 Service Requirements

See “Common Specifications for Instruments on Fixed Platforms”

2.2.4 Calibration Requirement

See “Common Specifications for Instruments on Fixed Platforms”

2.2.5 Maintenance

See “Common Specifications for Instruments on Fixed Platforms”

2.3 Mechanical/Physical

See “Common Specifications for Instruments on Fixed Platforms”

2.4 Electrical

See “Common Specifications for Instruments on Fixed Platforms”

2.5 Data Storage and Processing

See Appendix A-1 for storage capacities at the typical sampling frequency.

See “Common Specifications for Instruments on Fixed Platforms”

2.6 Software/Firmware

See “Common Specifications for Instruments on Fixed Platforms”

2.7 Platform Interfaces

See “Common Specifications for Instruments on Fixed Platforms”

2.8 Compliance

See “Common Specifications for Instruments on Fixed Platforms”

2.9 Safety

See “Common Specifications for Instruments on Fixed Platforms”

2.10 Shipping and Storage

See “Common Specifications for Instruments on Fixed Platforms”

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2.11 Identification

See “Common Specifications for Instruments on Fixed Platforms”

2.12 Quality

See “Common Specifications for Instruments on Fixed Platforms”

3 Appendices

A-1. Specification Values by the Platform on Which the OPTAA Instruments are Deployed

The following table describes the performance and operational constraints, limits, etc. that are different between the different OOI platforms.

Specifications for Optical Attenuation and Absorption Instruments on Fixed Platforms

OPTAA Series	Cabled	Location	Operational depth range (m)	Deployment Interval (months)	Inductive Modem Required	Internal Batteries Required	Internal data Storage Required (# of samples)
A	C	O	0-300	13	N	N	N
B	C	O	0-3500	13	N	N	N
C	C	C	0-600	13	N	N	N
D	U	C	0-600	7	N	(see note 1)	Y(20,000,000)

Key:

Cabled:

C denotes platforms attached to the electro-optic cable in the Pacific Northwest (cabled)

U denotes platforms that have no cable connection to shore for power or data (uncabled)

Location:

O is open ocean

C is coastal

Note 1: Internal batteries are optional on some of the OPTAA series D platforms. These batteries shall be capable of providing power for the specified Deployment Interval while sampling at the Typical Sampling Frequency.