



Technical Note 172

DeNovix DS-11 Series Fluorometer vs. Thermo Fisher Qubit™ Fluorometer Comparison

Introduction

The DeNovix DS-11 Series Spectrophotometer / Fluorometer and the Thermo Fisher Qubit™ 3.0/4 fluorometer are commonly used for fluorescence quantification of nucleic acids, proteins and other biomolecules. This note presents a comparison of instrument features and system performance of the DeNovix DS-11 Series fluorometer and the Thermo Fisher Qubit™ 3.0/4 fluorometer. A performance comparison of DeNovix dsDNA Quantification Assays and Thermo Fisher Qubit™ dsDNA assays is also presented.

The DS-11 Series fluorometer enables precise fluorescence quantification using a proprietary optical core and a versatile set of four user-selectable fluorescence channels. The DS-11 Series fluorometer, combined with DeNovix dsDNA Fluorescence Assays, provides the highest sensitivity and widest dynamic range for quantification available. When compared to the Thermo Fisher Qubit™ 3.0/4 fluorometers and Qubit™ dsDNA assays, the DeNovix DS-11 Series fluorometer provides a detection limit 20X below Qubit™ and an upper range 2X higher.

DeNovix dsDNA Quantification Assays

DeNovix offers three dsDNA Fluorescence Quantification Kits that enable quick, sensitive and reproducible measurements of dsDNA, ranging from 0.5 pg/μL to 4000 ng/μL in a simple mix-and-measure protocol. DeNovix Broad Range, High Sensitivity and Ultra High Sensitivity Assays provide significantly enhanced dynamic range over Thermo Fisher Qubit™ assays (Figure 1).

The DeNovix Ultra High Sensitivity dsDNA Assay delivers unmatched sensitivity, measuring concentrations as low as 0.5 pg/μL. Thermo Fisher's Qubit™ has no equivalent assay.

Due to DeNovix's 20X greater sensitivity over the Thermo Fisher Qubit™ HS dsDNA assays, scientists are better equipped for research than ever. Single cell analysis, laser captured samples, circulating DNA and tumor heterogeneity studies are among the applications that can now benefit from faster and more accurate quantification.

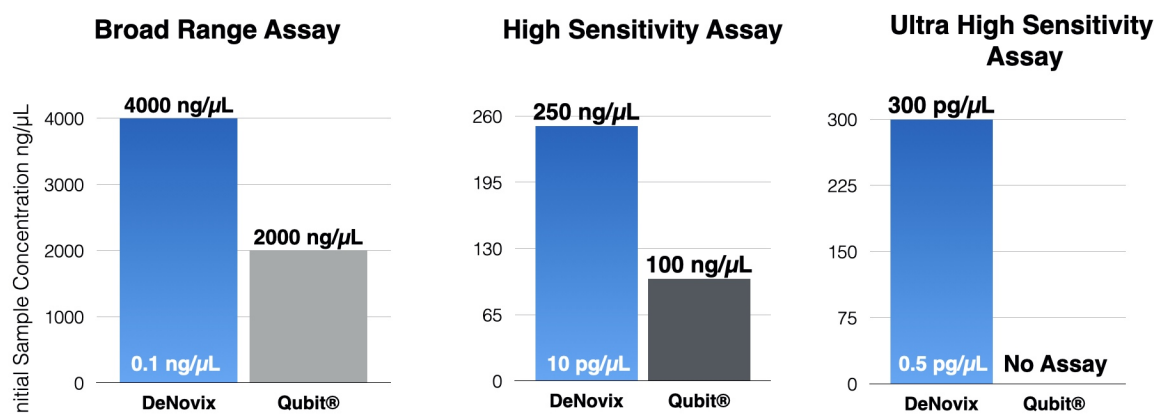


Figure 1: Comparison of dsDNA Fluorescence Assay Concentration Ranges

Feature Comparison

The DeNovix DS-11 Series fluorometer includes features equivalent or superior to Thermo Fisher's Qubit™ 3.0/4 fluorometers. Table 1 summarizes each system. DeNovix fluorometers are compatible with DeNovix Assays and a wide range of other fluorescence assays. Intuitive EasyApps™ software comes preinstalled on this stand-alone instrument. The system includes a custom operating system and a 7" HD touchscreen.

Table 1: Feature Comparison of the DeNovix DS-11 Series and Thermo Fisher Qubit™ 3.0 / 4.0 Fluorometers

Feature	DeNovix DS-11 Series Spectrophotometer / Fluorometer	Thermo Fisher Qubit™ 3.0/4 Fluorometers
Fluorescence Channels	4 (UV, Blue, Green, Red)	2 (Blue, Red)
dsDNA Assay Concentration Range	0.5 pg/μL – 4000 ng/μL*	10 pg/μL – 2000 ng/μL**
Minimum Sample Volume	1 μL (in 200 μL assay volume)	1 μL (in 200 μL assay volume)
Measurement Time	2 seconds	5 seconds
Standard Curves Options	2-point standard or customizable 2 – 8 standards	2 or 3 point standard
Compatible Assays	Wide range of assays including commonly used DeNovix, Thermo Fisher Qubit™, and Promega™ Assays	Thermo Fisher Qubit™ Assays
UV Assays	Possible including: Alexa Fluor 405, Hoechst 33258, DAPI, eBFP, 7-hydroxy 4-methylcoumarin and 4-Methylumbelliferyl B-D-Galactopyranoside	None
Display	7" HD Touchscreen	5.7" Touchscreen
Password Protected Accounts	Yes	Not Available
Method Development	Easy method development	Requires use of online tool & subsequent import
Accessory Support	USB keyboard, mouse, barcode reader	Not Available
Data Export	WiFi/ethernet to network drives, Email results, USB; LIMS compatible	USB
Networking	WiFi and Ethernet	Not Available
Printing	WiFi printing or local label printer	Not Available
Onboard Sample Storage Capacity	32 GB storage, >8 million samples	4 GB storage, 1000 samples
Software Updates	WiFi, ethernet, USB; Automatic notifications	USB
Colors	Arctic White, Brazilian Blue, Tungsten Silver, Fire Red	White
Warranty	2 years	1 year
Country of Manufacture	USA	Malaysia

* Using DeNovix dsDNA Assays

** Using Thermo Fisher Qubit™ dsDNA assays

Methods

Comparison data for DeNovix dsDNA Quantification Assays and correlating Thermo Fisher Qubit™ quantification assays were obtained on a DeNovix DS-11 Series fluorometer and Thermo Fisher Qubit™ 3.0 fluorometer respectively. Each assay was prepared as described in the manufacturer's protocol. Samples were mixed and incubated at room temperature for five minutes. Three replicate measurements were taken for each sample. The DeNovix Assays were measured on the DeNovix fluorometer, and the Thermo Fisher Qubit™ assays were measured on the Qubit™ 3.0 fluorometer.

DeNovix Broad Range, High Sensitivity and Ultra High Sensitivity Assays

For Broad Range and High Sensitivity, a series of dilutions of calf thymus DNA was prepared in TE buffer. Working solution (190 μL) was added to a thin-walled, clear UV-transparent 0.5 mL PCR tube (DeNovix cat #TUBE-PCR-0.5-500). dsDNA (10 μL) was added to each tube in the standard range, and volume was adjusted for total mass in the extended range.

For Ultra High Sensitivity, working solution (200 μL) was added to a thin-walled, clear UV-transparent 0.5 mL PCR tube. dsDNA (10 μL) was added to each tube.

Thermo Fisher Qubit™ Broad Range and High Sensitivity Assays

A series of dilutions from phage lambda DNA was prepared in TE buffer. Working solution (190 μL) was added to a thin-walled, clear UV-transparent 0.5 mL PCR tube. dsDNA (10 μL) was added to each standard tube, and volume was adjusted for total mass within the core range of the assay. The extended range of the Thermo Fisher Qubit™ assays increases the total mass limitations of the assay. The appropriate total mass for the extended range was added to each assay tube using 200 μL total volumes.

Performance Data

Table 2: Performance Comparison of DeNovix Broad Range Assay Measured on a DeNovix DS-11 FX+ and Thermo Fisher Qubit™ Broad Range Assay Measured on Qubit™ 3.0 / 4.0 Fluorometers

Broad Range dsDNA Assay

Expected DeNovix Assay measured on DS-11 FX Thermo Fisher Qubit™ Assay measured on Qubit™ Fluorometers

ng/μL	ng/μL	%CV	ng/μL	%CV
4000	3551.61	0.010	Out of Assay Range	
3000	3123.24	0.008	Out of Assay Range	
2000	1974.53	0.007	1826.33	3.340
1000	1050.92	0.007	896.67	1.897
400	358.08	0.073	481.33	2.288
200	195.70	0.140	196.67	1.471
100	106.10	0.089	90.53	2.053
50	53.75	0.095	45.20	2.341
25	26.83	0.112	21.00	1.905
12.5	13.48	0.126	12.37	1.683
6.25	6.65	0.301	5.91	2.493
2	2.39	0.460	2.04	0.980
1	1.12	1.339	0.810	2.506
0.5	0.542	0.000	0.625	1.293
0.2	0.237	4.641	0.345	6.083
0.1	0.116	4.310	Measured Out of Range	

Table 3: Performance Comparison of DeNovix High Sensitivity Assay Measured on DeNovix DS-11 FX+ and Thermo Fisher Qubit™ High Sensitivity Assay Measured on Qubit™ 3.0 / 4.0 Fluorometers

High Sensitivity dsDNA Assay

Expected DeNovix Assay measured on DS-11 FX Thermo Fisher Qubit™ Assay measured on Qubit™ Fluorometers

ng/μL	ng/μL	%CV	ng/μL	%CV
250	261.62	0.006	Out of Assay Range	
100	98.07	0.027	112.67	1.025
25	24.78	0.016	26.33	1.096
10	10.57	0.360	10.13	1.140
3	3.04	0.197	3.17	2.026
1	0.790	0.101	1.476	0.889
0.3	0.245	0.163	0.703	0.164
0.1	0.070	0.000	0.119	1.788
0.03	0.019	0.000	0.072	1.520
0.01	0.005	2.000	0.019	2.859
0.005	0.004	5.000	0.008	4.619

Table 4: Performance Comparison of DeNovix Ultra High Sensitivity Assay Measured on DeNovix DS-11 FX+ and Thermo Fisher Qubit™ Fluorometer

Ultra High Sensitivity dsDNA Assay

Expected DeNovix Assay measured on DS-11 FX Thermo Fisher Qubit™ Assay measured on Qubit™ Fluorometer

pg/μL	pg/μL	%CV	pg/μL	StDev
300	304.40	0.108	No Equivalent Assay	
150	142.91	0.182		
50	45.18	0.398		
10	8.519	1.056		
2	1.832	2.238		
1	1.085	8.750		
0.5	0.360	6.890		

Summary

The combination of the DeNovix DS-11 Series fluorometer and DeNovix dsDNA Quantification Assays provides fast and accurate measurements with unmatched sensitivity. The DS-11 Series fluorometer and DeNovix Assays enable superior accuracy, higher sensitivity and a broader range of dsDNA quantification (0.5 pg/μL – 4000 ng/μL) compared to the Thermo Fisher Qubit™ 3.0/4.0 fluorometers and Qubit™ assay range (10 pg/μL – 2000 ng/μL).

Fluorometer mode is available on the DS-11 FX and DS-11 FX+ Spectrophotometer / Fluorometer and the QFX Fluorometer. DeNovix dsDNA Quantification Assays are available for purchase [on our webstore](#) and through DeNovix authorized distributors.

Take the Next Step

Learn more about the QFX

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28-MAR-2024

