

## qScript™ cDNA Synthesis Kit

Cat Nos.	95047-025	Size	25 x 20- $\mu$ L reactions
	95047-100		100 x 20- $\mu$ L reactions
	95047-500		500 x 20- $\mu$ L reactions

Store at -20°C

### Description

The qScript cDNA Synthesis Kit is a sensitive and easy-to-use solution for RNA quantification using two-step RT-PCR. The novel qScript Reaction Mix provides all the necessary components for cDNA synthesis except enzyme and RNA template. The optimized blend of random and oligo(dT) primers provides robust, consistent and unbiased first-strand synthesis over a broad range of RNA template concentrations. qScript reverse transcriptase is a mixture of an engineered MMLV RT and a ribonuclease inhibitor protein. The simplified reaction procedure is ideally suited for high throughput expression studies using real-time quantitative RT-PCR. The resulting cDNA product is directly compatible with current real-time PCR methods or conventional end-point RT-PCR of targets  $\leq$  1 kb in length.

### Components

	<u>95047-025</u>	<u>95047-100</u>	<u>95047-500</u>
qScript Reaction Mix (5X)	1 x 100 $\mu$ L	1 x 400 $\mu$ L	2 x 1 mL
5X concentrated solution of optimized buffer, magnesium, oligo(dT) and random primers, and dNTPs			
qScript Reverse Transcriptase, 50X concentration	1 x 25 $\mu$ L	1 x 100 $\mu$ L	1 x 500 $\mu$ L
Nuclease-free water	1 x 1.5 mL	1 x 1.5 mL	4 x 1.5 mL

### Storage and Stability

Kit components are stable for 2 years when stored in a constant temperature freezer at -20°C. After thawing, mix thoroughly before using.

### Reaction Protocol

1. Thaw all frozen components. Mix thoroughly, and briefly centrifuge to collect contents before using. Place all components, including qScript RT on ice.
2. Add the following to a 0.2-mL thin-walled PCR tube or 96-well PCR reaction plate sitting on ice:

RNA (1 $\mu$ g to 10 $\mu$ g total RNA)	variable
Nuclease-free water	variable
qScript Reaction Mix (5X)	4.0 $\mu$ L
<u>qScript RT</u>	<u>1.0 <math>\mu</math>L</u>
final volume	20.0 $\mu$ L

Note: When performing multiple first-strand reactions, a master mix can be prepared with water, qScript Reaction Mix and qScript RT.

	<u>Single rxn.</u>	<u>25 rxns.</u>	<u>100 rxns.</u>
Nuclease-free water	10 $\mu$ L	250 $\mu$ L	1000 $\mu$ L
qScript Reaction Mix (5X)	4 $\mu$ L	100 $\mu$ L	400 $\mu$ L
<u>qScript RT</u>	<u>1 <math>\mu</math>L</u>	<u>25 <math>\mu</math>L</u>	<u>100 <math>\mu</math>L</u>
total volume	15 $\mu$ L	375 $\mu$ L	1500 $\mu$ L

Dispense 15  $\mu$ L of cDNA master mix to each well / tube.  
Add 5  $\mu$ L of RNA sample to each reaction.  
Cover the reaction plate with sealing film or cap each reaction.

3. Vortex gently and then centrifuge 10s to collect contents.
4. Place tube(s) in a thermal cycler programmed as follows:
  - 1 cycle: 22°C, 5 min
  - 1 cycle: 42°C, 30 min
  - 1 cycle: 85°C, 5 min
  - 4°C hold
5. Initiate run.
6. After completion of cDNA synthesis, use 1/5<sup>th</sup> to 1/10<sup>th</sup> of the first-strand reaction (2-4  $\mu$ L) for PCR amplification. If desired, cDNA product can be diluted with 10 mM Tris-HCl (pH 8.0), 0.1 mM EDTA and stored at -20°C.

### **Guidelines for Reverse Transcription-qPCR**

*Minus RT-controls:* Accurate quantification of gene expression by RT-qPCR requires testing and reporting the extent of contamination of genomic DNA in each RNA sample for each gene of interest. The presence of trace amounts of gDNA does not usually interfere with quantification of high copy reference genes. However, it can have a significant contribution on signal for low copy genes. Even when using primers that are separated by intronic sequence or bridge exon junctions, the presence of genomic DNA can produce positive signals from amplification of pseudogene or off-target PCR product. Therefore, it is important to always include the appropriate "no RT" or "minus RT" control reactions in your experimental design.

While it is feasible to construct a formal cDNA synthesis control that includes all components except the RT, the most direct method to test for the presence of genomic DNA is to bypass the RT step and use an equivalent amount of the RNA preparation directly for PCR amplification. For example: if you start with 1 µg of total RNA for cDNA synthesis and use 1/10<sup>th</sup> of the first-strand reaction as template for qPCR; then use 100 ng of total RNA as template for the minus RT-control qPCR. Any signal from the RNA only reaction is attributable to the presence of genomic DNA.

*DNase digestion of total RNA:* If trace levels of genomic DNA obscure accurate quantification of your gene(s) of interest, use a high quality, RNase-free preparation of DNase I to remove residual genomic DNA. After the DNase digestion, it is essential to remove all traces of DNase activity before proceeding with first-strand synthesis. Suitable RNA purification methods include phenol:chloroform extraction followed by ethanol precipitation, or the use of chaotropic salts and a silica-based RNA purification cartridge or column. Simple "heat-kill" procedures or the use of inactivating slurry solutions are not compatible with qScript cDNA Synthesis Kit. Please call technical support at (800) 364-2149 or visit our web site at [www.quantabio.com](http://www.quantabio.com) if you require additional information or protocols.

### **Quantily Control**

Kit components are free of contaminating DNase and RNase. qScript cDNA Synthesis Kit is functionally tested in a two-step RT-qPCR procedure with AccuQuant SYBR<sup>®</sup> Green SuperMix for amplification of the ACTB mRNA in HeLa cell total RNA (log fold serial dilutions from 1 µg to 10 pg). One-tenth of each first-strand reaction is used for qPCR amplification. Kinetic analysis must demonstrate linear resolution over five orders of dynamic range ( $r^2 > 0.995$ ) and a PCR efficiency  $> 90\%$ .

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