C101-E112D

SHIMADZU
Excellence in Science

Spectrophotometer for Life Science

BioSpec-nano

Power of small.

BioSpec-nano

Spectrophotometer for Life Science

With a focus on ease of use, high-accuracy quantitation of nucleic acids and proteins has become quicker and faster. In addition, photometric measurement is now possible.

1 µL or 2 µL Nucleic Acid Quantitation Note1)

Analysis can be performed with 1 µL (pathlength: 0.2 mm) or 2 µL (pathlength: 0.7 mm) samples.

Easy Drop-and-Start Measurement

Automatic sample mounting eliminates the need for arm raising and lowering, and the automatic wiping feature makes wiping of the measurement sample unnecessary, enabling measurement of one sample after another.

Excellent Reproducibility and Measurement Accuracy

High reproducibility is obtained even when measuring low concentration samples. High correlation is achieved with the measurement values provided with the double beam spectrophotometer.

Quick & Simple Operation

Blank measurement, sample measurement, output of reports as PDF or CSV files, and other basic operations are performed quickly and simply with a click of a button.

Stress-Free Analysis with Data Judgment Feature

Automatic data judgment based on the OD800 measurement value eliminates the need for concern about inadequate measurement caused by a drop in volume or the inclusion of bubbles.

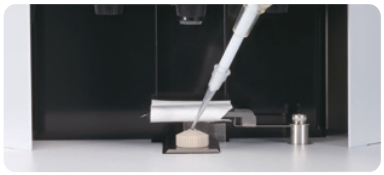
Note 1) When measuring substances like proteins that do not easily form droplets, deposit more than 1 – 2 µL of sample.

Drop-and-Start Analysis [1 µL / 2 µL samples can be measured.] Note2)

Just drop the sample onto the target and click the button. That's all there is to analysis. The instrument will perform everything else for you – sample mounting, measurement and wiping. Liquid-contact parts no longer need to be wiped with a cloth.

1. Drop the sample

Sample volume required for measurements are :
1 µL for pathlength 0.2 mm
2 µL for pathlength 0.7 mm



2. Outstanding analysis range & measurement reproducibility

The optimum pathlength for the sample concentration can be selected using the instrument lever.

3. Start measurement

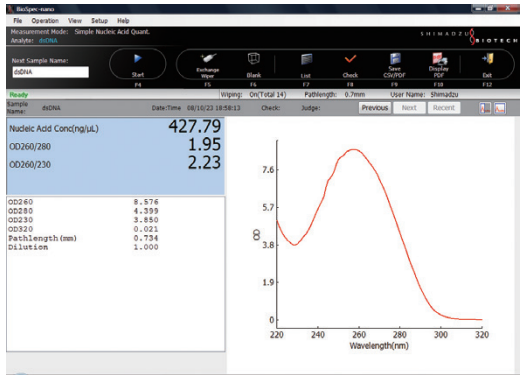
Click the [start] button to start sample measurement.
You will find using the [start] button on the instrument handy when performing analyses with gloves on.

Button in software window

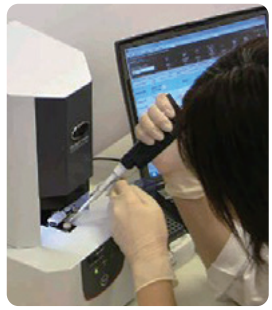
Instrument [start] button

4. Check the analysis results

Analysis results are automatically displayed after measurement ends.
A series of samples can be analyzed while confirming spectra in the Detailed View Mode.



[Simple Nucleic Acid Quant. - Detailed View Mode]
[Measurement Sample: Purified dsDNA in Tris-EDTA (TE) buffer]

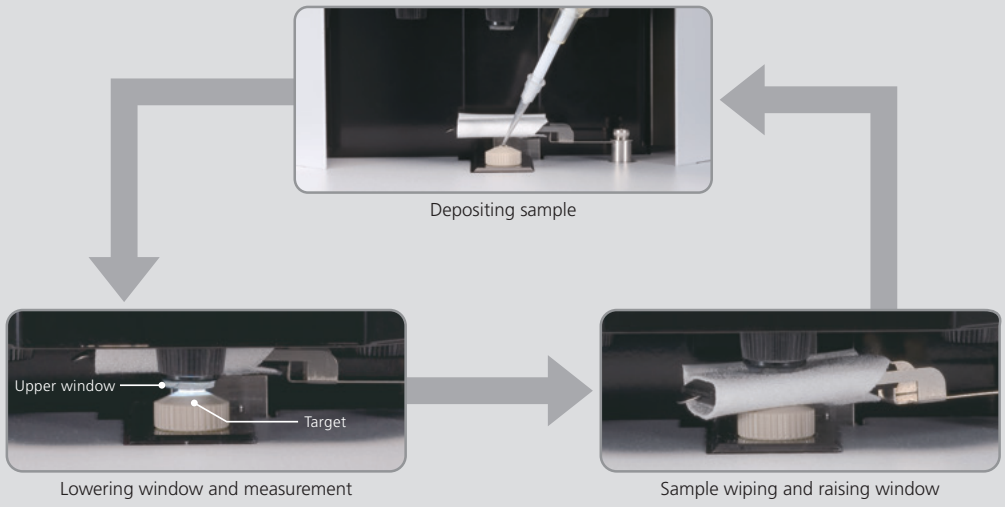


Automatic sample wiping allows the analyst to deposit the next measurement sample while the current sample is being measured without having to put down the pipette. Measurement is easy even when there are many samples.

Note 2) When measuring substances like proteins that do not easily form droplets, deposit more than 1 – 2 µL of sample. The results can be checked using the analysis data judgment feature. (See P. 7)

Automatic Optical Pathlength Setting & Automatic Wiping

From setting the optical pathlength to measurement to wiping away the sample, it's all automatic.
Tedious operations, like raising and lowering the arm to set the pathlength and wiping off the sample with a piece of cloth, are no longer required. There is no need to worry about whether the sample has been thoroughly wiped away, or whether the measurement site might become scratched.



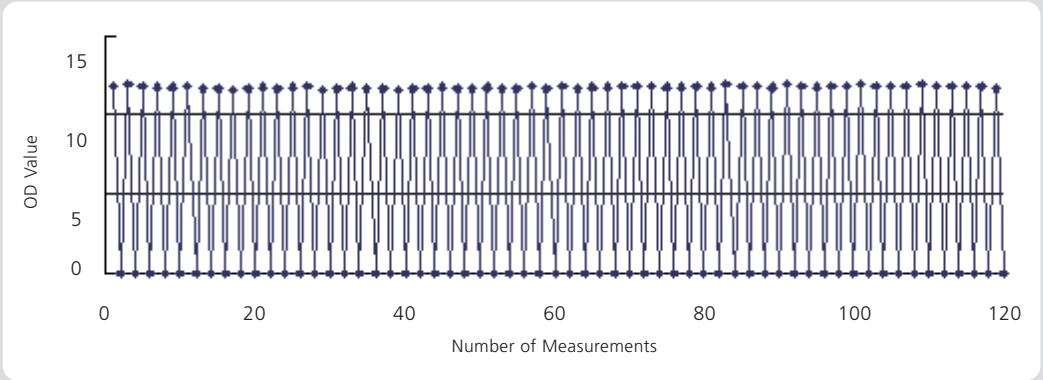
Low Carryover Achieved with Automatic Wiping Feature

The automatic wiping function of the BioSpec-nano greatly minimizes sample carryover from one measurement to the next. Below are the results of alternate measurement of a double stranded DNA sample and a blank (TE buffer), each measured 60 times with automatic one-time wiping[Note 3)] between measurements. In order to determine the level of carryover from the measured DNA sample, measurement of the next blank was conducted without replacing the wiper during the analyses. The results indicated that carryover[Note 4)] was extremely low, averaging a mere 0.13%.

Note 3) Automatic wiping following measurement can be set to a maximum of 5 times. Normally, wiping just once is sufficient to obtain good results, however, wiping 3 times is recommended for samples having high viscosity, such as protein samples.

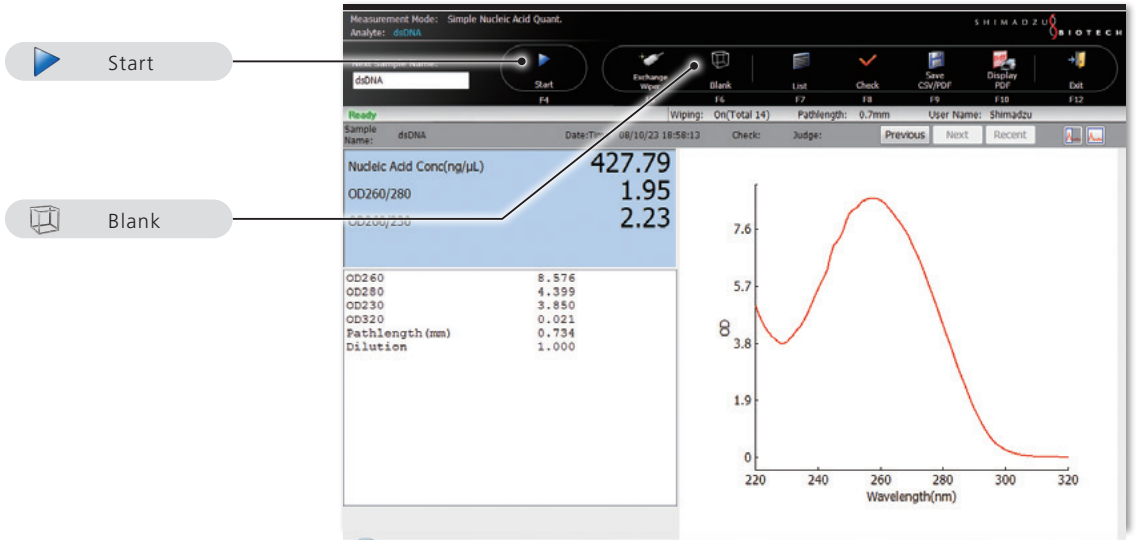
Note 4) Carryover (%) = (calculated DNA concentration when measuring TE buffer / concentration of DNA measured immediately before) x 100.

Measurement Values from 60 Alternate Measurements Each of Double Stranded DNA Sample and Blank (TE Buffer)



Quick & Simple Operation

Basic operations can be conveniently performed by clicking icons in the software or function keys on the instrument itself.
Organizing data is also easy even when there many samples.



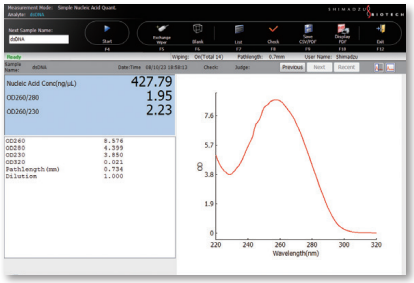
Display of Measurement Results

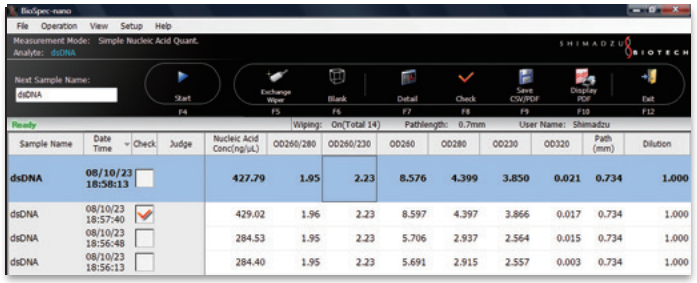
Detail / List

Toggles between the Detail and List view modes.

Detail Displays the analysis results and spectrum of the sample currently selected.

List Displays the analysis results of all samples in a table format.
Converts analysis results to PDF files, and displays them using Adobe Reader.

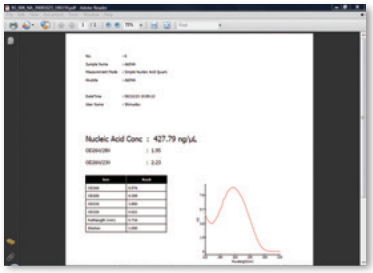




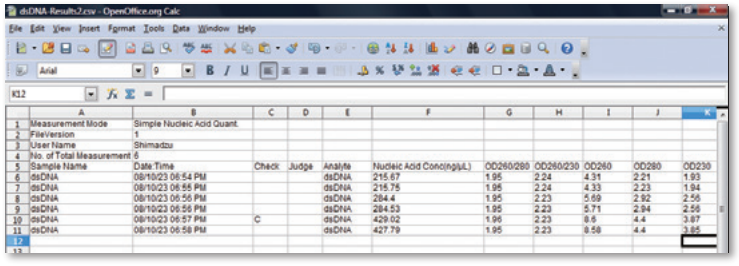
Saves Analysis Results

Saves analysis results to CSV or PDF files. CSV files can be edited in Microsoft Excel or other spreadsheet software.

Display PDF



Save CSV/PDF



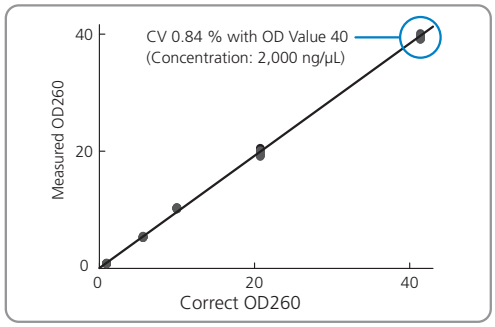
Outstanding Measurement Accuracy & Reproducibility

[Secure Analysis / High Measurement Accuracy]

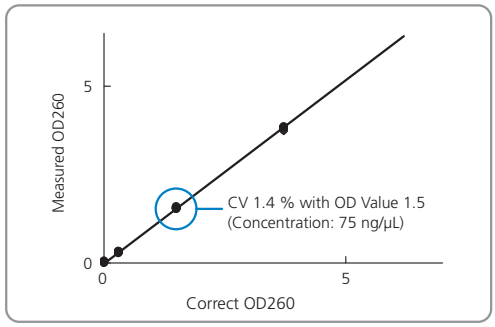
As little as 1 – 2 µL of undiluted sample can be measured as is.
High reproducibility is obtained even when measuring low concentration samples.
High correlation is achieved with the measurement values provided with the double beam spectrophotometer.

Example of 10 Successive Measurements of the Same Sample (Double Stranded DNA)

Pathlength: 0.2 mm (Example of analysis at 1 µL)



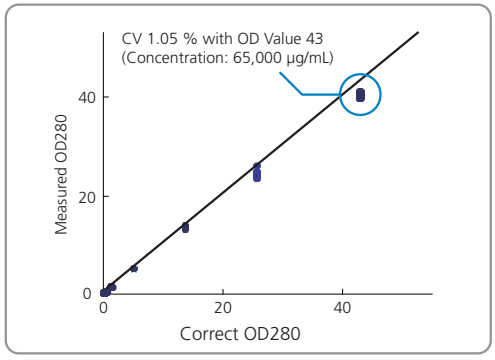
Pathlength: 0.7 mm (Example of analysis at 2 µL)



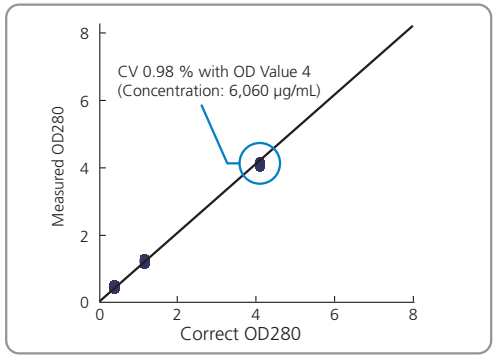
Sample : Diluted purified double stranded DNA
Buffer : TE
Instrument : Shimadzu double beam spectrophotometer Measurement using 1 mm cell and 0.1 mm cell.

Example of 10 Successive Measurements of the Same Sample (BSA = Bovine Serum Albumin)

Pathlength: 0.2 mm (Example of analysis at 3 µL)



Pathlength: 0.7 mm (Example of analysis at 4 µL)



Sample : BSA
Buffer : Distilled water
Instrument : Shimadzu double beam spectrophotometer Measurement using 1 mm cell and 0.1 mm cell.

Analysis Data judgment

If a droplet is not properly formed for some reason, such as because of, the depositing of insufficient volume, or if the sample contains bubbles, a larger OD800 value is generated. If the measured value is outside the range of the set OD800 value, ! OD 800 is displayed, allowing confirmation of the measurement validity.

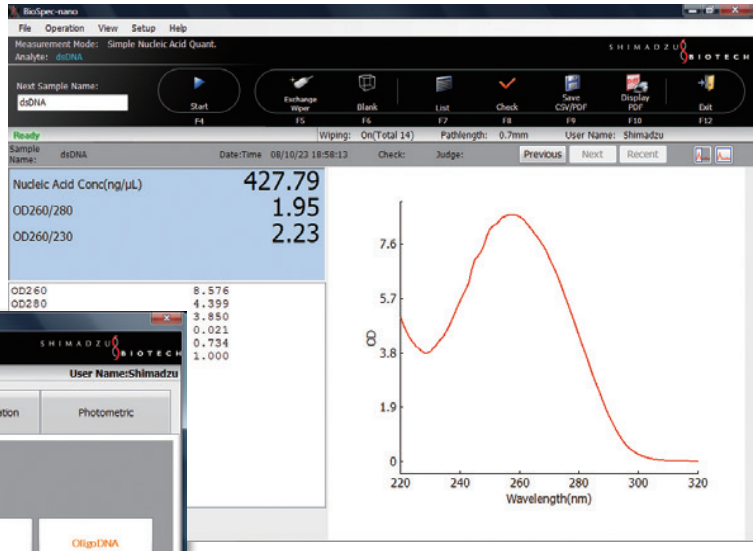
(Note: This applies to sample solutions that do not exhibit absorption at 800 nm.)

Sample Name	Date Time	Check	Judge	Nucleic Acid Conc(ng/µL)	OD260/280
20100409	10/04/09 17:07:57		! OD 800	331.17	6.99
20100409	10/04/09 17:06:49			179.69	5.04

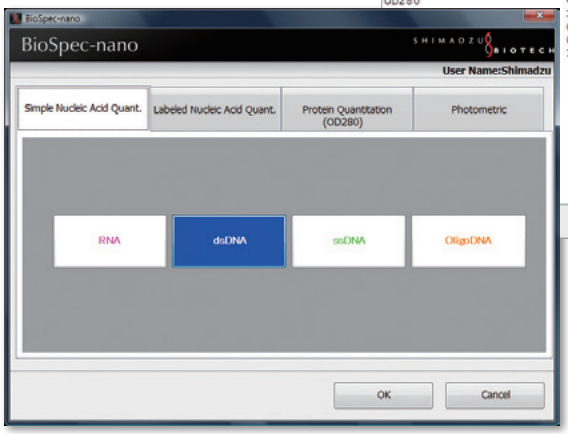
Stress-free Nucleic Acid & Labeled Nucleic Acid Quantitation

Simple Nucleic Acid Quantitation Mode

For the quantitation of RNA, dsDNA, ssDNA, and OligoDNA.
The nucleic acid concentration and OD ratio (OD260/280 and OD260/230) are calculated.



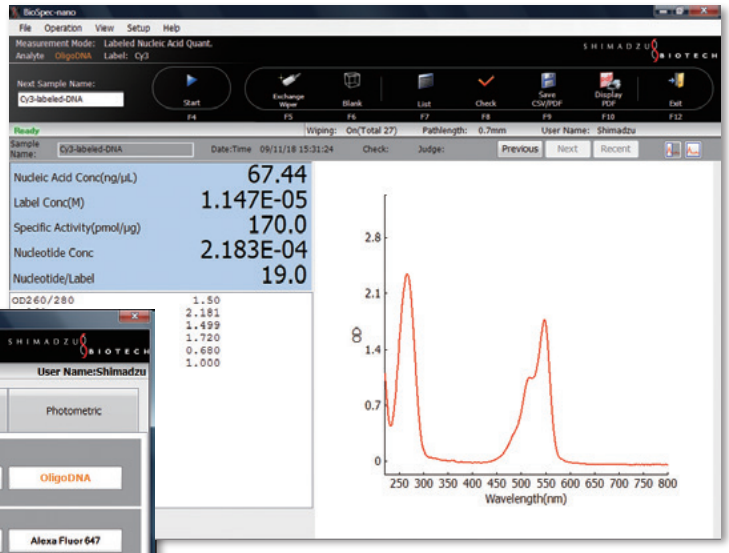
[Simple Nucleic Acid Quant. - Detailed View Mode]
[Measurement sample: Purified dsDNA in TE buffer]



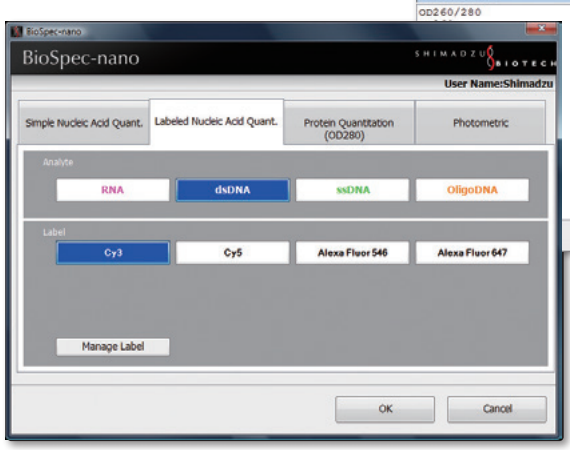
[Analysis Setting Windows - Simple Nucleic Acid Quant.]

Labeled Nucleic Acid Quantitation Mode

For the quantitation of nucleic acids (RNA, dsDNA, ssDNA, OligoDNA) labeled by Cy3, Cy5, Alexa Fluor 546, and Alexa Fluor 647[Note5].
The nucleic acid concentration, label concentration, nucleotide concentration, and labeling ratio are all calculated.



[Labeled Nucleic Acid Quant. - Detailed View Mode]
[Measurement Sample: OligoDNA labeled by Cy3 in TE buffer]



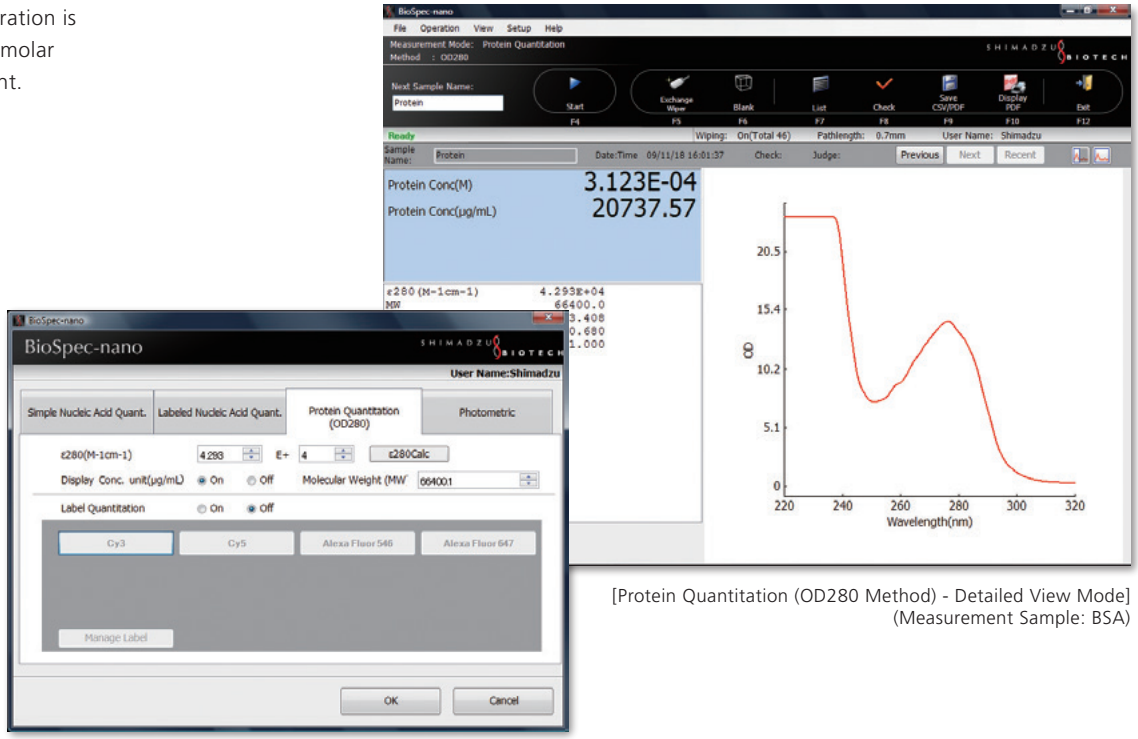
[Analysis Setting Windows - Labeled Nucleic Acid Quantitation]

Note 5) Four dyes are pre-registered. An additional 8 new labels can be registered.

Outstanding Analysis Range & Measurement Reproducibility

Protein Quantitation Mode

The protein concentration is calculated from the molar absorption coefficient.

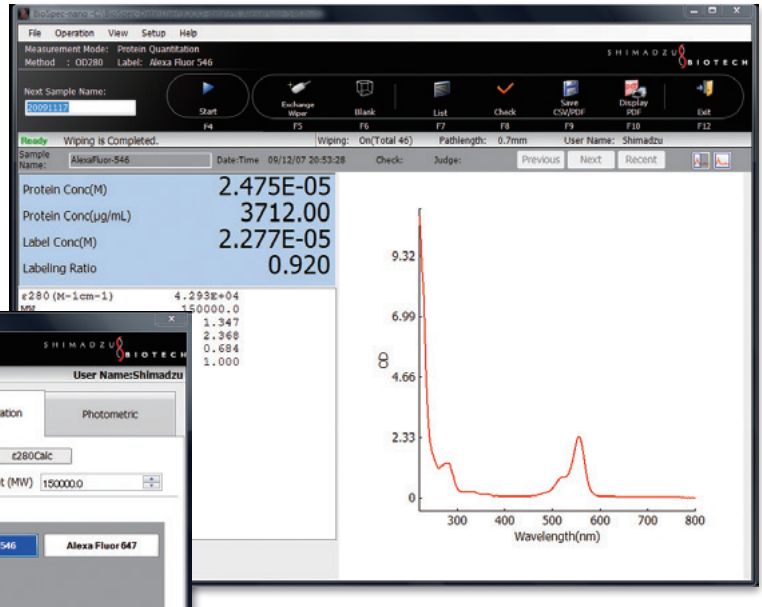


[Protein Quantitation (OD280 Method) - Detailed View Mode]
(Measurement Sample: BSA)

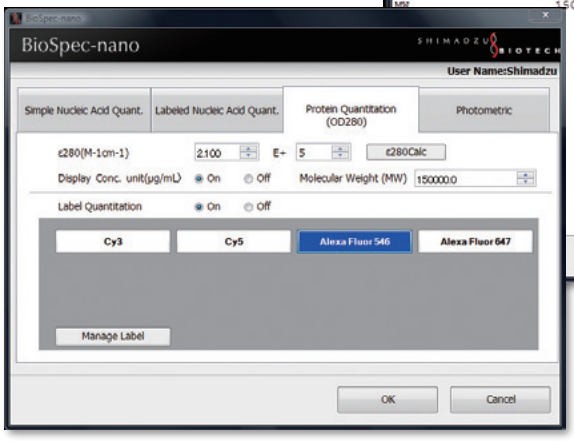
[Analysis Selection Window - Protein Quantitation (OD280 Method)]

Labeled Protein Quantitation Mode

Cy3, Cy5, Alexa Fluor 546, and Alexa Fluor 647[Note 5] are used for quantitation of labeled proteins. The protein concentration, label concentration, and labeling rate are calculated.



[Labeled Protein Quantitation - Detailed View Mode]
(Measurement Sample: Alexa Fluor 546-IgG)

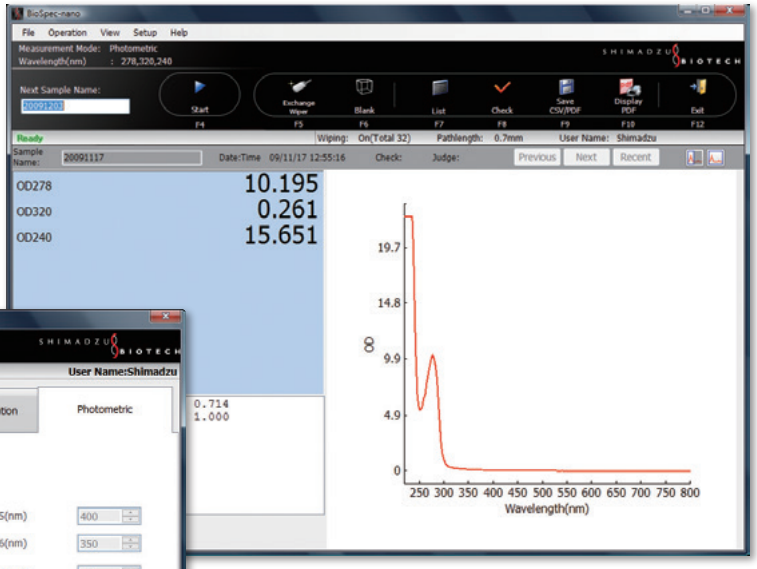


[Analysis Selection Window - Labeled Protein Quantitation]

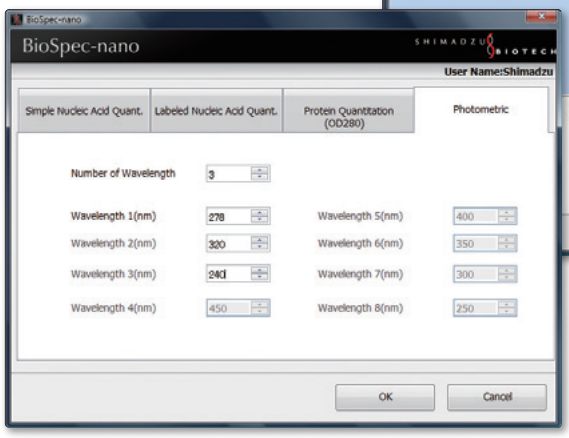
Photometric Measurement

Photometric Measurement Mode

OD values can be displayed for up to 8 freely selected wavelengths.



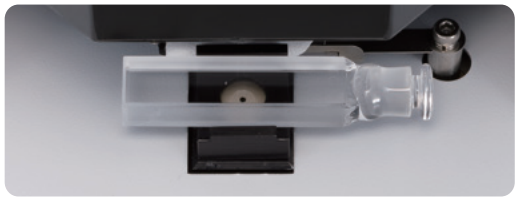
[Photometric Measurement - Detailed View Mode]
(Measurement Sample: BSA)

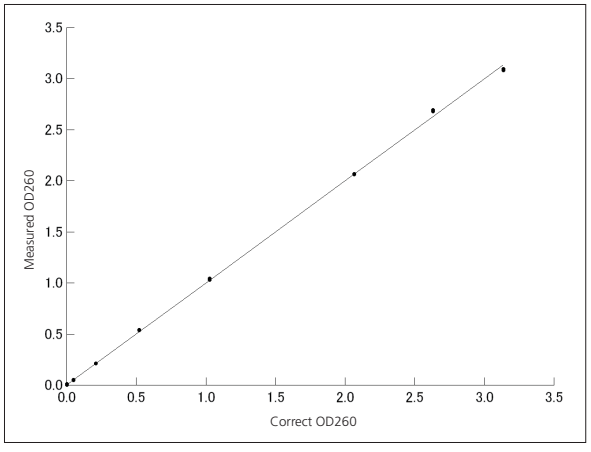


[Analysis Selection Window - Photometric Measurement]

Option Cell (Pathlength: 5 mm)

The 5 mm pathlength cell and 5 mm cell adapter are required separately.
The optional 5 mm pathlength cell and its adapter are placed over the target for use as shown below.





Example of analysis at 2 mL*

5 mm pathlength cell
(sample volume: 2 mL)
(P/N: 208-92258)

5 mm cell adapter
(P/N: 206-26513)

* All of the analysis example data are provided for reference only.
1 OD corresponds to 50 ng/µL dsDNA.

Sample: Purified dsDNA
Buffer: TE

Ten measurements were performed at each point.

BioSpec-nano Specifications

Hardware Specifications

Item	Specification
Measuring wavelength range	220 to 800 nm
Spectrum bandwidth	3 nm
Wavelength accuracy	±1 nm
Pathlength	0.2 mm, 0.7 mm (manual selection)
Photometric range	0 to 1.5 Abs
Photometric value unit	OD (Optical Density), absorbance converted with 10 mm pathlength
Option cell	Available (pathlength: 5 mm, sample volume: 2 mL) Pathlength lever switched to Option (5 mm) position
Sample volume	1 µL min. (pathlength: 0.2 mm)
	2 µL min. (pathlength: 0.7 mm)
Light source	Xenon flash lamp
Monochrometer	Holographic grating

Item	Specification
Detector	Photo diode array
Auto wiping function	Provided
Sample mount function	Auto
Spectrum measuring time	3 sec
Quantitation range*	Pathlength 0.2 mm, 1 to 75 OD 50 to 3,700 ng / µL
(OD, dsDNA concentration)	Pathlength 0.7 mm, 0.3 to 21 OD 15 to 1,000 ng / µL
	Optional 5 mm pathlength cell, 0.04 to 3 OD
Power requirements	2 to 150 ng / µL
	AC 100 V / 120 V / 220 V / 230 V / 240 V, 50 / 60 Hz, 40 VA
Ambient temperature, humidity	18 to 28°C, 40 to 80% (without dew condensation)
Dimensions & Weight	Width 210 mm x Depth 214 mm x Height 417 mm
	7 kg

*Quantitation range is a range which can secure the accuracy (±10% as a guide) specified by us.

Software Specifications

Item	Specification
Analysis mode	Simple nucleic acid quantitation, labeled nucleic acid quantitation, protein quantitation, labeled protein quantitation, photometric measurement
Simple nucleic acid quantitation	Nucleic acid concentration (RNA, dsDNA, ssDNA, OligoDNA) calculation, OD ratio (OD260 / 280, OD260 / 230) calculation
Labeled nucleic acid quantitation	Nucleic acid concentration (RNA, dsDNA, ssDNA, OligoDNA), nucleotide concentration calculation, Label concentration, labeling ratio calculation, OD ratio (OD260 / 280) calculation
Protein quantitation	Protein concentration (M, µg/mL), label concentration, labeling ratio
Photometric measurement	OD display for 8 wavelengths maximum
Label management	Label registration (up to 8 new labels), edit, deletion Default labels (Cy 3, Cy 5, Alexa Fluor 546, Alexa Fluor 647)

Item	Specification
Analysis results display	Detailed view (displays the focused sample analysis results and spectrum) List view (displays analysis results of all samples)
Analysis data judgment	OD ratio (OD260 / 280, OD260 / 230), OD 800 judgment
PDF output	Analysis results (detailed view, list view) saved in PDF file
CSV output	Analysis results (detailed view, list view), spectra data saved in tab delimited text
User management	Multiple user or single user mode selected at the time of installation
(Multiple user mode)	User management: User registration, edit, deletion Login: User name, password entry Data saved in respective folders

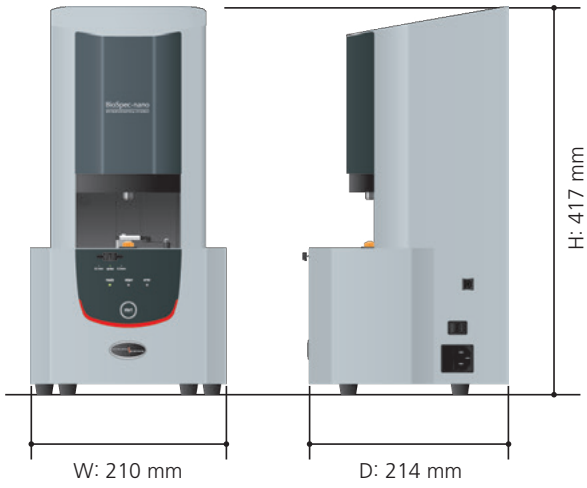
PC Requirements for BioSpec-nano

* A separate PC is required.

Item	Specification
OS	Windows 7 Professional 32/64bit edition Windows 10 Pro 64bit edition
CPU	1.6 GHz or higher processor
System memory	512 MB or larger (1 GB or larger when using Windows Vista)
Hard disk capacity	40 GB or larger
Display resolution	1024 × 768 pixels or above
USB 2.0 port	1 port or more (for connecting the instrument), 2 ports or more when using a USB printer
Printer	Printer compatible with the system used
Disk drive	DVD-ROM or CD-ROM drive

Consumables

P/N	Part Name
206-25901	Wiping paper (highly absorbent wiper, 100 sheets/set)



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