Complete sample intelligence— NanoDrop One Spectrophotometer and Qubit 3 Fluorometer

Know the quantity and quality of your DNA, RNA, or protein sample in seconds

For scientists working with DNA, RNA, or proteins, sample quality often plays a critical role in determining the success or failure of an experiment. The Thermo Scientific™ NanoDrop™ One Spectrophotometer and the Invitrogen™ Qubit™ 3 Fluorometer offer the ability to obtain the most complete information about the concentration and purity of your DNA, RNA, or protein sample. Knowing the precise concentration (quantity) and purity (quality) of your sample early helps you prevent costly troubleshooting and reworking downstream.

While both the NanoDrop One Spectrophotometer and the Qubit 3 Fluorometer provide accurate measurement of DNA, RNA, and protein samples, each offers unique advantages.

NanoDrop One Spectrophotometer

Cited in more than 30,000 publications, NanoDrop spectrophotometers fundamentally changed the way scientists evaluate nucleic acid and protein samples by eliminating the need for large sample volumes.

The next-generation NanoDrop One Spectrophotometer utilizes Thermo Scientific™ Acclaro™ sample intelligence technology, which identifies contaminants and provides corrected concentration values, helping you assess the quality of your sample before you use it in downstream applications.

Qubit 3 Fluorometer

The Qubit 3 Fluorometer is a cutting-edge benchtop device that accurately measures DNA, RNA, and protein using highly sensitive Invitrogen™ Qubit™ quantitation assays. In conjunction with state-of-the-art, highly optimized algorithms and a seamless user interface, the Qubit 3 Fluorometer employs fluorescent dyes that only produce signal when bound to the target of interest, thereby minimizing the effects of contaminants, including degraded DNA or RNA.

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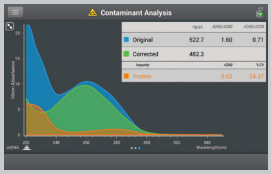
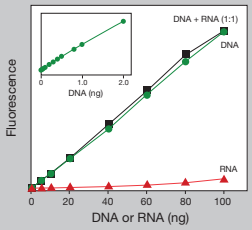
Table 1. Comparison of NanoDrop One Spectrophotometer and Qubit 3 Fluorometer for nucleic acid quantitation.

	NanoDrop One Spectrophotometer	Qubit 3 Fluorometer
Overview	Fast and simple—allows direct measurement of purified samples with no dilutions required	Sensitive and specific—measures nucleic acid concentration accurately whether dsDNA, ssDNA, total RNA, or microRNA, even in the presence of contaminants
Technology	UV absorbance	Fluorescence
Workflow	Pipette sample onto pedestal; measure; read absorbance	Mix sample with reagents; incubate for 2–5 minutes; read fluorescence
Applications	Routine assessment of quantity and quality (purity) of DNA, RNA, and proteins	Use with very dilute or difficult-to-process samples when higher sensitivity is required, or when nucleic acid contaminants are suspected (e.g., DNA in RNA, dNTPs)
dsDNA quantitation range (ng/µL)	0.2–27,500*	0.01–1000
Nucleic acid sample purity assessment	Acclaro sample intelligence technology identifies presence of contaminants such as protein or guanidine; provides corrected analyte concentration value	Unique fluorescent dyes enable differentiation between nucleic acid types (e.g. DNA vs. RNA) without any sample pretreatment



dsDNA sample contaminated with protein. The absorbance contribution from the protein (orange) is subtracted from the original result (blue) to obtain the corrected dsDNA concentration (green).



The Qubit™ dsDNA HS Assay is selective for dsDNA, even in the presence of an equal mass of RNA.

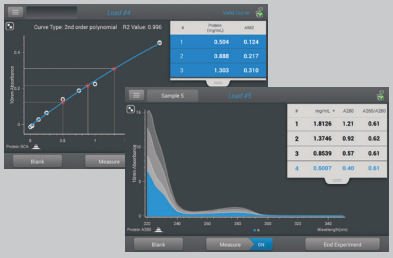
* dsDNA quantitation range for NanoDrop One is 0.2 ng/µL with cuvette and 2.0 ng/µL without.

Table 2. Which instrument best suits your protein quantitation needs?

NanoDrop One Spectrophotometer

The NanoDrop instrument provides a selection of these preprogrammed applications:

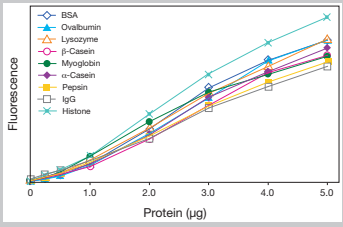
- Direct quantitation of A_{280} with Protein Editor
- A_{205} peptide bond absorbance for proteins or peptides lacking tryptophan and tyrosine residues
- Colorimetric protein assays: Bradford, BCA, Lowry, and Thermo Scientific™ Pierce™ 660 nm assay



Total protein concentration for 3 samples are shown as red squares on a BCA assay standard curve (upper panel); four different purified protein samples were measured using the Protein A_{280} application (lower panel).

Qubit 3 Fluorometer

Qubit assays exhibit minimal protein-to-protein variability and are resistant to most contaminants, including salts, reducing agents (DTT, β-mercaptoethanol), DNA, and amino acids, but not detergents.



Low protein-to-protein variation in the Qubit protein assay. Solutions of the following proteins were assayed: bovine serum albumin (BSA), chicken egg ovalbumin, chicken egg lysozyme, bovine milk ß-casein, equine myoglobin, bovine milk a-casein, porcine pepsin, mouse immunoglobulin (IgG), and calf thymus histone.

Table 3. Which instrument best suits your nucleic acid quantitation and quality assessment needs?

Application	NanoDrop One Spectrophotometer	Qubit 3 Fluorometer
General PCR	Routine PCR applications have become robust over the years. Using UV to quantify the template is sufficient.	The fluorometer is good for routine samples, and preferred if sample is prone to high amounts of contaminants that absorb at 260 nm (A_{260}) (dNTPs, oligos, RNA, etc.).
Quantitative PCR	UV allows the researcher to determine the presence of contaminants that may affect the polymerase reaction (e.g., phenol).	Reliable qPCR results require highly accurate template concentrations. The specificity and sensitivity of Qubit assays are well suited for this task.
Sequencing	Using UV to quantify the template is sufficient, except if the sample is prone to high amounts of contaminants that absorb at 260 nm (A_{260}) (e.g., RNA in DNA samples).	If samples are prone to contaminants that absorb at 260 nm (A_{260}), the high specificity of a Qubit assay is advantageous.
NGS	UV for sample evaluation during the library construction process allows the researcher to determine the presence of contaminants that may affect different stages of the workflow.	Reliable NGS results require highly accurate template concentrations. The specificity and sensitivity of Qubit assays are well suited for this task.
RT-qPCR	Standard RNA extractions are less prone to DNA contamination, so UV spectrophotometric measurement can be used to normalize the amount of RNA that goes into the reaction.	The specificity and sensitivity of Qubit assays are good for routine samples, and desirable if the sample is prone to DNA contamination or degraded RNA (dNTPs or NTPs).
QC of dye-labeled microarray probes	Enables simultaneous measurement of the amount of dye and probe.	The Qubit instrument is not recommended for QC of dye-labeled microarray probes, but Qubit assays can be used to accurately measure microarray probe concentration.
Genotyping/mutation detection	A_{260} measurement can overstate concentrations due to mixed contaminants.	The specificity of the Qubit assay is desirable when samples contain contaminants that absorb at 260 nm (A_{260}).
Intuitive workflow 1. Select 2. Read Sample 3. View Results		

For most laboratories, it is highly advantageous to have available both the speed and simplicity of the NanoDrop One Spectrophotometer and the specificity and sensitivity of the Qubit 3 Fluorometer. Together, the two elegantly designed instruments provide you with precise quantification and intelligent quality assessment of your biomolecules of interest, and help save your lab significant time and money by helping to prevent downstream experimental failures.

Ordering information

Description	Quantity	Cat. No.
Instruments		
NanoDrop One Spectrophotometer	1 unit	ND-ONE-W
NanoDrop One^{C} Spectrophotometer	1 unit	ND-ONEC-W
NanoDrop One Spectrophotometer & Qubit 3 Fluorometer	1 unit	A30225
NanoDrop One^{C} Spectrophotometer & Qubit 3 Fluorometer	1 unit	A30226
Qubit 3 Fluorometer	1 unit	Q33216
Qubit 3 Starter Kit	1 unit	Q33217
Qubit 3 NGS Starter Kit	1 unit	Q33218
NanoDrop accessories		
NanoDrop One Productivity Kit	1 kit	ND-PP1
NanoDrop One^{C} Productivity Kit	1 kit	ND-PP1C
Dymo LabelWriter 450 with labels	1 kit	PNTR-LW400
PR-1 Reconditioning Compound Kit	1 kit	CHEM-PR1-KIT
PV-1 Performance Verification Solution	1 kit	CHEM-PV-1
Qubit assays		
Qubit dsDNA HS Assay Kit	100 assays	Q32851
	500 assays	Q32854
Qubit dsDNA BR Assay Kit	100 assays	Q32850
	500 assays	Q32853
Qubit ssDNA Assay Kit	100 assays	Q10212
Qubit RNA HS Assay Kit	100 assays	Q32852
	500 assays	Q32855
Qubit RNA BR Assay Kit	100 assays	Q10210
	500 assays	Q10211
Qubit MicroRNA Assay Kit	500 assays	Q32881
Qubit Protein Assay Kit	100 assays	Q33211
	500 assays	Q33212
Qubit Assay Tubes	500 tubes	Q32856

To find out more, go to **thermofisher.com/nanodrop-qubit**

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