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Qubit™ Endotoxin Detection Assay Kit

USER GUIDE

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Publication Number MAN0029395

Revision B

For Research Use Only. Not for use in diagnostic procedures.

ThermoFisher SCIENTIFIC

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For descriptions of symbols on product labels or product documents, go to thermofisher.com/symbols-definition.

Revision history: MAN0029395 B (English)

Revision	Date	Description
B	25 November 2024	Updated formula in the document - Quant-iT™ Endotoxin Detection Assay Kit.
A.0	4 July 2023	New document for Qubit™ Endotoxin Detection Assay Kit.

The information in this guide is subject to change without notice.

Contents

1 Product information

IMPORTANT! Before using this product, read and understand the information in the "Safety" appendix in this document.

Product description

The Qubit™ Endotoxin Detection Assay Kit is an efficient, fluorescent endpoint assay that uses amebocyte lysates to quantify endotoxin in various sample types, such as nucleic acids, proteins, peptides, antibodies, or water samples (Table 1). Amebocyte lysates are widely used as a sensitive assay for the detection of endotoxin lipopolysaccharide (LPS), the membrane component of gram-negative bacteria. When endotoxin encounters the amebocyte lysate, a series of enzymatic reactions results in the activation of Factor B, Factor C, and pro-clotting enzyme. The activated enzyme catalyzes a cleavage event in the substrate to produce a fluorescent signal. After stopping the reaction, the resulting signal can be measured on the Qubit™ Flex Fluorometer. The fluorescent signal is proportional to the endotoxin concentration in the sample and enables quantification from 0.01–10.0 EU/mL, depending on the sample volume.

Note: This assay is designed to work on Qubit™ Flex fluorometers and requires the use of the Qubit™ Flex System Verification Assay Kit (Cat. No. Q33254) before the first run. The assay is not designed for use with single-read Qubit™ fluorometers (for example, Qubit™ 4 Fluorometer).

Note: Consult the Certificate of Analysis (CofA) for lot-specific incubation time when using the assay with fluorescence microplate readers.

Contents and storage

Table 1 Contents and storage for the Qubit™ Endotoxin Detection Assay Kit.

Component	Amount	Storage[1]
Qubit™ Endotoxin Reagent (Component A)	1 vial	2–8°C
Qubit™ Endotoxin-Free DMSO (Component B)	100 µL	
Qubit™ Lyophilized Endotoxin Standard from *E. coli* (0111:B4) (Component C)	2 vials	
Qubit™ Lyophilized Amebocyte Lysate (Component D)	2 vials (40 reactions per vial)	
Qubit™ Endotoxin-Free Water (Component E)[2]	2 x 50 mL	

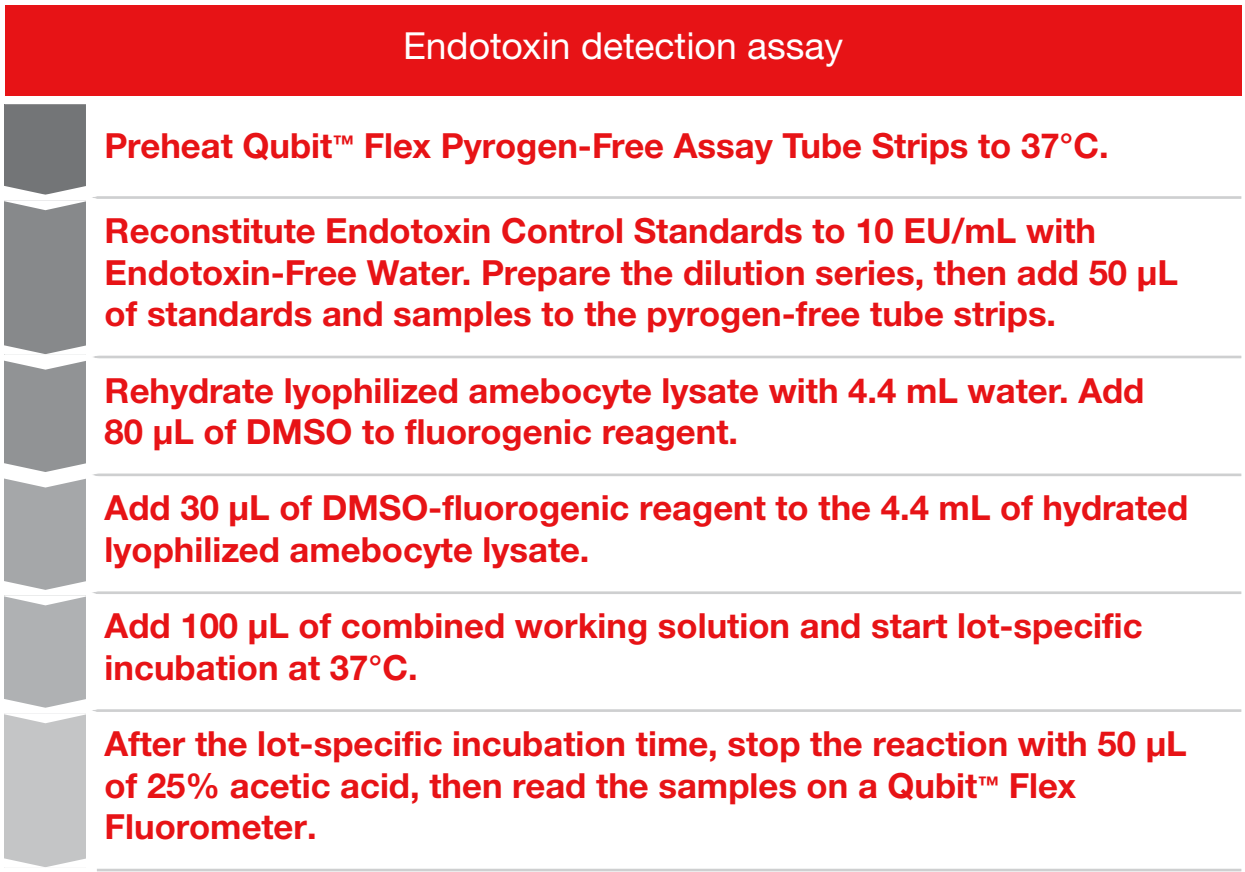
[1] Kits are stable for at least 6 months from the date of receipt when stored as directed.
[2] Endotoxin-Free Water can be stored at room temperature for short-term storage.

Required materials not supplied

- Acetic acid, 25%
- Disposable pyrogen-free glass tubes (Cat. No. A43889)
- PCR tube strip mixer
- Pyrogen-free pipette tips and pipettors
- Qubit™ Flex Pyrogen-Free Tube Strips (Cat. No. Q32893)
- Qubit™ Flex Verification Assay Kit (Cat. No. Q33254)
- Stable temperature heat block with microcentrifuge tube inserts (Cat. No. 88870001 and 88870120)
- Vortex mixer

Note: Ensure all materials (for example, pipette tips, glass tubes, microcentrifuge tubes, etc.) are endotoxin-free.

Workflow


Endotoxin detection assay
Preheat Qubit™ Flex Pyrogen-Free Assay Tube Strips to 37°C.
Reconstitute Endotoxin Control Standards to 10 EU/mL with Endotoxin-Free Water. Prepare the dilution series, then add 50 µL of standards and samples to the pyrogen-free tube strips.
Rehydrate lyophilized amebocyte lysate with 4.4 mL water. Add 80 µL of DMSO to fluorogenic reagent.
Add 30 µL of DMSO-fluorogenic reagent to the 4.4 mL of hydrated lyophilized amebocyte lysate.
Add 100 µL of combined working solution and start lot-specific incubation at 37°C.
After the lot-specific incubation time, stop the reaction with 50 µL of 25% acetic acid, then read the samples on a Qubit™ Flex Fluorometer.

2 Methods

Procedural guidelines

Assay dynamic range	The assay can be run with variable sample inputs to augment the dynamic range of the assay. • For 50 µL samples, the assay detects endotoxin at 0.01–1.0 EU/mL. • For 25 µL samples, the assay detects 0.02–2.0 EU/mL. • For 5 µL samples, the assay detects 0.10–10.0 EU/mL.
Contamination	To avoid cross-contamination, work from the lowest to highest endotoxin concentration when preparing standards and adding the working solution. Additionally, be cautious when opening and closing the tube-strip lids.
Assay temperature	The Endotoxin Detection Assay requires that the assay be incubated at 37°C throughout the run time. For best results, use a dry-block style heater. Cabinet-style incubators are not recommended for this assay because of insufficient surface area contact to properly heat the tube strips. In addition, never use a water bath as these cannot be maintained as endotoxin-free.
Assay Reference Standard	For each assay, you have the choice to run a new reference standard or use values from the last reading. When first using the instrument, perform a new reference read each time. As you become familiar with the assay and the instrument, you can decide how comfortable you are using the data stored from the last reading. The reference reading is consistent for 3 months. Update the reference reading after every 3-month period.
Assay calibration	Assay standards must be run each time the assay is performed. Previous standards and standard curve are not viable because this is a temperature-sensitive enzymatic assay.
More assay considerations	• Accurate pipetting is critical for maintaining consistent results. A repetitive pipettor can help in normalizing volumes between samples. Ensure pipetting order and rate of reagent addition remain consistent from tube-to-tube and strip-to-strip. • Endotoxin adheres to glass and plastic surfaces; before pipetting, vortex solutions to ensure the correct endotoxin concentrations are measured. • Glass tubes are recommended for making standard stock solutions. • Each lysate lot is tested for functionality using the United States Reference Standard Endotoxin (EC-6). The assay lot is then matched to a specific lot of Qubit™ Lyophilized Endotoxin Standard (Component C) by testing in parallel with the Reference Standard Endotoxin. A Reference Standard Endotoxin to Qubit™ Endotoxin Standard correlation assay determines the potency of each new lot when used with each matching lysate lot.

Before you begin

- Obtain the lot-specific incubation time for the assay from the CofA or the outside kit label.
- Ensure that the endotoxin-free water, DMSO, and endotoxin control are equilibrated to room temperature. The remaining materials can stay refrigerated until needed or stored at room temperature for up to 30 minutes before use.
- Before starting, warm a thermal block to 37 ± 1°C to ensure the heat is stable and consistent. *(Optional)*: Start preheating pyrogen-free Qubit™ Flex Tube Strips.

Prepare reference standards

1. Using the Qubit™ Flex System Verification Assay Kit (Cat. No. Q33254), transfer 200 µL of the Green Fluorescence Reagent (Component B) into each tube of a Qubit™ Flex assay strip.

2. At any time before measuring samples, run the Endotoxin Assay program and follow the prompts to read reference samples.

Note: This is required the first time the assay is run. On the next run, you have the choice to run a new reference standard or use values from the last reading. When first using the instrument, perform a new reference read each time. As you become familiar with the assay and the instrument, you can decide how comfortable you are using the data stored from the last reading. The reference reading is consistent for 3 months. Update the reference reading after every 3-month period.

Prepare endotoxin control stock solutions

Each vial of Qubit™ Lyophilized Endotoxin Standard contains 10–50 EU of lyophilized endotoxin from *E. coli* (0111:B4) (Component C). Lot-specific potency is printed on the label and also available on the CofA. Reconstitute the material with room temperature Qubit™ Endotoxin-Free Water (Component E) by adding the amount of endotoxin-free water indicated on the vial to make a 10 EU/mL solution. For example, reconstituting a vial with a potency of 15 EU with 1.5 mL of endotoxin-free water yields a concentration of 10 EU/mL.

1. Mix thoroughly by vortexing at 1,500 rpm or greater for at least 10 minutes.

Note: Reconstituted stock solution is stable for 4 weeks at 2–8°C. Before subsequent use, warm the solution to room temperature and mix thoroughly by vortexing for 15 minutes to ensure that no endotoxin adheres to the sides of the glass vial.

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2. Prepare Endotoxin Standards using pyrogen-free materials using the serial dilution described in Table 2.

Note: For optimal results, mix thoroughly by vortexing each solution for at least 30 seconds before use in preparing the subsequent dilution.

Table 2 Serial dilutions for endotoxin standard stock solutions.

Standard	Endotoxin concentration	Previous dilution volume	Endotoxin-free water volume (Component E)
Standard 4	1.0 EU/mL	200 µL of reconstituted 10 EU/mL Endotoxin Standard (Component C) prepared in step 1	1,800 µL
Standard 3	0.1 EU/mL	200 µL of 1.0 EU/mL standard	1,800 µL
Standard 2	0.01 EU/mL	200 µL of 0.1 EU/mL standard	1,800 µL
Standard 1	0.00 EU/mL	0 µL	2,000 µL

Prepare standards and samples

1. Set up the needed number of assay tube strips for standards and samples. The endotoxin detection assay can be performed with standards in duplicates (requiring 1 standard tube strip) or quadruplicates (requiring 2 standard strips). Each vial of lyophilized amebocyte lysate reagent can be used for a maximum of 40 reactions (5 full tube strips).

Note: Use with Qubit™ Flex Pyrogen-Free Tube Strips (Cat. No. Q32893).

2. Label the tube lids.

Note: Do not label the side of the tube because this can interfere with the sample read. Label the lid of each standard tube correctly. Calibration of the Qubit™ fluorometer requires the standards to be inserted into the instrument in the correct order.

3. Add 50 µL of each endotoxin standard stock solution to each tube as shown below. Ensure samples are added in the proper location of the tube strip. Adding to the wrong location will compromise the assay results.

Note: For optimal results, mix the samples thoroughly before pipetting.

Table 3 Standard tube strip setup.

Positions 1 and 2	Positions 3 and 4	Positions 5 and 6	Positions 7 and 8
0 EU/mL (Standard 1)	0.01 EU/mL (Standard 2)	0.1 EU/mL (Standard 3)	1.0 EU/mL (Standard 4)

Note: Standards can be run as duplicates using one tube strip or quadruplicates using two tube strips. If quadruplicates are desired, prepare the second standard strip in the same manner as the first, referencing the layout in Table 3.

4. Add 5, 25, or 50 µL of each sample into the appropriate well. For best results, vigorously vortex each solution for 10–30 seconds before transfer. If using less than 50 µL of sample, first add endotoxin-free water, then the sample to the tube to ensure that the final volume is 50 µL. See the following table for the effect of sample input on assay detection range.

Table 4 Sample volume input and the corresponding assay detection range.

Sample volume	Volume of endotoxin-free water to add	Assay range
50 µL	0 µL	0.01–1.0 EU/mL
25 µL	25 µL	0.02–2.0 EU/mL
5 µL	45 µL	0.1–10.0 EU/mL

- If needed, adjust the sample pH to 6–8 using endotoxin-free 0.1 M NaOH or 0.1 M HCl. Avoid pH-electrode contamination of the sample by testing the pH of a small sample taken from the bulk sample.
- Components of undiluted serum interfere in the assay. For example, serum must be completely free of red blood cells and the diluted sample may need to be heat-shocked (70°C for 15 minutes). For more information about the assay tolerance for contaminants see “Contaminants and interfering factors” on page 16.
- To stop all bacteriological activity in test samples, store samples to be tested at 2–8°C for <24 hours or –20°C for >24 hours.

Note: Run each sample in replicate with dilution controls.

5. Preheat all tube strips, standards, and unknowns to 37 ± 1°C for 10 minutes using a heat block. For ease of use during this step, tube strips can be left uncapped.

   Note: Use of cabinet-style incubators and water baths is not recommended because of possible improper heating or contamination.

   Note: Do not heat reference standards prepared in “Prepare reference standards” on page 8.

Prepare Assay Working Solution

1. Dissolve the Qubit™ Endotoxin Reagent (Component A) by adding 80 µL of the Qubit™ Endotoxin-Free DMSO (Component B). Mix thoroughly to fully dissolve the material.

Note: Remaining reconstituted Qubit™ Endotoxin Reagent can be stored for 4 weeks at 2–8°C. Before subsequent use, warm the solution to room temperature and mix thoroughly to ensure homogeneity.

2. Reconstitute Qubit™ Lyophilized Amebocyte Lysate (Component D) using 4.4 mL of Qubit™ Endotoxin-Free Water (Component E). To mix, swirl gently to dissolve the powder. **Avoid foaming and do not vortex the solution.** If more than 1 vial is needed, pool 2 or more vials before use. For best results, let stand for 1–2 minutes after the first mixing to enable the solution to settle. Use within 10 minutes of preparation.

   Note: Ensure that you recover all powder from the sides and the cap of the vial by gently inverting end-over-end. Extreme care must be taken not to touch the inside part of the cap to avoid contamination.

   Note: Reconstituted Qubit™ Lyophilized Amebocyte Lysate (Component D) solution is stable for 1 week at –20°C or colder if frozen immediately after reconstitution. On thawing, the reconstituted lysate solution can be used only one time. Once thawed, gently swirl the reagent to mix before use.

3. Prepare the Assay Working Solution by adding 30 µL of the DMSO-Endotoxin Reagent Solution (from step 1) to the hydrated amebocyte lysate from step 2 to create the Assay Working Solution. Mix by inversion and do not shake because this can create unwanted bubbles.

   Note: If using multiple vials of the Qubit™ Lyophilized Amebocyte Lysate (Component D), add 30 µL of the DMSO-Endotoxin Reagent solution to each vial and pool the Assay Working Solutions before use to ensure a homogeneous solution. For optimal results, use the Assay Working Solution within 10 minutes of preparation and do not store for future use.

Start assay

1. Keeping all samples and standards at 37 ± 1°C, add 100 µL of the Assay Working Solution to each tube. Start timing as the Assay Working Solution is added to the first sample. The lot-specific incubation time (T) is printed on the kit label and CoA (typically 20 ± 5 minutes).

   Note: Ensure pipetting order and rate of reagent addition remain consistent from tube-to-tube and strip-to-strip throughout the procedure. A repeater or multichannel pipette is recommended.

2. After the Assay Working Solution has been added to all standards and samples, thoroughly mix all samples and standards.

   Note: To ensure proper mixing, use a vortex mixer with a tube-strip adaptor and vortex at speeds sufficient to create a visible vortex inside the sample strip for the most consistent results.

3. After mixing, continue incubating the tube strips at 37 ± 1°C for the lot-specific time (T), as indicated on the kit label and CoA.

4. After the incubation time has elapsed, immediately add 50 µL of the Stop Solution (25% acetic acid in water) into each standard and sample tube. For optimal results, add the Stop Solution to the standards and samples in the same order and at the same speed the lysate reagent was added. Failure to stop the reaction can compromise the results.

   To ensure immediate addition of the Stop Solution, tube caps can be opened several minutes ahead of time without affecting the reaction.

5. Briefly mix the samples by vortex.

Read reference standards, assay standards, and samples on the Qubit™ Flex Fluorometer

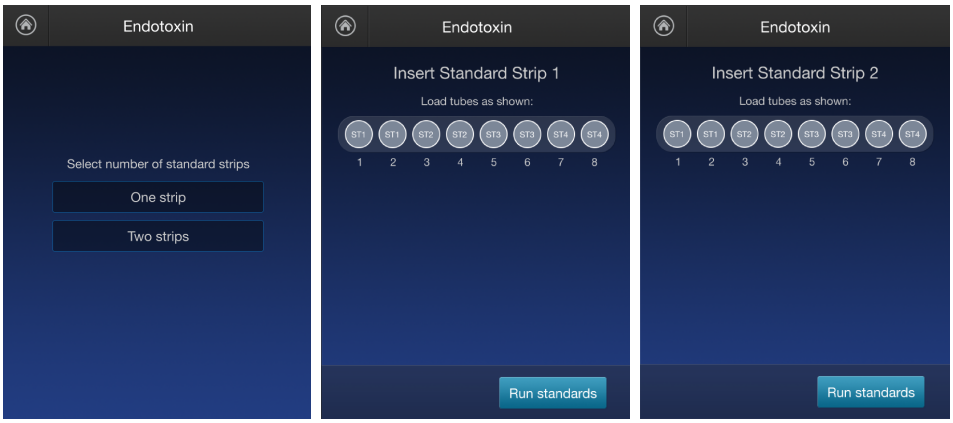
1. On the Qubit™ Flex Fluorometer **Home** screen, tap **Endotoxin**. The **Read reference** screen displays.

   If a reference calibration was already performed, the instrument prompts to read a new reference or use the previous reference. To use the previous reference, tap **Use existing reference** and skip to step 4.

2. Tap **Read new reference**.

3. Insert the tube strip containing the reference samples into the sample chamber, close the lid, then tap **Run reference**. When the reading is complete (approximately 3 seconds), remove the tube strip.

4. Select the desired number of Standard strips to be run by tapping **One strip** or **Two strips** and follow the screen prompts. Ensure the tube strip is correctly oriented as indicated with Standard 1 on the left and Standard 4 on the right.



After all requested Standard Strips are read, the instrument displays the graphical results on the **Standards complete** screen with a report of the correlation coefficient (*r*). For best results, *r* is ≥0.98.

5. Tap **Run samples** from the **Standards complete** screen. Follow the prompts to indicate the sample volume and tube positions to be read. If fewer than 8 samples are used, tap to deselect the tube positions not containing a sample.

Note: When selecting between the sample input buttons, the corresponding assay detection range will be indicated on the screen.

Note: *(Optional)* Tap **More options** to add the assay kit lot number, tags, or sample IDs. For information about using these options, refer to the Qubit™ Flex Fluorometer User Guide (**MAN0018186**).

6. After the sample information has been selected, load the sample tube strip into the sample chamber as shown in the **Insert samples** screen and then tap **Next**.

   Sample results display in a list corresponding to the sample run number. The values listed are the concentration of the original sample. For more information about interpreting the sample results, see the Qubit™ Flex Fluorometer User Guide (**MAN0018186**).

7. *(Optional)* Tap **Add samples** to read more samples and follow the screen prompts.

8. *(Optional)* After all samples runs are complete, export the results data as a CSV or PDF file.

A Troubleshooting

Observation	Possible cause	Recommended action
Error screen displays at reference calibration	A sample was missing in the tube strip.	Ensure all 8 tube-strip tubes contain the solution.
	The samples were not consistent between replicates.	Ensure the solution in each tube is pipetted from the original sample container for maximal homogeneity.
Error screen displays at standard calibration	Sample was missing in a tube.	Repeat the assay ensuring the appropriate solution is used in each of the 8 tube-strip tubes. Ensure the standard dilatation series is prepared appropriately (see Table 2) and the strip orientation is Standard 1 (0 EU/mL) on the left (see Table 3).
	Standards were not sufficiently different between adjacent concentrations.	Repeat the assay ensuring the appropriate solution is used in each of the 8 tube-strip tubes. Ensure the standard dilatation series is prepared appropriately (see Table 2) and the strip orientation is Standard 1 (0 EU/mL) on the left (see Table 3).
	A sample replicate had exceptionally high variance.	Repeat the assay ensuring the appropriate solution is used in each of the 8 tube-strip tubes. Ensure the standard dilatation series is prepared appropriately (see Table 2) and the strip orientation is Standard 1 (0 EU/mL) on the left (see Table 3).
	Sample standards were out of order.	Repeat the assay ensuring the appropriate solution is used in each of the 8 tube-strip tubes. Ensure the standard dilatation series is prepared appropriately (see Table 2) and the strip orientation is Standard 1 (0 EU/mL) on the left (see Table 3).
Non-linear standard curve with correlation coefficient below desired 0.980	Endotoxin Standard solution and dilutions were not mixed well.	Vortex the Endotoxin Standard solution for 15 minutes before each use.
		Vortex all Endotoxin Standard dilutions for 1–2 minutes before each use.
		Before adding into sample tubes, vortex the Endotoxin Standard dilutions for 2 minutes if they were sitting for >10 minutes after preparation.
	Pipetting order and rate of reagent addition were not correct.	Ensure pipetting order and rate of reagent addition remain consistent from tube-to-tube and strip-to-strip.
		Use a repetitive or multichannel pipettor.
	Incubation times were not correct.	Ensure correct incubation times are used and start the timer when adding reagent into the first well.

Observation	Possible cause	Recommended action
Greater signal in blank than standard dilutions	Materials (for example, tips, vials, or tube strips) were contaminated.	Use endotoxin-free materials.
Sample result is out of range	Test sample endotoxin concentration was found to be >1.0 EU/mL.	If the sample is too high, dilute the sample 5-fold in endotoxin-free water or use a lower sample volume. Repeat the test.

B

Supplemental information

Contaminants and interfering factors

The presence of interfering substances in test samples can cause inhibition leading to false negatives. Common interfering substances include detergents, buffers, serum, or media (Table 4). If unknown whether the sample contains interfering substances, or how their presence affects the assay results, determine the potential product inhibition for each sample type undiluted or at an appropriate dilution. This type of test is often referred to as a Positive Product Control (PPC) or spike recovery test.

To confirm potential inhibition, add a known amount of endotoxin to an aliquot or test sample dilution (for example, 5 µL of the 1.0 EU/mL prepared standard). Assay the spiked sample and an unspiked sample to determine the respective endotoxin concentrations. Interference is said to be negligible if the recovery value is between 50–200%. If the recovery value is outside of that range, then use a sample dilution to reduce potential interference.

Table 5 Known tolerance of potential interfering factors to achieve a valid endotoxin spike recovery of 50–200%. Concentrations listed refer to the actual concentration in the sample that produced no decrease in quantification values when spiked with 0.5 EU/mL endotoxin.

Contaminant	Concentration in 50-µL sample	Concentration in 25-µL sample	Concentration in 5-µL sample
Complete Ham's F-12K Medium supplemented with 1% fetal bovine serum[1]	1:10[2]	1:5	1:1
Complete Dulbecco's Modified Eagle Medium (DMEM) supplemented with 1% fetal bovine serum[1]	1:10[2]	1:5	1:1
DNA[3]	0.1 µg/mL	0.2 µg/mL	1.0 µg/mL
Plasmid DNA[4]	1.0 µg/mL	2.0 µg/mL	10.0 µg/mL
Glycerol	0.1%	0.2%	1.0%
Triton™ X-100 Detergent	0.01%	0.02%	0.1%
Triton™ X-100 Detergent reduced	0.01%	0.02%	0.1%
SDS	0.001%	0.002%	0.010%
Tween™-20 Detergent	0.005%	0.010%	0.050%
Sucrose	1%	2%	10%
EDTA (pH 8.0)	1 mM	2 mM	10 mM

[1] Supplemented with Penicillin-Streptomycin-Glutamine (100x) diluted to 1X and containing phenol red.

[2] Dilutions in this row are expressed in the form of a ratio where 1:100 means a 100-fold dilution of contaminant to the standard samples.

[3] Sheared salmon sperm DNA (15632011)

[4] pBR322 (SD0041)

Sample dilutions

If samples require dilutions to be in the detection range of the assay, or to reduce interference factors identified by a PCC or spike recovery test, confirm the validity of that dilution by calculating the maximum valid dilution (MVD) or minimum valid concentration (MVC) of the sample. In either case, the endotoxin limit of the target (EU/unit) as well as the potency of sample or its concentration (units/mL) must be determined by the user or their application. For the Qubit™ Endotoxin Detection Assay Kit, the endotoxin limit is 0.01 EU/mL when using 50 µL or 0.1 EU/mL when using 5 µL samples.

For example, a plasmid preparation yields 1,000 µg/mL of DNA. The endotoxin limit of this assay is 0.010 EU/mL when a 50 µL sample is being tested. The target for the endotoxin limit in the sample is 0.1 EU/µg in their sample. The following equations are used to find the MVD and MVC values:

- MVD = (Endotoxin limit x Potency) / (Test sensitivity)
- MVC = (Test sensitivity) / (Endotoxin limit)

Entering the example values:

- MVD = (1,000 µg/mL) x (0.1 EU/µg) / (0.01 EU/mL) = 10,000
- MVC = (0.01 EU/mL) / (0.1 EU/µg) = 0.1 µg/mL

Qubit™ assay kits and parts for use with the Qubit™ Fluorometer

Table 6 Assay kits and parts.

Product	Cat. No.	No. of assays	Target	Notes
Qubit™ dsDNA BR Assay Kit	Q32850	100	dsDNA	• Core range (high confidence): 0.01 µg/mL to 5 µg/mL • Extended range (moderate confidence): 5 µg/mL to 10 µg/mL • Useful for quantification of genomic and miniprep DNA samples • Accurate in the presence of RNA, salts, solvents, proteins, and free nucleotides
	Q32853	500		
Qubit™ dsDNA HS Assay	Q32851 Q33230	100	dsDNA	• Core range (high confidence): 1 ng/mL to 500 ng/mL • Extended ranges (moderate confidence): 0.5 ng/mL to 1 ng/mL and 500 ng/mL to 600 ng/mL • Useful for quantification of PCR products, viral DNA, and samples for subcloning • Accurate in the presence of RNA, salts, solvents, proteins, and free nucleotides
	Q33222 Q33231	500		
Qubit™ ssDNA Assay Kit	Q10212	100	ssDNA	• Core range (high confidence): 5 ng/mL to 1,000 ng/mL • Extended ranges (moderate confidence): 1 ng/mL to 5 ng/mL and 1,000 ng/mL to 1,200 ng/mL • Useful for quantification of oligos, primers, denatured DNA, PCR products • Accurate in the presence of salts, urea, solvents, proteins, ATP, and agarose
Qubit™ RNA HS Assay Kit	Q32852	100	RNA	• Core range (high confidence): 25 ng/mL to 500 ng/mL • Extended ranges (moderate confidence): 20 ng/mL to 25 ng/mL and 500 ng/mL to 1,000 ng/mL • Useful for quantification of samples for microarray, RT-PCR, and Northern blot procedures • Accurate in the presence of DNA, salts, solvents, proteins, and free nucleotides
	Q32855	500		
Qubit™ RNA BR Assay Kit	Q10210	100	RNA	• Core range (high confidence): 0.1 µg/mL to 5 µg/mL • Extended ranges (moderate confidence): 0.05 µg/mL to 0.1 µg/mL and 5 µg/mL to 6 µg/mL • Useful for quantification of samples for microarray, RT-PCR, and Northern blot procedures • Accurate in the presence of DNA, salts, solvents, proteins, and free nucleotides
	Q10211	500		

Table 6 Assay kits and parts. *(continued)*

Product	Cat. No.	No. of assays	Target	Notes
Qubit™ RNA XR Assay Kit	Q33233	100	RNA	• Core range: 1 ng/mL to 8 µg/mL • Useful for quantification of samples for RT-PCR, qRT-PCR or RNA-SEQ • Accurate in the presence of DNA, salts, solvents, proteins, and free nucleotides
	Q33234	500		
Qubit™ microRNA Assay Kit	Q32880	100	RNA	• Core range (high confidence): 5 ng/mL to 500 ng/mL • Extended ranges (moderate confidence): 2.5 ng/mL to 5 ng/mL and 500 ng/mL to 750 ng/mL • Useful for quantification of samples for qRT-PCR and sequencing applications • Accurate in the presence of rRNA, large mRNA (>1000 bp), salts, solvents, proteins, and free nucleotides
	Q32881	500		
Qubit™ Protein Assay Kit	Q33211	100	Protein	• Core range (high confidence): 1.25 µg/mL to 25 µg/mL • Extended ranges (moderate confidence): 1 µg/mL to 1.25 µg/mL and 25 µg/mL to 26 µg/mL • Little protein-to-protein difference in signal • Accurate in the presence of DTT, β-mercaptoethanol, amino acids, and DNA • Signal is stable for 3 hours
	Q33212	500		
Qubit™ RNA IQ Assay Kit	Q33221	75	RNA integrity and quality	• Although small in size, the tertiary structure of 5s and tRNA binds the large RNA dye • Accurate in the presence of salts, protein, solvents, and RNA stabilization reagents • Signal is stable for 1 hour • For use with the Qubit™ 4 and Qubit™ Flex fluorometers; the assay does not work on the original Qubit™, Qubit™ 2.0, or Qubit™3 fluorometers
	Q33222	275		

Table 7 Assay accessories.

Product	Cat. No.	Amount
Qubit™ RNA IQ Assay – Lambda DNA Standard	Q33235	1 set
Qubit™ XR Assay – RNA Standard	Q33236	1 set
Qubit™ Assay Tubes	Q32856	500 tubes
Qubit™Flex Assay Tube Strips	Q33252	125 tube strips

C

Safety

WARNING! GENERAL SAFETY. Using this product in a manner not specified in the user documentation may result in personal injury or damage to the instrument or device. Ensure that anyone using this product has received instructions in general safety practices for laboratories and the safety information provided in this document.

- Before using an instrument or device, read and understand the safety information provided in the user documentation provided by the manufacturer of the instrument or device.
- Before handling chemicals, read and understand all applicable Safety Data Sheets (SDSs) and use appropriate personal protective equipment (gloves, gowns, eye protection, and so on). To obtain SDSs, visit **thermofisher.com/support**.

Chemical safety

WARNING! GENERAL CHEMICAL HANDLING. To minimize hazards, ensure laboratory personnel read and practice the general safety guidelines for chemical usage, storage, and waste provided below. Consult the relevant SDS for specific precautions and instructions:

- Read and understand the Safety Data Sheets (SDSs) provided by the chemical manufacturer before you store, handle, or work with any chemicals or hazardous materials. To obtain SDSs, see the "Documentation and Support" section in this document.
- Minimize contact with chemicals. Wear appropriate personal protective equipment when handling chemicals (for example, safety glasses, gloves, or protective clothing).
- Minimize the inhalation of chemicals. Do not leave chemical containers open. Use only with sufficient ventilation (for example, fume hood).
- Check regularly for chemical leaks or spills. If a leak or spill occurs, follow the manufacturer cleanup procedures as recommended in the SDS.
- Handle chemical wastes in a fume hood.
- Ensure use of primary and secondary waste containers. (A primary waste container holds the immediate waste. A secondary container contains spills or leaks from the primary container. Both containers must be compatible with the waste material and meet federal, state, and local requirements for container storage.)
- After emptying a waste container, seal it with the cap provided.
- Characterize (by analysis if needed) the waste generated by the particular applications, reagents, and substrates used in your laboratory.
- Ensure that the waste is stored, transferred, transported, and disposed of according to all local, state/provincial, and/or national regulations.
- **IMPORTANT!** Radioactive or biohazardous materials may require special handling, and disposal limitations may apply.

WARNING! HAZARDOUS WASTE (from instruments). Waste produced by the instrument is potentially hazardous. Follow the guidelines noted in the preceding General Chemical Handling warning.

Documentation and support

Customer and technical support

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  - Training for many applications and instruments
- Order and web support
- Product documentation
  - User guides, manuals, and protocols
  - Certificates of Analysis
  - Safety Data Sheets (SDSs; also known as MSDSs)

  Note: For SDSs for reagents and chemicals from other manufacturers, contact the manufacturer.

Limited product warranty

Life Technologies Corporation and its affiliates warrant their products as set forth in the Life Technologies' General Terms and Conditions of Sale at **www.thermofisher.com/us/en/home/global/terms-and-conditions.html**. If you have questions, contact Life Technologies at **www.thermofisher.com/support**.