
All about RT

cDNA Synthesis

Selection Chart of Bioneer's cDNA Synthesis Products

by Application

cDNA Synthesis Kits

Application	RT PreMix	CycleScript RT PreMix	RocketScript™ RT PreMix	RocketScript™ Cycle RT PreMix	RocketScript™ RT PreMix, RNase H Minus
Standard RT	√	√	√	√	√
High Efficiency RT		√		√	√
RT of Secondary Structured RNA			√	√	√
RT of Long kb RNA					√

One-step RT-PCR Kits

Application	RT-PCR PreMix	RocketScript™ RT-PCR PreMix	RocketScript™ RT-PCR PreMix, RNase H Minus	Dual-HotStart™ RT-PCR PreMix	Dual-HotStart™ RT-PCR PreMix (with UDG)	RocketPlex RT-PCR PreMix
Standard RT-PCR	√	√	√	√	√	√
RT-PCR of Secondary Structured RNA		√	√	√	√	√
High Specificity & Sensitivity RT-PCR				√	√	
Multiplex RT-PCR						√
Prevent Air-contamination of PCR Products					√	
RT-PCR of Long kb RNA			√			

One-step RT-qPCR Kits

Application	Dual-HotStart™ RT-qPCR PreMix	GreenStar™ RT-qPCR PreMix
RT-qPCR by Taqman Probe Method	√	
RT-qPCR by dsDNA Binding Dye Method		√
High Specificity & Sensitivity RT-qPCR	√	√

Enzymes

Application	M-MLV RTase	CycleScript RTase	RocketScript™ RTase	RocketScript™ RTase, RNase H Minus
Standard RT	√	√	√	√
High Efficiency RT		√		√
RT of Secondary Structured RNA			√	√
RT of Long kb RNA				√

Selection Chart of Bioneer's cDNA Synthesis Products

by Specification

cDNA Synthesis Kits

Product	Fragment Size	RNase H Activity	DNase Activity	RNase Activity	GC-rich
RT PreMix	≤ 9 kb	O	X	X	***
CycleScript RT PreMix	≤ 9 kb	O	X	X	***
<i>RocketScript</i> [™] RT PreMix	≤ 10 kb	O	X	X	***
<i>RocketScript</i> [™] Cycle RT PreMix	≤ 10 kb	O	X	X	***
<i>RocketScript</i> [™] RT PreMix, RNase H Minus	≤ 12.5 kb	X	X	X	****

One-step RT-PCR Kits

Product	Fragment Size	5' → 3' Exonuclease	3' → 5' Exonuclease	Specificity	GC-rich	Leaves 3'-A
RT-PCR PreMix	≤ 5 kb	X	X	-	***	O
<i>RocketScript</i> [™] RT-PCR PreMix	≤ 6 kb	X	X	-	***	O
<i>RocketScript</i> [™] RT-PCR PreMix, RNase H Minus	≤ 12.5 kb	O	X	-	***	O
<i>Dual-HotStart</i> [™] RT-PCR PreMix	≤ 3 kb	O	X	*****	*****	O
<i>Dual-HotStart</i> [™] RT-PCR PreMix (with UDG)	≤ 3 kb	O	X	*****	*****	O
<i>RocketPlex</i> RT-PCR PreMix	≤ 1 kb	X	X	****	***	O

One-step RT-qPCR Kits

Product	Fragment Size	5' → 3' Exonuclease	3' → 5' Exonuclease	Specificity	GC-rich	Leaves 3'-A
<i>GreenStar</i> [™] RT-qPCR PreMix	≤ 200 bp	O	X	****	****	O
<i>Dual-HotStart</i> [™] RT-qPCR PreMix	≤ 200 bp	O	X	*****	*****	O

Enzymes

Product	Fragment Size	RNase H Activity	DNase Activity	RNase Activity	GC-rich
<i>M-MLV</i> Reverse Transcriptase	≤ 9 kb	O	X	X	***
CycleScript Reverse Transcriptase	≤ 9 kb	O	X	X	***
<i>RocketScript</i> [™] Reverse Transcriptase	≤ 10 kb	O	X	X	***
<i>RocketScript</i> [™] RTase, RNase H Minus	≤ 12.5 kb	X	X	X	***

Technology

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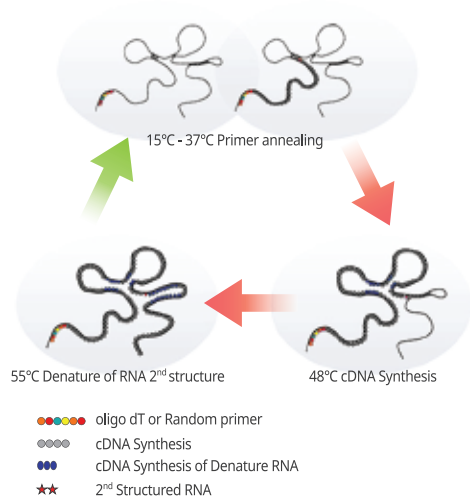
Contents

- cDNA Synthesis Technology
 - Cycle Temperature Reverse Transcription (CTRT)
 - *RocketScript*[™] Reverse Transcriptase
- One-Step RT-PCR & RT-qPCR Technology
 - *Dual-HotStart*[™] Technology

Bioneer's Technology for High Performance in cDNA Synthesis

Cycle Temperature Reverse Transcription (CTRT)

- Cyclic reverse reaction to maximize efficiency of cDNA synthesis
- Synthesize full-length cDNA by inhibiting formation of secondary structure of template RNA
- Primer is included to synthesize cDNA by adding template RNA only

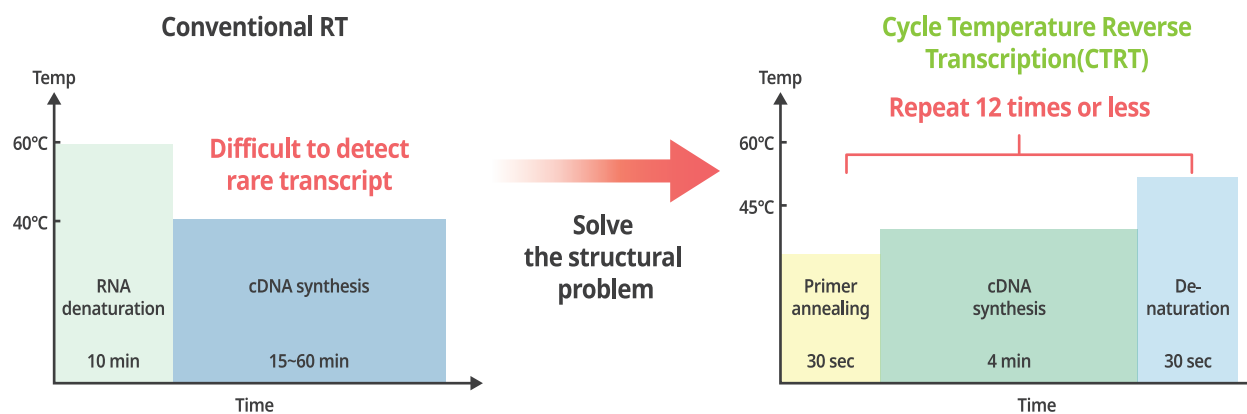


Bioneer's Cycle Temperature Reverse Transcription (CTRT) is a technology to overcome the inactivity of reverse transcriptase at high temperatures. CTRT induces annealing of primer at low temperatures and also inhibit the formation of secondary structure of template RNA at high temperatures.

Reverse transcription at high temperatures improves cDNA synthesis and solves the problem of template RNA complex structure formation.

User can control temperature and time, according to the experimental conditions, thereby achieving high efficiency cDNA synthesis.

Conventional RT vs Bioneer's CTRT



CTRT technology-applied products

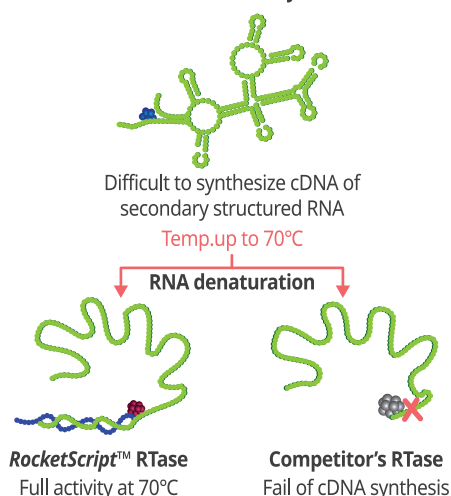
Product Name	Cat. no.
AccuPower® CycleScript RT PreMix	K-2044 - K-2050-2
AccuPower® RocketScript™ Cycle RT PreMix	K-2201 - K-2210
CycleScript Reverse Transcriptase	E-3131 - E-3132

Bioneer's Technology for High Performance in cDNA Synthesis

RocketScript™ Reverse Transcriptase

- Thermostable *RocketScript*™ RTase enables cDNA synthesis of complex secondary structure RNA effectively
- Delivers the outstanding expansibility and the greatest sensitivity of cDNA synthesis

Native *M-MLV* Activity at 42°C



M-MLV RTase, which is the most widely used cDNA synthesis method, has low thermal stability and cDNA synthesis proceeds at 42°C. Therefore, it is difficult to synthesize cDNA of RNA with complex secondary structure.

To solve this problem, Bioneer has developed *RocketScript*™ Reverse Transcriptase, which is active at temperatures higher than 50°C. This product can synthesize cDNA at various temperatures of 42-70°C according to customer's experimental conditions.

RocketScript™ technology-applied products

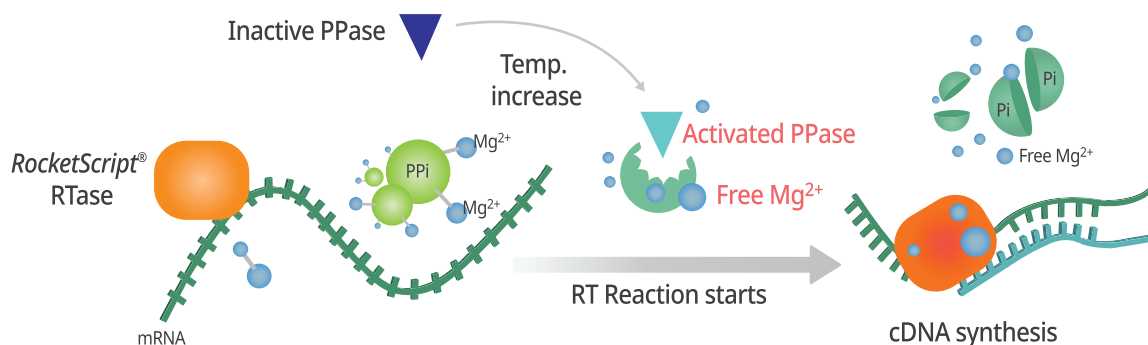
Product Name	Cat. no.
<i>AccuPower</i> ® <i>RocketScript</i> ™ RT PreMix	K-2101 - K-2104
<i>AccuPower</i> ® <i>RocketScript</i> ™ Cycle RT PreMix	K-2201 - K-2210
<i>AccuPower</i> ® <i>RocketScript</i> ™ RT PreMix, RNase H Minus	K-2221 - K-2248
<i>AccuPower</i> ® <i>RocketScript</i> ™ RT-PCR PreMix	K-2501 - K-2504
<i>AccuPower</i> ® <i>RocketScript</i> ™ RT-PCR PreMix, RNase H Minus	K-2231 - K-2234
<i>AccuPower</i> ® <i>RocketPlex</i> RT-PCR PreMix	K-2211 - K-2214
<i>AccuPower</i> ® <i>Dual-HotStart</i> ™ RT-PCR PreMix	K-6710 - K-6713
<i>AccuPower</i> ® <i>Dual-HotStart</i> ™ RT-PCR PreMix (with UDG)	K-6714 - K-6715
<i>AccuPower</i> ® <i>GreenStar</i> ™ RT-qPCR PreMix / Master Mix (2X)	K-6400 - K-6403
<i>AccuPower</i> ® <i>Dual-HotStart</i> ™ RT-qPCR PreMix / Master Mix (2X)	K-6704 - K-6707
<i>RocketScript</i> ™ Reverse Transcriptase	E-3141 - E-3142
<i>RocketScript</i> ™ Reverse Transcriptase, RNase H Minus	E-3161 - E-3162

Bioneer's Technology for High Performance in RT-PCR & RT-qPCR

Dual-HotStart™ Technology

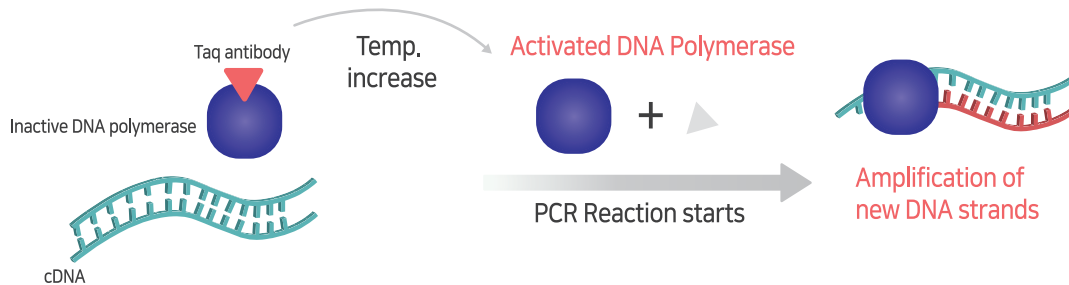
- Minimize non-specific reactions by applying hotstart technology to both RT and PCR/qPCR reactions
- Excellent sensitivity for detection of less than 10 copies of RNA
- One-step RT-PCR & RT-qPCR for synthesis and amplification of cDNA in a single tube

Dual-HotStart™ Technology



1st hotstart reaction: Hotstart RT

It uses a unique enzyme-mediated HotStart method that provides robust, sensitive, and reliable cDNA synthesis results. Bioneer's *RocketScript™* reverse transcriptase is completely inhibited by pyrophosphate at temperatures below 50°C. However, *RocketScript™* reverse transcriptase becomes fully active at temperatures above 50°C via pyrophosphate hydrolysis with a thermostable pyrophosphatase. This prevents the formation of mis-primed products and primer-dimers during the reaction set up process resulting in improved specificity of cDNA synthesis.



2nd hotstart reaction: Hotstart PCR & qPCR

Bioneer's HotStart *Taq* DNA Polymerase provides superior priming accuracy and specificity that cannot be achieved with other enzymes. You will use less enzyme per reaction, save money, and get higher sensitivity than with other HotStart enzymes.

Dual-HotStart™ technology-applied products

Product Name	Cat. no.
<i>AccuPower® Dual-HotStart™</i> RT-PCR PreMix	K-6710 - K-6713
<i>AccuPower® Dual-HotStart™</i> RT-PCR PreMix (with UDG)	K-6714 - K-6715
<i>AccuPower® Dual-HotStart™</i> RT-qPCR PreMix / Master Mix (2X)	K-6704 - K-6707

cDNA Synthesis Kits

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Contents

- *AccuPower*[®] RT PreMix
- *AccuPower*[®] CycleScript RT PreMix
- *AccuPower*[®] *RocketScript*[™] RT PreMix
- *AccuPower*[®] *RocketScript*[™] Cycle RT PreMix
- *AccuPower*[®] *RocketScript*[™] RT PreMix, RNase H Minus

02 AccuPower® RT PreMix

For Standard cDNA Synthesis with *M-MLV* RTase

• Description

AccuPower® RT PreMix is an easy to resuspend, vacuum-dried premix for cDNA synthesis that consists of *M-MLV* (*Moloney Murine Leukemia Virus*) reverse transcriptase, RNase inhibitor, dNTPs, reaction buffer, tracking dye, and patented stabilizer. All of the key components are premixed at optimal concentrations. Simply add template RNA, primers and D.W. for cDNA synthesis reaction.

• Features and Benefits

Ease-of-use:

All of the required components for cDNA synthesis, such as *M-MLV* reverse transcriptase and RNase inhibitor are premixed at optimal concentrations. The user only adds the target RNA, primers and D.W., and the reaction is ready to start. The resulting product can be used as template for PCR using the *AccuPower*® PCR PreMix without additional purification steps.

Stability:

AccuPower® RT PreMix contains a special stabilizer to preserve the stability of the components and the activity of the RTase during storage.

Reproducibility:

AccuPower® PreMix is manufactured under strict ISO 9001 quality control conditions to ensure reproducible performance.

• Application

- First-strand synthesis of cDNA from RNA molecules (RT)
- Random priming reaction
- cDNA library construction
- Probe labeling
- mRNA 5'-end mapping by primer extension analysis
- PCR
- Real-time qPCR

• Specifications

- DNase activity: No
- RNase activity: No
- Fragment size: ~ 9 kb

• Experimental Data

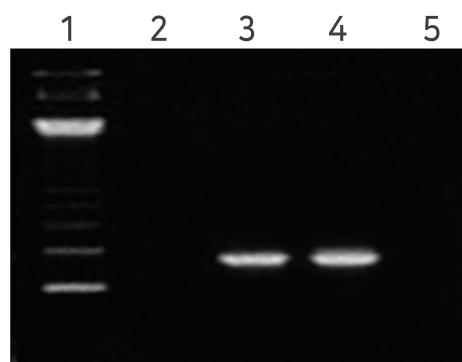


Figure 1. Specific amplification of 5'- UTR region of HCV with *AccuPower*® RT PreMix.

Lane 1: DNA Ladder (BM corp.)

Lane 2: negative control

Lane 3, 4: HCV positive serum

Lane 5: HCV negative serum

02 AccuPower® CycleScript RT PreMix

For High Performance cDNA Synthesis from rare templates with CycleScript *M-MLV* RTase

● Description

AccuPower® CycleScript RT PreMix (available with: dT₂₀, dN₁₂, or dN₆ primers) utilize cyclic temperature reverse transcription (CTRT) technology, enhancing efficiency of cDNA synthesis. Bioneer's CTRT is an innovative technology to synthesize more homogeneous cDNA in less time compared to the conventional reverse transcription. The use of cyclic RT produces cDNA amplification and better results compared to conventional reverse transcription PCR – especially for rare transcripts.

The PreMix is a vacuum-dried PCR mixture of CycleScript reverse transcriptase, a primer, and all of the other components packaged in individual tubes. Simply add template RNA, and D.W. for cDNA synthesis reaction.

Conventional Reverse Transcription

-Step 1: RNA denaturation at 65°C for 10 min

-Step 2: cDNA synthesis at a temperature between 37°C-55°C for 15-60 min

Cyclic Reverse Transcription

-Step 1: Primer annealing at a temperature between 25°C and 40°C for 30 sec

-Step 2: cDNA synthesis at a temperature between 42°C and 48°C for 4 min

-Step 3 (optional): Denaturation of the secondary structure of the RNA template and cDNA synthesis at a temperature between 50°C and 55°C for 30 sec

● Features and Benefits

Flexible Reaction Conditions:

The reverse transcription is performed by either a cyclic reverse transcription reaction that is carried out like a PCR or conventional reverse transcription at a fixed temperature, 42°C.

Ease-of-use:

All of the required components for cDNA synthesis such as RTase, dNTPs, reaction buffer, and primer (dT₂₀, dN₁₂ or dN₆) are contained in the premix. Simply add template RNA and D.W. to start your reaction.

Stability:

AccuPower® CycleScript RT PreMix contains a special stabilizer to preserve the stability of the components and the activity of the RTase during storage. It is stable for 2 years at -20°C.

Reproducibility:

AccuPower® PreMix is manufactured under strict ISO 9001 quality control conditions to ensure reproducible performance.

● Application

- Sequencing single and double-strand DNA or RNA
- Random priming reaction
- cDNA library construction
- Probe labeling
- mRNA 5'-end mapping by primer extension analysis
- PCR
- Real-time qPCR

● Specifications

- DNase activity: No
- RNase activity: No
- Fragment size: ~ 9 kb

● Experimental Data

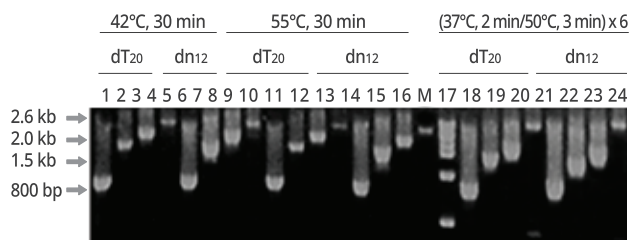


Figure 1. Reaction conditions of CTRT compared with that of conventional RT.

The conventional fixed temperature RT reactions at 42°C and 55°C and cyclic temperature RT reactions at 37°C and 50°C were performed using HeLa cell total RNA (800 ng each). The 800 bp, 1.5 kb, 2.0 kb, and 2.6 kb fragments of human transferrin receptor gene were amplified with each primer. AccuPower® CycleScript RT PreMix series (dT₂₀ & dN₁₂) preferably shows good results at CTRT reaction condition.

02 AccuPower® RocketScript™ RT PreMix

For High Temperature cDNA Synthesis with Thermostable *RocketScript™ M-MLV* RTase

● Description

AccuPower® *RocketScript™* RT PreMix contains Bioneer's exclusive *M-MLV* based thermostable reverse transcriptase, *RocketScript™*. Native *M-MLV* RTase has maximum activity at relatively low temperatures (42°C), causing several problems in reverse transcription of RNA molecules with complex secondary structure. *RocketScript™* has thermostable activity (42-70°C), allowing efficient cDNA synthesis from virtually any RNA.

The vacuum-dried PreMix contains all needed components for a successful reverse transcription reaction, including RTase, RNase inhibitor and buffer. Just add template RNA, primers and D.W., for cDNA synthesis reaction.

● Features and Benefits

Thermostable Activity:

RocketScript™ is able to perform reverse transcription reactions throughout a wide range of temperatures between 42°C and 70°C, allowing efficient cDNA synthesis from secondary structure of RNA.

Enhanced Performance:

RocketScript™ has enhanced performance to handle both high and low input RNA concentrations as well as short and long RT target sizes.

Ease-of-use:

All of the required components for cDNA synthesis such as RTase, RNase inhibitor, dNTPs and reaction buffer are contained in the premix. Simply add template RNA, primer and D.W. to start your reaction.

Reproducibility:

AccuPower® PreMix is manufactured under strict ISO 9001 quality control conditions to ensure reproducible performance.

● Application

- First-strand synthesis of cDNA from RNA molecules (RT)
- Random priming reaction
- cDNA library construction
- Probe labeling
- mRNA 5'-end mapping by primer extension analysis
- PCR
- Real-time PCR

● Specifications

- DNase activity: No
- RNase activity: No
- Fragment size: ~ 10 kb

● Experimental Data

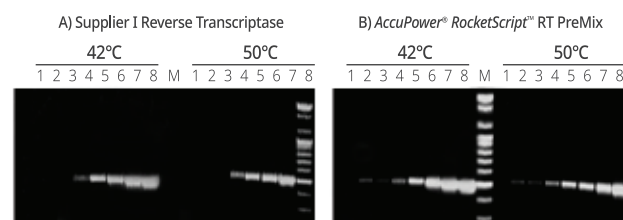


Figure 1. Sensitivity comparison between AccuPower® *RocketScript™* RT PreMix and *M-MLV* RTase.

Sensitivity results of AccuPower® *RocketScript™* RT PreMix using GAPDH compared with conventional reverse transcriptases. Each 10 fg - 100 ng of total RNA used for RT and the same amount of RT products used for electrophoresis.

- Lane 1: 10 fg human total RNA from HeLa cell
- Lane 2: 100 fg human total RNA from HeLa cell
- Lane 3: 1 pg human total RNA from HeLa cell
- Lane 4: 10 pg human total RNA from HeLa cell
- Lane 5: 100 pg human total RNA from HeLa cell
- Lane 6: 1 ng human total RNA from HeLa cell
- Lane 7: 10 ng human total RNA from HeLa cell
- Lane 8: 100 ng human total RNA from HeLa cell

AccuPower® RocketScript™ Cycle RT PreMix

For High Performance/High Temperature cDNA Synthesis
with Thermostable *RocketScript™* RTase and Cyclic Temperature Reverse Transcription(CTRT)

Description

AccuPower® RocketScript™ Cycle RT PreMix utilize both thermostable *RocketScript™* reverse transcriptase and cyclic temperature reverse transcription (CTRT) technology, enhancing efficiency of cDNA synthesis. Native *M-MLV* RTase has maximum activity at relatively low temperatures (42°C), causing several problems in reverse transcription of RNA molecules with complex secondary structure. Bioneer's exclusive *M-MLV* based thermostable reverse transcriptase, *RocketScript™* has thermostable activity across a wide temperature range (42-70 °C), allowing efficient cDNA synthesis from virtually any RNA. Bioneer's CTRT is an innovative technology to synthesize more homogeneous cDNA in less time compared to the conventional reverse transcription. The use of cyclic RT produces cDNA amplification and better results compared to conventional reverse transcription PCR – especially for rare transcripts.

The PreMix contains all required components for a reverse transcription reaction, including RTase, primer, RNase inhibitor and buffer. Just add template RNA and D.W. for cDNA synthesis reaction.

Features and Benefits

Thermostable Activity:

RocketScript™ is able to perform reverse transcription reactions throughout a wide range of temperatures between 42°C and 70°C, allowing efficient cDNA synthesis from secondary structure of RNA.

Enhanced Performance:

RocketScript™ has enhanced performance to handle high and low input RNA concentrations as well as short and long RT target sizes.

Flexible Reaction Conditions:

The reverse transcription is performed by either a cyclic reverse transcription reaction that is carried out like a PCR or conventional reverse transcription at a fixed temperature, 42°C.

Ease-of-use:

All of the required components for cDNA synthesis such as RTase, dNTPs, reaction buffer, and primer (dT₂₀, dN₁₂ or dN₆) are contained in the premix. Simply add template RNA and D.W. to start your reaction.

Reproducibility:

AccuPower® PreMix is manufactured under strict ISO 9001 quality control conditions to ensure reproducible performance.

Application

- First-strand synthesis of cDNA from RNA molecules (RT)
- Random priming reaction
- cDNA library construction
- Probe labeling
- mRNA 5'-end mapping by primer extension analysis
- PCR
- Real-time qPCR

Specifications

- DNase activity: No
- RNase activity: No
- Fragment size: ~ 10 kb

Experimental Data

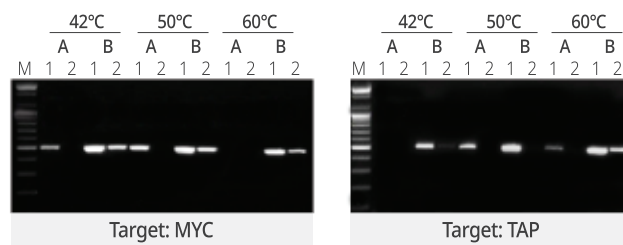


Figure 1. Complex RNA amplification results of *AccuPower® RocketScript™* Cycle RT PreMix.

Each target gene (MYC, TAP) was amplified after performing reverse transcription with *AccuPower® RocketScript™* Cycle RT PreMix.

Rxn. conditions: Conventional 1 hr incubation at 42°C, 50°C, or 60°C, deactivation at 95°C for 5 min

A: *M-MLV* Reverse Transcriptase

B: *AccuPower® RocketScript™* Cycle RT PreMix with Oligo (dT₂₀)

Lane 1: 100 ng human total RNA from HeLa cell

Lane 2: 10 ng human total RNA from HeLa cell

02 AccuPower® RocketScript™ RT PreMix, RNase H Minus

For Synthesis of Full length cDNA with RocketScript™ RTase without RNase H activity

• Description

AccuPower® RocketScript™ RT PreMix, RNase H Minus contains RocketScript™ Reverse Transcriptase with RNase H mutation. Reverse transcriptase with RNase H activity is disabled from extending its template and is prevented from synthesizing long cDNA. However, RocketScript™ Reverse Transcriptase, RNase H Minus does not have RNase H activity and is able to synthesize long cDNA. Its high processivity as well as good sensitivity allows successful cDNA synthesis even from tiny amount of template RNA, such as 1 pg human total RNA.

The PreMix contains all required components for a reverse transcription reaction, including RTase, primer, RNase inhibitor and buffer. Just add template RNA and D.W. for cDNA synthesis reaction.

• Features and Benefits

Thermostable Activity:

RocketScript™ is able to perform reverse transcription reactions throughout a wide range of temperatures between 42°C and 70°C, allowing efficient cDNA synthesis from secondary structure of RNA.

Elimination of RNase H Activity:

RocketScript™ series products are able to perform RT reaction at various temperature range of 42-70°C to suit users' needs. However, due to RNase H activity, it is not able to synthesize long size cDNA. This product has inhibited RNase H activity via point mutation. Thus, it is able to synthesize cDNA up to 12.5 kb.

Sensitivity:

This product efficiently synthesizes cDNA from even 1 pg of human total RNA.

Ease-of-use:

All of the required components for cDNA synthesis such as RTase, dNTPs, reaction buffer, and primer (dT₂₀, dN₁₂ or dN₆) are contained in the premix. Simply add template RNA and D.W. to start your reaction.

Reproducibility:

AccuPower® PreMix is manufactured under strict ISO 9001 quality control conditions to ensure reproducible performance.

• Application

- First-strand synthesis of cDNA from RNA molecules (RT)
- Random priming reaction
- cDNA library construction
- Probe labeling
- mRNA 5'-end mapping by primer extension analysis
- PCR
- Real-time qPCR

• Specifications

- DNase activity: No
- RNase activity: No
- RNase H activity: No
- Fragment size: ~ 12.5 kb

• Experimental Data

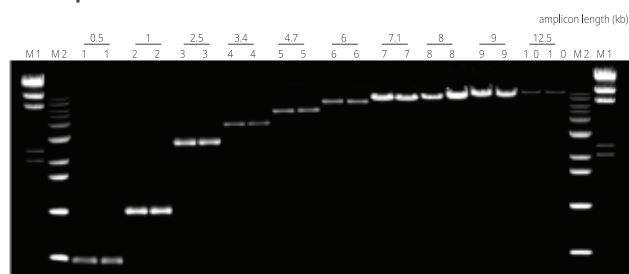


Figure 1. Performance of the AccuPower® RocketScript™ RT PreMix, RNase H Minus in two-step RT-PCR.

RT was used to amplify 500 bp to 11 kb cDNA. Sizes are indicated above gel. The larger amplicons require 1 µg of RNA, likely due to the low abundance of full-length RNA and the difficulty in reading through a long transcript.

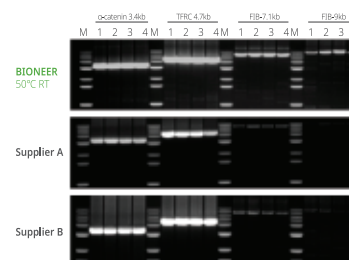


Figure 2. High synthesis rate at 50°C using Bioneer AccuPower® RocketScript™ RT PreMix, RNase H Minus.

Synthesis of cDNA at 50°C or 42°C for 10, 20, 30 and 60 min using 1 µg of 9 kb RNA transcript as a template using Bioneer cDNA synthesis kit and other kits for first strand cDNA synthesis. Reaction products were resolved on a 1% alkaline agarose gel. Bioneer cDNA synthesis kit completed synthesis of 9 kb transcripts in 10 min.

Lane 1: RT for 10 min

Lane 2: RT for 20 min

Lane 3: RT for 30 min

Lane 4: RT for 60 min

One-step RT-PCR kits

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Contents

- *AccuPower*[®] RT-PCR PreMix
- *AccuPower*[®] *RocketScript*[™] RT-PCR PreMix
- *AccuPower*[®] *RocketScript*[™] RT-PCR PreMix, RNase H Minus
- *AccuPower*[®] *Dual-HotStart*[™] RT-PCR PreMix
- *AccuPower*[®] *Dual-HotStart*[™] RT-PCR PreMix (with UDG)
- *AccuPower*[®] *RocketPlex* RT-PCR PreMix

03 AccuPower® RT-PCR PreMix

For One-step RT-PCR with *M-MLV* RTase and *Top* DNA Polymerase

• Description

AccuPower® RT-PCR performs sequential cDNA synthesis and amplification in one tube. This PreMix contains all required components for reverse transcription and PCR reaction, such as reverse transcriptase, DNA polymerase, dNTPs, reaction buffer and etc. Just add template RNA, primers and D.W. for RT-PCR reaction. The kit can be used for cDNA synthesis from low-copy RNA or mRNA followed by PCR.

• Features and Benefits

Ease-of-use:

All the required components for cDNA synthesis and PCR, such as reverse transcriptase, DNA polymerase, dNTPs, reaction buffer and etc, are premixed at optimal concentrations. Simply add template RNA, primers and D.W. to start your reaction.

Stability:

AccuPower® RT-PCR PreMix contains a special stabilizer to preserve the stability of the components and the activity of the RTase during storage. It is stable for 2 years at -20°C.

Reproducibility:

AccuPower® PreMix is manufactured under strict ISO 9001 quality control conditions to ensure reproducible performance.

• Application

- First-strand synthesis of cDNA from RNA molecules (RT)
- RT-PCR
- cDNA library construction
- Gene expression analysis

• Specifications

- 5' → 3' exonuclease: No
- 3' → 5' exonuclease: No
- 3' – A overhang: Yes
- Fragment size: ~ 5 kb

• Experimental Data



Figure 1. Sensitivity comparison between *AccuPower*® RT-PCR PreMix and Supplier I RT-PCR kit.

Each 10^9 copies ~ 10^3 copies of PSTVd (Potato Spindle Tber Viroid) used for RT-PCR and the same volume of each RT-PCR product was used for electrophoresis.

Lane 1: 10^9 copy Lane 2: 10^8 copy Lane 3: 10^7 copy

Lane 4: 10^6 copy Lane 5: 10^5 copy Lane 6: 10^4 copy

Lane 7: 10^3 copy Lane 8: NTC

Lane M: 100 bp DNA Ladder (Bioneer, Cat. no. D-1030)

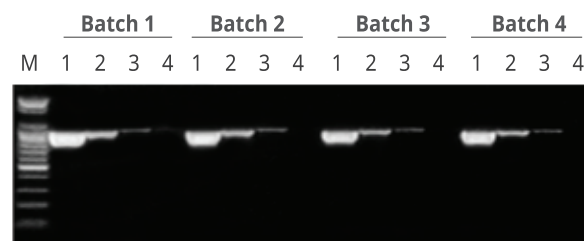


Figure 2. Comparison of reproducibility test for *AccuPower*® RT-PCR PreMix batch 1, 2, 3 and batch 4 products using serial diluted human total RNA.

Lane 1: 10 ng human total RNA from HeLa cell

Lane 2: 1 ng human total RNA from HeLa cell

Lane 3: 100 pg human total RNA from HeLa cell

Lane 4: 10 pg human total RNA from HeLa cell

03 AccuPower® RocketScript™ RT-PCR PreMix

For One-step High Temperature cDNA Synthesis and PCR with *RocketScript*™ RTase and *Top* DNA Polymerase

• Description

AccuPower® *RocketScript*™ RT-PCR PreMix contains Bioneer's exclusive *M-MLV* based thermostable reverse transcriptase and *Top* DNA polymerase. By using *RocketScript*™ RTase, full length cDNA are efficiently synthesized from complex secondary structure RNA species. *RocketScript*™ also has outstanding extension properties, allowing for highly sensitive and high-yielding cDNA synthesis of low copy targets. This PreMix contains all required components for reverse transcription and PCR reaction, such as reverse transcriptase, DNA polymerase, dNTPs, reaction buffer and etc. Just add template RNA, primers and D.W. for RT-PCR reaction.

• Features and Benefits

Thermostable Activity:

RocketScript™ is able to perform reverse transcription reactions throughout a wide range of temperatures between 42°C and 70°C, allowing efficient cDNA synthesis from secondary structure of RNA.

Sensitivity:

Detection limit is up to 10 pg of total RNA extracted from cells and tissues.

Ease-of-use:

All the required components for cDNA synthesis and PCR, such as reverse transcriptase, DNA polymerase, dNTPs, reaction buffer and etc, are contained in the premix. Just add template RNA, primers and D.W. to start your reaction.

Reproducibility:

AccuPower® PreMix is manufactured under strict ISO 9001 quality control conditions to ensure reproducible performance.

• Application

- First-strand synthesis of cDNA from RNA molecules (RT)
- RT-PCR
- cDNA library construction
- Gene expression analysis

• Specifications

- 5' → 3' exonuclease: No
- 3' → 5' exonuclease: No
- 3' – A overhang: Yes
- Fragment size: ~ 6 kb

• Experimental Data

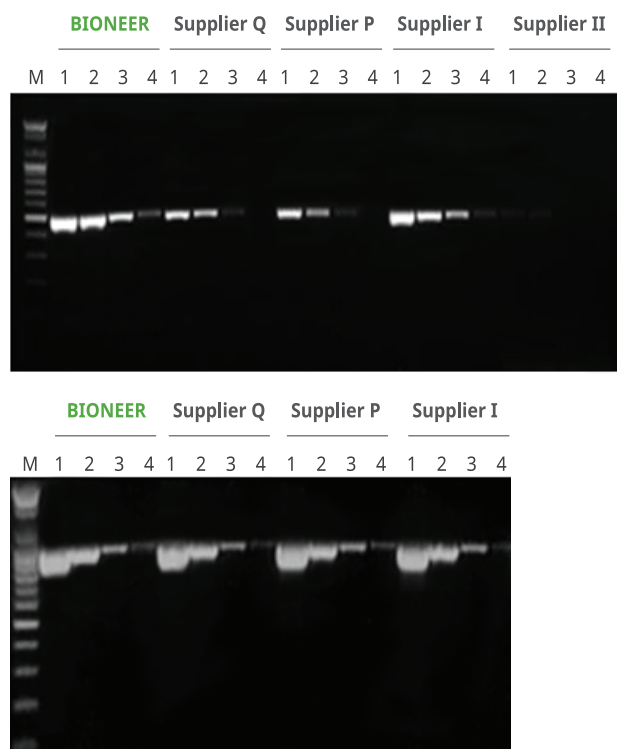


Figure 1. Performance comparison between *AccuPower*® *RocketScript*™ RT-PCR PreMix and competitor RT-PCR kits.

Complex secondary structure RNA species amplification by *RocketScript*™ is outstanding compared to the leading competitor's reverse transcriptase. RT reactions were performed according to each manufacturer's recommendations.

Lane 1: 10 ng of total RNA from HeLa cells
 Lane 2: 1 ng of total RNA from HeLa cells
 Lane 3: 100 pg of total RNA from HeLa cells
 Lane 4: 10 pg of total RNA from HeLa cells

03 AccuPower® RocketScript™ RT-PCR PreMix, RNase H Minus

For One-step Synthesis of Full length cDNA and PCR
with *RocketScript™* RTase without RNase H activity and *ProFi Taq* DNA Polymerase

• Description

AccuPower® RocketScript™ RT-PCR PreMix, RNase H Minus contains Bioneer's *RocketScript™* RTase, RNase H Minus and *ProFi Taq* DNA Polymerase. *RocketScript™* Reverse Transcriptase, RNase H Minus is a recombinant *M-MLV* reverse transcriptase with completely eliminated RNase H activity, as well as increased thermal stability up to 70 °C. It minimizes RNA degradation for increased length of cDNA up to 12.5 kb, with higher cDNA yields, especially at higher temperature suitable for RT reaction with complex secondary or high GC content template RNA. This PreMix contains all required components for reverse transcription and PCR reaction, such as reverse transcriptase, DNA polymerase, dNTPs, reaction buffer and etc. Just add template RNA, primers and D.W. for RT-PCR reaction.

• Features and Benefits

Elimination of RNase H Activity:

Eliminated RNase H activity from *RocketScript™* RTase, with additional help from long & high-Fidelity *ProFi Taq* DNA Polymerase, can produce very long RT-PCR products up to 12.5 kb with higher yield.

Thermostable Activity:

RocketScript™ is able to perform reverse transcription reactions throughout temperatures from 42°C to 70°C.

Sensitivity:

Detection limit is up to 10 pg of total RNA extracted from cells and tissues.

Ease-of-use:

All the required components for RT-PCR, such as reverse transcriptase, DNA polymerase, dNTPs, reaction buffer and etc, are contained in the premix. Just add template RNA, primers and D.W. to start your reaction.

Reproducibility:

AccuPower® PreMix is manufactured under strict ISO 9001 quality control conditions to ensure reproducible performance.

• Application

- Standard RT-PCR
- Long kb RT-PCR
- Gene-expression analysis
- Virus detection

• Specifications

- DNase activity: No
- RNase activity: No
- RNase H activity: No
- Fragment size: ~ 12.5 kb

• Experimental Data

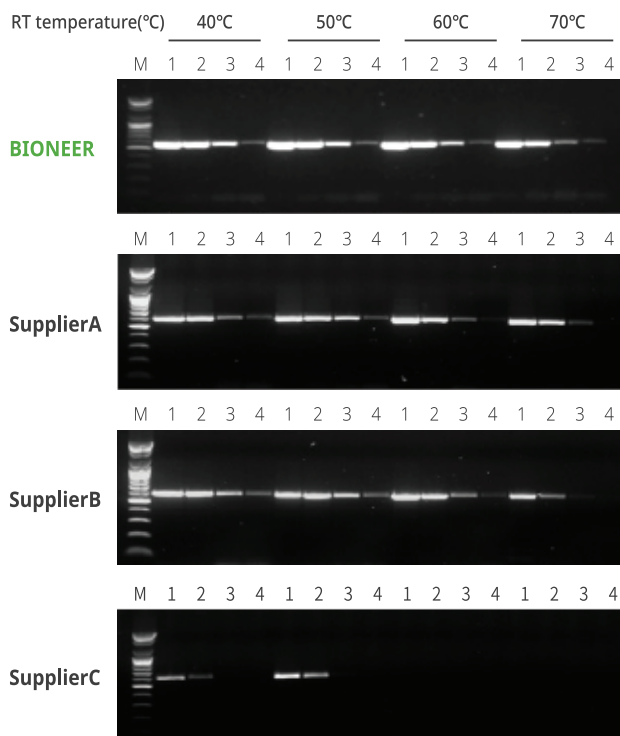


Figure 1. Comparison of thermal stability between *RocketScript™* RT-PCR PreMix, RNase H Minus and other suppliers' RT-PCR kits.

RocketScript™ RT-PCR PreMix, RNase H Minus, as well as other competitors' RT-PCR kits, were used to synthesize cDNA at a temperature range of 40 – 70°C, it is shown that *RocketScript™* RT-PCR PreMix, RNase H Minus provides increased specificity and higher yields of cDNA than other suppliers' kits.

M: 100 bp DNA Ladder (Bioneer, Cat. No. D-1030)

Lane 1-4: 10 ng, 1 ng, 100 pg, 10 pg human total RNA from HeLa cells, respectively.

03 AccuPower® Dual-HotStart™ RT-PCR PreMix

For High Specific and High Sensitive One-step RT-PCR with *RocketScript™* RTase and HotStart *Taq* DNA Polymerase

• Description

AccuPower® Dual-HotStart™ RT-PCR PreMix is a breakthrough product to overcome frequent problems of RT reaction by applying *Dual-HotStart™* technology in both RT and PCR. With this product, cDNA synthesis of your selective RNA will be performed with high sensitivity from a small amount of template RNA. Successive PCR amplification of synthesized cDNA also occurs via a one-step reaction with cDNA synthesis. This one-step RT-PCR product is easily generated with excellent sensitivity for a wide range of applications, including several types of virus tests and gene expression analysis experiments. This product is ready-to-use, simply add template RNA, primers and D.W. to obtain your results with great reproducibility.

• Features and Benefits

Specificity:

Our premier *Dual-HotStart™* RT-PCR reaction which utilizes *Pyro-HotStart* RT reaction and HotStart PCR provides accurate result of target gene amplification.

Sensitivity:

The detection limit is low enough to be detected as the minimum amount of target template RNA and up to 10 pg of total RNA extracted from cells and tissues.

Ease-of-use:

All the required components for RT-PCR, such as reverse transcriptase, DNA polymerase, dNTPs, reaction buffer and etc, are contained in the premix. Just add template RNA, primers and D.W. to start your reaction.

Reproducibility:

AccuPower® PreMix is manufactured under strict ISO 9001 quality control conditions to ensure reproducible performance.

• Application

- Low copy viral/bacterial pathogen load determination in an earlier stage
- Low copy mRNA amplification
- Low copy target RNA quantification
- RNA amplification for microarray and NGS

• Specifications

- 5' → 3' exonuclease: Yes
- 3' → 5' exonuclease: No
- 3' – A overhang: Yes
- Fragment size: ~ 3 kb

• Experimental Data

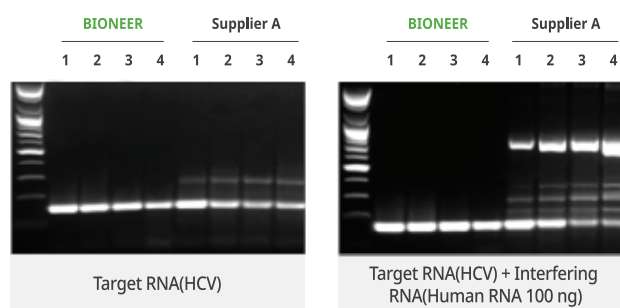


Figure 1. Comparison of PCR amplification specificity between *AccuPower® Dual-HotStart™* RT-PCR PreMix from Bioneer and other supplier's Hotstart PCR master mix in high concentration of interfering RNA.

Lane 1: HCV 10⁷

Lane 2: HCV 10⁶

Lane 3: HCV 10⁵

Lane 4: HCV 10⁴

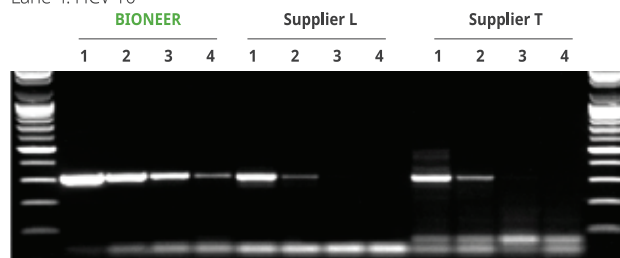


Figure 2. Comparison of PCR amplification sensitivity between *AccuPower® Dual-HotStart™* RT-PCR PreMix from Bioneer and other suppliers' Hotstart RT-PCR kits.

Target: human PGK1

Lane 1: 10 ng of human RNA

Lane 2: 1 ng of human RNA

Lane 3: 100 pg of human RNA

Lane 4: 10 pg of human RNA

03 AccuPower® Dual-HotStart™ RT-PCR PreMix (with UDG)

For High Specific and High Sensitive One-step RT-PCR / Prevention Carry-over Contamination

Description

AccuPower® Dual-HotStart™ RT-PCR PreMix (with UDG) is a breakthrough product to overcome frequent problems of RT reaction by applying Dual-HotStart™ technology in both RT and PCR and to prevent carryover contamination. With this product, cDNA synthesis of your selective RNA will be performed with high sensitivity from a small amount of template RNA. This one-step RT-PCR product is easily generated with excellent sensitivity for a wide range of applications, including several types of virus tests and gene expression analysis experiments. This product is ready-to-use, simply add template RNA, primers and D.W. to obtain your results with great reproducibility.

Features and Benefits

Prevention of Carry over Contamination:

UDG and dUTP in the PreMix or Master Mix prevent the re-amplification of carry over PCR products between reactions. The dUTP ensures that any amplified DNA will contain uracil rather than thymine. And UDG removes uracil residues from single- or double-stranded DNA, which prevents uracil-containing DNA from serving as template in future PCRs. In PCR with AccuPower® Dual-HotStart™ RT-PCR PreMix (with UDG) the UDG incubation step at 37°C for 2 min destroys any uracil-containing DNA fragments from previous reactions. UDG is inactivated by the high temperatures during normal PCR cycling, thereby allowing the amplification of genuine target sequences.

Specificity:

Our premier Dual-HotStart™ RT-PCR reaction which utilizes Pyro-HotStart RT reaction and HotStart PCR provides accurate result of target gene amplification.

Sensitivity:

The detection limit is low enough to be detected as the minimum amount of target template RNA and up to 10 pg of total RNA extracted from cells and tissues.

Ease-of-use:

All the required components for RT-PCR, such as reverse transcriptase, DNA polymerase, dNTPs, reaction buffer and etc, are contained in the premix. Just add template RNA, primers and D.W. to start your reaction.

Reproducibility:

AccuPower® PreMix is manufactured under strict ISO 9001 quality control conditions to ensure reproducible performance.

Application

- Low copy viral/bacterial pathogen load determination in an earlier stage
- Low copy mRNA amplification
- Low copy target RNA quantification
- RNA amplification for microarray and NGS

Specifications

- 5' → 3' exonuclease: Yes
- 3' → 5' exonuclease: No
- 3' – A overhang: Yes
- Fragment size: ~ 3 kb

Experimental Data

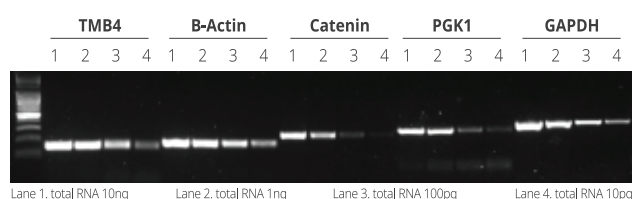


Figure 1. Sensitivity of AccuPower® Dual-HotStart™ RT-PCR PreMix (with UDG).

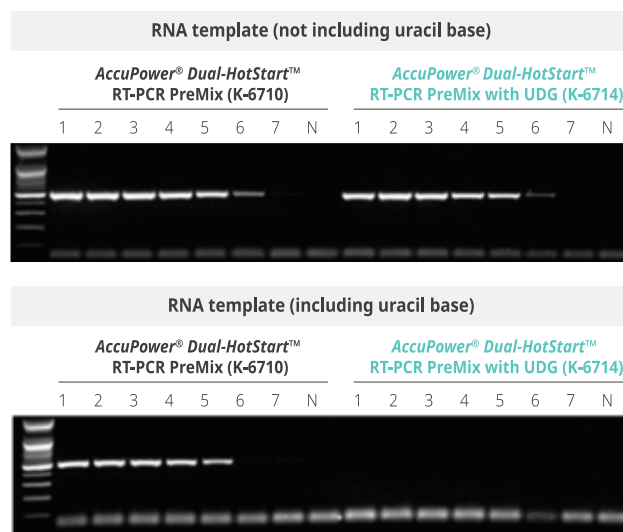


Figure 2. Comparison of amplification quality using PCR products (not including uracil base or including uracil base) between AccuPower® Dual-HotStart™ RT-PCR PreMix and AccuPower® Dual-HotStart™ RT-PCR PreMix (with UDG).

Lane 1: 10⁷ Lane 2: 10⁶ Lane 3: 10⁵
Lane 4: 10⁴ Lane 5: 10³ Lane 6: 10²
Lane 7: 10 Lane 8: NTC

03 AccuPower® RocketPlex RT-PCR PreMix

For One-step High Temperature cDNA Synthesis and Multiplex (up to 10-plex) with *RocketScript™* RTase and *Top* DNA Polymerase

• Description

With *AccuPower® RocketPlex* RT-PCR PreMix, the best thermostable reverse transcription is available, while giving you multiplex capabilities in the subsequent PCR. By combining Multiplex RT-PCR with *RocketScript™* reverse transcriptase, you can amplify up to 10 target genes. *AccuPower® RocketPlex* RT-PCR PreMix contains all needed components for sequential cDNA synthesis and amplification of multiple targets in one tube. The RT-PCR PreMix consists of *RocketScript™* reverse transcriptase, thermostable DNA polymerase dNTPs, reaction buffer, RNase inhibitor, loading dye and stabilizer in a vacuum-dried mix.

• Features and Benefits

Multiplex Performance:

Detect 1 - 10 target genes in a single tube directly from total RNA.

Thermostable Activity:

Thermostable reverse transcription activity (up to 70°C) lets you blast through secondary structure.

Specificity:

Provide highly specific PCR products by using HotStart *Top* DNA Polymerase.

Ease-of-use:

All the required components for RT-PCR, such as reverse transcriptase, DNA polymerase, dNTPs, reaction buffer and etc, are contained in the premix. Just add template RNA, primers and D.W. to start your reaction.

Reproducibility:

AccuPower® PreMix is manufactured under strict ISO 9001 quality control conditions to ensure reproducible performance.

• Application

- Multiplex RT-PCR
- Low copy detection
- Gene expression analysis

• Specifications

- 5' → 3' exonuclease: No
- 3' → 5' exonuclease: No
- 3' – A overhang: Yes
- Fragment size: ~ 1 kb

• Experimental Data

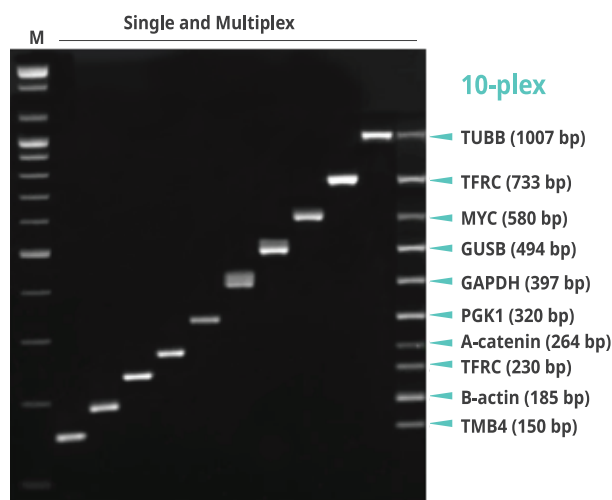


Figure 1. Single RT-PCR and multiplex RT-PCR using *AccuPower® RocketPlex* RT-PCR PreMix.

M: 25/100 bp Mixed DNA Ladder (Bioneer, Cat. no. D-1020)

One-step RT-qPCR kits

All about RT (cDNA Synthesis)

04

Contents

- *AccuPower® GreenStar™* RT-qPCR PreMix & Master Mix
- *AccuPower® Dual-HotStart™* RT-qPCR PreMix & Master Mix

04 AccuPower® GreenStar™ RT-qPCR PreMix & Master Mix

For High Sensitive and Specific One-step RT-qPCR with dsDNA Binding Dye

Description

AccuPower® GreenStar™ RT-qPCR PreMix detects desired target genes precisely from various samples. This real-time PCR product with intercalating dye monitors gene amplification at the same time through fluorescence evaluation at each cycle. It has a feature of selective synthesis of target cDNA from a small amount of template RNA, and is useful for RNA viral detection and for quantitative gene expression.

Features and Benefits

High Sensitivity:

It is possible to detect target template with very small copy number in large amount of RNA.

Specificity:

HotStart DNA polymerase minimizes synthesis of non-specific product at zero cycle. Activated DNA polymerase during temperature elevation can quickly amplify precise target.

Instrument Compatibility:

Master mix type product provide optimized result for various real-time PCR machine.

Ease-of-use:

All the required components for RT-qPCR, such as reverse transcriptase, DNA polymerase, dNTPs, reaction buffer and etc, are contained in the premix. Just add template RNA, primers, probes and D.W. to start your reaction.

Reproducibility:

AccuPower® PreMix is manufactured under strict ISO 9001 quality control conditions to ensure reproducible performance.

Application

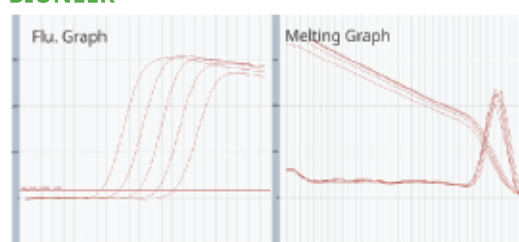
- Low copy viral/bacterial pathogen load determination in an earlier stage
- Low copy mRNA amplification
- Low copy target RNA quantification
- RNA amplification for microarray and NGS

Specifications

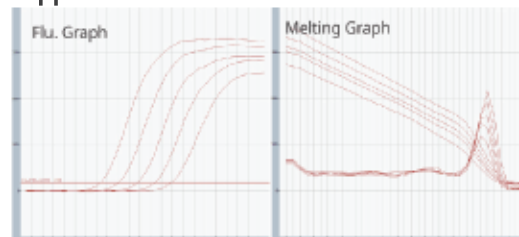
- 5' → 3' exonuclease activity: Yes
- 3' → 5' exonuclease activity: No
- 3' – A overhang: Yes
- Fragment size: ~ 200 bp

Experimental Data

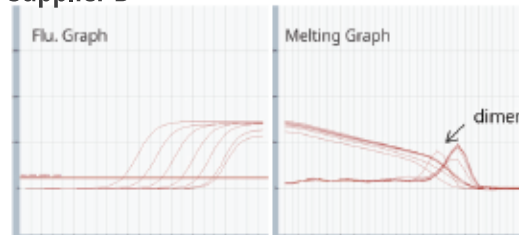
BIONEER



Supplier A



Supplier B



RNA (ng)	BIONEER	Supplier A	Supplier B
100	17.79	17.38	19.00
10	21.46	20.82	22.67
1	25.00	24.67	26.17
0.1	27.31	27.45	29.85
0.01	30.34	30.34	32.82
0.001	33.28	33.58	35.58
NTC	UD	37.32	36.28

Figure 1. Comparison of specificity between AccuPower® GreenStar™ RT-qPCR PreMix and Suppliers' master mixture.

04 AccuPower® Dual-HotStar™ RT-qPCR PreMix & Master Mix

For High Specificity and High Sensitivity One-step RT-qPCR with Duo Harmony of HotStart in RT and qPCR each

• Description

AccuPower® Dual-HotStar™ RT-qPCR PreMix improves RT reaction problem by applying Dual-HotStart™ technology in both RT and qPCR. With this product, cDNA synthesis of your selective RNA will be performed with high sensitivity from a small amount of template RNA. Successive PCR amplification of synthesized cDNA also occurs via a one-step reaction with cDNA synthesis. This product is ready-to-use, simply add template RNA, primers, probes and D.W. to obtain your results with great reproducibility. In addition, we provide the tubes and plate that you can use not only Exicycler™ 96 but also other similar Real-Time PCR machine.

• Features and Benefits

High Sensitivity & Specificity:

This product is idealized to get accurate target gene by using our premier Dual-HotStart™ RT-qPCR reaction which utilizing PyroHotStart RT reaction and HotStart PCR. You can get great result with smallest amount of your target template and high concentrated RNA product. The product has wide dynamic range such as 10^1 - 10^{10} copies.

Multiplexing:

This product can use with several different dye (Probe). So, you can detect several types of target gene.

Use of Various Template RNA:

You can get amazing Real-Time RT-qPCR result since it includes HotStart™ RTase which provides RT reaction in high temperature. So you can use various template RNA even though it has highly formed secondary structure.

Ease-of-use:

All the required components for RT-qPCR, such as reverse transcriptase, DNA polymerase, dNTPs, reaction buffer and etc, are contained in the premix. Just add template RNA, primers, probes and D.W. to start your reaction.

Reproducibility:

AccuPower® PreMix is manufactured under strict ISO 9001 quality control conditions to ensure reproducible performance.

• Application

- Low copy viral/bacterial pathogen load determination in an earlier stage
- Low copy mRNA amplification
- Low copy target RNA quantification
- RNA amplification for microarray and NGS

• Specifications

- 5' → 3' exonuclease activity: Yes
- 3' → 5' exonuclease activity: No
- 3' – A overhang: Yes
- Fragment size: ~ 200 bp

• Experimental Data

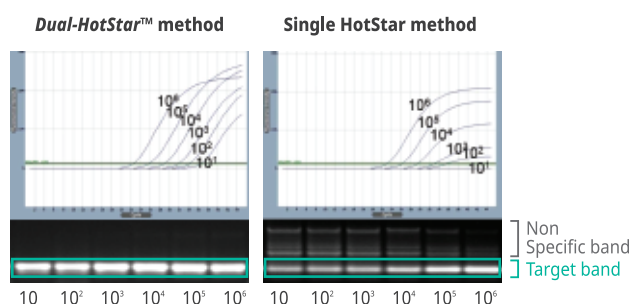


Figure 1. High specificity of AccuPower® Dual-HotStar™ RT-qPCR PreMix. Experiment with HCV target. 10 fold serial dilution of template RNA (10^6 copies - 10 copies spiked in human total RNA). Conventional hotstart qPCR always generate non-specific amplification at low template concentration, which deteriorate the sensitivity of qPCR. AccuPower® Dual-HotStar™ RT-qPCR PreMix accurately amplifies target RNA without non-specific amplification, even at low concentration of template.

Enzymes

05

Contents

- *M-MLV* Reverse Transcriptase
- CycleScript Reverse Transcriptase
- *RocketScript*[™] Reverse Transcriptase
- *RocketScript*[™] Reverse Transcriptase, RNase H Minus

05 Reverse Transcriptase for cDNA Synthesis

M-MLV Reverse Transcriptase

Standard cDNA Synthesis

Moloney Murine Leukemia Virus (M-MLV) Reverse Transcriptase is a RNA-dependent DNA polymerase. This enzyme is able to use an RNA molecule as a template and synthesize a double-stranded DNA. *M-MLV* Reverse Transcriptase is isolated from an *E. coli* strain containing a recombinant clone. It is ideal for use of first-strand synthesis cDNA from RNA molecules and for cDNA synthesis for reverse transcriptase PCR and RT-qPCR.

● Features and Benefits

- Optimized 5X buffer: For faster setup within 10 minutes
- Full length cDNA: For genes up to 9 kb
- RNase, DNase and Proteinase-free: Ensures the integrity of your samples

CycleScript Reverse Transcriptase

High Performance cDNA Synthesis

CycleScript Reverse Transcriptase (CTase) enables the synthesis of cDNA at 55°C by adding a stabilizing agent to a highly purified reverse transcriptase.

● Features and Benefits

- Stability: The stabilizer was added to RNase, DNase & proteinase free reverse transcriptase (*M-MLV*) to improve the thermal stability of the enzyme.
- High Efficiency: It induces primer annealing to RNA at low temperature and solves the secondary structure of RNA template at high temperature, so it can increase cDNA synthesis rate and enable full-length cDNA synthesis.

RocketScript™ Reverse Transcriptase

High Performance / High Temperature cDNA Synthesis

RocketScript™ reverse transcriptase is Bioneer's exclusive *M-MLV* based thermostable reverse transcriptase (RTase). Native *M-MLV* RTase has maximum activity at relatively low temperatures (42°C), causing several problems in reverse transcription of RNA molecules with complex secondary structure. *RocketScript™* has thermostable activity (42°C-70°C), allowing efficient cDNA synthesis from complex secondary structure RNA. Melt the stems and loops keeping you away from your results.

● Features and Benefits

- Thermostable Activity: *RocketScript™* RTase is active even at high temperatures above 50°C. The RT reaction can be performed at various temperatures up to 42-70°C, and cDNA synthesis can be effectively performed.

RocketScript™ Reverse Transcriptase, RNase H Minus

High Performance / High Temperature / Long Size cDNA Synthesis

RocketScript™ Reverse Transcriptase, RNase H Minus removes the activity of RNase H, allowing 12.5 kb long RNA to be efficiently synthesized into full-length cDNA.

● Features and Benefits

- Long cDNA Synthesis: By removing the activity of RNase H, cDNA can be synthesized effectively up to 12.5 kb.
- High Sensitivity: 1 pg of RNA also shows excellent sensitivity to amplification.

Instrument

06

Contents

- *AllInOneCycler™* Thermal Block
- *Exicycler™* 96 Real-time Quantitative Thermal Block

AllInOneCycler™ Thermal Block

Fast Conventional PCR System



Description

AllInOneCycler™ uses the patented novel alloy block and cutting-edge temperature control algorithm to provide the fastest among the currently released thermal cyclers. This consists of (selectable/interchangeable) 6 different types of block depending on experimental purposes, which are 2 different metals (normal and novel alloy) and classified to 3 sample-well types (96-well, 384-well and slide PCR). There is also precise temperature control system that ensures reproducible results, and the thermal gradient function enables that can be up to 12 different temperatures. Finally, a new graphic interface enables the user to use *AllInOneCycler™* easier with compact and lightweight design and an improved portability and space efficiency.

Features and Benefits

Fastest Ramping Rate:

A standard thermal block for *AllInOneCycler™* provides maximum ramp rate at 9.5°C/sec (Figure 1).

Excellent Accuracy & Uniformity:

Precise temperature control system improves the temperature accuracy and uniformity on the entire thermal block that includes wells between center and border. As a result, the user can achieve reproducible results because of these thermal reliability (Figure 2).

Thermal Gradient Function:

The researcher can find the optimal experimental conditions easily by using gradient function of *AllInOneCycler™* at once, and also reduce the time and consumables for additional experiments to set optimal condition.

Interchangeable Thermal Block:

Bioneer provides the interchangeable thermal blocks made of 2 different metals (normal and novel alloy) and classified to 3 sample-well types (96-well, 384-well and slide PCR).

Easy-to-use Interface:

Through graphical user interface with 7-inch touch LCD screen, the user can use *AllInOneCycler™* easily and conveniently.

Experimental Data

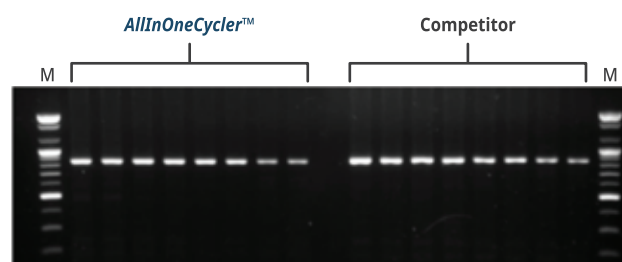
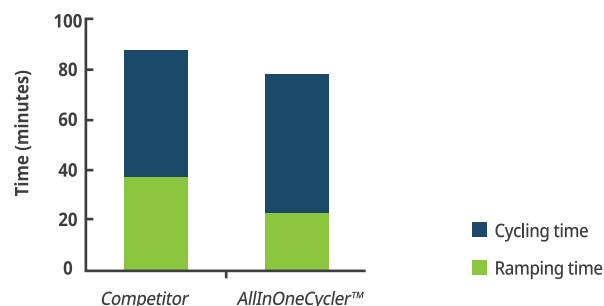


Figure 1. Comparison of operating times and amplification results between competitor and *AllInOneCycler™* (normal block).

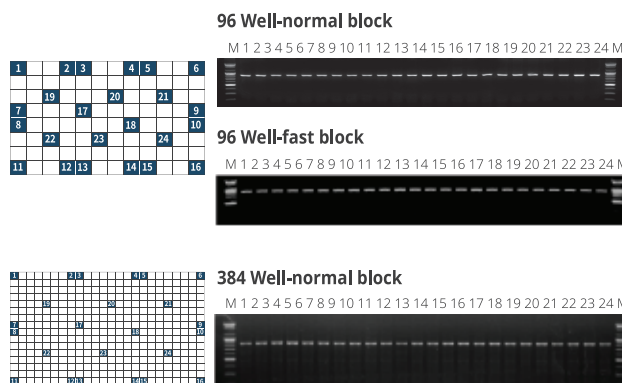


Figure 2. PCR amplification results on 24 representative wells on 96 well-block and 384 well-block to confirm temperature uniformity.

06 **Exicycler™ 96 Real-time Quantitative Thermal Block**

Superior 5-color Real-time Quantitative PCR System



• Description

Exicycler™ 96 is a superior 96-well qPCR system designed for real-time qPCR applications demanding the highest performance. In addition, *in vitro* diagnostic software packages have also been developed (MFDS, CE-IVD certified versions), which allows the instrument to be used for molecular diagnostic purposes.

• Features and Benefits

High Sensitivity & Accuracy:

Bioneer's imaging technique based on polarization of light provides sensitive detection for robust and reliable results. Our patented polarizing optical apparatus mitigates the common problem of a reflection light, allowing precise quantification and target discrimination (Figure 1).

Improved Thermal Block Ramp Rate:

Exicycler™ 96 reduces the experimental time due to improved ramp rate compared to the previous model.

Excellent Accuracy & Uniformity:

Light Tunnel technology in the optic module minimizes well to well signal variations and improves homogeneity. Ct variation is less than 0.3. Precise temperature control system improves temperature accuracy and uniformity for all wells of thermal block. It provides reproducible results (Figure 2).

5-multiplex PCR:

Light Tunnel technology eliminates need of a reference dye. No need to reserve one channel for a reference dye, which enables TRUE 5-color multiplexing.

• Technology of *Exicycler™ 96*

Light Polarization Technology

In the conventional technology, excitation light is generally brighter than the fluorescence generated from the sample. Therefore, light reflected from an optical component interferes with the fluorescence generated from the sample. Furthermore, it is hard to completely distinguish one from the other. This can cause imprecise and unreliable results.

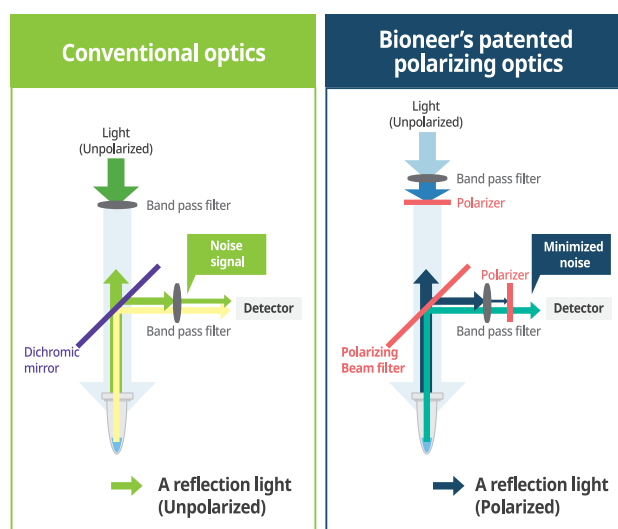


Figure 1. Separation of a reflection light from fluorescence.

Light Tunnel Technology

Light Tunnel technology removes well-to-well variation by transforming light collected in condensing lens to uniform surface light source. It improves optical accuracy and uniformity for the whole plate. Regardless of location of well, the Ct variation will be minimized.

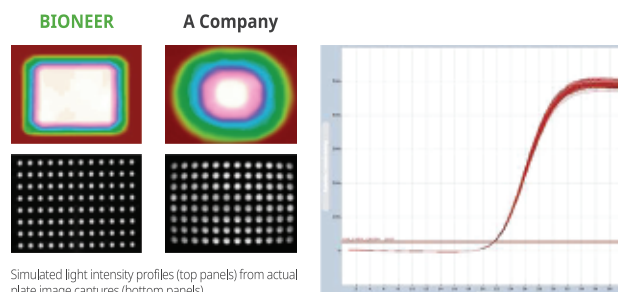


Figure 2. Minimized Ct variation by light tunnel technology.

Ordering Information

Cat. no.	Product Name
AccuPower® RT PreMix	
K-2041 / K-2043	AccuPower® RT PreMix, 96 tubes, 20 µl / 50 µl
K-2041-B / K-2043-B	AccuPower® RT PreMix, 480 tubes, 20 µl / 50 µl
AccuPower® CycleScript RT PreMix	
K-2044 / K-2047	AccuPower® CycleScript RT PreMix (dT20), 96 tubes, 20 µl / 50 µl
K-2044-B / K-2047-B	AccuPower® CycleScript RT PreMix (dT20), 480 tubes, 20 µl / 50 µl
K-2045 / K-2048	AccuPower® CycleScript RT PreMix (dN12), 96 tubes, 20 µl / 50 µl
K-2045-B / K-2048-B	AccuPower® CycleScript RT PreMix (dN12), 480 tubes, 20 µl / 50 µl
K-2046 / K-2049	AccuPower® CycleScript RT PreMix (dN6), 96 tubes, 20 µl / 50 µl
K-2046-B / K-2049-B	AccuPower® CycleScript RT PreMix (dN6), 480 tubes, 20 µl / 50 µl
AccuPower® RocketScript™ RT PreMix	
K-2101 / K-2103	AccuPower® RocketScript™ RT PreMix, 96 tubes, 20 µl / 50 µl
K-2102 / K-2104	AccuPower® RocketScript™ RT PreMix, 480 tubes, 20 µl / 50 µl
AccuPower® RocketScript™ Cycle RT PreMix	
K-2201 / K-2203	AccuPower® RocketScript™ Cycle RT PreMix (dT20), 96 tubes, 20 µl / 50 µl
K-2202 / K-2204	AccuPower® RocketScript™ Cycle RT PreMix (dT20), 480 tubes, 20 µl / 50 µl
K-2205 / K-2207	AccuPower® RocketScript™ Cycle RT PreMix (dN6), 96 tubes, 20 µl / 50 µl
K-2206	AccuPower® RocketScript™ Cycle RT PreMix (dN6), 480 tubes, 20 µl
K-2208 / K-2210	AccuPower® RocketScript™ Cycle RT PreMix (dN12), 96 tubes, 20 µl / 50 µl
K-2209	AccuPower® RocketScript™ Cycle RT PreMix (dN12), 480 tubes, 20 µl
AccuPower® RocketScript™ RT PreMix, RNase H Minus	
K-2221 / K-2223	AccuPower® RocketScript™ RT PreMix, RNase H Minus, 96 tubes, 20 µl / 50 µl
K-2222 / K-2224	AccuPower® RocketScript™ RT PreMix, RNase H Minus, 480 tubes, 20 µl / 50 µl
K-2241 / K-2243	AccuPower® RocketScript™ RT PreMix (dT20), RNase H Minus, 96 tubes, 20 µl / 50 µl
K-2242 / K-2244	AccuPower® RocketScript™ RT PreMix (dT20), RNase H Minus, 480 tubes, 20 µl / 50 µl
K-2245 / K-2246	AccuPower® RocketScript™ RT PreMix (dN6), RNase H Minus, 96 tubes, 20 µl / 50 µl
K-2247 / K-2248	AccuPower® RocketScript™ RT PreMix (dN12), RNase H Minus, 96 tubes, 20 µl / 50 µl
AccuPower® RT-PCR PreMix	
K-2055 / K-2057	AccuPower® RT-PCR PreMix, 96 tubes, 20 µl / 50 µl
K-2055-B / K-2057-B	AccuPower® RT-PCR PreMix, 480 tubes, 20 µl / 50 µl
AccuPower® RocketScript™ RT-PCR PreMix	
K-2501 / K-2503	AccuPower® RocketScript™ RT-PCR PreMix, 96 tubes, 20 µl / 50 µl
K-2502 / K-2504	AccuPower® RocketScript™ RT-PCR PreMix, 480 tubes, 20 µl / 50 µl
AccuPower® RocketScript™ RT-PCR PreMix, RNase H Minus	
K-2231 / K-2233	AccuPower® RocketScript™ RT-PCR PreMix, RNase H Minus, 96 tubes, 20 µl / 50 µl
K-2232 / K-2234	AccuPower® RocketScript™ RT-PCR PreMix, RNase H Minus, 480 tubes, 20 µl / 50 µl

Ordering Information

Cat. no.	Product Name
<i>AccuPower® Dual-HotStart™</i> RT-PCR PreMix	
K-6710 / K-6711	<i>AccuPower® Dual-HotStart™</i> RT-PCR PreMix, 96 tubes, 20 µl / 50 µl
K-6712 / K-6713	<i>AccuPower® Dual-HotStart™</i> RT-PCR PreMix, 480 tubes, 20 µl / 50 µl
<i>AccuPower® Dual-HotStart™</i> RT-PCR PreMix (with UDG)	
K-6714 / K-6715	<i>AccuPower® Dual-HotStart™</i> RT-PCR PreMix (with UDG), 96 tubes, 20 µl / 50 µl
<i>AccuPower® RocketPlex</i> RT-PCR PreMix	
K-2211 / K-2213	<i>AccuPower® RocketPlex</i> RT-PCR PreMix, 96 tubes, 20 µl / 50 µl
K-2212 / K-2214	<i>AccuPower® RocketPlex</i> RT-PCR PreMix, 480 tubes, 20 µl / 50 µl
<i>AccuPower® GreenStar™</i> RT-qPCR PreMix & Master Mix	
K-6400	<i>AccuPower® GreenStar™</i> RT-qPCR PreMix, 96 tubes, 50 µl
K-6403	<i>AccuPower® GreenStar™</i> RT-qPCR Master Mix (2X), 2.5ml
<i>AccuPower® Dual-HotStart™</i> RT-qPCR PreMix & Master Mix	
K-6704	<i>AccuPower® Dual-HotStart™</i> RT-qPCR PreMix, 96 tubes, 50 µl
K-6707	<i>AccuPower® Dual-HotStart™</i> RT-qPCR Master Mix (2X), 2.5 ml
<i>M-MLV</i> Reverse Transcriptase	
E-3121 / E-3122	<i>M-MLV</i> Reverse Transcriptase, 10,000 unit / 50,000 unit
<i>CycleScript</i> Reverse Transcriptase	
E-3131 / E-3132	<i>CycleScript</i> Reverse Transcriptase, 10,000 unit / 50,000 unit
<i>RocketScript™</i> Reverse Transcriptase	
E-3141 / E-3142	<i>RocketScript™</i> Reverse Transcriptase, 10,000 unit / 50,000 unit
<i>RocketScript™</i> Reverse Transcriptase, RNase H Minus	
E-3161 / E-3162	<i>RocketScript™</i> Reverse Transcriptase, RNase H Minus, 10,000 unit / 50,000 unit

Related Products (Instruments)

Cat. no.	Product Name
<i>AllInOneCycler™</i>	
A-2041-1N	<i>AllInOneCycler™</i> 96 well PCR system
A-2041-1F	<i>AllInOneCycler™</i> Fast 96 well PCR system
<i>Exicycler™</i> 96 (Ver.4)	
A-2060-1	<i>Exicycler™</i> 96 (Ver.4) Real-Time Quantitative Thermal Block
A-2060-2	<i>Exicycler™</i> 96 (Ver.4) Fast Real-Time Quantitative Thermal Block

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