



C DNA/RNA Amplification

DNA Amplification
RNA Amplification
Real-Time PCR
Customized PCR

Overview

AccuPower® PreMix series is an innovative PCR master mix product range designed to make your PCR, reverse transcription RT-PCR and qPCR experiments easier and more cost effective than ever. With a wide range of applications and unparalleled ease of use and stability, *AccuPower*® PCR PreMix series will be an important addition to your collection of research tools.

Each tube or plate you order has all the components of a PCR master mix –including enzyme, buffer and dNTPs - lyophilized with a patented stabilizer that maintains full activity of reagents for over one month at room temperature, one year at 4°C or two years in the freezer. Simply add your primers and template into a tube/plate. Never make a dNTP stock solution or aliquot PCR enzymes tediously. In addition, since there are no stock solutions, you will never have to deal with or worry about contaminated stock solutions. Each reaction is pre-dispensed and dried in its own tube/well!

In addition to extended *AccuPower*® shelf life, our unique stabilizers also improve enzyme half-life. In fact, enzyme stability is maintained at 95°C for up to 3 times longer than with standard, liquid based, DNA polymerases, making it an ideal enzyme for amplifying GC-rich DNA.

AccuPower® PCR PreMix is available with or without loading dye. When present, you can load PCR product directly into gel after experiment – no glycerol or sucrose is further required.

Selection Guide of *AccuPower*® PreMix Series – By Application

■ DNA Amplification

Products	Applications								
	Standard PCR	HotStart PCR	Prevent Carryover Contamination	PCR for Gene Cloning	PCR for TA Cloning	High Fidelity PCR	Long Range PCR	GC Rich PCR	Multiplex PCR
<i>AccuPower</i> ® PCR	✓				✓				
<i>AccuPower</i> ® PCR (with UDG)	✓		✓		✓				
<i>AccuPower</i> ® Taq PCR	✓				✓				
<i>AccuPower</i> ® HotStart PCR	✓	✓			✓			✓	
<i>AccuPower</i> ® HotStart PCR (with UDG)	✓	✓	✓		✓			✓	
<i>AccuPower</i> ® GoldHotStart Taq PCR	✓	✓			✓			✓	
<i>AccuPower</i> ® PyroHotStart Taq PCR	✓	✓			✓			✓	
<i>AccuPower</i> ® HotStart Pfu PCR	✓	✓		✓		✓			
<i>AccuPower</i> ® ProFi Taq PCR	✓			✓	✓	✓	✓	✓	
<i>AccuPower</i> ® Pfu PCR	✓			✓		✓			
<i>AccuPower</i> ® Multiplex PCR	✓	✓			✓				✓
<i>AccuPower</i> ® Gold Multiplex PCR	✓	✓			✓				✓

■ RNA Amplification

cDNA Synthesis Kits

Products	Applications			
	Standard RT	High Efficiency RT	RT of Secondary Structured RNA	HotStart RT
<i>AccuPower</i> ® RT	✓			
<i>AccuPower</i> ® CycleScript RT	✓	✓	✓	
<i>AccuPower</i> ® <i>RocketScript</i> ™ RT	✓		✓	
<i>AccuPower</i> ® <i>RocketScript</i> ™ Cycle RT	✓	✓	✓	
<i>AccuPower</i> ® <i>RocketScript</i> ™ RT (RNase H-)	✓		✓	

One-step RT-PCR Kits

Products	Applications					
	Standard RT-PCR	RT-PCR of Secondary Structured RNA	High Specificity & High Sensitivity	HotStart RT	Prevent Carryover Contamination	Multiplex RT-PCR
<i>AccuPower</i> ® RT-PCR	✓					
<i>AccuPower</i> ® <i>RocketScript</i> ™ RT-PCR	✓	✓				
<i>AccuPower</i> ® <i>Dual-HotStart</i> ™ RT-PCR	✓	✓	✓	✓		
<i>AccuPower</i> ® <i>Dual-HotStart</i> ™ RT-PCR (with UDG)	✓	✓	✓	✓	✓	
<i>AccuPower</i> ® <i>RocketPlex</i> RT-PCR	✓	✓				✓

■ Real-Time PCR

Products	Applications				
	HotStart RT	HotStart qPCR	qPCR (Intercalating dye)	qPCR (TaqMan Probe)	Prevent Carryover Contamination
<i>AccuPower</i> ® <i>GreenStar</i> ™ qPCR		✓	✓		
<i>AccuPower</i> ® <i>DualStar</i> ™ qPCR		✓		✓	
<i>AccuPower</i> ® <i>Plus DualStar</i> ™ qPCR		✓		✓	
<i>AccuPower</i> ® <i>Plus DualStar</i> ™ qPCR (with UDG)		✓		✓	✓
<i>AccuPower</i> ® <i>Dual-HotStart</i> ™ RT-qPCR	✓	✓		✓	

Specifications of AccuPower® Premix Series

■ PCR & One-step RT-PCR

Product	Product Size	5'→3' Exonuclease	3'→5' Exonuclease	Specificity	Fidelity	GC-rich	Leaves 3'-A
PCR	≤ 10 kb	No	No	***	***	***	Yes
PCR (with UDG)	≤ 10 kb	No	No	***	***	***	Yes
Taq PCR	≤ 10 kb	Yes	No	***	***	***	Yes
Pfu PCR	≤ 10 kb	No	Yes	****	*****	***	No
ProFi Taq PCR	≤ 30 kb	Yes	Yes	****	****	***	Yes
HotStart PCR	≤ 10 kb	No	No	****	***	****	Yes
HotStart PCR (with UDG)	≤ 10 kb	No	No	****	***	****	Yes
GoldHotStart Taq PCR	≤ 10 kb	Yes	No	****	***	****	Yes
PyroHotStart Taq PCR	≤ 10 kb	Yes	No	****	***	****	Yes
HotStart Pfu PCR	≤ 15 kb	No	Yes	****	*****	***	No
Multiplex PCR	1~20 frag.	No	No	****	***	***	Yes
Gold Multiplex PCR	1~20 frag.	No	No	****	***	***	Yes
RT-PCR	≤ 6 kb	No	No	-	-	***	Yes
RocketScript™ RT-PCR	≤ 6 kb	No	No	-	-	***	Yes
RocketScript™ RT-PCR (RNase H-)	≤ 12.5 kb	Yes	No	-	-	***	Yes
Dual-HotStart™ RT-PCR	≤ 3kb	Yes	No	*****	-	****	Yes
Dual-HotStart™ RT-PCR (with UDG)	≤ 3kb	Yes	No	*****	-	****	Yes
RocketPlex RT-PCR	≤ 1 kb	No	No	****	-	***	Yes

■ Reverse Transcription

Product	Product Size	RNase H Activity	DNase Activity	RNase Activity	GC-rich
RT	≤ 9 kb	Yes	No	No	***
CycleScript RT	≤ 9 kb	Yes	No	No	***
RocketScript™ RT	≤ 10 kb	Yes	No	No	***
RocketScript™ Cycle RT	≤ 10 kb	Yes	No	No	***
RocketScript™ RT (RNase H-)	≤ 12.5 kb	No	No	No	****

■ qPCR & One-step RT-qPCR

Product	5'→3' Exonuclease	3'→5' Exonuclease	Specificity	GC-rich	Leaves 3'-A
GreenStar™ qPCR	No	No	****	****	Yes
Dual-Star™ qPCR	Yes	No	*****	****	Yes
Plus Dual-Star™ qPCR	Yes	No	****	****	Yes
Plus Dual-Star™ qPCR (with UDG)	Yes	No	****	****	Yes
Dual-HotStart™ RT-qPCR	Yes	No	*****	****	Yes

Selection Guide of Enzymes

Product		Applications								
		PCR					RT			
		Standard PCR	HotStart PCR	PCR for Gene Cloning	Long Range PCR	GC Rich PCR	Multiplex PCR	Standard RT	Cyclic RT	Long range RT
DNA Polymerase	<i>Top</i>	✓								
	<i>Taq</i>	✓								
	<i>Pfu</i>	✓		✓						
	<i>ProFi Taq</i>	✓		✓	✓					
HotStart DNA Polymerase	<i>Top</i>	✓	✓			✓	✓			
	<i>Taq</i>	✓	✓			✓	✓			
Reverse Transcriptase	<i>M-MLV</i>							✓		
	CycleScript							✓	✓	
	<i>RocketScript</i> [™]							✓	✓	
	<i>RocketScript</i> [™] RNase H Minus							✓	✓	✓

Specifications of Enzymes

Product	Product Size	5'→3' Exonuclease	3'→5' Exonuclease	Specificity	Fidelity	GC-rich	Leaves 3'-A
<i>Top</i> DNA Polymerase	≤ 10 kb	No	No	****	***	***	Yes
<i>Taq</i> DNA Polymerase	≤ 10 kb	Yes	No	****	***	***	Yes
HotStart <i>Taq</i> DNA Polymerase	≤ 12 kb	Yes	No	****	***	****	Yes
HotStart DNA Polymerase	≤ 12 kb	No	No	****	***	****	Yes
<i>ProFi Taq</i> DNA Polymerase	≤ 30 kb	Yes	Yes	****	***	****	Yes
<i>Pfu</i> DNA Polymerase	≤ 10 kb	No	Yes	***	****	**	No
<i>M-MLV</i> Reverse Transcriptase	≤ 9 kb	-	-	-	-	***	-
CycleScript Reverse Transcriptase	≤ 9 kb	-	-	-	-	***	-
<i>RocketScript</i> [™] Reverse Transcriptase	≤ 10 kb	-	-	-	-	***	-
<i>RocketScript</i> [™] RTase RNase H(-)	≤ 12.5 kb	-	-			***	-

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DNA Amplification ●●●

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Standard PCR Kit

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HotStart PCR Kit

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DNA Polymerase

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Conventional PCR Instrument

AllInOneCycler™ → Go to M. Instruments

Life Science Product

For Standard PCR, Dried-type Premix with *Top* DNA Polymerase

■ Description

AccuPower® PCR PreMix is a convenient lyophilized PCR master mix containing *Top* DNA polymerase, dNTPs, reaction buffer, tracking dye, and our patented stabilizer. AccuPower® PCR PreMix includes our super-processive “three times faster than regular *Taq*” *Top* DNA polymerase for faster nucleic acid amplification. *Top* DNA polymerase is engineered to be faster by the removal of the 5'-3' exonuclease activity from *Thermus thermophilus* DNA polymerase. The result is an enzyme that is ideal for all applications where you would normally use *Taq*. Its Mastermix version, instead of dried format, is also available.

AccuPower® PCR PreMix is available with or without tracking dye, depending on your application. If purchased a product with tracking dye, final PCR product can be loaded on agarose gels directly without addition of loading buffer.

■ Features and Benefits

● Stability:

AccuPower® PCR PreMix maintains its stability long-term storage due to Bioneer's unique stabilizer. AccuPower® PCR PreMix maintains full activity after treatment at 95°C for 90 min, whereas standard solution-type MasterMixes will lose at least 1/2 their activity after this heat treatment. From this, stabilizers in AccuPower® increase the 1/2 life of the enzyme which can result in better yield in addition to significantly extending the life of the product.

● Ease-of-use:

Simply add template DNA, Primers and ddH₂O to start the PCR reaction. Every AccuPower® PCR PreMix tube contains DNA polymerase and all other components required for PCR. No need to add sample loading buffer by the included tracking dye and precipitants required on the electrophoresis step. Also, the carry-over contamination by generation of aerosols can be minimized. This product can be used for cloning such as T-A cloning vector since the end products leaves an A overhang on amplicons. PCR is convenient and fast with AccuPower®.

● Sensitivity:

Sensitivity tests using both Lambda DNA and Human genomic DNA as template demonstrates equivalent or better sensitivity relative to competitor products.

● Reproducibility:

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

■ Specifications

- Enzyme: *Top* DNA polymerase
- 5' to 3' exonuclease activity: No
- 3' to 5' exonuclease activity: No
- 3' - A overhang: Yes
- Fragment size: Up to ~ 10 kb

■ Application

- Conventional PCR
- Primer extension
- TA cloning
- Gene sequencing

■ Storage Temperature

- 20°C up to 2 years and/or room temperature for a month.

■ Experimental Data

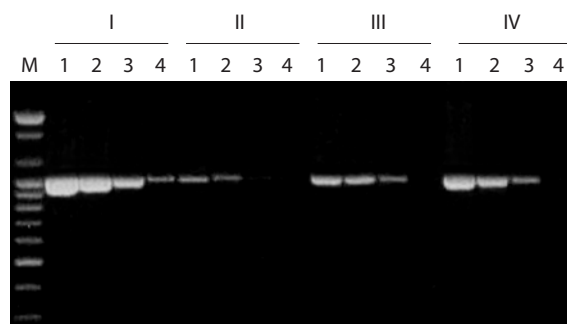


Figure 1. Comparison of sensitivity test for PCR PreMix and other companies' products using serial diluted human gDNA.

Amplification of the human insulin receptor gene.

I: AccuPower® PCR PreMix
 II: A company *Taq* DNA polymerase
 III: B company *Taq* DNA polymerase
 IV: C company PCR PreMix
 Lane 1: Human gDNA 10 ng
 Lane 2: Human gDNA 1 ng
 Lane 3: Human gDNA 100 pg
 Lane 4: Human gDNA 10 pg

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

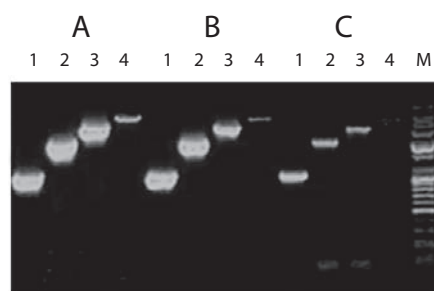


Figure 2. Comparison of processivity test for AccuPower® PCR PreMix and other companies' products using lambda DNA.

Rxn. condition 95°C 5 min, [94°C 30 sec, 57°C 30 sec, 72°C 30 sec] (30 cycles), 72°C 5 min.

A: AccuPower® PCR PreMix

B: S company's Taq premix type

C: T company's Taq premix type

Lane 1: 1 kb fragment of Lambda DNA

Lane 2: 2 kb fragment of Lambda DNA

Lane 3: 3 kb fragment of Lambda DNA

Lane 4: 4 kb fragment of Lambda DNA

M: 100 bp plus DNA Ladder (Bioneer, Cat. no. D-1035)

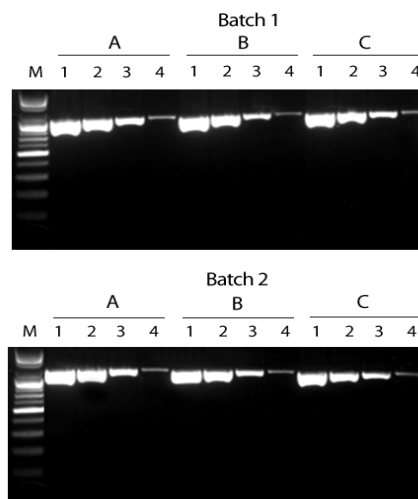


Figure 3. Comparison of thermostability of AccuPower® PCR PreMix. AccuPower® PCR PreMix is incubated at 95°C with various time.

A: 30 min, B: 60 min, C: 90 min

Lane 1: Human genomic DNA 10 ng

Lane 2: Human genomic DNA 1 ng

Lane 3: Human genomic DNA 100 pg

Lane 4: Human genomic DNA 10 pg

M: 100 bp plus DNA ladder (Bioneer, Cat. no. D-1035)

Ordering Information

Cat. no.	Product Description
K-2011	AccuPower® PCR PreMix, 0.5 ml thin-wall microtube / 100 tubes, 50 µl rxn
K-2012	AccuPower® PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached cap / 96 tubes, 20 µl rxn
K-2013	AccuPower® PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached cap / 96 tubes, 50 µl rxn
K-2016	AccuPower® PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached cap / 480 tubes, 20 µl rxn
K-2017	AccuPower® PCR PreMix, 0.2 ml thin-wall tubes with individual cap / 480 tubes, 50 µl rxn
K-2018	AccuPower® PCR Master Mix, 1 ml of 2X master mix solution
K-2018-1	AccuPower® PCR Master Mix, 10 ml of 2X master mix solution
K-2080-1	AccuPower® PCR PreMix, thin-wall 384-well full-skirted plate, 5 µl rxn
K-2080-2	AccuPower® PCR PreMix, thin-wall 384-well full-skirted plate, 10 µl rxn
K-2080-3	AccuPower® PCR PreMix, thin-wall 384-well full-skirted plate, 20 µl rxn
K-2260-1	AccuPower® PCR PreMix, thin-wall 96-well flat plate, 10 µl rxn
K-2260-2	AccuPower® PCR PreMix, thin-wall 96-well full-skirted plate, 10 µl rxn
K-2260-3	AccuPower® PCR PreMix, thin-wall 96-well semi-skirted plate, 10 µl rxn
K-2260-4	AccuPower® PCR PreMix, thin-wall 96-well flat plate, 20 µl rxn
K-2260-5	AccuPower® PCR PreMix, thin-wall 96-well full-skirted plate, 20 µl rxn
K-2260-6	AccuPower® PCR PreMix, thin-wall 96-well semi-skirted plate, 20 µl rxn

For Standard PCR, Dried-type Premix with Top DNA Polymerase/ Prevention Carry-over Contamination



Description

Polymerase chain reaction (PCR) is a powerful technique that can amplify a single molecule of DNA to levels detectable on an agarose gel. Therefore, a presence of a small amount of DNA in the reaction can amplify and lead to a false positive result. Such effect is common, where there may be products from previous PCR amplifications that can carryover to the next PCR cycle (termed: carry-over contamination). To avoid this, the most common way is to avoid carry-over contamination is to use dUTP as a substitute for dTTP for all PCR performed in a lab and treating all PCR reactions with Uracil-DNA Glycosylase (UDG). This is treated prior to loading on a thermal cycler in order to destroy trace amounts of DNA from previous amplifications.

AccuPower® PCR PreMix (with UDG) is a ready-to-use master mix containing all components, except primers and template, for the amplification and detection of DNA in PCR. The master mix combines Top DNA polymerase with integrated UDG carryover prevention technology to provide optimal performance with a variety of PCR detection technologies.

Features and Benefits

- **Prevention of Carryover Contamination:**
UDG and dUTP in the Master Mix prevent the re-amplification of carryover PCR products between reactions. dUTP ensures that any amplified DNA will contain uracil, while UDG removes uracil residues from single- or double-stranded DNA, preventing dU-containing DNA from serving as template in subsequent PCR reactions. Prior to PCR, a UDG incubation step (37°C, 2 min) cleaves uracil residues from any contaminating dU-containing DNA from previous PCR reactions. UDG is then inactivated by the high temperatures during normal PCR cycling, allowing the amplification of legitimate target sequences (Figure 1).
- **Ease-of-use:**
All reaction components required for PCR, including thermostable DNA polymerase and dNTPs are contained within each tube and in a lyophilized "PreMix" form. The user needs only to add template DNA, primers and water. Materials necessary for loading agarose gels for electrophoresis are also added in the reaction, eliminating the need to add loading dye after PCR is completed.

- **Sensitivity:**
Sensitivity test using Lambda DNA and Human genomic DNA as template show significantly better sensitivity compared to other competitor products.

- **Reproducibility:**
AccuPower® PCR PreMix is manufactured under strict ISO 9001 quality control conditions to ensure reproducible PCR performance.

Specifications

- Enzyme: Top DNA polymerase
- 5' to 3' exonuclease activity: No
- 3' to 5' exonuclease activity: No
- 3' - A overhang: Yes
- Fragment size: Up to ~ 10 kb

Application

- Conventional PCR
- Primer extension
- TA cloning
- Gene sequencing
- Molecular diagnosis

Transport Temperature

Room temperature

Storage Temperature

-20°C

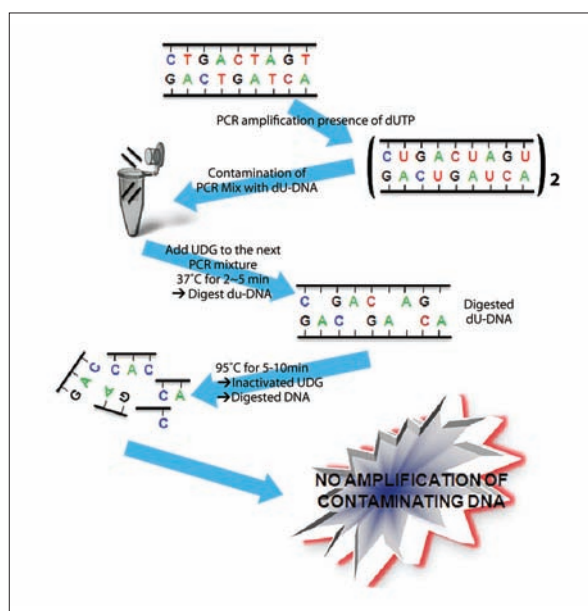


Figure 1. Prevention of carryover contamination.

■ Experimental Data

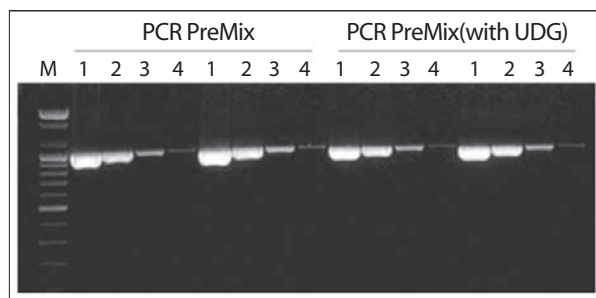


Figure 2. Comparison of sensitivity between *AccuPower*® PCR PreMix and *AccuPower*® PCR PreMix (with UDG).

AccuPower® PCR PreMix and the competing products (solution type's master mix) are incubated at 95°C with various times. Sensitivity test was operated using serial diluted human genomic DNA. Reaction mixture was incubated at 37°C for 2 min followed by 95°C for 5 min, 30 cycles of 20 sec at 95°C, 20 sec at 55°C, 30 sec at 72°C.

Lane 1: 10 ng of human genomic DNA
 Lane 2: 1 ng of human genomic DNA
 Lane 3: 100 pg of human genomic DNA
 Lane 4: 10 pg of human genomic DNA
 M: 100 bp DNA Ladder (Bioneer, Cat. no. D-1030-1)

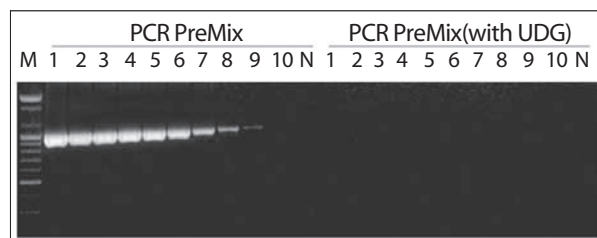


Figure 3. Efficiency of uracil DNA glycosylase using PCR products (including uracil base).

Efficiency test of uracil DNA glycosylase was operated using serial diluted PCR products including uracil base. *AccuPower*® PCR PreMix was also tested for negative control. Reaction mixture was incubated at 37°C for 2 min, followed by 95°C for 5 min, 30 cycles of 20 sec at 95°C, 20 sec at 55°C, 30 sec at 72°C.

Lane 1: 10^{11} copy Lane 2: 10^{10} copy Lane 3: 10^9 copy
 Lane 4: 10^8 copy Lane 5: 10^7 copy Lane 6: 10^6 copy
 Lane 7: 10^5 copy Lane 8: 10^4 copy Lane 9: 10^3 copy
 Lane 10: 10^2 copy Lane N: No template control
 M: 100 bp DNA Ladder (Bioneer, Cat. no. D-1030-1)

■ Ordering Information

Cat. no.	Product Description
K-2012-1	<i>AccuPower</i> ® PCR PreMix (with UDG), 0.2 ml thin-wall tubes with attached cap / 96 tubes, 20 μ l rxn
K-2016-1	<i>AccuPower</i> ® PCR PreMix (with UDG), 0.2 ml thin-wall tubes with attached cap / 480 tubes, 20 μ l rxn

For Standard PCR, Dried-type Premix with *Taq* DNA Polymerase



■ Description

AccuPower® Taq PCR PreMix is a convenient lyophilized PCR master mix containing Taq DNA polymerase, dNTPs, reaction buffer, tracking dye, and patented stabilizer and is aliquoted into 8-strip PCR tubes (0.5 ml tubes, as well as 96 and 384 well plates are also available). The premix retains its activity for over a month at room temperature and is stable for two years in -20°C freezer.

AccuPower® Taq PCR PreMix is available with or without tracking dye, depending on your application. If purchased with tracking dye, reactions can be loaded on agarose gels without adding loading buffer.

■ Features and Benefits

- **Flexible:**
Taq provides accurate amplification of standard and highly suitable for all PCR applications.
- **Ease-of-use:**
All reaction components required for PCR, including thermostable DNA polymerase and dNTPs are contained within each tube and in a lyophilized "PreMix" form. Just add template and primers and start your reaction. dNTPs, buffer and enzyme are provided.
- **Reproducibility:**
Bioneer's strict quality controlled production system ensures that your results will be reproducible experiment after experiment.
- **Sensitivity:**
Stable at room temperature for a month and for 2 years in a -20°C freezer

■ Specifications

- Enzyme: Taq DNA polymerase
- 5' to 3' exonuclease: Yes
- 3' to 5' exonuclease: No
- 3' - A overhang: Yes
- Fragment Size: ~10 kb

■ Application

- Conventional PCR
- Primer extension
- TA cloning
- Gene sequencing

■ Transport Temperature

Room temperature

■ Storage Temperature

-20°C

■ Experimental Data

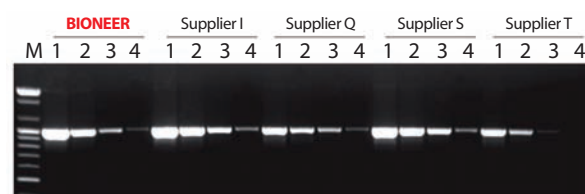


Figure 1. Comparison of PCR amplification quality between AccuPower® Taq PCR PreMix from Bioneer and other suppliers' Taq PCR master mix. Target Gene: Human insulin receptor gene.

The cycling conditions for AccuPower® Taq PCR PreMix were 95°C for 5 min, 30 cycles of 20 sec at 95°C, 20 sec at 55°C, and 30 sec at 72°C. PCR reactions using other suppliers' PCR master mix were performed according to each supplier's protocol.

Lane 1: 10 ng Human genomic DNA
Lane 2: 1 ng Human genomic DNA
Lane 3: 100 pg Human genomic DNA
Lane 4: 10 pg Human genomic DNA
Lane M: 100 bp DNA Ladder (Bioneer, Cat. no. D-1030)

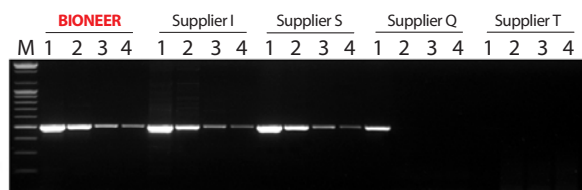


Figure 2. Comparison of amplification quality between *AccuPower® Taq* PCR PreMix and suppliers' *Taq* PCR master mix.

Target Gene: IRGC (Immunity-related GTPase family, cinema).

Bioneer reaction mixture was followed by 95°C for 5 min, 35 cycles of 20 sec at 95°C, 20 sec at 55°C, 30 sec at 72°C. PCR reactions using other suppliers' PCR master mix were performed according to each supplier's protocol.

Lane 1: 10 ng human genomic DNA

Lane 2: 1 ng human genomic DNA

Lane 3: 100 pg human genomic DNA

Lane 4: 10 pg human genomic DNA

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

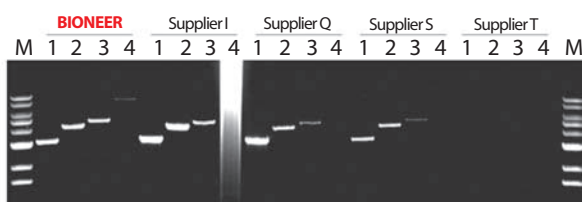


Figure 3. Comparison of long kb amplification between *AccuPower® Taq* PCR PreMix and suppliers' *Taq* PCR master mix.

Bioneer reaction mixture was followed by 95°C for 5 min, 30 cycles of 20 sec at 95°C, 20 sec at 65°C, 8 min at 68°C. PCR reactions using other suppliers' PCR master mix were performed according to each suppliers' protocol.

Lane 1: 3 kb fragment (Human tumor protein p53 gene)

Lane 2: 4 kb fragment (Human beta globin region)

Lane 3: 4.5 kb fragment (Human DNA cross-link repair 1A gene)

Lane 4: 8 kb fragment (Human hemoglobin epsilon 1 gene)

Lane M: 1 kb DNA Ladder (Bioneer, Cat. no. D-1040)

■ Ordering Information

Cat. no.	Product Description
K-2601	<i>AccuPower® Taq</i> PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached cap / 96 tubes, 20 µl rxn,
K-2602	<i>AccuPower® Taq</i> PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached cap / 480 tubes, 20 µl rxn
K-2603	<i>AccuPower® Taq</i> PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached cap / 96 tubes, 50 µl rxn
K-2604	<i>AccuPower® Taq</i> PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached cap / 480 tubes, 50 µl rxn
K-2609	<i>Taq</i> PCR Master Mix, 2.5 ml of 2X master mix solution
K-2610	<i>Taq</i> PCR Master Mix, 25 ml of 2X master mix solution, 12.5 ml X 2 tubes

For Hotstart PCR, Dried-type Premix with *Top* DNA Polymerase



■ Description

AccuPower® HotStart PCR PreMix is a lyophilized PCR master mix containing a thermostable DNA polymerase, thermostable pyrophosphatase, reaction buffer, dNTPs, tracking dye, and patented stabilizer in a ready to use HotStart PCR PreMix. Bioneer uses a unique enzyme-mediated hotstart PCR that provides robust and reliable results. Bioneer's *Top* DNA polymerase is inhibited at lower temperatures (<70°C) by pyrophosphate. However, *Top* DNA Polymerase is rendered fully active at temperatures above 70°C via pyrophosphate hydrolysis with our thermostable pyrophosphatase. This prevents the formation of mis-primed products and primer-dimers during the reaction set up process resulting in improved PCR specificity. It is ideal for nucleic acid amplification reactions involving complex genomic or cDNA templates, very low copy targets, and multiplex reactions.

■ Features and Benefits

● Specificity:

Pyrophosphate (PPi) has a very high affinity with Mg²⁺ ion required for DNA polymerases. Thus in the presence of excess PPi, DNA polymerase is not active. AccuPower® HotStart PCR PreMix uses excess PPi to eliminate the production of non-specific product during PCR setup. However, during the first cycle of PCR, at temperatures above 70°C, the added thermostable PPase cleaves PPi and releases the bound Mg²⁺, thereby activating the DNA polymerase. Thus non-specific amplification is suppressed during set-up and at lower temperatures, and the Polymerase is fully active after the first incubation at 95°C. In addition, the presence of thermostable PPase delays the plateau phase of PCR by removing the PPi that normally accumulates during amplification, allowing you to amplify low copy targets with confidence (Figure 1).

● Robust yields due to novel Enzyme-Mediated HotStart PCR:

AccuPower® HotStart PCR PreMix uses a novel hotstart method, that utilizes pyrophosphosphate (hereinafter referred as "PPi"), a thermostable pyrophosphatase (hereinafter as "PPase"), Mg²⁺, and DNA polymerase. It shows robust yields in long-cycle PCR with low copy targets by increasing specificity and sensitivity, while delaying the plateau effect.

■ Specifications

- Enzyme: *Top* DNA polymerase
- 5' to 3' exonuclease activity: No
- 3' to 5' exonuclease activity: No
- 3' - A overhang: Yes
- Fragment size: Up to ~ 12 kb

■ Application

- High specificity PCR
- High sensitivity PCR
- gDNA template PCR
- Low copy target PCR
- Multiple primer pairs PCR
- cDNA template PCR

■ Transport Temperature

Room temperature

■ Storage Temperature

-20°C

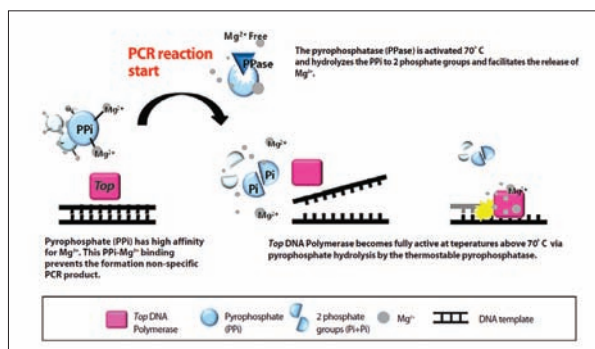


Figure 1. Enzyme-mediated HotStart PCR.

■ Experimental Data

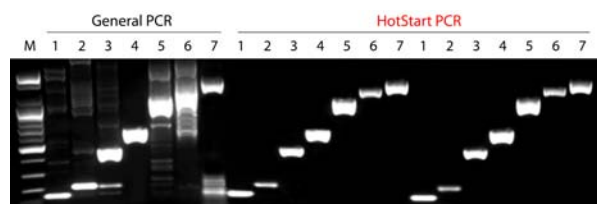


Figure 2. Specificity comparison between *AccuPower*® PCR PreMix and *AccuPower*® HotStart PCR PreMix.

Lane 1: P75/P73 primer set (139 bp)
 Lane 2: P55/P53 primer set (211 bp)
 Lane 3: P55/P63 primer set (447 bp)
 Lane 4: P75/P83 primer set (618 bp)
 Lane 5: P55/P73 primer set (1082 bp)
 Lane 6: P65/P83 primer set (1296 bp)
 Lane 7: P55/P83 primer set (1561 bp)

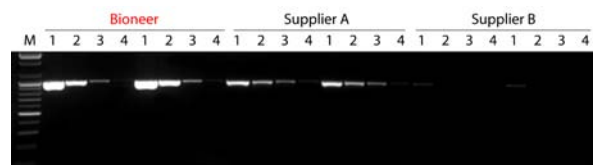


Figure 3. Comparison of PCR amplification sensitivity between *AccuPower*® HotStart PCR PreMix from Bioneer and other suppliers' HotStart PCR kit.

Lane 1: Human gDNA 10 ng
 Lane 2: Human gDNA 1 ng
 Lane 3: Human gDNA 100 pg
 Lane 4: Human gDNA 10 pg
 M: 100 bp plus DNA ladder (Bioneer, Cat. no D-1035)

■ Ordering Information

Cat. no.	Product Description
K-5050	<i>AccuPower</i> ® HotStart PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached cap / 96 tubes, 20 µl rxn,
K-5051	<i>AccuPower</i> ® HotStart PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached cap / 480 tubes, 20 µl rxn
K-5052	<i>AccuPower</i> ® HotStart PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached cap / 96 tubes, 50 µl rxn
K-5053	<i>AccuPower</i> ® HotStart PCR PreMix, 0.5 ml thin-wall tubes with attached cap / 100 tubes, 50 µl rxn
K-5057	<i>AccuPower</i> ® HotStart PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached cap / 480 tubes, 50 µl rxn

For Hotstart PCR, Dried-type Premix with *Top* DNA Polymerase/ Prevention of Carryover Contamination

Description

Polymerase chain reaction (PCR) is a powerful technique that can amplify a single molecule of DNA to levels detectable on an agarose gel. Therefore, a presence of small amount of DNA in the reaction can amplify and lead to a false positive result. Such effect is common, where there may be products from previous PCR amplifications that can carryover to the next PCR cycle (termed: carry-over contamination). To avoid this, the most common way is to avoid carry-over contamination is to use dUTP as a substitute for dTTP for all PCR performed in a lab and treating all PCR reactions with Uracil-DNA Glycosylase (UDG). This is treated prior to loading on a thermal cycler in order to destroy trace amounts of DNA from previous amplifications. *AccuPower®* HotStart PCR PreMix (with UDG) is a ready-to-use master mix containing all components, except primers and template, for the amplification and detection of DNA in PCR. The master mix combines *Top* DNA polymerase with enzyme-mediated hotstart technology with integrated UDG carryover prevention technology to provide optimal performance with a variety of PCR detection technologies.

Features and Benefits

- **Prevention of Carryover Contamination:**
UDG and dUTP in the MasterMix prevent the re-amplification of carryover PCR products between reactions. dUTP ensures that any amplified DNA will contain uracil, while UDG removes uracil residues from single- or double-stranded DNA, preventing dU-containing DNA from serving as template in subsequent PCR reactions. Prior to PCR, a UDG incubation step (37°C, 2 min) cleaves uracil residues from any contaminating dU-containing DNA from previous PCR reactions. UDG is then inactivated by the high temperatures during normal PCR cycling, allowing the amplification of legitimate target sequences (Figure 1).
- **Specificity:**
Pyrophosphate (PPi) has a very high affinity with Mg^{2+} ion required for DNA polymerases. Thus in the presence of excess PPi, DNA polymerase is not active. *AccuPower®* HotStart PCR PreMix uses excess PPi to eliminate the production of non-specific product during PCR setup. However, during the first cycle of PCR, at temperatures above 70°C, the added thermostable PPase cleaves PPi and releases the bound Mg^{2+} , thereby activating the DNA polymerase. Thus non-specific amplification is suppressed during set-up and at

lower temperatures, and the polymerase is fully active after the first incubation at 95°C. In addition, the presence of thermostable PPase delays the plateau phase of PCR by removing the PPi that normally accumulates during amplification, allowing you to amplify low copy targets with confidence.

- **Ease-of-use:**
All reaction components required for PCR, including thermostable DNA polymerase and dNTPs are contained within each tube and in a lyophilized "PreMix" form. The user needs only to add template DNA, primers and water. Materials necessary for loading agarose gels for electrophoresis are also added in the reaction, eliminating the need to add loading dye after PCR is completed.
- **Reproducibility:**
AccuPower® products are manufactured under strict ISO 9001 quality control conditions to ensure reproducible PCR performance, experiment after experiment.

Specifications

- Enzyme: *Top* DNA polymerase
- 5' to 3' exonuclease activity: No
- 3' to 5' exonuclease activity: No
- 3' - A overhang: Yes
- Fragment size: Up to ~ 12 kb

Application

- gDNA template PCR
- Low-copy target PCR
- Multiple primer pairs PCR
- cDNA template PCR
- Molecular diagnosis

Transport Temperature

Room temperature

Storage Temperature

-20°C

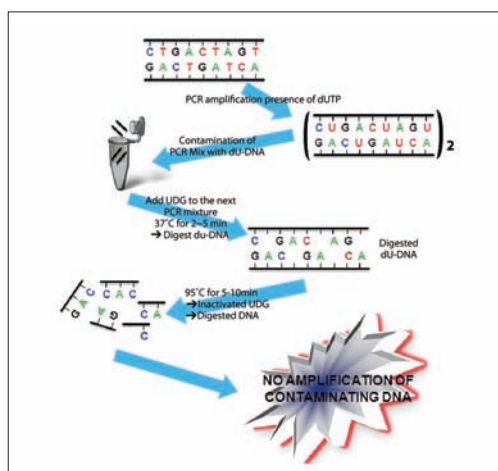


Figure 1. Prevention of carryover contamination.

■ Experimental Data

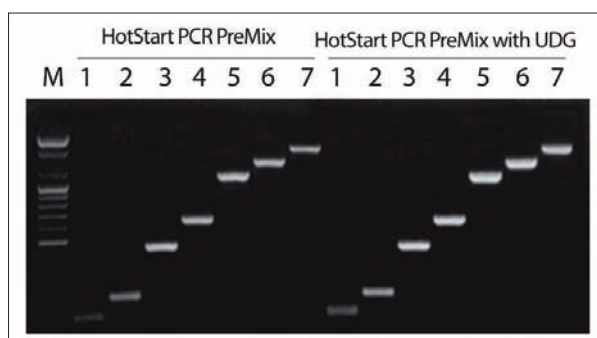


Figure 2. Comparison of specificity between *AccuPower*® HotStart PCR PreMix and HotStart PCR PreMix (with UDG).

Specificity test was operated using 7 pairs of primers targeting P53 gene. Reaction mixture was incubated at 37°C for 2 min followed by 95°C for 5 min, 30 cycles of 20 sec at 95°C, 40 sec at 55°C, 1 min at 72°C.

The amount of DNA (human) used to test is 10 ng.

Lane 1: 139 bp
Lane 2: 211 bp
Lane 3: 447 bp
Lane 4: 618 bp
Lane 5: 1082 bp
Lane 6: 1,296 bp
Lane 7: 1,561 bp

M: 100 bp plus DNA Ladder (Bioneer, Cat. no. D-1030-1)

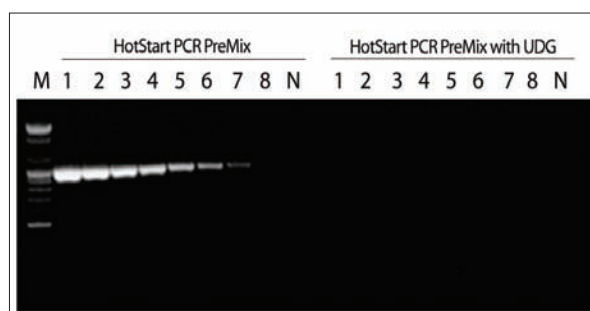


Figure 3. Efficiency of uracil DNA glycosylase using PCR product (including uracil base).

Efficiency test of uracil DNA glycosylase was operated using serial diluted PCR products including uracil base. *AccuPower*® HotStart PCR PreMix was also tested for negative control. Reaction mixture was incubated at 37°C for 2 min followed by 95°C for 5 min, 30 cycles of 20 sec at 95°C, 20 sec at 55°C, 30 sec at 72°C.

Lane 1: 10^{11} copy
Lane 2: 10^{10} copy
Lane 3: 10^9 copy
Lane 4: 10^8 copy
Lane 5: 10^7 copy
Lane 6: 10^6 copy
Lane 7: 10^5 copy
Lane 8: 10^4 copy

Lane N: No template control

M: 100 bp plus DNA Ladder (Bioneer, Cat. no. D-1030-1)

■ Ordering Information

Cat. no.	Product Description
K-5050-1	<i>AccuPower</i> ® HotStart PCR PreMix (with UDG), 0.2 ml thin-wall tubes with attached cap / 96 tubes, 20 µl rxn
K-5051-1	<i>AccuPower</i> ® HotStart PCR PreMix (with UDG), 0.2 ml thin-wall tubes with attached cap / 480 tubes, 20 µl rxn

For Hotstart PCR, Premix and Master Mix with GoldHotstart Taq DNA Polymerase



■ Description

AccuPower® GoldHotstart Taq PCR PreMix is a convenient lyophilized PCR master mix containing GoldHotstart Taq DNA polymerase, dNTPs, reaction buffer, tracking dye, and patented stabilizer and is aliquoted in 8-PCR tube strips. GoldHotstart Taq DNA polymerase is inhibited at lower temperature, but is activated at during the start of PCR. This prevents the formation of misprimed products, as well as primer-dimers, during the reaction set up process resulting in improved specificity. Its Mastermix version, instead of dried format, is also available.

■ Features and Benefits

- **Specificity:**
A non-specific signal is dramatically eliminated by using hotstart technology.
- **Stability:**
Stable at room temperature for a month, or for 2 years in a -20°C freezer.
- **Ease-of-use:**
All reaction components required for PCR, including thermostable DNA polymerase and dNTPs are contained within each tube and in a lyophilized "PreMix" form. The user needs only to add template DNA, primers and water. Materials necessary for loading agarose gels for electrophoresis are also added in the reaction, negating the need to add loading dye after PCR is completed.
- **Reproducibility:**
Each batch is produced under strict quality controls. Errors that commonly occur during mass production are eliminated during the individual packaging process. Bioneer's current batch processing system allows for the production of more accurate and reproducible end-product yield.

■ Specifications

- Enzyme: GoldHotStart Taq DNA polymerase
- 5' to 3' exonuclease: Yes
- 3' to 5' exonuclease: No
- 3' - A overhang: Yes
- Fragment size: Up to ~ 5 kb (Human genomic DNA)

■ Application

- High specificity PCR
- High sensitivity PCR
- gDNA template PCR
- Low-copy target PCR
- Multiple primer pairs PCR
- cDNA template PCR
- TA cloning

■ Transport Temperature

Room temperature

■ Storage Temperature

- 20°C

■ Experimental Data

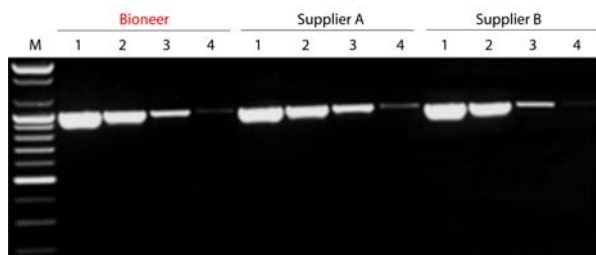


Figure 1. Comparison of PCR amplification efficiency between AccuPower® GoldHotStart Taq PCR PreMix from Bioneer and other suppliers' HotStart PCR master mix.

Target: Human insulin receptor gene.

The cycling conditions for AccuPower® GoldHotStart Taq PCR PreMix were 95°C for 5 min, 30 cycles of 95°C for 30 sec, 55°C for 30 sec and 72°C for 30 sec. PCR reactions using other suppliers' PCR master mix were performed according to each suppliers' protocol.

Lane 1: 10 ng of human gDNA

Lane 2: 1 ng of human gDNA

Lane 3: 100 pg of human gDNA

Lane 4: 10 pg of human gDNA

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

■ Experimental Data

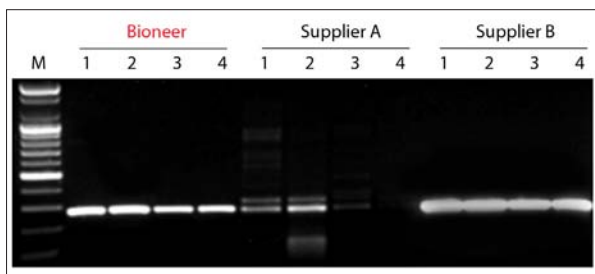


Figure 2. Comparison of PCR amplification specificity between *AccuPower® GoldHotStart Taq* PCR PreMix from Bioneer and other suppliers' Hotstart PCR master mix.

Target: ApoE gene (The PCR product size is 268 bp). The cycling conditions for *AccuPower® GoldHotStart Taq* PCR PreMix were 95°C for 5 min, 35 cycles of 95°C for 30 sec, 57°C for 30 sec and 72°C for 30 sec. PCR reactions using other suppliers' PCR master mix were performed according to each supplier's protocol.

Lane 1,2: 100 ng human genomic DNA

Lane 3,4: 10 ng human genomic DNA

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

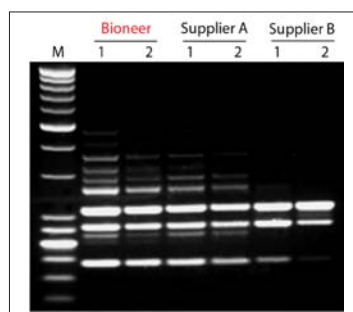


Figure 3. Comparison of PCR amplification specificity between *AccuPower® GoldHotStart Taq* PCR PreMix from Bioneer and other suppliers' Hotstart PCR master mix.

The cycling conditions for *AccuPower® GoldHotStart Taq* PCR PreMix were 95°C for 5 min, 35 cycles of 95°C for 30 sec, 65°C for 30 sec and 72°C for 30 sec. PCR reactions using other suppliers' PCR master mix were performed according to each supplier's protocol.

Lane 1: 100 ng human genomic DNA

Lane 2: 10 ng human genomic DNA

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

■ Ordering Information

Cat. no.	Product Description
K-2621	<i>AccuPower® GoldHotStart Taq</i> PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached cap / 96 tubes, 20 µl rxn
K-2622	<i>AccuPower® GoldHotStart Taq</i> PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached cap / 480 tubes, 20 µl rxn
K-2623	<i>AccuPower® GoldHotStart Taq</i> PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached cap / 96 tubes, 50 µl rxn
K-2624	<i>AccuPower® GoldHotStart Taq</i> PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached cap / 480 tubes, 50 µl rxn
K-2629	<i>AccuPower® GoldHotStart Taq</i> PCR MasterMix, 2.5 ml of 2X master mix solution
K-2630	<i>AccuPower® GoldHotStart Taq</i> PCR MasterMix, 25 ml of 2X master mix solution

For Hotstart PCR, Dried-type Premix with Taq DNA Polymerase Applied Enzyme-mediated Hotstart Technology



Description

AccuPower® PyroHotStart Taq PCR PreMix is a PCR master mix containing a thermostable DNA polymerase, thermostable pyrophosphatase, reaction buffer, dNTPs, tracking dye, and patented stabilizer in a ready to use HotStart PCR Master Mix. Bioneer uses a unique enzyme-mediated hotstart PCR that provides robust and reliable results. Bioneer's Taq DNA Polymerase is inhibited at lower temperatures (<70°C) by pyrophosphate. However, Taq DNA polymerase is rendered fully active at temperatures above 70°C via pyrophosphate hydrolysis with our thermostable pyrophosphatase. This prevents the formation of mis-primed products and primer-dimers during the reaction set up process resulting in improved PCR specificity. It is ideal for nucleic acid amplification reactions involving complex genomic or cDNA templates, very low copy targets, and multiplex reactions.

Features and Benefits

- **Specificity:**
Pyrophosphate (PPi) has high affinity for Mg^{2+} . By adding PPi to the reaction mixture, the Mg^{2+} ions necessary for normal PCR are bound, preventing DNA polymerase activity. This PPi- Mg^{2+} binding prevents non-specific before PCR (zero-cycle) product formation. Upon thermal cycling, the pyrophosphatase (PPase) that is also added to the mixture is activated (>70°C) and hydrolyzes the PPi to 2 phosphate groups and facilitates the release of Mg^{2+} , which is then available for DNA polymerase to use and resume normal activity (Figure 1).
- **Stability:**
Stable at room temperature for a month and for 2 years in a -20°C freezer
- **Ease-of-use:**
All reaction components required for PCR, including thermostable DNA polymerase and dNTPs are contained within each tube and in a lyophilized "PreMix" form. The user needs only to add template DNA, primers and water. Materials necessary for loading agarose gels for electrophoresis are also added in the reaction, negating the need to add loading dye after PCR is completed.

- **Reproducibility:**

Each batch is produced under strict quality controls. Errors that commonly occur during mass production are eliminated during the individual packaging process. Bioneer's current batch processing system allows for the production of more accurate and reproducible end-product yield.

Specifications

- Enzyme: Taq DNA polymerase
- 5' to 3' exonuclease: Yes
- 3' to 5' exonuclease: No
- 3' - A overhang: Yes
- Fragment size: Up to ~ 5 kb (Human genomic DNA)

Application

- High specificity PCR
- High sensitivity PCR
- gDNA template PCR
- Low-copy target PCR
- Multiple primer pairs PCR
- cDNA template PCR
- TA cloning

Transport Temperature

Room temperature

Storage Temperature

-20°C

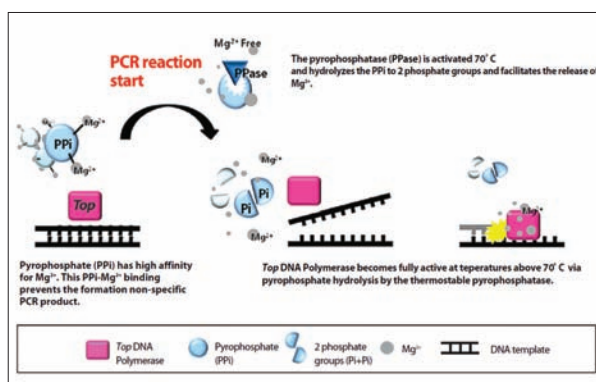


Figure 1. Scheme of Enzyme-mediated hotstart PCR.

■ Experimental Data

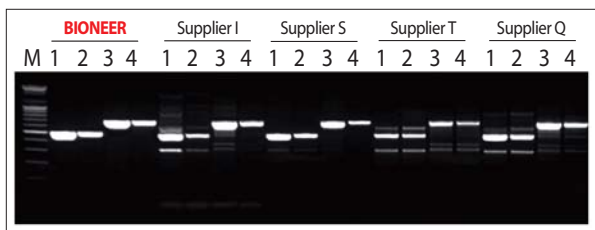


Figure 2. Comparison of PCR amplification specificity between *AccuPower® PyroHotStart Taq* PCR PreMix from Bioneer and other suppliers' hotstart PCR master mix

PCR reactions were performed according to each supplier's protocol. Target: Human Prp gene

The PrP gene was amplified from human genomic DNA with two different primer sets, separately. This data shows that *AccuPower® PyroHotStart Taq* PCR PreMix has higher amplification efficiency and specificity than other suppliers' HotStart PCR master mix.

Lane 1: 100 ng DNA PrP primer set (500 bp)
 Lane 2: 10 ng DNA PrP primer set (500 bp)
 Lane 3: 100 ng DNA PrP primer set (705 bp)
 Lane 4: 10 ng DNA PrP primer set (705 bp)
 Lane M: 100 bp DNA Ladder (Bioneer, Cat. no. D-1030)

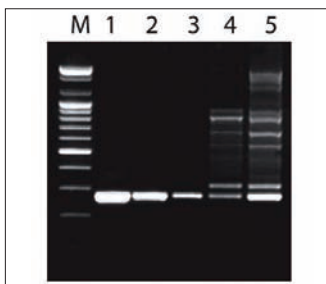


Figure 3. Comparison of PCR amplification specificity between *AccuPower® PyroHotStart Taq* PCR PreMix from Bioneer and other suppliers' HotStart PCR master mix.

The ApoE gene was amplified from 100 ng of human genomic DNA (The PCR product size is 268 bp). This data shows that *AccuPower® PyroHotStart Taq* PCR PreMix has higher amplification efficiency and specificity than other suppliers' HotStart PCR master mix.

Lane 1: *AccuPower® PyroHotStart Taq* PCR PreMix
 Lane 2: Supplier I HotStart *Taq* PCR premix
 Lane 3: Supplier S HotStart *Taq* PCR master mix
 Lane 4: Supplier T HotStart *Taq* PCR master mix
 Lane 5: Supplier Q HotStart *Taq* PCR master mix
 Lane M: 100 bp DNA Ladder (Bioneer, Cat. no. D-1030)

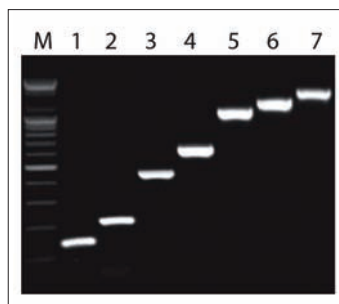


Figure 4. *AccuPower® PyroHotStart Taq* PCR PreMix has high amplification efficiency and specificity.

Specificity test was performed using 7 different sets of primers targeting the P53 gene. 10 ng of human genomic DNA was used for each PCR reaction. The cycling conditions were 95°C for 5 min, 30 cycles of 95°C for 20 sec, 55°C for 40 sec, and 72°C for 1 min, and 72°C for 5 min for final extension.

Lane 1: P75/73 primer set (139 bp)
 Lane 2: P55/53 primer set (211 bp)
 Lane 3: P55/63 primer set (447 bp)
 Lane 4: P75/83 primer set (618 bp)
 Lane 5: P55/73 primer set (1,082 bp)
 Lane 6: P65/83 primer set (1,296 bp)
 Lane 7: P55/83 primer set (1,561 bp)
 Lane M: 100 bp DNA Ladder (Bioneer, Cat. no. D-1030)

■ Ordering Information

Cat. no.	Product Description
K-2611	<i>AccuPower® PyroHotStart Taq</i> PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached cap / 96 tubes, 20 µl rxn
K-2612	<i>AccuPower® PyroHotStart Taq</i> PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached cap / 480 tubes, 20 µl rxn
K-2613	<i>AccuPower® PyroHotStart Taq</i> PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached cap / 96 tubes, 50 µl rxn
K-2614	<i>AccuPower® PyroHotStart Taq</i> PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached cap / 480 tubes, 50 µl rxn

For Hotstart PCR and High Fidelity PCR, Dried-type Premix with *Pfu* DNA Polymerase



■ Description

AccuPower® HotStart *Pfu* PCR PreMix is a ready-to-use lyophilized mastermix containing all components for high fidelity PCR. Just addition of primers and template into the tube provides reproducible results. AccuPower® HotStart *Pfu* PCR PreMix uses a unique enzyme-mediated hotstart PCR method that reduces pre-PCR mis-primings, primer dimers, artifacts, and any other non-specific amplification. Besides AccuPower® HotStart *Pfu* PCR PreMix provides sensitivity, high specificity and proofreading activity. So you'll get fewer errors in your PCR product.

■ Features and Benefits

- High Fidelity:
AccuPower® HotStart *Pfu* PCR PreMix has the high fidelity which reduces the mispriming during DNA amplification.
- High Specificity:
Pyrophosphate (PPI) has a high affinity for Mg^{2+} and PPI binds to Mg^{2+} which is essential component for PCR so that DNA polymerase activity is suppressed. Consequently, PPI- Mg^{2+} binding prevents non-specific amplification
- Ease-of-Use:
Just add template and primers and start your reaction.

■ Specifications

- Enzyme: *Pfu* DNA polymerase
- 5' to 3' exonuclease activity: No
- 3' to 5' exonuclease activity: Yes
- 3' - A overhang: No
- Fragment size: Up to ~ 10 kb

■ Application

- Gene cloning with blunt ends
- Site-directed mutagenesis
- High fidelity amplification
- High specificity PCR
- cDNA template PCR

■ Transport Temperature

Room temperature

■ Storage Temperature

-20°C

■ Experimental Data

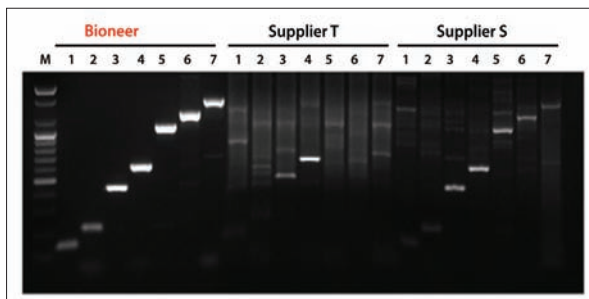


Figure 1. AccuPower® HotStart *Pfu* PCR PreMix shows enhanced specificity compared to competitors.

Specificity test was performed using 7 different sets of primers targeting the p53 gene. 10 ng of human genomic DNA was used for each PCR reaction. The cycling conditions were 95°C for 5 min, 32 cycles of 95°C for 30 sec, 62°C for 40 sec, and 72°C for 1 min 30 sec, and 72°C for 5 min for final extension.

Lane 1: P75/73 primer set (139 bp)
 Lane 2: P55/53 primer set (211 bp)
 Lane 3: P55/63 primer set (447 bp)
 Lane 4: P75/83 primer set (618 bp)
 Lane 5: P55/73 primer set (1082 bp)
 Lane 6: P65/83 primer set (1296 bp)
 Lane 7: P55/83 primer set (1561 bp)
 Lane M: 100 bp DNA Ladder (Bioneer, Cat. no. D-1030)

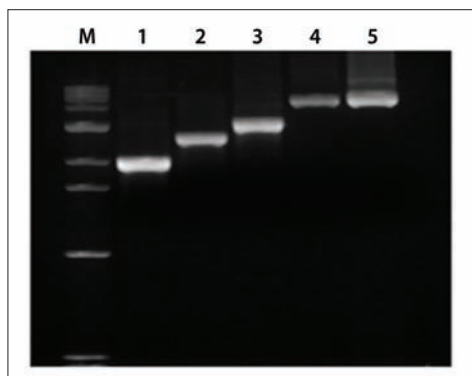


Figure 2. AccuPower® HotStart *Pfu* PCR PreMix has high amplification efficiency.

Template DNA: 200 ng of human genomic DNA

Bioneer reaction mixture was followed by 95°C for 5 min, 35 cycles of 95°C for 20 sec, 65°C for 20 sec, and 68°C for 15 min, and 68°C for 5 min for final extension.

Lane 1: 2 kb fragment

Lane 2: 2.5 kb fragment

Lane 3: 3 kb fragment

Lane 4: 4.5 kb fragment

Lane 5: 5 kb fragment

Lane M: 1 kb DNA Ladder (Bioneer, Cat. no. D-1040)

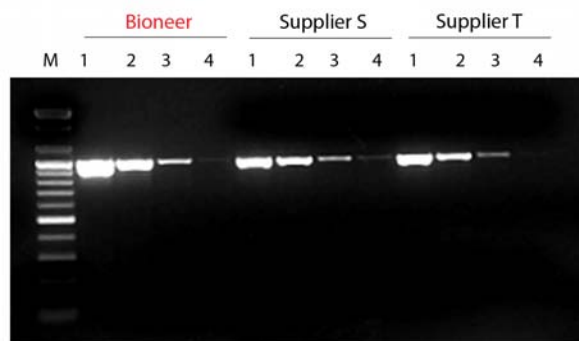


Figure 3. Comparison of PCR amplification efficiency between AccuPower® HotStart *Pfu* PCR PreMix from Bioneer and other suppliers' PCR master mix. Target: human insulin receptor gene.

The cycling conditions for AccuPower® HotStart *Pfu* PCR PreMix were 95°C for 5 min, 30 cycles of 95°C for 30 sec, 55°C for 30 sec and 72°C for 2 min. PCR reactions using other suppliers' PCR master mix were performed according to each supplier's protocol.

Lane 1: 10 ng of human genomic DNA

Lane 2: 1 ng of human genomic DNA

Lane 3: 100 pg of human genomic DNA

Lane 4: 10 pg of human genomic DNA

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

■ Ordering Information

Cat. no.	Product Description
K-2301	AccuPower® HotStart <i>Pfu</i> PCR PreMix 96 tubes, 20 µl rxn
K-2302	AccuPower® HotStart <i>Pfu</i> PCR PreMix 96 tubes, 50 µl rxn
K-2303	AccuPower® HotStart <i>Pfu</i> PCR PreMix 480 tubes, 20 µl rxn
K-2304	AccuPower® HotStart <i>Pfu</i> PCR PreMix 480 tubes, 50 µl rxn

For High Fidelity PCR, Dried-type Premix with *Pfu* DNA Polymerase

■ Description

AccuPower® *Pfu* PCR PreMix is a lyophilized mixture of *Pfu* DNA polymerase, dNTPs and reaction buffer in a convenient premix format. Simply add template, primers and water and mix – AccuPower® offers easy set-up for every PCR application. Bioneer's patented stabilizer maintains the activity of the PreMix for over a month when stored at room temperature (25°C) and for over 2 years in the freezer (-20°C).

■ Features and Benefits

- High Fidelity:
AccuPower® *Pfu* PCR PreMix is a high fidelity (error rate = 1.9×10^6) enzyme that reduces errors during DNA amplification.
- High Purity:
AccuPower® *Pfu* PCR PreMix is a recombinant enzyme that eliminates smearing and unwanted background found in native *Pfu* enzymes.
- Thermostability:
Pfu has an optimal activity that is higher than most other thermostable polymerases, and exhibits low activity at temperatures below 50°C. This results in higher specificity for your PCR reactions.
- Stability:
Stable for a month at room temperature and for 2 years in a -20°C freezer.
- Reproducibility:
Bioneer's strict quality controlled production system ensures that your results will be reproducible experiment after experiment.
- Convenient:
Just add template and primers and start your reaction. dNTPs, buffer and enzyme are provided.

■ Specifications

- Enzyme: *Pfu* DNA polymerase
- 5' to 3' exonuclease activity: No
- 3' to 5' exonuclease activity: Yes
- 3' - A overhang: No
- Fragment size: Up to ~ 10 kb

■ Application

- Gene synthesis
- Gene cloning
- Conventional PCR
- Primer extension
- Site directed mutagenesis
- High fidelity

■ Transport Temperature

Room temperature

■ Storage Temperature

-20°C

■ Experimental Data

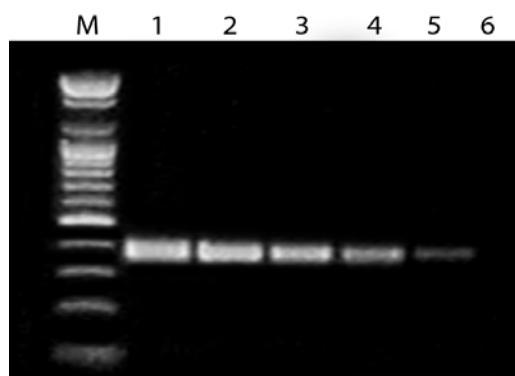


Figure 1. Template range & sensitivity of *AccuPower® Pfu* PCR PreMix for human DNA template.

Test of working range & sensitivity of *AccuPower® Pfu* PCR PreMix for human DNA template.

Line 1: 100 ng Line 2: 10 ng Line 3: 1 ng
Line 4: 100 pg Line 5: 10 pg Line 6: Template negative
M: 100 bp DNA Ladder (Bioneer, Cat. no. D-1030)

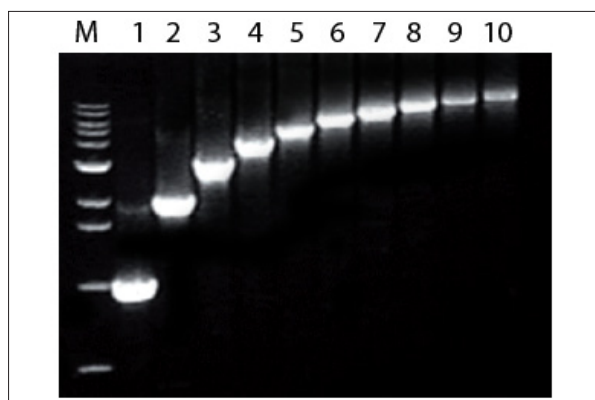


Figure 2. Amplification of lambda DNA of 1 kb to 10 kb with *AccuPower® Pfu* PCR PreMix.

Lane 1: 1 kb fragment Lane 2: 2 kb fragment
Lane 3: 3 kb fragment Lane 4: 4 kb fragment
Lane 5: 5 kb fragment Lane 6: 6 kb fragment
Lane 7: 7 kb fragment Lane 8: 8 kb fragment
Lane 9: 9 kb fragment Lane 10: 10 kb fragment
M: 1 kb DNA Ladder (Bioneer, Cat. no. D-1040)

■ Ordering Information

Cat. no.	Product Description
K-2022	<i>AccuPower® Pfu</i> PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached cap / 96 tubes, 20 µl rxn
K-2023	<i>AccuPower® Pfu</i> PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached cap / 96 tubes, 50 µl rxn
K-2024	<i>AccuPower® Pfu</i> PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached cap / 480 tubes, 20 µl rxn
K-2025	<i>AccuPower® Pfu</i> PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached cap / 480 tubes, 50 µl rxn
K-2026	<i>AccuPower® Pfu</i> PCR Master Mix, 1 ml of 2X master mix solution
K-2027	<i>AccuPower® Pfu</i> PCR PreMix, 0.5 ml thin-wall tubes with attached cap / 100 tubes, 50 µl rxn

For Long PCR (up to 30 kb) and High Fidelity PCR, Dried-type Premix



■ Description

AccuPower® ProFi Taq PCR PreMix is a convenient lyophilized PCR master mix containing ProFi Taq DNA polymerase, reaction buffer, dNTPs, tracking dye, and a patented stabilizer. ProFi Taq DNA polymerase in the premix is a unique recombinant Taq DNA polymerase that offers enhanced amplification efficiency and higher fidelity for PCR. AccuPower® ProFi Taq PCR PreMix is applicable to any human template DNA, and especially effective in amplifying long genomic DNA fragments around 30 kb. AccuPower® ProFi Taq PCR PreMix provides accurate long-range amplification of standard and amplification of low-copy target, and is highly suitable for all PCR applications.

■ Features and Benefits

- Long Range PCR:
ProFi Taq is especially effective in amplifying long human genomic DNA fragments around 21 kb and amplifying lambda DNA up to 30 kb.
- Ease-of-use:
All reaction components required for PCR, including thermo-stable DNA polymerase and dNTPs are contained within each tube and in a lyophilized "PreMix" form.
- Reproducibility:
Bioneer's strict quality controlled production system ensures that your results will be reproducible experiment after experiment.
- Convenient:
Just add template and primers and start your reaction. dNTPs, buffer and enzyme are provided.
- Stability:
Stable at room temperature for a month and for 2 years in a -20°C freezer.
- High Fidelity:
ProFi Taq DNA Polymerase fidelity is over 5-times higher than Taq DNA polymerase.

■ Specifications

- Enzyme: ProFi Taq DNA polymerase
- 5' to 3' exonuclease: Yes
- 3' to 5' exonuclease: Yes
- 3' - A overhang: Yes
- PCR product size: ~ 30 kb

■ Application

- Primer extension
- Long range amplification from genomic DNA
- High amplification efficiency
- Excellent performance on difficult templates
- Amplification of low-copy targets
- High yield and high sensitivity PCR

■ Transport Temperature

Room temperature

■ Storage Temperature

-20°C

■ Experimental Data

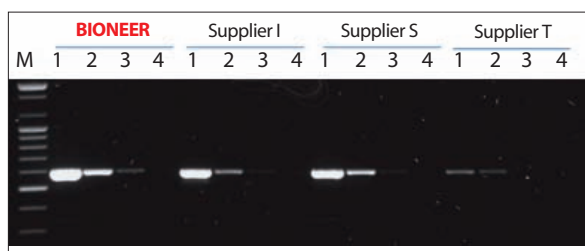


Figure 1. Comparison of PCR amplification efficiency between AccuPower® ProFi Taq PCR PreMix from Bioneer and other suppliers' PCR master mix.

cDNA synthesized from 10-fold serial-diluted human total RNA from 10 ng to 10 pg using AccuPower® RocketScript™ Cycle RT PreMix (Bioneer, Cat. no. K-2201) was used as a template for PCR amplification. The cycling conditions for AccuPower® ProFi Taq PCR PreMix were 95°C for 5 min, 33 cycles of 95°C for 20 sec, 55°C for 20 sec and 72°C for 30 sec. PCR reactions using other suppliers' PCR master mix were performed according to each supplier's protocol.

Target: human GAPDH gene
Lane 1: 10 ng of human total cDNA
Lane 2: 1 ng of human total cDNA
Lane 3: 100 pg of human total cDNA
Lane 4: 10 pg of human total cDNA
Lane M: 100 bp DNA Ladder (Bioneer, Cat. no. D-1030)

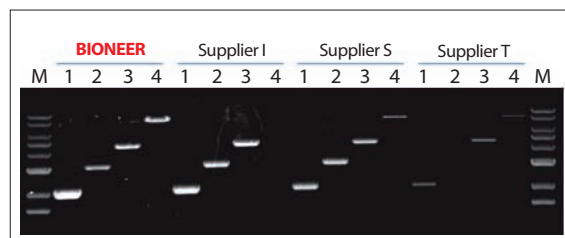


Figure 2. Comparison of PCR amplification sensitivity between *AccuPower® ProFi Taq* PCR PreMix from Bioneer and other suppliers' PCR master mix.

The cycling conditions for *AccuPower® ProFi Taq* PCR PreMix were 95°C for 5 min, 30 cycles of 95°C for 20 sec, 65°C for 20 sec and 68°C for 4 min. PCR reactions using other suppliers' PCR master mix were performed according to each supplier's protocol.

Lane 1: 2 kb fragment (human tumor protein p53 gene)

Lane 2: 3 kb fragment (human tumor protein p53 gene)

Lane 3: 4.5kb fragment (human DNA cross-link repair 1A gene)

Lane 4: 8 kb fragment (human hemoglobin epsilon 1 gene)

Lane M: 1 kb DNA Ladder (Bioneer, Cat. no. D-1040)

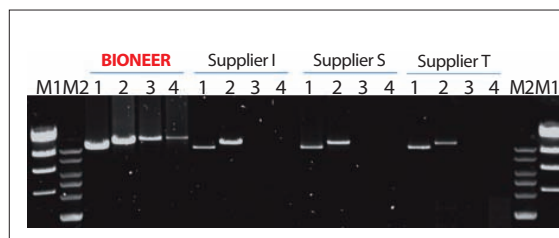


Figure 3. Comparison of PCR amplification of long targets between *AccuPower® ProFi Taq* PCR PreMix from Bioneer and other suppliers' PCR master mix.

The cycling conditions for *AccuPower® ProFi Taq* PCR PreMix were 95°C for 5 min, 32 cycles of 95°C for 20 sec, 65°C for 40 sec, and 68°C for 15 min. PCR reactions using other suppliers' PCR master mix were performed according to each supplier's protocol. Human DNA was used as a template for PCR amplification.

Lane 1: 11 kb fragment

Lane 2: 13.5 kb fragment

Lane 3: 17.6 kb fragment

Lane 4: 21.4 kb fragment

Lane M1: Lambda/*Hind* III marker (Bioneer, Cat. no. D-1050)

Lane M2: 1 kb DNA Ladder (Bioneer, Cat. no. D-1040)

■ Ordering Information

Cat. no.	Product Description
K-2631	<i>AccuPower® ProFi Taq</i> PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached caps / 96 tubes, 20 µl rxn/tube
K-2632	<i>AccuPower® ProFi Taq</i> PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached caps / 480 tubes, 20 µl rxn/tube
K-2633	<i>AccuPower® ProFi Taq</i> PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached caps / 96 tubes, 50 µl rxn/tube
K-2634	<i>AccuPower® ProFi Taq</i> PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached caps / 480 tubes, 50 µl rxn/tube

For Multiplex PCR (up to 20-plex), Dried-type Premix



■ Description

AccuPower® Multiplex PCR PreMix simultaneously detects one to twenty products in a single PCR reaction. It is provided in our convenient AccuPower® format which is a lyophilized premix that contains everything you need for PCR including enzyme, dNTPs and our special multiplex buffer. Simply add template and primers (and ddH₂O if needed) and start your PCR.

AccuPower® Multiplex PCR PreMix is ideal for genotyping analysis and qualitative and semi-quantitative gene expression analysis using cDNA template.

■ Features and Benefits

- **Multiplex PCR:**
Up to 20 different target genes from human genomic DNA can be amplified in a single tube.
- **Specificity:**
A Non-specific signal is dramatically eliminated by using hotstart Technology.
- **Stability:**
Stable at room temperature for a month and for 2 years in a -20°C freezer.
- **Ease-of-use:**
All reaction components required for PCR, including thermostable DNA polymerase and dNTPs are contained within each tube and in a lyophilized "PreMix" form. Just add template and primers and start your reaction. dNTPs, buffer and enzyme are provided.
- **Reproducibility:**
Bioneer's strict quality controlled production system ensures that your results will be reproducible experiment after experiment.

■ Specifications

- Enzyme: HotStart *Top* DNA polymerase
- 5' to 3' exonuclease activity: No
- 3' to 5' exonuclease activity: No
- 3' - A overhang: Yes
- Fragment size: ~ 1 kb

■ Application

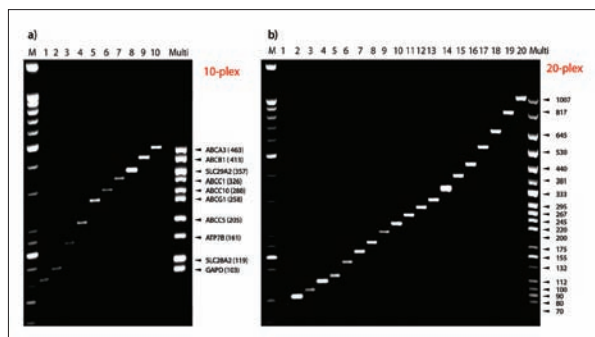
- Genotyping assays
- Diagnostic assays
- RAPD
- DNA and RNA chip
- cDNA library

■ Transport Temperature

Room temperature

■ Storage Temperature

-20°C



■ Experimental Data

Figure 1. Single PCR and multiplex PCR using AccuPower® Multiplex PCR PreMix.

Each lane from left to right indicates the single and multiplex PCR product using AccuPower® Multiplex PCR PreMix.

a) 10-plex multiplex PCR

b) 20-plex multiplex PCR

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

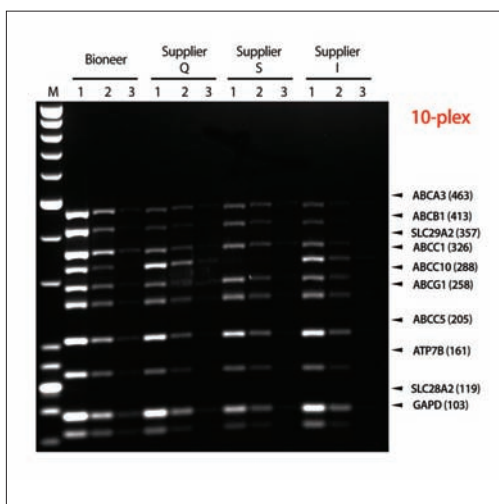


Figure 2. Comparison of amplification quality between *AccuPower*® Multiplex PCR PreMix and other suppliers' multiplex PCR kit.

6-plex primers were added into *AccuPower*® Multiplex PCR PreMix and other suppliers' multiplex PCR kit. A series of human genomic DNA diluents were tested.

(Lane 1: Human genomic DNA 100 ng, Lane 2: Human genomic DNA 10 ng, Lane 3: Human genomic DNA 1 ng). All data were obtained using *MyGenie*™ 96 Gradient Thermal Block (Bioneer, Cat. no. A-2040-1).

Supplier Q: Supplier Q's multiplex PCR kit

Supplier S: Supplier S's multiplex PCR kit

Supplier I: Supplier I's *Taq* DNA polymerase for multiplex PCR (0.5 U, added 2 mM MgCl₂)

Rxn. condition: 95°C for 10 min, followed by 35 cycles of 30 sec at 95°C, 30 sec at 60°C, 60 sec at 72°C
M: 25/100 bp Mixed DNA Ladder (Bioneer, Cat. no. D-1020)

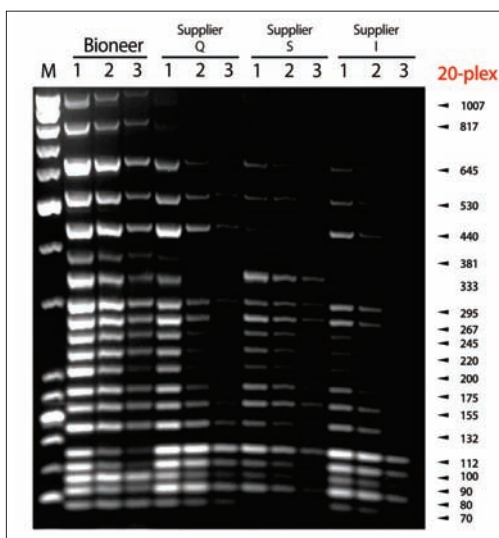


Figure 3. Comparison of amplification quality between *AccuPower*® Multiplex PCR PreMix and other suppliers' multiplex PCR kit.

10-plex primers were added into *AccuPower*® Multiplex PCR PreMix and other suppliers' multiplex PCR kit. A series of human genomic DNA diluents were tested.

(Lane 1: Human genomic DNA 100 ng, Lane 2: Human genomic DNA 10 ng, Lane 3: Human genomic DNA 1 ng). All data were obtained using *MyGenie*™ 96 Gradient Thermal Block (Bioneer, Cat. no. A-2040-1).

Supplier Q: Supplier Q's multiplex PCR kit

Supplier S: Supplier S's multiplex PCR kit

Supplier I: Supplier I's *Taq* DNA polymerase for multiplex PCR (0.5 U, added 2 mM MgCl₂)

Rxn. condition: 95°C for 10 min, followed by 35 cycles of 30 sec at 95°C, 30 sec at 65°C, 60 sec at 72°C
M: 25/100 bp Mixed DNA Ladder (Bioneer, Cat. no. D-1020)

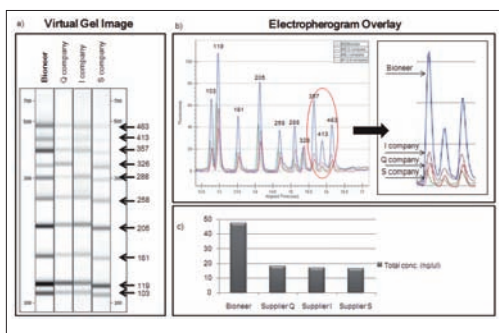


Figure 4. Comparison of amplification quality using *Labchip*™ between *AccuPower*® Multiplex PCR PreMix and other suppliers' multiplex PCR kit.

a) Virtual Gel Image. Gel image illustrates data reproducibility of the *LabChip*™ 90 system.

b) Overlay of expression level using Bioneer's Multiplex PCR PreMix and other company's multiplex PCR kit. The electropherogram displays the data between 10 PCR products yield using 10-plex primer sets to illustrate the amplification efficiency.

c) The graph shows the total concentration of PCR products between *AccuPower*® Multiplex PCR PreMix and other suppliers' multiplex PCR kit.

■ Ordering Information

Cat. no.	Product Description
K-2111	<i>AccuPower</i> ® Multiplex PCR PreMix, 0.2 ml thin-wall tubes with attached cap / 96 tubes, 20 µl rxn
K-2112	<i>AccuPower</i> ® Multiplex PCR PreMix, 0.2 ml thin-wall tubes with attached cap / 96 tubes, 50 µl rxn
K-2113	<i>AccuPower</i> ® Multiplex PCR PreMix, 0.2 ml thin-wall tubes with attached cap / 480 tubes, 20 µl rxn
K-2114	<i>AccuPower</i> ® Multiplex PCR PreMix, 0.2 ml thin-wall tubes with attached cap / 480 tubes, 50 µl rxn

For Multiplex PCR (up to 20-plex) Dried-type Premix



Description

AccuPower® Gold Multiplex PCR PreMix can amplify up to 20 target genes in a single tube. AccuPower® Gold Multiplex PCR PreMix contains Bioneer's unique enzyme-mediated HotStart technology with Pyrophosphatase (PPase) and Pyrophosphate (PPi) for efficient suppression of non-specific products and enhanced amplification specificity. AccuPower® Gold Multiplex PCR PreMix can be used for a variety of applications including genotyping assays or molecular diagnostics, and can also be used for cDNA-based semi-quantitative assays.

Features and Benefits

- **Flexibility:**
Up to 20 different target genes from human genomic DNA can be amplified in a single tube.
- **Specificity:**
Pyrophosphate (PPi) has high affinity for Mg^{2+} . By adding PPi to the reaction mixture, the Mg^{2+} ions necessary for normal PCR are bound, preventing DNA polymerase activity. This PPi- Mg^{2+} binding prevents non-specific before PCR (zero-cycle) product formation. Upon thermal cycling, the pyrophosphatase (PPase) that is also added to the mixture is activated ($>70^{\circ}C$) and hydrolyzes the PPi to 2 phosphate groups and facilitates the release of Mg^{2+} , which is then available for DNA polymerase to use and resume normal activity. (Figure 1)
- **Ease-of-use:**
All reaction components required for PCR, including thermostable DNA polymerase and dNTPs are contained within each tube and in a lyophilized "PreMix" form. The user needs only to add template DNA, primers and water to perform up to 20-plex PCR. Materials necessary for loading agarose gels for electrophoresis are also added in the reaction, negating the need to add loading dye after PCR is completed.

- **Reproducibility:**

Each batch is produced under strict quality controls. Errors that may occur during mass production are eliminated during the individual packaging process. Bioneer's current batch processing system allows for the production of more accurate and reproducible end-product. Additionally, the streamlining of setup using a lyophilized premix enhances reproducibility by minimizing setup variables.

Specifications

- Enzyme: Top DNA polymerase
- 5' to 3' exonuclease activity: No
- 3' to 5' exonuclease activity: No
- 3' - A overhang: Yes
- Fragment size: ~ 1 kb

Application

Target	Application
Human and Animal	STR analysis for determining genetic profiles in forensic cases
	Molecular diagnostic analysis
	Genotyping assay
	Qualitative and semi-qualitative gene expression assay
	Mutant screening
	Transgenic organism analysis
Plant	STR analysis
	Detection of pathogens/bacteria infection
	Transgenic organism analysis
	Qualitative and semi-qualitative gene expression assay

Transport Temperature

Room temperature

Storage Temperature

-20°C

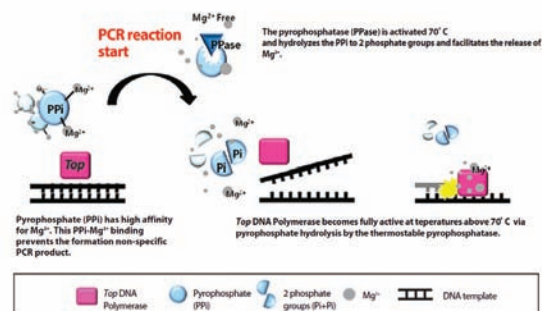


Figure 1. Enzyme-mediated HotStart PCR.

■ Experimental Data

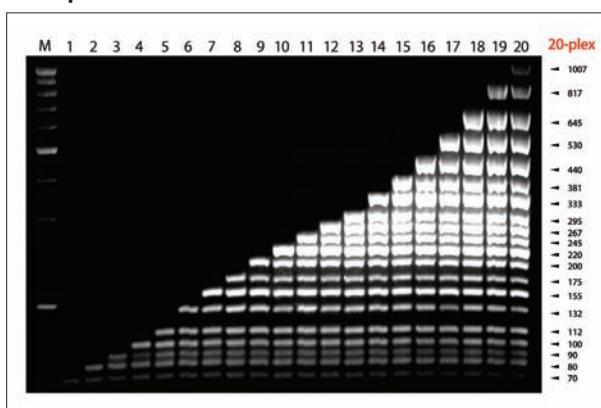


Figure 2. High specificity of AccuPower® Gold Multiplex PCR PreMix.

Each lane from left to right represents the progressive number of primer sets (1~20) included in AccuPower® Gold Multiplex PCR PreMix reactions.

Rxn. condition: 95°C for 10 min, followed by 30 cycles (a), 35 cycles (b) of 30 sec at 95°C, 30 sec at 57°C, 60 sec at 72°C.

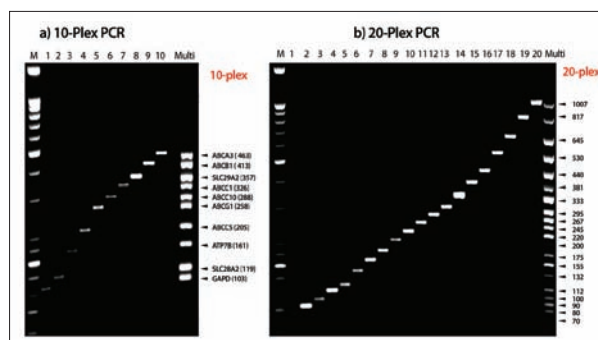


Figure 3. High specificity of AccuPower® Gold Multiplex PCR PreMix.

Each lane from left to right indicates the single and multiplex PCR product using AccuPower® Gold Multiplex PCR PreMix.

a) 10-plex multiplex PCR b) 20-plex multiplex PCR

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

Rxn. condition: 95°C for 10 min, followed by 30 cycles(a), 35 cycles(b) of 30 sec at 95°C, 30 sec at 57°C, 60 sec at 72°C.

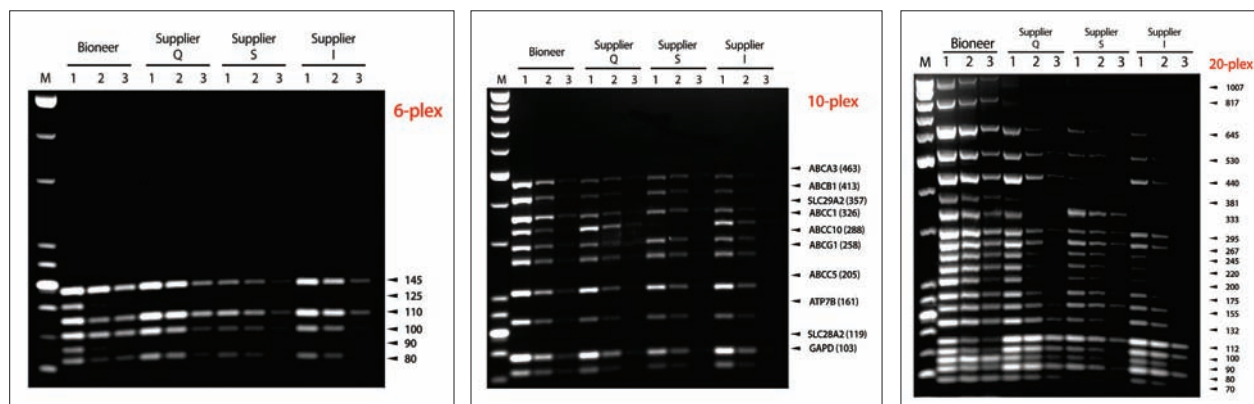


Figure 4. Comparison of amplification quality between AccuPower® Gold Multiplex PCR PreMix and other suppliers' multiplex PCR kit.

6-plex a), 10-plex b), 20-plex c) primers were added into AccuPower® Gold Multiplex PCR PreMix and other suppliers' master mixture. A series of human genomic DNA diluents were tested. (Lane 1: 100 ng, Lane 2: 10 ng, Lane 3: 1 ng). All data were obtained using MyGenie™ 96 Gradient Thermal Block (Bioneer, Cat. no. A-2040-1).

Supplier Q: Multiplex PCR master mix Supplier S: Multiplex PCR master mix

Supplier I: Taq DNA polymerase for multiplex PCR (0.5 U), added 2 mM MgCl₂

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

Rxn. condition: 95°C for 10 min, followed by 35 cycles of 30 sec at 95°C, 30 sec at 60°C, 60 sec at 72°C.

■ Ordering Information

Cat. no.	Product Description
K-2115	AccuPower® Gold Multiplex PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached cap / 96 tubes, 20 µl rxn
K-2116	AccuPower® Gold Multiplex PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached cap / 480 tubes, 20 µl rxn
K-2117	AccuPower® Gold Multiplex PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached cap / 96 tubes, 50 µl rxn
K-2118	AccuPower® Gold Multiplex PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached cap / 480 tubes, 50 µl rxn

Enzymes for Everyday PCR, Faster than *Taq* DNA Polymerase, and TA Cloning Compatible**Description**

Top DNA polymerase is a novel thermostable DNA polymerase that is more processive than *Taq* DNA polymerase. In fact, the extension rate of *Top* DNA polymerase is > 3 x that of *Taq* DNA Polymerase! *Top* DNA polymerase can be used for a variety of PCR applications (including TA cloning) and is a robust enzyme for everyday PCR. It contains no proofreading or 5'→3' exonuclease activity.

Features and Benefits

- Fast:
Three times faster processive than standard *Taq* DNA polymerase.
- High performance:
Up to 10 kb amplification

Specifications

- 5' to 3' exonuclease activity: No
- 3' to 5' exonuclease activity: No
- 3'-A' overhang: Yes
- Fragment Size: ~10 kb

Application

- Real-Time quantification of DNA and cDNA targets using SYBR Green dye.
- Gene expression profiling
- Microbial & viral pathogen detection

Note: This enzyme is specifically optimized for increasing the rate of base incorporation by inactivation 5'→3' exonuclease activity. Therefore, this is not recommended to use for Real-Time PCR using Taqman probe.

Reagents Supplied

- 10X Reaction buffer (pH 9.0): Tris-HCl, KCl, etc.
- 1X Dilution buffer (pH 8.0): Tris-HCl, EDTA, DTT, stabilizers, etc.
- dNTPs mixture: 10 mM, each dNTP 2.5 mM

Concentration

500 U/100 µl

Storage Conditions

pH 8.0, Tris-HCl, EDTA, DTT, stabilizers, etc.

Storage Temperature

20°C

Unit Definition

One unit is defined as the amount of enzyme that will incorporate 10 nmole of dNTP into acid-insoluble material in 30 min at 72°C.

Experimental Data

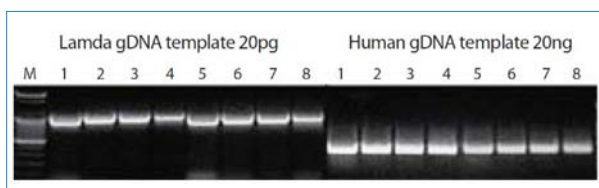


Figure 1. Enzyme activity test of *Top* DNA Polymerase and *Taq* DNA polymerase.

Top DNA polymerase/*Taq* DNA Polymerase was serially diluted and used to amplify 20 ng of each lambda and human genomic DNA.

Lane 1: 1 U of *Top* DNA Polymerase used

Lane 2: 0.5 U of *Top* DNA Polymerase used

Lane 3: 0.33 U of *Top* DNA Polymerase used

Lane 4: 0.25 U of *Top* DNA Polymerase used

Lane 5: 1 U of *Taq* DNA Polymerase used

Lane 6: 0.5 U of *Taq* DNA Polymerase used

Lane 7: 0.33 U of *Taq* DNA Polymerase used

Lane 8: 0.25 U of *Taq* DNA Polymerase used

Lane M: 100 bp plus DNA Ladder (Bioneer, Cat. no. D-1035)

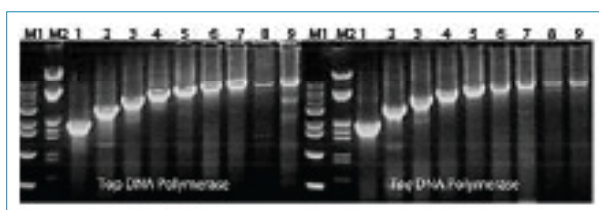


Figure 2. Long PCR amplification test of *Top* DNA Polymerase and *Taq* DNA Polymerase using Lambda DNA.

10 ng of Lambda DNA and 1 U of each DNA Polymerase used for amplification.

Lane 1: 2 kb PCR product Lane 2: 3 kb PCR product

Lane 3: 4 kb PCR product Lane 4: 5 kb PCR product

Lane 5: 6 kb PCR product Lane 6: 7 kb PCR product

Lane 7: 8 kb PCR product Lane 8: 9 kb PCR product

Lane 9: 10 kb PCR product

M1: 1 kb DNA Ladder (Bioneer, Cat. no. D-1040)

M2: Lambda DNA/*Hind* III Marker (Bioneer, Cat. no. D-1050)

Ordering Information

Cat. no.	Product Description
E-3100	<i>Top</i> DNA Polymerase, 500 U, 10 mM dNTPs, 10 x reaction buffer with $MgCl_2$
E-3100-1	<i>Top</i> DNA Polymerase, 500 U, 10 mM dNTPs, 10 x reaction buffer, 20 mM $MgCl_2$
E-3100-2	<i>Top</i> DNA Polymerase, 500 U, 10 x reaction buffer with $MgCl_2$
E-3100-3	<i>Top</i> DNA Polymerase, 500 U, 10 x reaction buffer, 20 mM $MgCl_2$
E-3101	<i>Top</i> DNA Polymerase, 2,000 U, 10 mM dNTPs, 10 x reaction buffer with $MgCl_2$
E-3101-1	<i>Top</i> DNA Polymerase, 2,000 U, 10 mM dNTPs, 10 x reaction buffer, 20 mM $MgCl_2$
E-3101-2	<i>Top</i> DNA Polymerase, 2,000 U, 10 x reaction buffer with $MgCl_2$
E-3101-3	<i>Top</i> DNA Polymerase, 2,000 U, 10 x reaction buffer, 20 mM $MgCl_2$

Versatile DNA Polymerase for Everyday Routine PCR



■ Description

Taq DNA Polymerase is a thermostable DNA polymerase that catalyzes the polymerization of nucleotides into duplex DNA in the 5' → 3' direction. Bioneer's *Taq* DNA Polymerase is isolated from recombinant *Escherichia coli* strain containing the DNA polymerase gene from *Thermus aquaticus* YT1. It exhibits its highest activity at pH 9.0 and 72°C.

■ Features and Benefits

- High yield & sensitivity:
Perform high yield and high sensitive PCR using Bioneer *Taq* DNA polymerase.
- Versatility:
Use for a wide range of DNA amplifications including Real-Time PCR using TaqMan probe or SYBR Green.
- Robust performance:
Optimized reaction buffer enhances PCR performance.

■ Specifications

- 5' to 3' exonuclease activity: Yes
- 3' to 5' exonuclease activity: No
- 3' - A overhang: Yes
- Fragment size: ~10 kb

■ Application

- Real-Time quantification of DNA and cDNA targets using Dual probe, SYBR Green dye
- Gene expression profiling
- Microbial & viral pathogen detection

■ Reagents Supplied

- 10X Reaction buffer (pH 9.0): Tris-HCl, KCl, etc.
- 1X Dilution buffer (pH 8.0): Tris-HCl, KCl, EDTA, DTT, stabilizers, etc.
- dNTPs mixture: 10 mM, each dNTP 2.5 mM

■ Concentration

500 U/100 µl

■ Storage Conditions

pH 8.0, Tris-HCl, KCl, EDTA, DTT, stabilizers, etc.

■ Storage Temperature

-20°C

■ Unit Definition

One unit is defined as the amount of enzyme that will incorporate 10 nmole of dNTP into acid-insoluble material in 30 min at 72°C.

■ Experimental Data

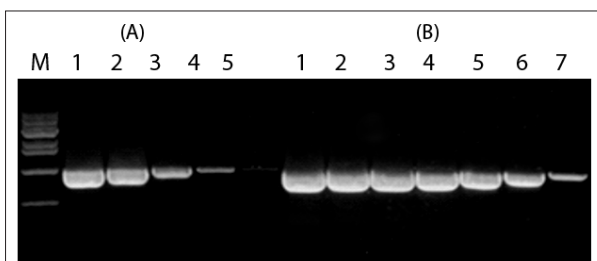


Figure 1. Using 1 unit of *Taq* DNA Polymerase, the activity of the polymerase was tested on human genomic DNA (A), lambda genomic DNA (B) as template. Each template DNA was serially diluted by ten-folds, with different ranges.

Lane 1: 100 ng Template DNA
Lane 2: 10 ng Template DNA
Lane 3: 1 ng Template DNA
Lane 4: 100 pg Template DNA
Lane 5: 10 pg Template DNA
Lane 6: 1 pg Template DNA
Lane 7: 100 fg Template DNA
M: 1 kb DNA Ladder (Bioneer, Cat. no. D-1040)

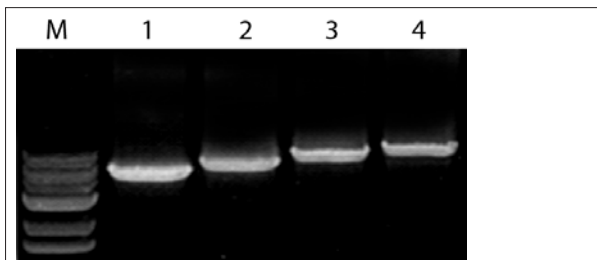


Figure 2. Amplification of fragments ranging from 5 kb to 8 kb from template Lambda DNA 20 pg with 1 units of *Taq* DNA Polymerase.

Lane 1: 5 kb PCR product
Lane 2: 6 kb PCR product
Lane 3: 7 kb PCR product
Lane 4: 8 kb PCR product
M: 1 kb DNA Ladder (Bioneer, Cat. no. D-1040)

■ Ordering Information

Cat. no.	Product Description
E-2011	<i>Taq</i> DNA Polymerase, 500 U, 10 mM dNTPs, 10 x reaction buffer with $MgCl_2$
E-2011-1	<i>Taq</i> DNA Polymerase, 500 U, 10 mM dNTPs, 10 x reaction buffer, 20 mM $MgCl_2$
E-2011-2	<i>Taq</i> DNA Polymerase, 500 U, 10 x reaction buffer with $MgCl_2$
E-2011-3	<i>Taq</i> DNA Polymerase, 500 U, 10 x reaction buffer, 20 mM $MgCl_2$
E-2013	<i>Taq</i> DNA Polymerase, 2,000 U, 10 mM dNTPs, 10 x reaction buffer with $MgCl_2$
E-2013-1	<i>Taq</i> DNA Polymerase, 2,000 U, 10 mM dNTPs, 10 x reaction buffer, 20 mM $MgCl_2$
E-2013-2	<i>Taq</i> DNA Polymerase, 2,000 U, 10 x reaction buffer with $MgCl_2$
E-2013-3	<i>Taq</i> DNA Polymerase, 2,000 U, 10 x reaction buffer, 20 mM $MgCl_2$

Novel Enzyme for High Fidelity PCR with DNA Proofreading



■ Description

Pfu DNA polymerase is a thermostable DNA polymerase isolated from *Pyrococcus furiosus* Vc1. It catalyzes the DNA-dependent polymerization of nucleotides into duplex DNA in the 5' → 3' direction and exhibits 3' → 5' exonuclease (proof reading) activity. *Pfu* DNA polymerase is the ideal choice for a variety of techniques requiring high-fidelity DNA synthesis by PCR reaction. It can apply to cloning, gene expression, site-directed mutagenesis and etc.

■ Features and Benefits

- High Fidelity PCR:
3' → 5' exonuclease (proofreading) activity exists
- Thermostability:
Retaining up to 99% of its thermostable activity after 1 hour at 95°C.
- Terminal Transferase Activity:
Devoid of terminal transferase activity and generates blunt-ended PCR products

■ Specifications

- 5' to 3' exonuclease activity: No
- 3' to 5' exonuclease activity: Yes
- 3'-A overhang: No
- Fragment size: ~10 kb

■ Application

- Gene synthesis
- PCR or Primer extension requested high fidelity
- Blunt-end PCR Cloning or mutagenesis requested high fidelity

■ Reagents Supplied

- 10X Reaction Buffer (pH 9.0): Tris-HCl, KCl, etc.
- 1X Dilution buffer (pH 8.0): Tris-HCl, EDTA, DTT, Stabilizers, etc.
- dNTPs mixture: 10 mM, each dNTP 2.5 mM (optional)

■ Concentration

250 U/100 μl

■ Storage Condition

pH 8.0, Tris-HCl, EDTA, DTT, stabilizers, etc.

■ Storage Temperature

-20°C

■ Unit Definition

One unit is defined as the amount of enzyme that will incorporate 10 nmol of dNTP into acid-insoluble material in 30 min at 72°C.

■ Experimental Data

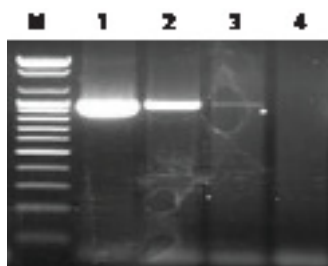


Figure 1. Human DNA was amplified using 2.5 units of enzyme in 50 µl reaction volume.

Lane 1: 20 ng Lane 2: 2 ng
Lane 3: 200 pg Lane 4: 20 pg
M: 100 bp DNA ladder (Bioneer, Cat. no. D-1030)

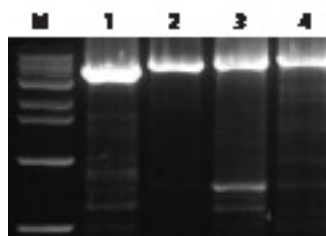


Figure 2. Long kb PCR test of *Pfu* DNA polymerase with lambda DNA

Lane 1: Lambda DNA 5 kb
Lane 2: Lambda DNA 6 kb
Lane 3: Lambda DNA 7 kb
Lane 4: Lambda DNA 8 kb
M: 1 kb DNA ladder (Bioneer, Cat. no. D-1040)

■ Ordering Information

Cat. no.	Product Description
E-2015	<i>Pfu</i> DNA Polymerase, 250 U, 10 x reaction buffer
E-2015-1	<i>Pfu</i> DNA Polymerase, 250 U, 10 mM dNTPs, 10 x reaction buffer
E-2016	<i>Pfu</i> DNA Polymerase, 1,000 U, 10 x reaction buffer

For High Efficiency and Amplification of Long Range PCR.



■ Description

ProFi Taq DNA polymerase, developed by Bioneer, is a unique recombinant *Taq* DNA polymerase that offers enhanced amplification efficiency for PCR. *ProFi Taq* DNA polymerase provides more efficient amplification and higher fidelity than conventional *Taq* DNA polymerase. This enzyme is applicable to any template DNA, and especially effective in amplifying large genomic DNA fragments up to 20 kb. *ProFi Taq* DNA polymerase provides accurate long-range amplification of standard and complex templates and amplification of low-copy target, and is highly suitable for all PCR applications.

■ Features and Benefits

- Flexible:
ProFi Taq provides accurate long-range amplification of standard and amplification of low-copy target, and is highly suitable for all PCR applications.
- Long PCR:
ProFi Taq is especially effective in amplifying large genomic DNA fragments around 21 kb and amplifying Lambda DNA up to 30 kb.
- Reproducibility:
Each batch is produced under strict quality controls. Errors that commonly occur during mass production are eliminated during the individual packaging process. Bioneer's current batch processing system allows for the production of more accurate and reproducible end-product yield.

■ Specifications

- 5' to 3' exonuclease activity: Yes
- 3' to 5' exonuclease activity: Yes
- 3'-A overhang: Yes
- Fragment size: ~30 kb

■ Application

- Primer extension
- long-range amplification from genomic DNA
- High amplification efficiency
- Excellent performance on difficult templates
- Amplification of low-copy targets
- High yield and high sensitivity PCR

■ Reagents Supplied

- 10X Reaction Buffer (pH 9.0): Tris-HCl, KCl, etc.
- 1X Dilution buffer (pH 8.0): Tris-HCl, EDTA, DTT, KCl, Stabilizers, etc.
- dNTPs mixture: 10 mM, each dNTP 2.5 mM

■ Concentration

250 U/50 µl

■ Storage Condition

pH 8.0, Tris-HCl, KCl, EDTA, DTT, stabilizers, etc.

■ Storage Temperature

-20°C

■ Experimental data

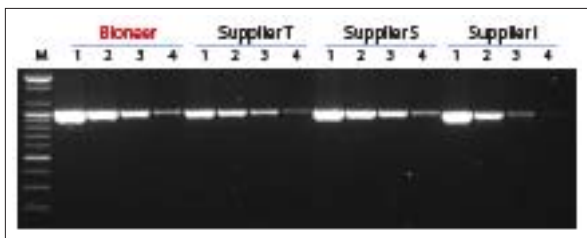


Figure 1. Comparison of PCR amplification efficiency between *ProFi Taq* DNA Polymerase from Bioneer and other suppliers' DNA polymerase.

The cycling conditions for *ProFi Taq* DNA Polymerase were 95°C for 5 min, 30 cycles of 95°C for 20 sec, 55°C for 20 sec and 72°C for 30 sec. PCR reaction using other suppliers' DNA polymerase were performed according to each supplier's protocol.

Target: human Insulin receptor gene

Lane 1: 10 ng of human genomic DNA

Lane 2: 1 ng of human genomic DNA

Lane 3: 100 pg of human genomic DNA

Lane 4: 10 pg of human genomic DNA

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

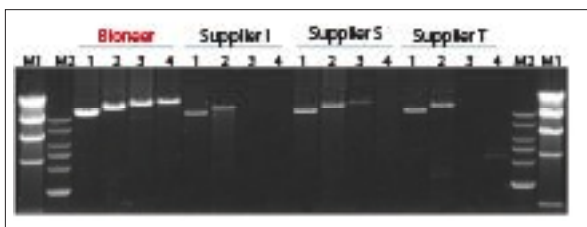


Figure 2. Comparison of PCR amplification of long targets between *ProFi Taq* DNA Polymerase from Bioneer and other suppliers' DNA polymerase.

The cycling conditions for *ProFi Taq* DNA Polymerase were 95°C for 5 min, 32 cycles of 95°C for 20 sec and 68°C for 15 min. PCR reactions using other suppliers' DNA polymerase were performed according to each supplier's protocol. Human genomic DNA was used as a template for PCR amplification.

Lane 1: 11 kb fragment

Lane 2: 13.5 kb fragment

Lane 3: 17.6 kb fragment

Lane 4: 21.4 kb fragment

Lane M1: Lambda/Hind III marker (Bioneer, Cat. no. D-1050)

Lane M2: 1 kb DNA Ladder (Bioneer, Cat. no. D-1040)

■ Ordering Information

Cat. no.	Product Description
E-2201	<i>ProFi Taq</i> DNA Polymerase 250 U, 10 mM dNTPs, 10 X reaction buffer with $MgCl_2$
E-2202	<i>ProFi Taq</i> DNA Polymerase 250 U, 10 mM dNTPs, 10 X reaction buffer without $MgCl_2$, 20 mM $MgCl_2$
E-2203	<i>ProFi Taq</i> DNA Polymerase 250 U, 10 X reaction buffer with $MgCl_2$
E-2204	<i>ProFi Taq</i> DNA Polymerase 250 U, 10 X reaction buffer without $MgCl_2$, 20 mM $MgCl_2$
E-2205	<i>ProFi Taq</i> DNA Polymerase 1000 U, 10 mM dNTPs, 10 X reaction buffer with $MgCl_2$
E-2206	<i>ProFi Taq</i> DNA Polymerase 1000 U, 10 mM dNTPs, 10 X reaction buffer without $MgCl_2$, 20 mM $MgCl_2$
E-2207	<i>ProFi Taq</i> DNA Polymerase 1000 U, 10 X reaction buffer with $MgCl_2$
E-2208	<i>ProFi Taq</i> DNA Polymerase 1000 U, 10 X reaction buffer without $MgCl_2$, 20 mM $MgCl_2$

Unique Enzyme-Mediated HotStart DNA Polymerase



■ Description

Bioneer's HotStart DNA polymerase uses an exclusive enzyme-mediated hotstart PCR method that, unlike most other hotstart PCR chemistries, completely releases all polymerase activity during the first denaturation step. *Top* DNA polymerase is completely inhibited by pyrophosphate (PPi) at temperatures below 70°C. However, at temperatures above 70°C, a thermostable pyrophosphatase (PPase) initiates pyrophosphate hydrolysis and activates the DNA polymerase. This prevents the formation of non-specific products and primer-dimers during the reaction set-up process and results in improved PCR specificity.

General Equation of PCR

Template + Primer + Mg^{2+} + dNTP \rightleftharpoons Elongation + 2Pi

■ Features and Benefits

- Fast:
More than three times more processive than standard *Taq* DNA Polymerase
- High Performance:
Amplifies fragments up to 12 kb.
- Value:
No license fee to pay !

■ Specifications

- 5' to 3' exonuclease activity: No
- 3' to 5' exonuclease activity: No
- 3'-A overhang: Yes
- Fragment size: ~12 kb

■ Application

- HotStart PCR, PCR with complex genomic templates/low copy templates/cDNA
- Multiplex PCR
- Primer extension
- SNP typing
- Real-Time PCR using SYBR Green dye
- Multiple primer pairs and amplification of low copy template DNA

■ Reagents Supplied

- 10X Reaction buffer (pH 9.0): Tris-HCl, KCl, and Pyrophosphate
- 1X Dilution buffer (pH 8.2): Tris-HCl, EDTA, DTT, stabilizers, etc.
- dNTPs mixture: 10 mM, each dNTP 2.5 mM
- 20 mM $MgCl_2$

■ Concentration

250 U /50 μ l

■ Storage Conditions

pH 8.2, Tris-HCl, KCl, EDTA, DTT, stabilizers, etc.

■ Storage Temperature

-20°C

■ Unit Definition

One unit is defined at the amount of enzyme that will incorporate 10 nmole of dNTP into acid-insoluble material in 30 min at 72°C.

■ Experimental Data

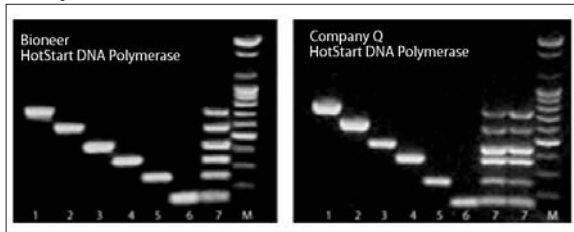


Figure 1. Multiplex PCR comparison of genomic DNA using 6 sets of primers and 2 different DNA polymerases.

Lane 1: 750 bp fragment Lane 2: 590 bp fragment
Lane 3: 450 bp fragment Lane 4: 360 bp fragment
Lane 5: 260 bp fragment Lane 6: 150 bp fragment
Lane 7: Multiplex PCR with primers used for Lane 1~6
Lane M: 100 bp DNA Ladder (Bioneer, Cat. no. D-1030)

■ Ordering Information

Cat. no.	Product Description
E-3150	HotStart DNA Polymerase, 250 U, 10 mM dNTPs, 10 X reaction buffer 20 mM MgCl ₂
E-3150-1	HotStart DNA Polymerase, 250 U, 10 X reaction buffer 20 mM MgCl ₂
E-3151	HotStart DNA Polymerase, 1,000 U, 10 mM dNTPs, 10 X reaction buffer 20 mM MgCl ₂

For Increased Specificity and Robust Sensitivity.



■ Description

HotStart *Taq* DNA polymerase is designed to increase specificity and sensitivity in PCR. The HotStart *Taq* DNA polymerase is inhibited at temperatures lower than 70°C, but is fully activated after the first denaturation step. This prevents the formation of mis-primed products and primer-dimers during the reaction setup process, resulting in improved PCR specificity.

■ Features and Benefits

- Maximized Specificity:
Virtually eliminates non-specific amplification. Ideal for multiplex PCR with 2-6 amplicons.
- Improved Sensitivity:
Excellent for PCR using low copy number targets.
- TA cloning Compatible:
PCR products amplified with Hotstart *Taq* DNA polymerase have 3' A overhang and can be used for TA cloning.
- Versatility:
HotStart *Taq* DNA Polymerase is ideal for a wide range of PCR applications.

■ Specifications

- 5' to 3' exonuclease activity: Yes
- 3' to 5' exonuclease activity: No
- 3'-A overhang: Yes
- Fragment size: ~10 kb

■ Application

- Real-Time quantification of DNA and cDNA targets using SYBR Green dye.
- HotStart PCR
- Multiplex PCR
- Automated PCR

■ Reagents Supplied

- 10X Reaction Buffer (pH 9.0): Tris-HCl, KCl, etc.
- 1X Dilution Buffer (pH 8.0): Tris-HCl, KCl, EDTA, DTT, Stabilizers, etc.
- dNTPs mixture: 10 mM, each dNTP 2.5 mM

■ Concentration

250 U/50 µl

■ Storage Conditions

pH 8.0, Tris-HCl, KCl, EDTA, DTT, Stabilizers, etc.

■ Storage Temperature

-20°C

■ Unit Definition

One unit is defined as the amount of enzyme that will incorporate 10 nmole of dNTP into acid-insoluble material in 30 min at 72°C.

■ Experimental Data

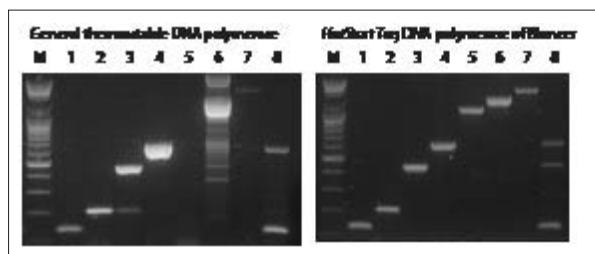


Figure 1. Specificity comparison between standard *Taq* and HotStart *Taq* DNA Polymerase. Single and multiples PCR results in human genomic DNA p53 Gene amplification.

Lane 1: 139 bp Lane 2: 211 bp
Lane 3: 447 bp Lane 4: 618 bp
Lane 5: 1,082 bp Lane 6: 1,296 bp
Lane 7: 1,561 bp
Lane 8: Multiplex PCR (139 bp, 447 bp, 618 bp)
M: 100 bp DNA Ladder (Bioneer, Cat. no D-1030)

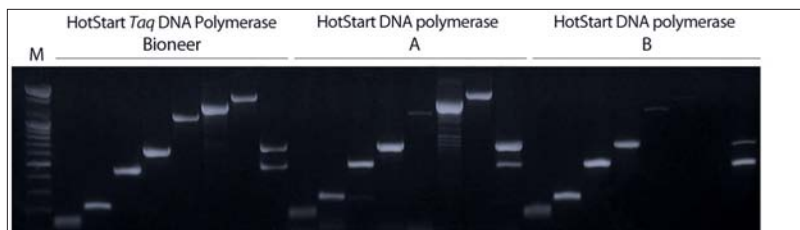


Figure 2. Performance comparison between HotStart *Taq* Polymerase and other supplier.

M: 100 bp DNA Ladder (Bioneer, Cat. no. D-1040)

A: Supplier A's hotstart DNA polymerase

B: Supplier B's hotstart DNA polymerase

■ Ordering Information

Cat. no.	Product Description
E-2017	HotStart <i>Taq</i> DNA Polymerase, 250 U, 10 mM dNTPs, 10 x reaction buffer with MgCl_2
E-2017-1	HotStart <i>Taq</i> DNA Polymerase, 1,000 U, 10 mM dNTPs, 10 x reaction buffer with MgCl_2
E-2017-2	HotStart <i>Taq</i> DNA Polymerase, 500 U, 10 mM dNTPs, 10 x reaction buffer with MgCl_2
E-2017-3	HotStart <i>Taq</i> DNA Polymerase, 250 U, 10 x reaction buffer with MgCl_2
E-2017-4	HotStart <i>Taq</i> DNA Polymerase, 1,000 U, 10 x reaction buffer with MgCl_2

RNA Amplification ●●●

Standard RT & RT-PCR Kit

<i>AccuPower</i> ® RT PreMix	44
<i>AccuPower</i> ® RT-PCR PreMix	46

High Efficiency RT Kit

<i>AccuPower</i> ® <i>CycleScript</i> ™ RT PreMix	48
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High Sensitivity RT & RT-PCR Kit

<i>AccuPower</i> ® <i>RocketScript</i> ™ RT PreMix	51
<i>AccuPower</i> ® <i>RocketScript</i> ™ Cycle RT PreMix	53
<i>AccuPower</i> ® <i>RocketScript</i> ™ RT-PCR PreMix	56

Long & High Efficiency RT Kit

<i>AccuPower</i> ® <i>RocketScript</i> ™ RT PreMix, RNase H Minus ^{New}	58
<i>AccuPower</i> ® <i>RocketScript</i> ™ RT-PCR PreMix, RNase H Minus ^{New}	60

Multiplex RT-PCR Kit

<i>AccuPower</i> ® <i>RocketPlex</i> ™ RT-PCR PreMix	61
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HotStart RT & RT-PCR Kit

<i>AccuPower</i> ® <i>Dual-HotStart</i> ™ RT-PCR PreMix	64
<i>AccuPower</i> ® <i>Dual-HotStart</i> ™ RT-PCR PreMix (with UDG)	66

Reverse Transcriptase

<i>M-MLV</i> Reverse Transcriptase	68
<i>CycleScript</i> Reverse Transcriptase	69
<i>RocketScript</i> ™ Reverse Transcriptase	72
<i>RocketScript</i> ™ Reverse Transcriptase, RNase H Minus	74

Conventional PCR Instrument

AllInOneCycler™ → Go to M. Instruments & Devices

For Standard cDNA Synthesis with M-MLV RTase, Dried-type Premix



■ Description

AccuPower® RT PreMix is a mixture for cDNA synthesis that consists of an easy to resuspend, lyophilized mix 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. to start your reaction. The kit is used for first strand cDNA synthesis from RNA.

■ Features and Benefits

- **Stability:**
In the AccuPower® RT PreMix, the reaction components are premixed with a special stabilizer prior to a freeze-drying step to preserve the stability of the components and the activity of the RTase during storage.
- **Ease-of-use:**
Almost all the required components for cDNA synthesis, such as *M-MLV* reverse transcriptase and RNase inhibitor are premixed in 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.
- **Reproducibility:**
AccuPower® RT PreMix is manufactured under strict ISO 9001 quality control conditions to ensure reproducible PCR performance.

■ Specifications

- Enzyme: *M-MLV* RTase
- DNase activity: No
- RNase activity: No
- RNase H activity: Yes
- Fragment size: ~ 9 kb

■ Application

- RT
- RT-PCR
- Random priming reaction
- cDNA library construction
- Probe labeling
- mRNA 5' end mapping by primer extension analysis
- Real-Time PCR

■ Transport Temperature

Room temperature

■ Storage Temperature

- 20°C

■ Experimental Data

Sensitivity & Reproducibility

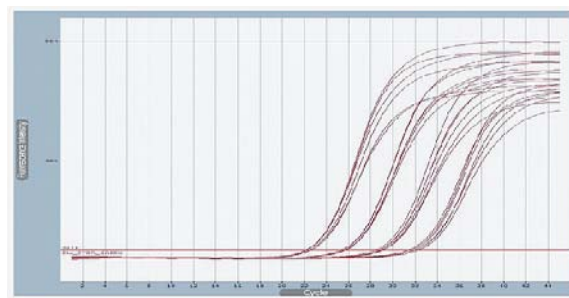


Figure 1. Amplification of GAPDH target gene was detected using human total RNA (from 10 ng to 10 pg) with AccuPower® RT PreMix.

Template RNA: Total RNA from HeLa cells. Data in the following table represent.

Ct value (n = 6).

Amount of template RNA	Average Ct value	Standard Deviation
10 pg	32.27	0.18
100 pg	28.85	0.27
1 ng	25.41	0.27
10 ng	22.13	0.29

Specific Amplification

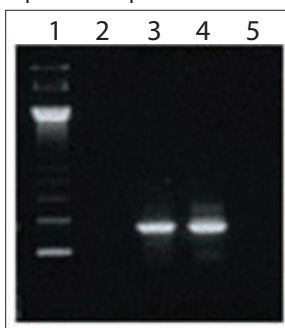


Figure 2. Specific amplification of 5'-UTR region of HCV with AccuPower® RT PreMix.

Lane 1: 100 bp DNA Ladder (Bioneer, Cat. no. D-1030)

Lane 2: negative control

Lane 3: HCV positive serum

Lane 4: HCV positive serum

Lane 5: HCV negative serum

Reliability and Reproducibility Test

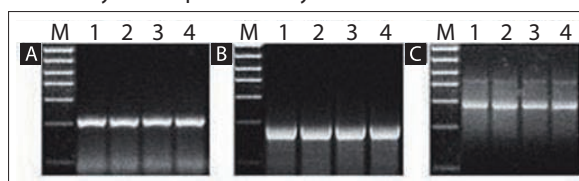


Figure 3. AccuPower® RT PreMix from each lot was tested to confirm reliability and reproducibility.

Human total RNA (panel A: actin, panel B: globin) and hog cholera virus RNA (panel C) were used as template. Following cDNA synthesis, AccuPower® PCR PreMix was used to amplify target genes.

Lane 1-4: Reliability test of each lot with AccuPower® RT PreMix

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

Ordering Information

Cat. no.	Product Description
K-2040	AccuPower® RT PreMix, 0.5 ml thin-wall tubes with attached cap / 100 tubes, 20 µl rxn
K-2041	AccuPower® RT PreMix (-dye), 0.2 ml thin-wall 8-tube strips with attached cap / 96 tubes, 20 µl rxn
K-2041-B	AccuPower® RT PreMix, 0.2 ml thin-wall 8-tube strips with attached cap / 480 tubes, 20 µl rxn
K-2042	AccuPower® RT PreMix, 0.5 ml thin-wall tubes with attached cap / 100 tubes, 50 µl rxn
K-2043	AccuPower® RT PreMix, 0.2 ml thin-wall 8-tube strips with attached cap / 96 tubes, 50 µl rxn
K-2043-B	AccuPower® RT PreMix, 0.2 ml thin-wall 8-tube strips with attached cap / 480 tubes, 50 µl rxn
K-2082-1	AccuPower® RT PreMix, thin-wall 384-well full-skirted plate, 5 µl rxn
K-2082-2	AccuPower® RT PreMix, thin-wall 384-well full-skirted plate, 10 µl rxn
K-2082-3	AccuPower® RT PreMix, thin-wall 384-well full-skirted plate, 20 µl rxn
K-2261-1	AccuPower® RT PreMix, thin-wall 96-well flat plate, 10 µl rxn
K-2261-2	AccuPower® RT PreMix, thin-wall 96-well full-skirted plate, 10 µl rxn
K-2261-3	AccuPower® RT PreMix, thin-wall 96-well semi-skirted plate, 10 µl rxn
K-2261-4	AccuPower® RT PreMix, thin-wall 96-well flat plate, 20 µl rxn
K-2261-5	AccuPower® RT PreMix, thin-wall 96-well full-skirted plate, 20 µl rxn
K-2261-6	AccuPower® RT PreMix, thin-wall 96-well semi-skirted plate, 20 µl rxn

For One-step RT-PCR with *M*-MLV RTase and *Top* DNA Polymerase, Dried-type Premix



■ Description

AccuPower® RT-PCR PreMix contains all needed components for sequential cDNA synthesis and amplification in one tube. This RT-PCR PreMix consists of *M*-MLV reverse transcriptase, RNA dependent DNA polymerase, and a thermostable DNA polymerase in a lyophilized mix of dNTPs, reaction buffer, RNase inhibitor, tracking dye, and a stabilizer. The kit can be used for cDNA synthesis from low-copy RNA or mRNA followed by PCR.

■ Features and Benefits

- Ease-of-use:
Almost all the required components for cDNA synthesis and PCR, such as *M*-MLV reverse transcriptase and *Top* DNA polymerase are premixed in optimal concentrations. The user only adds the purified target RNA, primers and D.W., and the reaction is ready to start.
- Reproducibility:
AccuPower® RT-PCR PreMix is manufactured under strict ISO 9001 quality control conditions to ensure reproducible PCR performance.
- Stability:
In the AccuPower® RT-PCR PreMix, the reaction components are premixed with a special stabilizer prior to a freeze-drying step to preserve the stability of the components and the activity of the RTase during storage. Stable for 2 years at -20°C.
- RNase, DNase and Proteinase-free:
Ensures the integrity of your samples.

■ Specifications

- Enzyme: *M*-MLV RTase, *Top* DNA polymerase
- 5' to 3' exonuclease: No
- 3' to 5' exonuclease: No
- 3' - A overhang: Yes
- RNase H activity: Yes
- Fragment size: ~ 5 kb

■ Application

- RT
- RT-PCR
- cDNA library construction
- Gene expression analysis

■ Transport Temperature

Room temperature

■ Storage Temperature

-20°C

■ Experimental Data

Sensitivity

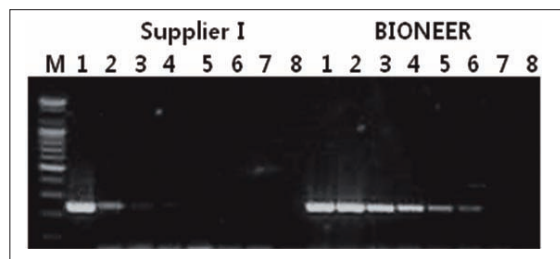


Figure 1. Sensitivity comparison between *AccuPower*® RT-PCR PreMix and Supplier I RT-PCR kit.

Each 10^9 copies $\sim 10^3$ 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)

Reproducibility

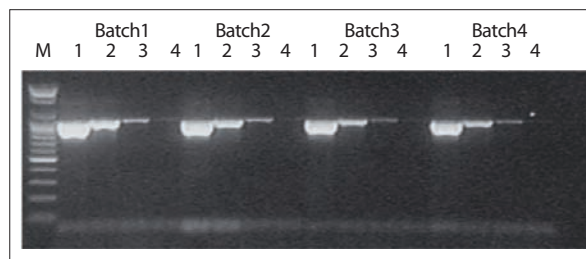


Figure 2. Comparison of reproducibility test for *AccuPower*® RT-PCR PreMix batch 1, 2, 3 and batch 4 products using serial diluted human total RNA.

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

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

■ Ordering Information

Cat. no.	Product Description
K-2055	<i>AccuPower</i> ® RT-PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached cap / 96 tubes, 20 μ l rxn
K-2055-B	<i>AccuPower</i> ® RT-PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached cap / 480 tubes, 20 μ l rxn
K-2056	<i>AccuPower</i> ® RT-PCR PreMix, 0.5 ml thin-wall individual tubes with attached cap / 100 tubes, 50 μ l rxn
K-2057	<i>AccuPower</i> ® RT-PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached cap / 96 tubes, 50 μ l rxn
K-2057-B	<i>AccuPower</i> ® RT-PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached cap / 480 tubes, 50 μ l rxn
K-2084-1	<i>AccuPower</i> ® RT-PCR PreMix, thin-wall 384-well full-skirted plate, 5 μ l rxn
K-2084-2	<i>AccuPower</i> ® RT-PCR PreMix, thin-wall 384-well full-skirted plate, 10 μ l rxn
K-2084-3	<i>AccuPower</i> ® RT-PCR PreMix, thin-wall 384-well full-skirted plate, 20 μ l rxn
K-2262-1	<i>AccuPower</i> ® RT-PCR PreMix, thin-wall 96-well flat plate, 10 μ l rxn
K-2262-2	<i>AccuPower</i> ® RT-PCR PreMix, thin-wall 96-well full-skirted plate, 10 μ l rxn
K-2262-3	<i>AccuPower</i> ® RT-PCR PreMix, thin-wall 96-well semi-skirted plate, 10 μ l rxn
K-2262-4	<i>AccuPower</i> ® RT-PCR PreMix, thin-wall 96-well flat plate, 20 μ l rxn
K-2262-5	<i>AccuPower</i> ® RT-PCR PreMix, thin-wall 96-well full-skirted plate, 20 μ l rxn
K-2262-6	<i>AccuPower</i> ® RT-PCR PreMix, thin-wall 96-well semi-skirted plate, 20 μ l rxn

For High Performance cDNA Synthesis from rare templates with CycleScript M-MLV RTase, Dried-type premix



Description

AccuPower® CycleScript RT PreMix (available with: dT₂₀, dN₁₂, or dN₆ primers) is an easy to resuspend lyophilized PCR mixture of CycleScript reverse transcriptase, a primer, and all of the other components for cDNA synthesis conveniently packaged in individual tubes. Simply add template RNA, and D.W. Then, the reverse transcription is performed by either a cyclic RT reaction or conventional reverse transcription PCR. The use of cyclic RT produces cDNA amplification and better results compared to conventional reverse transcription PCR – especially for rare transcripts.

AccuPower® CycleScript RT was developed for both a conventional reverse transcription PCR at a fixed temperature at 42°C and cyclic reverse transcription that is carried out like a PCR. Bioneer's cyclic RT is an innovative technology to synthesize more homogeneous cDNA in less time compared to the conventional reverse transcription.

Conventional Reverse Transcription

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

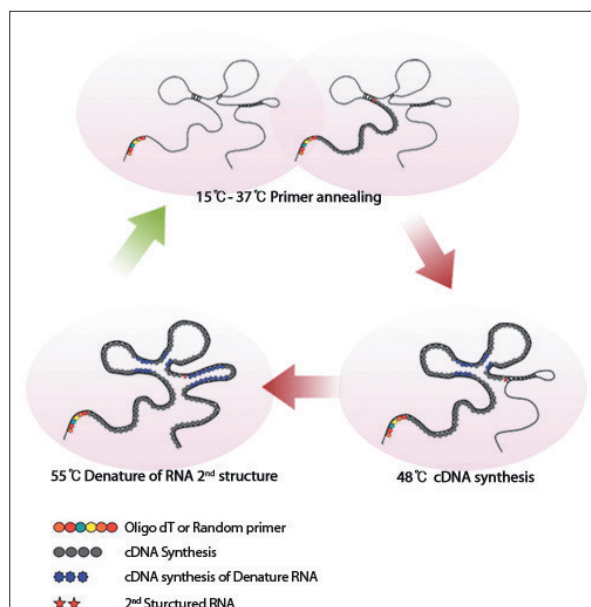
-Step 2: cDNA synthesis at a temperature between 37°C-55°C for 15-60 min

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

- **Ease-of-use:**
Simply add your purified RNA and start your reaction. Enzyme, dNTPs, reaction buffer, and oligo dT₂₀, dN₁₂ and dN₆ are provided.
- **Broad range of working temperatures:**
For RNAs which have rich GC contents or significant secondary structure.
- **Novel cyclic temperature reverse transcription:**
Ensures to synthesize even the rarest transcripts.
- **Stability:**
In the AccuPower® CycleScript RT PreMix, the reaction components are premixed with a special stabilizer prior to a freeze-drying step to preserve the stability of the components and the activity of the RTase during storage. Stable for 2 years at -20°C.
- **RNase, DNase and Proteinase-free:**
Ensures the integrity of your samples.

Specifications

- Enzyme: CycleScript RTase
- DNase activity: No
- RNase activity: No
- RNase H activity: Yes
- Fragment size: ~ 9 kb

■ Application

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

■ Transport Temperature

Room temperature

■ Storage Temperature

-20°C

■ Experimental Data

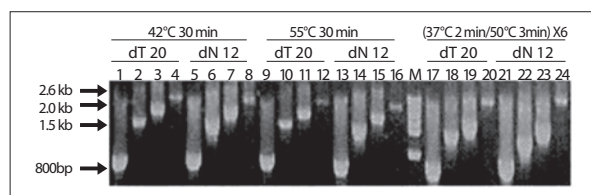


Figure 1. Reaction conditions of CTRT compared with that of conventional RT.

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

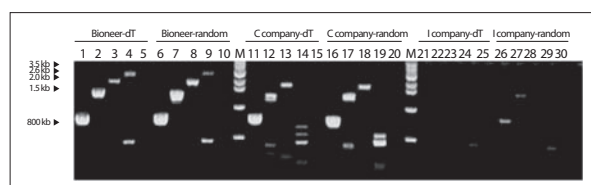


Figure 2. Gene amplification test of transferrin receptor compared with other companies.

The reaction condition was performed according to each manufacturer's recommendation. All cDNAs were reacted with AccuPower® PCR PreMix (Bioneer, Cat. no. K-2012).

Lane 1~5: AccuPower® CycleScript RT PreMix (dT₂₀) incubated at 55°C for 1 hr
 Lane 6~10: AccuPower® CycleScript RT PreMix (dN₁₂) incubated at 55°C for 1 hr
 Lane 11~15: C company's RT product including dT primer incubated at 42°C for 1 hr
 Lane 16~20: C company's RT product including random primer incubated at 42°C for 1 hr
 Lane 21~25: I company's RT product including dT primer incubated at 45°C for 1 hr
 Lane 26~30: I company's RT product including random primer incubated at 45°C for 1 hr
 Lane M: 1 kb DNA Ladder (Bioneer, Cat. no. D-1040)

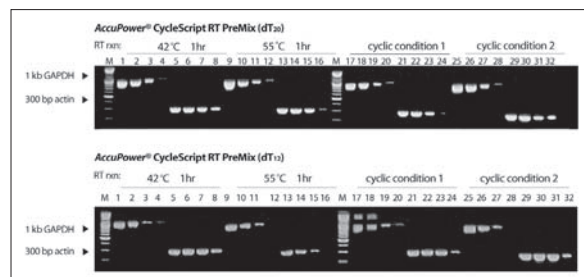


Figure 3. RT reaction at various temperature and short reaction time.

Rxn. condition: conventional 42°C 1 hr, 55°C 1 hr & cyclic reaction 1: (37°C 2 min/50°C 3 min) X 12, cyclic reaction 2: (37°C 1 min/ 47°C 3 min/ 55°C 1 min) X 12. This product shows thermal stability.

Target: Human GAPDH, human β-actin

primer set: human GAPDH primer set human β-actin primer set

Lane 1, 5, 9, 13, 17, 21, 25 & 29: HeLa cell total RNA 100 ng

Lane 2, 6, 10, 14, 18, 22, 26 & 30: HeLa cell total RNA 10 ng

Lane 3, 7, 11, 15, 19, 23, 27 & 31: HeLa cell total RNA 1 ng

Lane 4, 8, 12, 16, 20, 24, 28 & 32: HeLa cell total RNA 100 pg

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

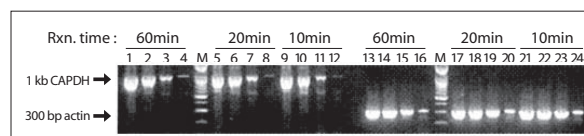


Figure 4. Amplification results at various reaction times.

CycleScript RT PreMix (dT₂₀) was performed cyclic temperature RT according to (37°C 2 min/50°C 3 min); X12, X4, X2 cycles. 10 min reaction is enough. HeLa cell total RNA templates were serially diluted such as 100 ng, 10 ng, 1 ng, 100 pg.

10 min: 2 times of 2 minutes at 37°C and 3 minutes at 50°C

20 min: 4 times of 2 minutes at 37°C and 3 minutes at 50°C

60 min: 12 times of 2 minutes at 37°C and 3 minutes at 50°C

M: 100 bp DNA Ladder (D-1030)

Lane 1, 5, 9, 13, 17, 21: 100 ng of HeLa cell total RNA used for reaction

Lane 2, 6, 10, 14, 18, 22: 10 ng of HeLa cell total RNA used for reaction

Lane 3, 7, 11, 15, 19, 23: 1 ng of HeLa cell total RNA used for reaction

Lane 4, 8, 12, 16, 20, 24, 28, 32: 100 pg of HeLa cell total RNA used for reaction

■ Ordering Information

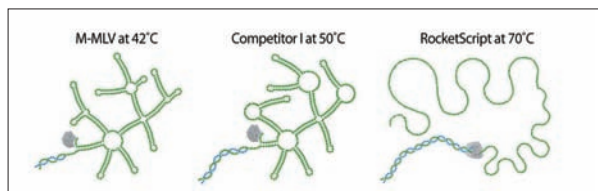
Cat. no.	Product Description
K-2044	AccuPower® CycleScript RT PreMix, dT ₂₀ / 0.2 ml thin-wall 8-tube strips with attached cap / 96 tubes, 20 µl rxn
K-2044-B	AccuPower® CycleScript RT PreMix, dT ₂₀ / 0.2 ml thin-wall 8-tube strips with attached cap / 480 tubes, 20 µl rxn
K-2045	AccuPower® CycleScript RT PreMix, dN ₁₂ / 0.2 ml thin-wall 8-tube strips with attached cap / 96 tubes, 20 µl rxn
K-2045-B	AccuPower® CycleScript RT PreMix, dN ₁₂ / 0.2 ml thin-wall 8-tube strips with attached cap / 480 tubes, 20 µl rxn
K-2046	AccuPower® CycleScript RT PreMix, dN ₆ / 0.2 ml thin-wall 8-tube strips with attached cap / 96 tubes, 20 µl rxn
K-2046-B	AccuPower® CycleScript RT PreMix, dN ₆ / 0.2 ml thin-wall 8-tube strips with attached cap / 480 tubes, 20 µl rxn
K-2047	AccuPower® CycleScript RT PreMix, dT ₂₀ / 0.2 ml thin-wall 8-tube strips with attached cap / 96 tubes, 50 µl rxn
K-2047-B	AccuPower® CycleScript RT PreMix, dT ₂₀ / 0.2 ml thin-wall 8-tube strips with attached cap / 480 tubes, 50 µl rxn
K-2048	AccuPower® CycleScript RT PreMix, dN ₁₂ / 0.2 ml thin-wall 8-tube strips with attached cap / 96 tubes, 50 µl rxn
K-2048-B	AccuPower® CycleScript RT PreMix, dN ₁₂ / 0.2 ml thin-wall 8-tube strips with attached cap / 480 tubes, 50 µl rxn
K-2049	AccuPower® CycleScript RT PreMix, dN ₆ / 0.2 ml thin-wall 8-tube strips with attached cap / 96 tubes, 50 µl rxn
K-2049-B	AccuPower® CycleScript RT PreMix, dN ₆ / 0.2 ml thin-wall 8-tube strips with attached cap / 480 tubes, 50 µl rxn
K-2050	AccuPower® CycleScript RT PreMix, dT ₂₀ / 0.5 ml thin-wall tubes with attached cap / 100 tubes, 50 µl
K-2050-1	AccuPower® CycleScript RT PreMix, dN ₁₂ / 0.5 ml thin-wall individual tubes with attached cap / 100 tubes, 50 µl rxn
K-2050-2	AccuPower® CycleScript RT PreMix, dN ₆ / 0.5 ml thin-wall individual tubes with attached cap / 100 tubes, 50 µl rxn

For High Temperature cDNA Synthesis with Thermostable *RocketScript™ M-MLV* RTase, Dried-type Premix

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 lyophilized PreMix contains all needed components for a successful reverse transcription reaction, including RTase, RNase inhibitor and buffer components. Just add template RNA, primers and D.W., and the RT reaction is ready to go.



Note: Schematic representation of the 5' UTR of a gene, with complex secondary structure, at three different temperatures. Note that *RocketScript™* RTase shows full activity at 70°C allowing it to synthesize the complete gene sequence where *M-MLV* and other Reverse Transcriptase's fail.

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.
- **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:**
The product contains the enzyme itself, plus RNase inhibitors and all other components necessary for the best reverse transcription results in the tube.
- **Reproducibility:**
Bioneer's strict quality controlled production system ensures that you can have reproducible result.

Specifications

- Enzyme: *RocketScript™* RTase
- DNase activity: No
- RNase activity: No
- RNase H activity: Yes
- Fragment size: ~ 10 kb

Application

- RT
- RT-PCR
- Random priming reactions
- cDNA library construction
- Probe labeling
- mRNA 5'-end mapping by primer extension analysis
- Real-Time PCR

Transport Temperature

Room temperature

Storage Temperature

- 20°C

Experimental Data

Thermostable Activity

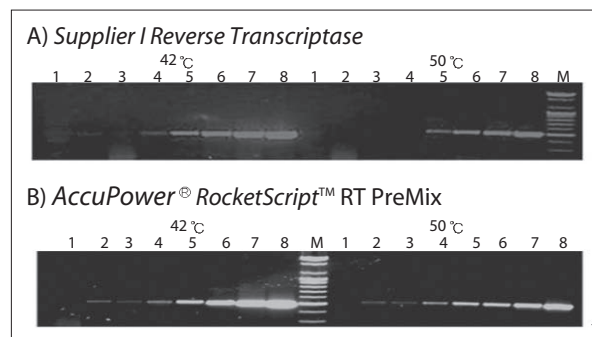


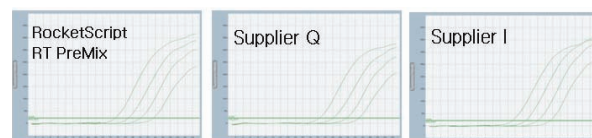
Figure 1. Sensitivity comparison between AccuPower® RocketScript™ RT PreMix and M-MLV RTase.

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

Sensitivity Test



Concentration	RocketScript™ RT PreMix	Supplier Q	Supplier I
10,000	23.91	25.63	24.43
1,000	27.33	28.92	28.03
100	30.62	32.42	30.88
10	33.63	35.43	33.95
Efficiency	104%	103%	108%
Linearity	0.9999	0.9996	0.9995

Figure 2. Sensitivity comparison between AccuPower® RocketScript™ RT PreMix and Supplier RTases using Real-Time PCR.

Rxn. conditions: conventional 1 hr incubation at 60°C, deactivation at 95°C for 5 min

All cDNAs were amplified with AccuPower® DualStar™ qPCR PreMix (Bioneer, Cat. no. K-6110).

Ordering Information

Cat. no.	Product Description
K-2101	AccuPower® RocketScript™ RT PreMix, 20 µl, 0.2 ml thin-wall 8-tube strips with attached cap, 96 tubes
K-2102	AccuPower® RocketScript™ RT PreMix, 20 µl, 0.2 ml thin-wall 8-tube strips with attached cap, 480 tubes
K-2103	AccuPower® RocketScript™ RT PreMix, 50 µl, 0.2 ml thin-wall 8-tube strips with attached cap, 96 tubes
K-2104	AccuPower® RocketScript™ RT PreMix, 50 µl, 0.2 ml thin-wall 8-tube strips with attached cap, 480 tubes

Enhanced Performance

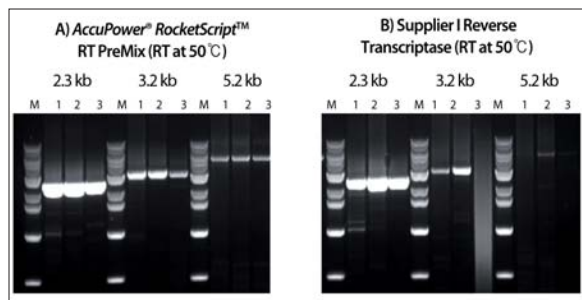


Figure 3. Comparison of amplification efficiency between AccuPower® RocketScript™ RT PreMix (A) and competitor M-MLV RTase (B).

RocketScript™ is able to handle a wide range of sample concentrations and transcript lengths so your downstream applications are minimally affected by the reverse transcription step.

Lane 1: 1,000 ng of total RNA from HeLa cells
 Lane 2: 100 ng of total RNA from HeLa cells
 Lane 3: 10 ng of total RNA from HeLa cells

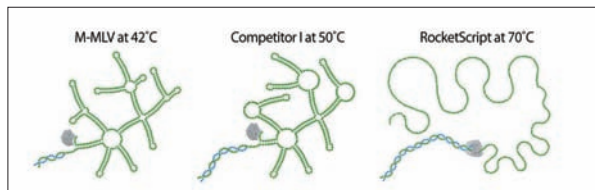
Note: Competitor products show inhibition at high input concentrations of total RNA.

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



■ Description

AccuPower® *RocketScript*™ Cycle RT PreMix is a ready-to use lyophilized PreMix containing all components for first-strand cDNA synthesis from purified Poly (A) or total RNA template. The PreMix contains Bioneer's exclusive *M-MLV* based thermostable reverse transcriptase, *RocketScript*™, and oligo dT₂₀ for convenience. Conditions are optimized for Bioneer's patented Cyclic Temperature Reverse Transcription (CTRT) in a premix form. 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. AccuPower® *RocketScript*™ Cycle RT PreMix has thermostable activity across a wide temperature range (42-70°C), allowing efficient cDNA synthesis from virtually any RNA.



Note: Schematic representation of the 5' UTR of a gene, with complex secondary structure, at three different temperatures. Note that *RocketScript*™ shows full activity at 70°C allowing it to synthesize the complete gene sequence where *M-MLV* and other reverse transcriptase's fail.

■ Features and Benefits

- **Thermostable Activity:**
Rocketscript™ is able to perform reverse transcription reactions in a wide range of temperatures between 42°C and 70°C.
- **Enhanced Performance:**
Rocketscript™ has enhanced performance to handle high and low input RNA concentrations as well as short and long RT target sizes.
- **Ease-of-use:**
The product contains the enzyme itself, plus RNase inhibitors and all other components necessary for the best reverse transcription results in the tube.

- **Reproducibility:**
Bioneer's strict quality controlled production system ensures that your results will be reproducible experiment after experiment.
- **Flexible Reaction Conditions:**
Both CTRT and first-strand cDNA synthesis are possible.
- **Broad range of working temperatures:**
For RNAs which have rich GC contents or significant secondary structure.

■ Specifications

- Enzyme: *RocketScript*™ RTase
- DNase activity: No
- RNase activity: No
- RNase H activity: Yes
- Fragment size: ~ 10 kb

■ Application

- RT
- RT-PCR
- Random priming reactions
- cDNA library construction
- Probe labeling
- mRNA 5'-end mapping by primer extension analysis
- Real-Time PCR

■ Transport Temperature

Room temperature

■ Storage Temperature

-20°C

Experimental Data

Thermostable Activity

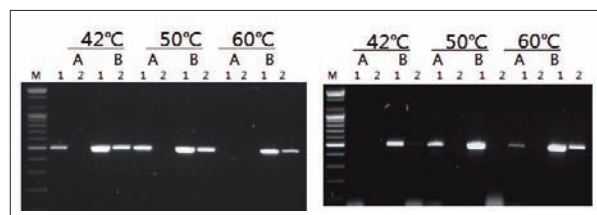


Figure 1. Complex RNA amplification results of AccuPower® RocketScript™ Cycle RT PreMix.

Each target gene (MYC, TFRC) 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 (dT)₂₀

Lane 1: 100 ng Human total RNA from HeLa cell

Lane 2: 10 ng Human total RNA from HeLa cell

Sensitivity & Full-length cDNA Synthesis

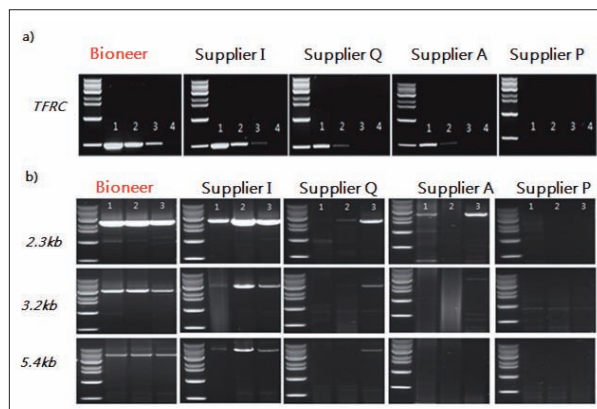


Figure 2. Comparison of amplification efficiency between AccuPower® RocketScript™ Cycle RT PreMix and competitors' RTases.

(a) Sensitivity test

Target: Human TFRC

Lane 1: 100 ng human total RNA from HeLa cell

Lane 2: 10 ng human total RNA from HeLa cell

Lane 3: 1 ng human total RNA from HeLa cell

Lane 4: 100 pg human total RNA from HeLa cell

Lane M: 1 kb DNA Ladder (Bioneer, Cat. no. D-1040)

RT reaction condition is performed according to each manufacturer's recommendations.

(b) Full-Length cDNA synthesis test

RT reactions were performed according to each manufacturer's recommendation. All cDNAs were amplified with AccuPower® HotStart PCR PreMix (K-5050) from Bioneer

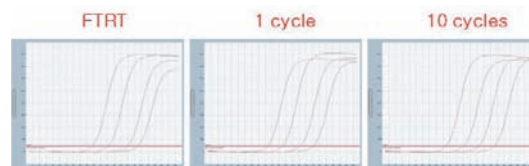
Note: Competitor products show inhibition at high input concentrations of total RNA.

Lane 1: 1 µg human total RNA from HeLa cell

Lane 2: 100 ng human total RNA from HeLa cell

Lane 3: 10 ng human total RNA from HeLa cell

Cyclic Temperature Reverse Transcription



Concentration (copies/rxn)	FTRT (Ct)	CTRT with 1 cycle (Ct)	CTRT with 10 cycles (Ct)
10,000	19.46	18.77	18.51
1,000	24.11	24.04	22.93
100	29.78	28.35	28.19
10	32.87	33.00	31.05

Figure 3. Low copy species enrichment by cycle.

Comparing FTRT (Fixed Temperature RT) to 1 and 10 cycle(s) of CTCT reveals progressive improvement of detection of cDNA in subsequent qPCR for CTCT as copies of template RNA decrease.

FTRT: 60 min incubation at 50°C followed by 5 min deactivation at 95°C

CTCT: Cycles of 37°C annealing 10 sec, 50°C cDNA synthesis 4 min, 55°C secondary structure melting and cDNA synthesis 30 sec

Target: Human GAPDH

Human total RNA from HeLa cells

qPCR with AccuPower® GreenStar™ qPCR PreMix (Bioneer, Cat. no. K-6210)

■ Ordering Information

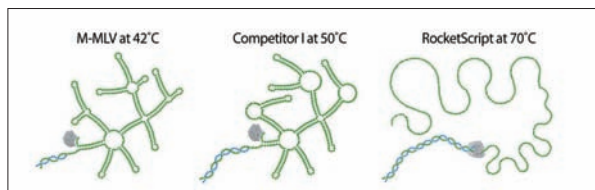
Cat. no.	Product Description
K-2201	AccuPower® RocketScript™ Cycle RT PreMix (dT ₂₀), 20 µl, 0.2 ml thin-wall 8-tube strips with attached cap, 96 tubes
K-2202	AccuPower® RocketScript™ Cycle RT PreMix (dT ₂₀), 20 µl, 0.2 ml thin-wall 8-tube strips with attached cap, 480 tubes
K-2203	AccuPower® RocketScript™ Cycle RT PreMix (dT ₂₀), 50 µl, 0.2 ml thin-wall 8-tube strips with attached cap, 96 tubes
K-2204	AccuPower® RocketScript™ Cycle RT PreMix (dT ₂₀), 50 µl, 0.2 ml thin-wall 8-tube strips with attached cap, 480 tubes
K-2205	AccuPower® RocketScript™ Cycle RT PreMix(dN ₆), 20 µl, 0.2 ml thin-wall 8-tube strips with attached cap, 96 tubes
K-2206	AccuPower® RocketScript™ Cycle RT PreMix(dN ₆), 20 µl, 0.2 ml thin-wall 8-tube strips with attached cap, 480 tubes
K-2207	AccuPower® RocketScript™ Cycle RT PreMix(dN ₆), 50 µl, 0.2 ml thin-wall 8-tube strips with attached cap, 96 tubes
K-2208	AccuPower® RocketScript™ Cycle RT PreMix(dN ₁₂), 20 µl, 0.2 ml thin-wall 8-tube strips with attached cap, 96 tubes
K-2209	AccuPower® RocketScript™ Cycle RT PreMix(dN ₁₂), 20 µl, 0.2 ml thin-wall 8-tube strips with attached cap, 480 tubes

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



■ Description

AccuPower® *RocketScript*™ RT-PCR PreMix contains Bioneer's exclusive *M-MLV* based thermostable reverse transcriptase and *Top* DNA polymerase, dNTPs and reaction buffer components all in a single, ease-of-use, one step RT-PCR product. 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. The convenient lyophilized PreMix also contains tracking dye (blue and yellow) and also a density increasing agent, allowing the user to directly place the reaction mixture in an agarose gel and perform electrophoresis.



Note: Schematic representation of the 5'UTR of a gene, with complex secondary structure, at three different temperatures. Note that *RocketScript*™ shows full activity at 70°C allowing it to synthesize the complete gene sequence where *M-MLV* and other reverse transcriptase's fail.

■ Features and Benefits

- **Thermostable Activity:**
Original *M-MLV* RTase has maximum activity at relatively low temperatures (42°C), causing several problems in reverse transcription of complex secondary structure RNA molecules. To solve this issue, Bioneer has developed a RTase activity at high temperatures (above 50°C). *RocketScript*™ has thermostable activity (42 - 70°C), allowing efficient cDNA synthesis from complex secondary structure RNA and give the user freedom to optimize the reverse transcription reaction based on temperature.
- **Ease-to-use:**
The product contains our thermostable RTase *RocketScript*™, RNase inhibitors and all other components necessary for a successful RT reaction in a single tube. Just add RNA, primers and D.W. to perform the RT reaction. Components necessary for agarose gel electrophoresis are also contained within the product including tracking dye and a density-increasing reagent for convenience. Thus, a TA vector cloning is possible without any additional reactions.
- **Reproducibility:**
Each product batch is produced under strict quality control processes for accurate and reproducible end product manufacturing.

■ Specifications

- Enzyme: *RocketScript*™ RTase, *Top* DNA polymerase
- 5' to 3' exonuclease: No
- 3' to 5' exonuclease: No
- 3' - A overhang: Yes
- RNase H activity: Yes
- Fragment size: ~ 6 kb

■ Application

- RT
- RT-PCR
- cDNA library construction
- Gene expression analysis

■ Transport Temperature

Room temperature

■ Storage Temperature

-20°C

■ Experimental Data

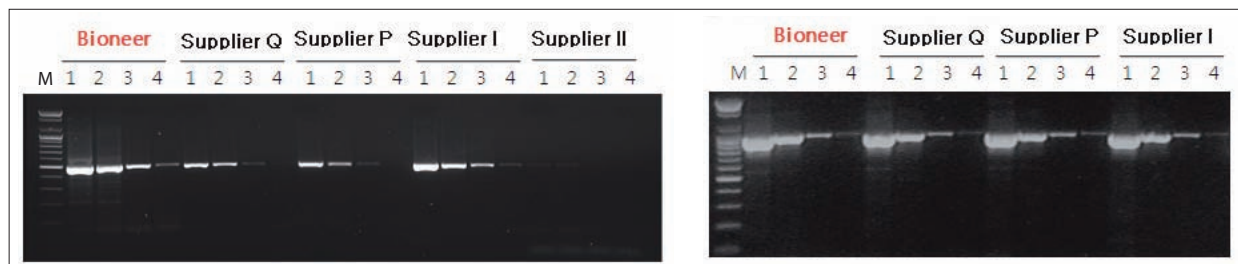


Figure 1. Performance comparison between *AccuPower® RocketScript™* RT-PCR PreMix and competitor RT-PCR kits.

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

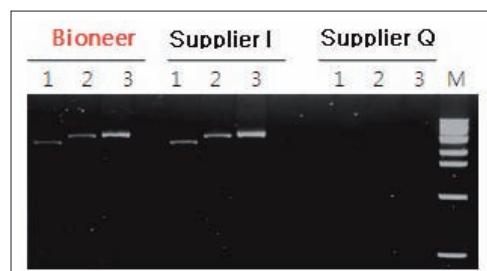


Figure 2. *AccuPower® RocketScript™* RT-PCR PreMix shows enhanced performance compared to competitors.

One-step RT-PCR reactions were performed with 100 ng total RNA from HeLa cells using reagents and conditions specified in each manufacturer's protocol.

Lane 1: 3 kb Lane 2: 4.5 kb Lane 3: 5.2 kb

RT reaction condition is performed according to each manufacturer's recommendations.

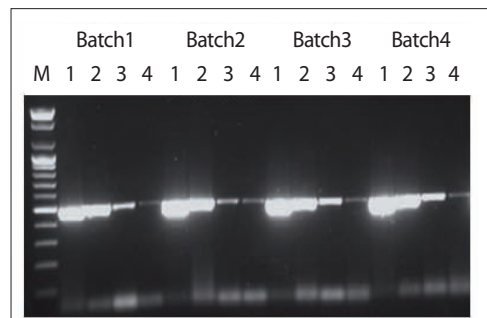


Figure 3. Highly reproducible amplifications.

Amplification of an 500 bp target gene was detected using human total RNA (from 10 ng to 10 pg) with *AccuPower® RocketScript™* RT-PCR PreMix.

As shown in figure 3, highly reproducible amplifications were achieved within each Lot. set of triplicates

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

■ Ordering Information

Cat. no.	Product Description
K-2501	<i>AccuPower® RocketScript™</i> RT-PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached cap/96 tubes 20 µl/rxn
K-2503	<i>AccuPower® RocketScript™</i> RT-PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached cap/96 tubes 50 µl/rxn
K-2502	<i>AccuPower® RocketScript™</i> RT-PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached cap/480 tubes 20 µl/rxn
K-2504	<i>AccuPower® RocketScript™</i> RT-PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached cap/480 tubes, 50 µl/rxn

Synthesis of Full length cDNA with *RocketScript*™ RT PreMix without RNase H activity



■ Description

AccuPower® *RocketScript*™ RT PreMix, RNase H Minus is uniquely developed by Bioneer. It is *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.

AccuPower® feature, which is premixed/lyophilized all the reaction components including *RocketScript*™ Reverse Transcriptase (RNase H Minus), applied to this product makes it easy to synthesize cDNA only after addition of template DNA/primer/D.W. It also prevents cross contamination problem, which is easily shown in master mix format, because of introduction of single use tube.

■ Features and Benefits

- **Thermostable Activity:**
This product is developed based on *Rocketscript*™ Reverse Transcriptase. Therefore, it is able to perform RT reaction at various temperature range of 42-70°C to suit users' needs. For this reason, it is able to synthesize cDNA up to 12.5 kb.
- **Elimination 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.
- **High Sensitivity:**
This product efficiently synthesizes cDNA from even 1 pg of human total RNA.

- **Ease-of-use:**
This product contains all the components including enzyme itself in each tube so that RT reaction can be carried right after addition of template RNA/primer/D.W. The reaction mixture after cDNA synthesis could be used in *AccuPower*® PCR PreMix for subsequent PCR.
- **Reproducibility:**
All products of Bioneer are produced through strict regulation of ISO quality system.

■ Specifications

- Enzyme: *RocketScript*™ RTase
- DNase activity: No
- RNase activity: No
- RNase H activity: No
- Fragment size: ~ 12.5 kb

■ Application

- RT
- RT-PCR
- Random priming reactions
- cDNA library construction
- Probe labeling
- mRNA 5'-end mapping by primer extension analysis
- Real-Time PCR

■ Transport Temperature

Room temperature

■ Storage Temperature

-20°C

■ Experimental Data

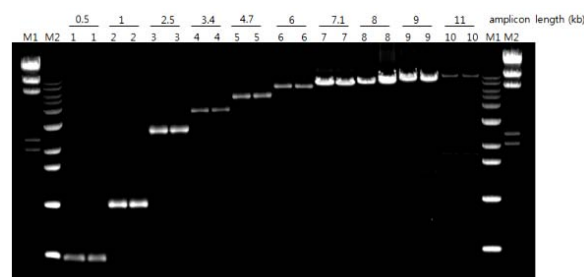


Figure 1. Performance of the *AccuPower*® *RocketScript*™ RT PreMix, RNase H Minus in two-step RT-PCR.

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.

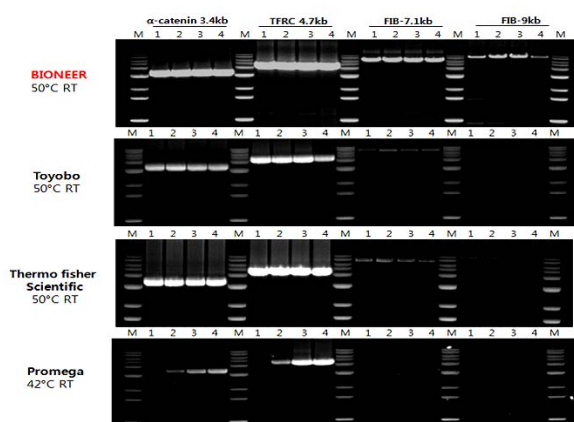


Figure 2. High synthesis rate at 50°C using Bioneer AccuPower® RocketScript™ RT PreMix, RNase H Minus.

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 transcript in 10 min.

Lane 1: RT 10 min Lane 2: RT 20 min
Lane 3: RT 30 min Lane 4: RT 60 min

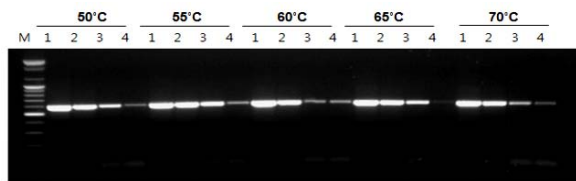


Figure 3. Thermal stability using Bioneer AccuPower® RocketScript™ RT PreMix, RNase H Minus.

Synthesis of cDNA at 50°C-70°C for 30 mins using 100 ng, 10 ng, 1 ng and 100 pg of 600 bp RNA transcript as a template using AccuPower® RocketScript™ RT PreMix, RNase H Minus. AccuPower® RocketScript™ RT PreMix, RNase H Minus completed synthesis of 70°C.

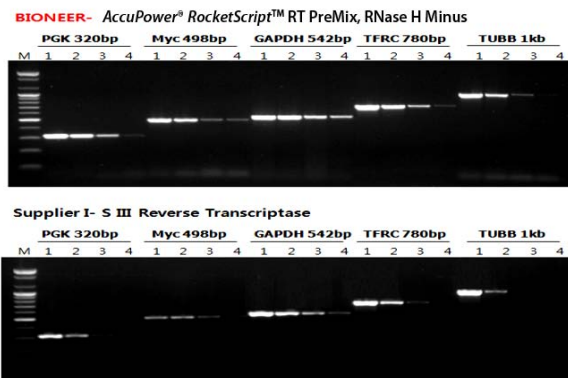
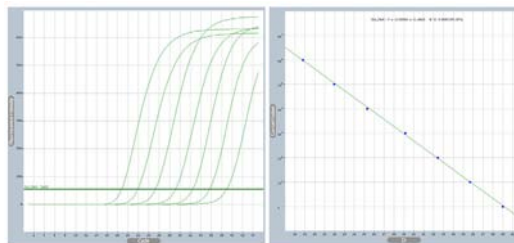


Figure 4. Sensitivity comparison of the various target.

Rxn. conditions: Conventional 30 min incubation at 50°C deactivation at 95°C for 5 min

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



Human RNA Concentration (pg)	Ct
10 ⁶	18.81
10 ⁵	21.96
10 ⁴	25.29
10 ³	29.16
10 ²	32.43
10	35.70
1	39.01

Figure 5. Broad dynamic range of AccuPower® RocketScript™ RT PreMix, RNase H Minus.

First-strand cDNA was generated using the AccuPower® RocketScript™ RT PreMix, RNase H Minus. cDNA was amplified using the AccuPower® Plus DualStar™ qPCR PreMix on the Exicycler™ 96 Real-Time Quantitative Thermal Block from Bioneer. The standard curve illustrates high linearity ($R^2 = 0.999$) across a broad range of input RNA, suggesting that the relative representation of specific RNA transcripts is preserved in the cDNA pool regardless of the abundance of total RNA. Amplification was performed on 10-fold serial dilutions of HeLa total RNA

Ordering Information

Cat. no.	Product Description
K-2801	AccuPower® RocketScript™ RT PreMix, RNase H Minus, 0.2 ml thin-wall 8-tube strips with attached cap, 96 tubes, 20 µl/rxn
K-2802	AccuPower® RocketScript™ RT PreMix, RNase H Minus, 0.2 ml thin-wall 8-tube strips with attached cap, 480 tubes, 20 µl/rxn
K-2803	AccuPower® RocketScript™ RT PreMix, RNase H Minus, 0.2 ml thin-wall 8-tube strips with attached cap, 96 tubes, 50 µl/rxn
K-2804	AccuPower® RocketScript™ RT PreMix, RNase H Minus, 0.2 ml thin-wall 8-tube strips with attached cap, 480 tubes, 50 µl/rxn

One-step RT-PCR from LONG length template RNA

Description

AccuPower® RocketScript™ RT-PCR PreMix, RNase H Minus is a new one-step RT-PCR product with high temperature-working RocketScript™ RTase, RNase H Minus and other components for RT-PCR including ProFi Taq DNA polymerase, dNTP, and reaction buffer in vacuum lyophilized format. 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. High temperature RT performance of RocketScript™ RTase, RNase H Minus provides RT-PCR product effectively from template RNA with resistant secondary structure.

Features and Benefits

- Elimination 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.
- Thermostable Activity:
This product is developed based on RocketScript™ Reverse Transcriptase. Therefore, it is able to perform RT reaction at various temperature range of 42~70°C to suit users' needs. For this reason, it is able to synthesize cDNA up to 12.5 kb.
- Sensitivity:
One-step RT-PCR in human total RNA extracted from cell/tissue is possible.
- Long kb RT-PCR:
cDNA synthesis with up to 12.5 kb target is possible.
- Ease-of-use:
This product contains all components for one-step RT-PCR such as RocketScript™ RTase, RNase H Minus, ProFi Taq PCR polymerase and others in a single tube. Just add RNA, primers and D.W. to perform the RT-PCR reaction. Components necessary for agarose gel electrophoresis are also contained within the product including tracking dye and a density-increasing reagent for convenience.
- Reproducibility:
All products of Bioneer are produced through strict regulation of ISO quality system.

Specifications

- Enzyme: RocketScript™ RTase (RNase H-), ProFi Taq DNA Polymerase
- 5' to 3' exonuclease: Yes
- 3' to 5' exonuclease: Yes
- 3' - A Overhang: Yes
- RNase H Activity: No
- Fragment size: ~ 12.5 kb

Application

- Low copies detection
- RNA virus detection
- Gene expression analysis

Transport Temperature

Room temperature

Storage Temperature

- 20°C

Ordering Information

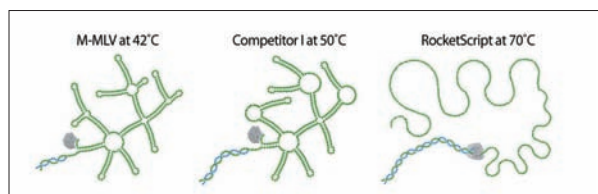
Cat. no.	Product Description
K-2511	AccuPower® RocketScript™ RT-PCR PreMix, RNase H Minus, 0.2 ml thin-wall 8-tube strips with attached cap/96 tubes, 20 µl/rxn
K-2512	AccuPower® RocketScript™ RT-PCR PreMix, RNase H Minus, 0.2 ml thin-wall 8-tube strips with attached cap/480 tubes, 20 µl/rxn
K-2513	AccuPower® RocketScript™ RT-PCR PreMix, RNase H Minus, 0.2 ml thin-wall 8-tube strips with attached cap/96 tubes, 50 µl/rxn
K-2514	AccuPower® RocketScript™ RT-PCR PreMix, RNase H Minus, 0.2 ml thin-wall 8-tube strips with attached cap/480 tubes, 50 µl/rxn

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



■ 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 both *RocketScript*[™] reverse transcriptase, an RNA-dependent DNA polymerase, and a thermostable DNA polymerase in a lyophilized mix of dNTPs, reaction buffer, RNase inhibitor, loading dye and stabilizer.



Note: Schematic representation of the 5' UTR of a gene, with complex secondary structure, at three different temperatures. Note that *RocketScript*[™] RTase shows full activity at 70°C allowing it to synthesize the complete gene sequence where *M-MLV* and other reverse transcriptases fail.

■ Features and Benefits

- Capacity:
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.
- High Efficiency and Sensitivity:
Detect every gene, every time.

- Ease-of-use:
Simply add RNA, Primer and D.W. to begin. All other reaction components are included.
- Reproducibility:
Bioneer's strict quality controlled production system ensures that your results will be reproducible experiment after experiment.

■ Specifications

- Enzyme: *RocketScript*[™] RTase, HotStart *Top* DNA polymerase
- 5' to 3' exonuclease: No
- 3' to 5' exonuclease: No
- 3' - A overhang: Yes
- RNase H activity: Yes
- Fragment size: ~ 1 kb

■ Application

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

■ Transport Temperature

Room temperature

■ Storage Temperature

- 20°C

■ Experimental Data

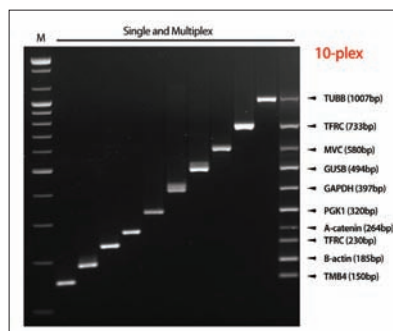


Figure 1. Single RT-PCR and multiplex RT-PCR using AccuPower® RocketPlex RT-PCR PreMix.

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

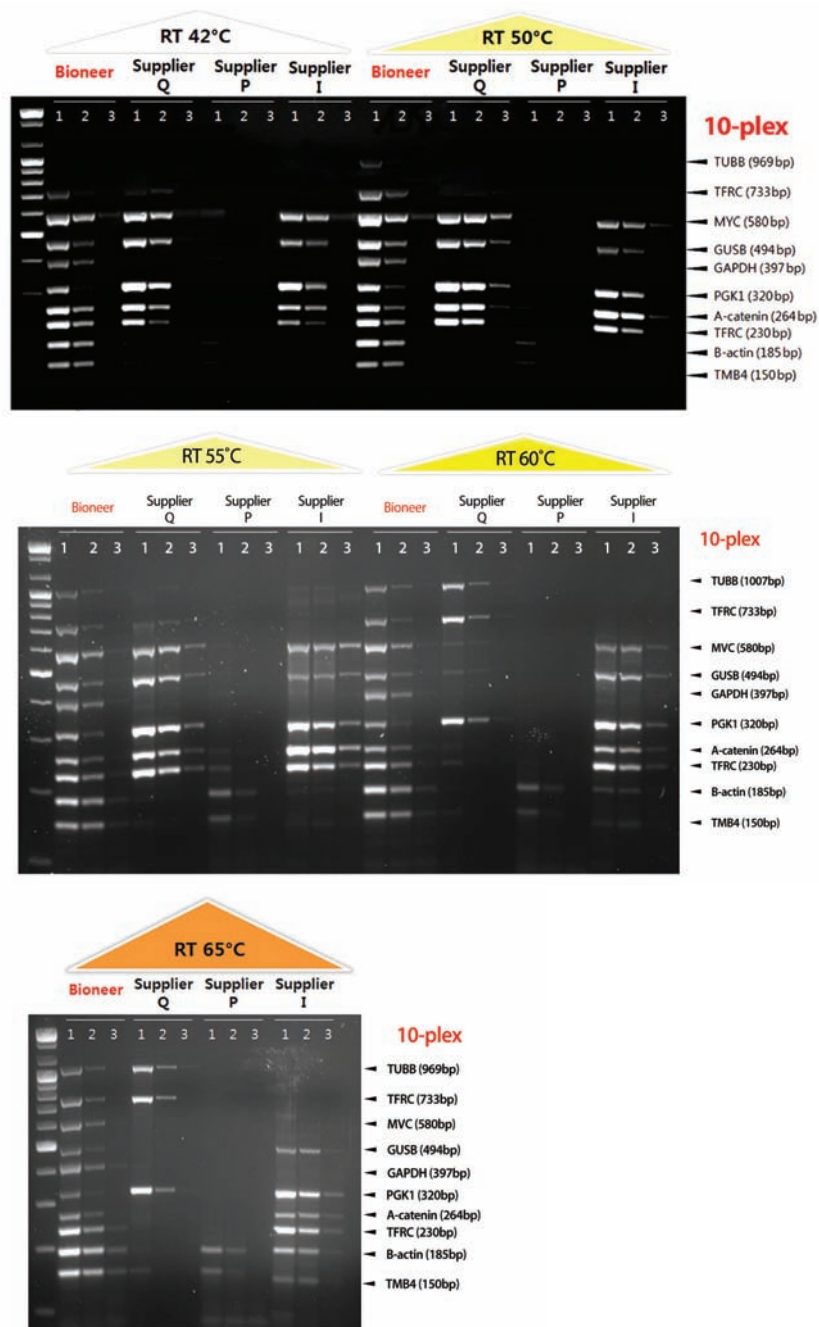


Figure 2. Comparison of amplification quality between AccuPower® RocketPlex RT-PCR PreMix and other suppliers' RT-PCR kit.

10-plex primers were added into AccuPower® RocketPlex RT-PCR PreMix and other supplier's RT-PCR kit. A series of human total RNA diluents were tested. All data were obtained using MyGenie™ 96 Gradient Thermal Block (Bioneer, Cat. no. A-2040-1). AccuPower® RocketPlex RT-PCR PreMix is able to perform reverse transcription reactions throughout a wide range of temperatures from 42°C to 70°C.

Lane 1: Human total RNA 100 ng

Lane 2: Human total RNA 10 ng

Lane 3: Human total RNA 1 ng.

■ Ordering Information

Cat. no.	Product Description
K-2211	AccuPower® RocketPlex RT-PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached cap/96 tubes, 20 µl/rxn
K-2212	AccuPower® RocketPlex RT-PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached cap/480 tubes, 20 µl/rxn
K-2213	AccuPower® RocketPlex RT-PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached cap/96 tubes, 50 µl/rxn
K-2214	AccuPower® RocketPlex RT-PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached cap/480 tubes, 50 µl/rxn

For High Specificity and High Sensitivity One-step RT-PCR with *RocketScript*™ RTase and HotStart Taq DNA Polymerase, Dried-type Premix and Master Mix



■ Description

AccuPower® Dual-HotStart™ RT-PCR PreMix is a breakthrough product to overcome frequent problems from RT reaction. By using this proprietary 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 DEPC-DW, and obtain your results with great reproducibility.

■ Features and Benefits

- **Specificity:**
Low detection limit with the smallest amount of your target template RNA, even in highly concentrated sample (Figure 1).
- **Sensitivity:**
Optimized to get accurate target gene amplification by using our premier Dual-HotStart™ RT-PCR reaction which utilizes Pyro-HotStart RT reaction and HotStart PCR.
- **Reproducibility:**
Containing all the components in each tube or well for reverse transcription and PCR, it maximizes reproducibility eliminating any carry-over contamination or technician error.
- **Ease-of-use:**
This kit contains all the reagents for RT-PCR, including thermostable DNA polymerase, *RocketScript*™ RTase, dNTPs and more, in one tube as freeze-and-dried format. User only needs to add template RNA, primers and DEPC-water into the tube.

■ Specifications

- Enzyme: *RocketScript*™ RTase, HotStart Taq DNA polymerase
- 5' to 3' exonuclease: Yes
- 3' to 5' exonuclease: No
- 3' - A overhang: Yes
- RNase H activity: Yes
- Fragment size: ~ 3 kb

■ 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

■ Transport Temperature

Room temperature

■ Storage Temperature

-20°C

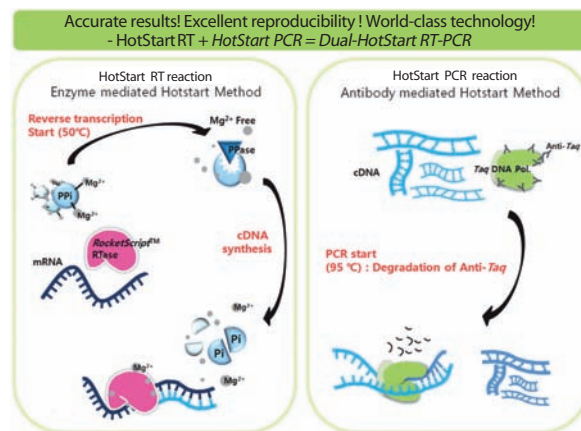


Figure 1. Dual-HotStart™ technology.

■ Experimental Data

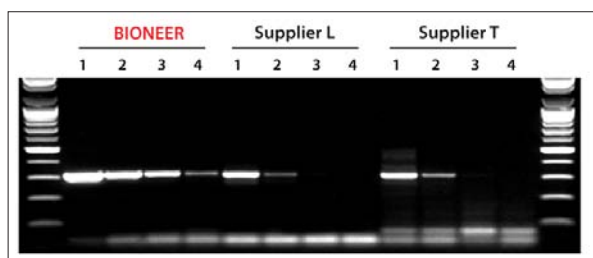


Figure 2. Comparison of PCR amplification sensitivity between *AccuPower® Dual-HotStart™* RT-PCR PreMix from Bioneer and other suppliers' Hotstart RT-PCR kit.

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

■ Ordering Information

Cat. no.	Product Description
K-6710	<i>AccuPower® Dual-HotStart™</i> RT-PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached cap/96 tubes, 20 ul/rxn
K-6711	<i>AccuPower® Dual-HotStart™</i> RT-PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached cap/96 tubes, 50 ul/rxn
K-6712	<i>AccuPower® Dual-HotStart™</i> RT-PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached cap/480 tubes, 20 ul/rxn
K-6713	<i>AccuPower® Dual-HotStart™</i> RT-PCR PreMix, 0.2 ml thin-wall 8-tube strips with attached cap/480 tubes, 50 ul/rxn

For High Specificity and High Sensitivity One-step RT-PCR / Prevention Carry-over Contamination, Dried-type Premix



Description

AccuPower® Dual-HotStart™ RT-PCR PreMix (with UDG) is a breakthrough product to overcome frequent problems from RT reaction and to prevent carryover contamination. By using this proprietary 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 DEPC-DW, and obtain your results with great reproducibility.

Features and Benefits

- **Prevention of Carryover Contamination:**
UDG and dUTP in the PreMix or in the Master Mix prevent the re-amplification of carryover 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 (Figure 1).
- **Specificity:**
Low detection limit with the smallest amount of your target template RNA, even in highly concentrated sample (Figure 2).
- **Sensitivity:**
Optimized to get accurate target gene amplification by using our premier Dual-HotStart™ RT-PCR reaction which utilizes Pyro-HotStart RT reaction and HotStart PCR.
- **Reproducibility:**
Containing all the components in each tube or well for reverse transcription and PCR, it maximizes reproducibility eliminating any carry-over contamination or technician error.

Ease-of-use:

This kit contains all the reagents for RT-PCR, including thermostable DNA polymerase, *RocketScript™* RTase, dNTPs and more, in one tube as freeze-and-dried format. User only needs to add template RNA, primers and DEPC-water into the tube.

Specifications

- Enzyme: *RocketScript™* RTase, HotStart *Taq* DNA polymerase
- 5' to 3' exonuclease: Yes
- 3' to 5' exonuclease: No
- 3'-A overhang: Yes
- RNase H activity: Yes
- Fragment size: ~ 3 kb

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

Storage Temperature

Room temperature

Storage Temperature

20°C

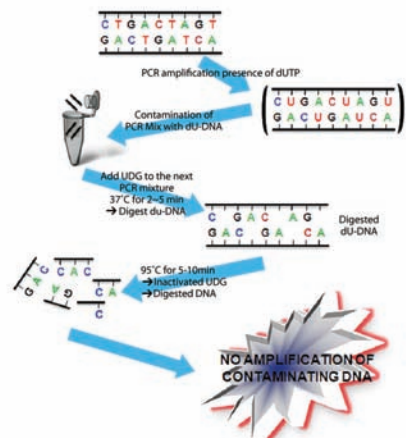


Figure 1. Prevention of carryover contamination.

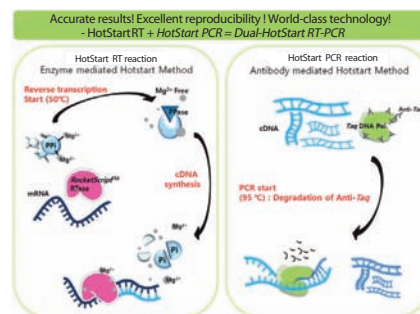
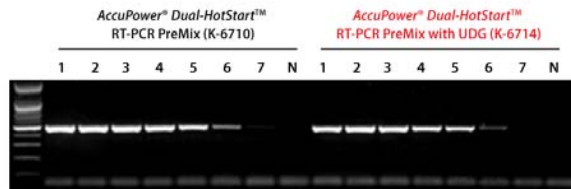


Figure 2. Dual-HotStart technology

Experimental Data

RNA template (not including uracil base)



RNA template (including uracil base)

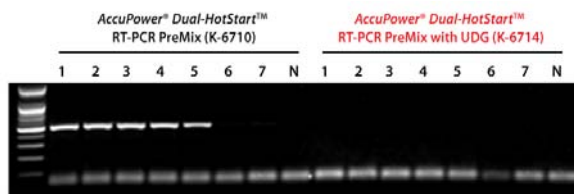


Figure 3. Comparison of amplification quality using PCR products (not including uracil base or including uracil base) between AccuPower® Dual-HotStart™ RT-PCR PreMix and AccuPower® Dual-HotStart™ RT-PCR PreMix (with UDG).

Lane 1: 10^8 copy Lane 2: 10^7 copy Lane 3: 10^6 copy
Lane 4: 10^5 copy Lane 5: 10^4 copy Lane 6: 10^3 copy
Lane 7: 10^2 copy Lane N: NTC

Ordering Information

Cat. no.	Product Description
K-2801	AccuPower® Dual-HotStart™ RT-PCR PreMix (with UDG), 0.2 ml thin-wall 8-tube strips with attached cap/96 tubes, 20 ul/rxn
K-2802	AccuPower® Dual-HotStart™ RT-PCR PreMix (with UDG), 0.2 ml thin-wall 8-tube strips with attached cap/96 tubes, 50 ul/rxn
K-2803	AccuPower® Dual-HotStart™ RT-PCR PreMix (with UDG), 0.2 ml thin-wall 8-tube strips with attached cap/480 tubes, 20 ul/rxn
K-2804	AccuPower® Dual-HotStart™ RT-PCR PreMix (with UDG), 0.2 ml thin-wall 8-tube strips with attached cap/480 tubes, 50 ul/rxn

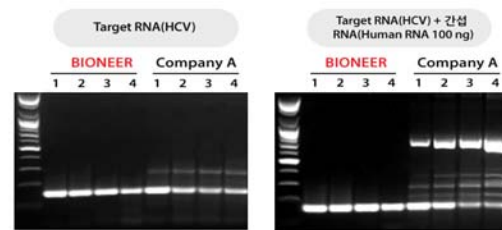


Figure 4. Comparison of PCR amplification specificity between AccuPower® Dual-HotStart™ RT-PCR PreMix (with UDG) from Bioneer and other suppliers' Hotstart PCR master mix.

Lane 1: HCV RNA 10^7 copy
Lane 2: HCV RNA 10^6 copy
Lane 3: HCV RNA 10^5 copy
Lane 4: HCV RNA 10^4 copy

Standard cDNA Synthesis



■ Description

Moloney Murine Leukemia Virus (M-MLV) Reverse Transcriptase is an 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 qRT-PCR.

Source: *M-MLV* Reverse Transcriptase is isolated from an *E. coli* strain containing a recombinant clone.

■ Features and Benefits

- Optimized 5X Buffer:
For more 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

■ Ordering Information

Cat. no.	Product Description
E-3121	<i>M-MLV</i> Reverse Transcriptase, 10,000 U, 5 x Reaction Buffer, 100 mM DTT, 10 mM dNTPs
E-3122	<i>M-MLV</i> Reverse Transcriptase, 50,000 U, 5 x Reaction Buffer, 100 mM DTT, 10 mM dNTPs

■ Specifications

- DNase activity : No
- RNase activity: No
- RNase H activity: Yes
- Strand displacement: Yes
- Fragment size: ~9 kb

■ Application

First strand cDNA synthesis from RNA, RT-PCR, and qRT-PCR

■ Reagents Supplied

- 5X Reaction Buffer (pH 8.1): Tris-HCl, KCl, etc.
- 100 mM DTT
- dNTPs mixture: 10 mM, each dNTP 2.5 mM

■ Concentration

10,000 U/50 µl

■ Storage Conditions

pH 7.6, Tris-Cl, NaCl, EDTA, DTT, Stabilizers, etc.

■ Storage Temperature

-20°C

■ Unit Definition

One unit is defined as the amount of enzyme required to incorporate 1 nmole of dTTP into acid-precipitable material in 10 min at 37°C using poly A, oligo dT as template primer.

High Performance cDNA Synthesis



■ Description

Get more cDNA in less time with CycleScript reverse transcriptase. CycleScript is a versatile reverse transcriptase - applicable to both conventional reverse transcription and cyclic reverse transcription (Cyclic RT, patent pending – for cDNA amplification). It features high activity across a wide range of temperatures from 37 to 55°C therefore, reverse transcription is carried out like PCR. The Cyclic RT reaction is composed of the following steps: 1st incubation at 15~40°C for primer annealing, heating up to 42~48°C for extension, and finally incubation at 50~55°C for denaturation of the secondary structure of the RNA (optional). Bioneer's novel Cyclic RT system offers homogeneous cDNA synthesis, with a high yield of cDNA up to 9 kb.

■ Features and Benefits

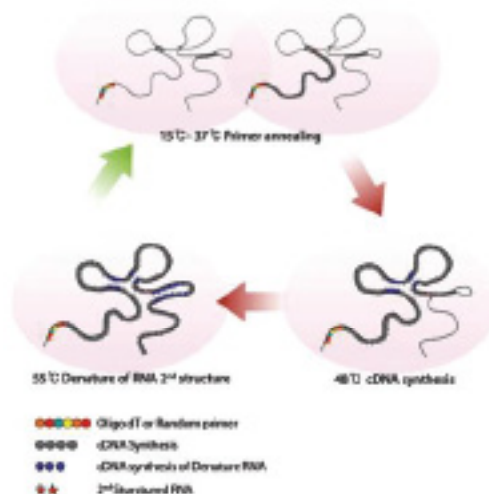
- Broad Range of Working Temperatures:
For GC-rich RNAs or RNAs with significant secondary structure
- Sensitive:
Even the rarest transcript can be reliably made into cDNA
- High Yield of cDNA:
For genes up to 9 kb within 10 minutes
- RNase, DNase, and Proteinase-free:
Ensures the integrity of your samples.

■ Specifications

- DNase activity : No
- RNase activity: No
- RNase H activity: Yes
- Strand displacement: Yes
- Fragment size: ~9 kb

■ Application

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



■ Reagents Supplied

- 5X Reaction Buffer (pH 8.1): Tris-HCl, KCl, etc.
- 100 mM DTT
- dNTPs mixture: 10 mM, each dNTP 2.5 mM

■ Concentration

10,000 U/50 µl

■ Storage Conditions

pH 7.6, Tris-Cl, NaCl, EDTA, DTT, Stabilizers, etc.

■ Storage Temperature

-20°C

■ Unit Definition

One unit is defined as the amount of enzyme required to incorporate 1 nmole of dTTP into acid-precipitable material in 10 min at 37°C using poly A oligo dT as template primer.

■ Principles

1st strand cDNA synthesis [20 uL volume]

Step 1 Mix template and primer

Total RNA (0.1~1 ug) or mRNA (5 ng ~ 100 ng)
+
add Oligo dT or Random hexamer(50 ~ 200 pmole)

* Denature RNA and primer for 10 min at 65°...

* Immediately cool on ice

(* Note. Optional when CTRT is performed)

**Step 2** All components mix

5X CycleScript reaction buffer	4 uL
100mMDTT	2 uL
10mM dNTP (variable volume)	2 uL
Nase inhibitor	20 units
CycleScript(200unit/uL)	1 uL
DEPC-DW	variable

Total (Step1 + Step 2) 20 uL



[Temperature]

[Option 1:CTRT]

Temperature	Time	
15 ~ 37 °C	30 sec	Repeat 12 times
42 ~ 48 °C	4 min	Deactivation
95 °C	5 min	Deactivation

[Option 2:FTRT]

Temperature	Time
37 ~ 55 °C	1 hr
55 °C(Optional)	30 sec
90 °C	5 min

*CTRT: Cyclic Temperature Reverse Transcription

*FTRT: Fixed Temperature Reverse Transcription

■ Experimental Data

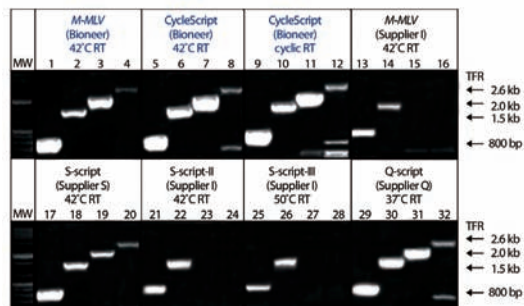


Figure 1. Comparison of transferrin receptor gene amplification with different reverse transcriptases.

700 ng of total RNA was used for reverse transcription and the same amount of amplified products were used for electrophoresis.

Lane 1 - 4: TFR (Transferrin receptor gene) amplified with *M-MLV*

Lane 5 - 8: TFR amplified with CycleScript

Lane 9 - 12: TFR amplified with CycleScript

Lane 13 - 16: TFR amplified with *M-MLV* from supplier I

Lane 17 - 20: TFR amplified with S-script from supplier S

Lane 21 - 24: TFR amplified with S-script II from supplier I

Lane 25 - 28: TFR amplified with S-script III from supplier I

Lane 29 - 32: TFR amplified with Q-script from supplier Q

Lane M.W.: 100 bp Plus DNA Ladder (Bioneer, Cat. no. D-1035)

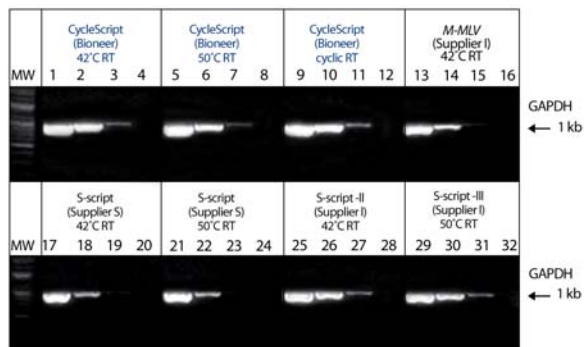


Figure 2. Comparison of GAPDH gene amplification with different reverse transcriptases.

Each 10 ng, 1 ng, 100 pg, and 10 pg of total RNA was used for reverse transcription and the same amount of amplified products were used for electrophoresis.

Lane 1 - 4: GAPDH amplified with CycleScript

Lane 5 - 8: GAPDH amplified with CycleScript

Lane 9 - 12: GAPDH amplified with CycleScript

Lane 13 - 16: GAPDH amplified with *M-MLV* from supplier I

Lane 17 - 20: GAPDH amplified with S-script from supplier S

Lane 21 - 24: GAPDH amplified with S-script from supplier S

Lane 25 - 28: GAPDH amplified with S-script from supplier I

Lane 29 - 32: GAPDH amplified with S-script from supplier I

■ Ordering Information

Cat. no.	Product Description
E-3131	CycleScript Reverse Transcriptase, 10,000 U, 10 mM dNTPs, 5 x Reaction Buffer, 100 mM DTT
E-3132	CycleScript Reverse Transcriptase, 50,000 U, 10 mM dNTPs, 5 x Reaction Buffer, 100 mM DTT

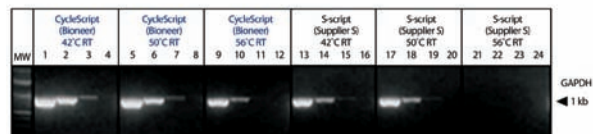


Figure 3. Working temperature comparison of different reverse transcriptases. Each 10 ng, 1 ng, 100 pg, and 10 pg of total RNA was used for reverse transcription and the same amount of amplified products were used for electrophoresis.

Lane 1 - 4: GAPDH amplified with CycleScript

Lane 5 - 8: GAPDH amplified with CycleScript

Lane 9 - 12: GAPDH amplified with CycleScript

Lane 13 - 16: GAPDH amplified with S-script from supplier S

Lane 17 - 20: GAPDH amplified with S-script from supplier S

Lane 21 - 24: GAPDH amplified with S-script from supplier S

High Performance / High Temperature cDNA Synthesis



■ Description

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:

Native *M-MLV* reverse transcriptase has low thermostable activity, therefore restricting reverse transcription reactions to relatively low temperatures (42°C). This attribute prevents RNA molecules containing many stems and loops (complex secondary structures) from being efficiently transcribed. To resolve this shortcoming, Bioneer has utilized synthetic biotechnology to develop a RTase that is active even at high temperatures of 60°C and above. By removing the traditional reaction temperature limit of 42°C, you are now able to choose your reaction temperature from 42°C-70°C and optimize your cDNA synthesis experiments.

● Enhanced Performance:

While engineering the enzyme, the researchers at Bioneer have gone ahead and engineered robust performance into RocketScript™. You can now confidently perform experiments with target lengths long and short, or input RNA concentrations low and high knowing that if the RNA is in the sample, it will be accurately represented in the cDNA.

● Ease-of-use:

All components necessary for cDNA synthesis including thermostable RTase and RNase inhibitor are included in the product for ease-of-use. All you need is source RNA and primers, and preparation for your reverse transcription reaction is complete.

● Reproducibility:

Each batch is produced under strict quality controls. Errors that commonly occur during mass production are eliminated during the individual packaging process. Bioneer's current batch processing system allows for the production of more accurate and reproducible end-product yield.

■ Specifications

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

■ Application

- Gene synthesis
- First-strand synthesis of cDNA from RNA molecules (Reverse Transcription)
- RT-PCR
- Random priming reactions
- Library construction
- Probe labeling
- mRNA 5'-end mapping by primer extension analysis
- Real-Time PCR

■ Concentration

10,000 U/50 µl

■ Storage Temperature

- 20°C

■ Unit Definition

One unit is defined as the amount of enzyme required to incorporate 1 nmole of dTTP into acid-precipitable material in 10 min at 37°C using poly A, oligo dT as template primer.

Experimental Data

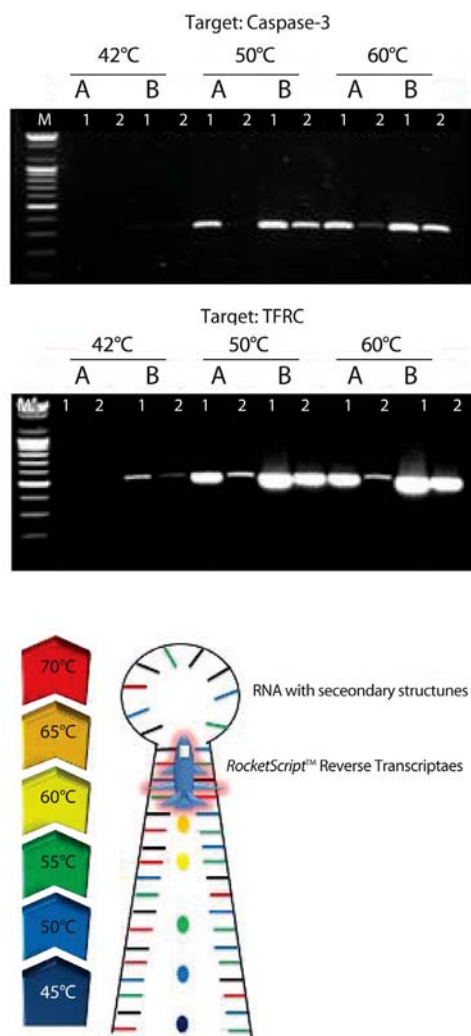


Figure 1. Complex RNA amplification. Complex RNA amplification results of *RocketScript™* Reverse Transcriptase compared with that of conventional RTase.

Rxn. condition: conventional 42°C / 50°C / 60°C 1 hr, deactivation 95°C 5 min, this product shows thermal stability.

Lane A: *M-MLV* Reverse Transcriptase
Lane B: *RocketScript™* Reverse Transcriptase
Lane 1: 100 ng human total RNA from HeLa cell
Lane 2: 10 ng human total RNA from HeLa cell

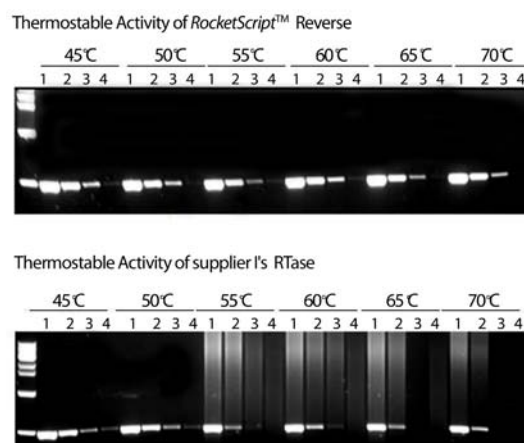


Figure 2. Thermostable stability check. Amplification results of *RocketScript™* Reverse Transcriptase using myc compared with supplier I Reverse transcription.

Rxn. condition: Incubation at each temperature 45°C/50°C/55°C/60°C/65°C/70°C for 1 hr, deactivation at 95°C for 5 min

Target: human myc 495 bp
Lane 1: 100 ng human total RNA from HeLa cell
Lane 2: 10 ng human total RNA from HeLa cell
Lane 3: 1 ng human total RNA from HeLa cell
Lane 4: 100 pg human total RNA from HeLa cell
Lane M: 1 kb DNA Ladder (Bioneer, Cat. no. D-1040)



Figure 3. Comparison of amplification quality between *RocketScript™* RTase and supplier's RTases.

Target gene expression Level.
Lane 1: 100 ng human total RNA from HeLa cell
Lane 2: 10 ng human total RNA from HeLa cell
Lane 3: 1 ng human total RNA from HeLa cell
Lane 4: 100 pg human total RNA from HeLa cell
Lane M: 1 kb DNA Ladder (Bioneer, Cat. no. D-1040)

Ordering Information

Cat. no.	Product Description
E-3141	<i>RocketScript™</i> Reverse Transcriptase, 10,000 U (50 rxns)
E-3142	<i>RocketScript™</i> Reverse Transcriptase, 50,000 U (250 rxns)

High Performance / High Temperature / Long Size cDNA Synthesis



Description

Rocketscript™ Reverse Transcriptase, RNase H Minus is uniquely developed by Bioneer. It is *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.

Features and Benefits

- **Elimination 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.
- **Thermostable Activity:**
This product is developed based on *Rocketscript™* Reverse Transcriptase. Therefore, it is able to perform RT reaction at various temperature range of 42-70°C to suit users' needs. For this reason, it is able to synthesize cDNA up to 12.5kb.
- **Reproducibility:**
All products of Bioneer are produced through strict regulation of ISO quality system.

Specifications

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

Application

- Gene synthesis
- First-strand synthesis of cDNA from RNA molecules (Reverse Transcription)
- RT-PCR
- Random priming reactions
- Library construction
- Probe labeling
- mRNA 5'-end mapping by primer extension analysis
- Real-Time PCR

Concentration

10,000 U/50 µl

Storage Temperature

-20°C

Unit Definition

One unit is defined as the amount of enzyme required to incorporate 1 nmole of dTTP into acid-precipitable material in 10 min at 37°C using poly A, oligo dT as template primer.

Experimental Data

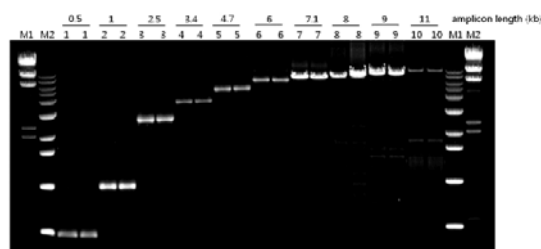


Figure 1. Performance of the transcriptor first strand cDNA synthesis kit in two-step RT-PCR.

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

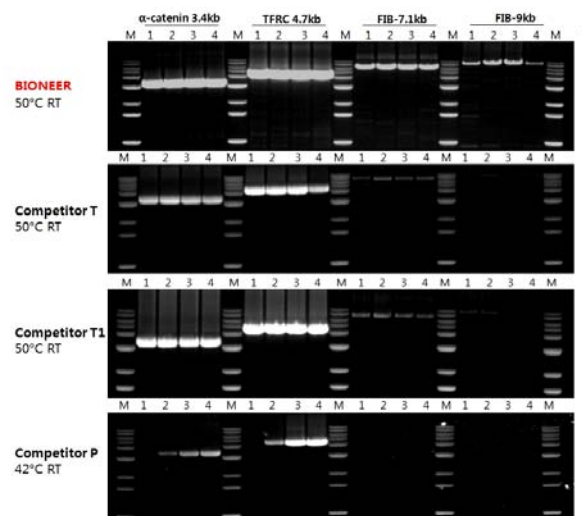


Figure 2. High synthesis rate at 50°C using Bioneer first strand cDNA synthesis kit. Synthesis of cDNA at 50°C or 42°C for 10, 20, 30 and 60 minutes using 1 µg of 9 kb RNA transcript as a template using Bioneer cDNA Synthesis Kit and other kits for first strand cDNA synthesis. Reaction products were resolved on a 1% alkaline agarose gel. Bioneer cDNA synthesis kit completed synthesis of 9 kb transcript in 10 min.

Lane 1: RT 10 min Lane 2: RT 20 min
Lane 3: RT 30 min Lane 4: RT 60 min

Ordering Information

Cat. no.	Product Description
E-3151	<i>RocketScript</i> ™ Reverse Transcriptase, RNase H Minus, 10,000 U (50 rxns)
E-3152	<i>RocketScript</i> ™ Reverse Transcriptase RNase H Minus, 50,000 U (250 rxns)

Real-Time PCR ●●●

Intercalating Dye Type Kit

<i>AccuPower® GreenStar™</i> qPCR PreMix	77
<i>AccuPower® 2X GreenStar™</i> qPCR Master Mix	79

TaqMan Probe Type Kit

<i>AccuPower® DualStar™</i> qPCR PreMix	81
<i>AccuPower® Plus DualStar™</i> qPCR PreMix & 2X Master Mix	83
<i>AccuPower® Plus DualStar™</i> qPCR PreMix & 2X Master Mix (with UDG) ^{New}	85
<i>AccuPower® Dual-HotStart™</i> RT-qPCR PreMix & 2X Master Mix	87

Real-Time PCR Instrument

Exicycler™ → Go to M. Instruments & Devices

For Real-Time PCR with Intercalating Dye, Dried-type Premix



■ Description

AccuPower® GreenStar™ qPCR PreMix is an all-in-one PreMix containing a lyophilized combination of all the necessary components for intercalating dye based Real-Time PCR reactions. The mixture includes intercalating dye, reaction buffer, dNTP, stabilizer and thermostable DNA polymerase as well as thermostable pyrophosphatase and pyrophosphate (PPi) which drive Bioneer's exclusive enzyme-mediated hotstart PCR. The stabilizer used in this product replaces H₂O on enzyme surfaces as the product is lyophilized allowing it to maintain full enzyme activity when stored up to 2 years at -20°C. Just add template and primers to start your reaction. AccuPower® GreenStar™ qPCR PreMix provides reproducible results with high specificity, increased amplification efficiency and superior sensitivity.

■ Features and Benefits

- **Specificity:**
AccuPower® GreenStar™ qPCR PreMix provides accurate Real-Time PCR results using a unique enzyme-mediated HotStart method that use thermostable pyrophosphatase and pyrophosphate (PPi).
- **Stability:**
Activity of this product is stable for 2 years in a -20 °C freezer.
- **Reproducibility:**
Each batch is produced under strict ISO quality controls for reproducible results.
- **Convenience:**
Ready-to-use format for popular qPCR instrument such as ABI7500, Opticon, and Exicycler™ 96.

■ Specifications

- Enzyme: Top DNA polymerase
- 5' to 3' exonuclease: No
- 3' to 5' exonuclease: No
- 3' - A overhang: Yes

■ Application

- Real-Time quantification of DNA and cDNA targets
- Gene expression profiling
- Gene functional analysis
- Microbial & viral pathogen detection

■ Transport Temperature

Room temperature

■ Application

-20°C

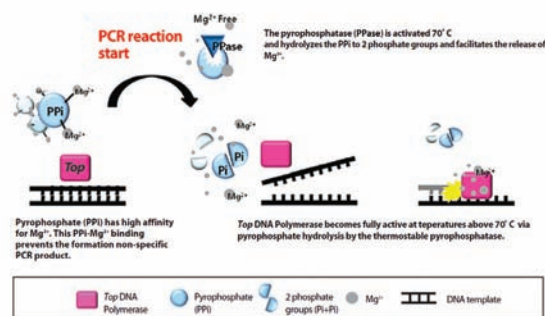


Figure 1. Enzyme-mediated HotStart PCR.

■ Experimental Data

High Specificity

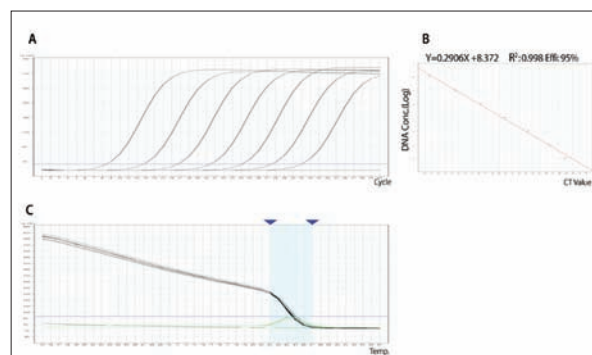


Figure 2. Real-Time PCR data of AccuPower® GreenStar™ qPCR PreMix.

AccuPower® GreenStar™ qPCR PreMix provides at least 7 orders of magnitude in dynamic range (10 fg ~ 10 ng /rxn).

A: Amplification curve of AccuPower® GreenStar™ qPCR PreMix.

Lambda DNA primers were added into AccuPower® GreenStar™ qPCR PreMix. A series of lambda DNA positive control diluents were tested.

B: Standard curve of AccuPower® GreenStar™ qPCR PreMix.

R² - 0.998, PCR efficiency - 95%

C: Melting curve analysis of AccuPower® GreenStar™ qPCR PreMix. The melting curve shows that only single amplified PCR product was obtained in all template range.

All data were obtained using Exicycler™ 96 Real-Time Quantitative Thermal Block (Bioneer, Cat. no. A-2060).

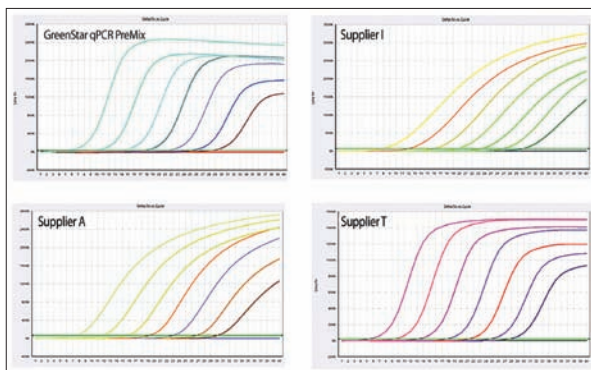


Figure 3. Comparison of amplification efficiency between *AccuPower® GreenStar™* qPCR PreMix and other supplier's master mixture.

Amplification curve of *AccuPower® GreenStar™* qPCR PreMix and other supplier's master mix kit.

Lambda DNA primers were added into *AccuPower® GreenStar™* qPCR PreMix and other supplier's master mix kit. A series of Lambda DNA positive control diluents were tested. Reaction mixtures were prepared and qPCR was performed according to each supplier's protocol.

All data were obtained using ABI7500 Fast Real-Time PCR machine (Applied Biosystems co.).

■ Ordering Information

Cat. no.	Product Description
K-6200	<i>AccuPower® GreenStar™</i> qPCR PreMix, 50 µl/rxn, 8-tube strips, 96 rxn, <i>Exicycler™</i> 96, optical film included
K-6201	<i>AccuPower® GreenStar™</i> qPCR PreMix, 50 µl/rxn, 8-tube strips, 96 rxn, ABI7500, optical film included
K-6202	<i>AccuPower® GreenStar™</i> qPCR PreMix, 50 µl/rxn, 8-tube strips with cap, 96 rxn, Opticon
K-6203	<i>AccuPower® GreenStar™</i> qPCR PreMix, 50 µl/rxn, 96-well plate, 96 rxn, <i>Exicycler™</i> 96, optical film included
K-6204	<i>AccuPower® GreenStar™</i> qPCR PreMix, 50 µl/rxn, 96-well plate, 96 rxn, ABI7500, optical film included
K-6210	<i>AccuPower® GreenStar™</i> qPCR PreMix, 20 µl/rxn, 8-tube strips, 96 rxn, <i>Exicycler™</i> 96, optical film included
K-6211	<i>AccuPower® GreenStar™</i> qPCR PreMix, 20 µl/rxn, 8-tube strips, 96 rxn, ABI7500, optical film included
K-6212	<i>AccuPower® GreenStar™</i> qPCR PreMix, 20 µl/rxn, 8-tube strips with cap, 96 rxn, Opticon
K-6213	<i>AccuPower® GreenStar™</i> qPCR PreMix, 20 µl/rxn, 96-well plate, 96 rxn, <i>Exicycler™</i> 96, optical film included
K-6214	<i>AccuPower® GreenStar™</i> qPCR PreMix, 20 µl/rxn, 96-well plate, 96 rxn, ABI7500, optical film included

For Real-Time PCR with Intercalating Dye, Master Mix



■ Description

AccuPower® 2X GreenStar™ qPCR Master Mix is a ready-to-use mixture of all the necessary components for Real-Time PCR reaction employing intercalating dye. The Master Mix includes intercalating dye, reaction buffer, dNTP, stabilizer and thermostable DNA polymerase as well as thermostable pyrophosphatase and pyrophosphate (PPi) which drive Bioneer's exclusive enzyme-mediated hotstart PCR. Just add template and primers to start your reaction. AccuPower® 2X GreenStar™ qPCR Master Mix provides reproducible results with high specificity, increased amplification efficiency and superior sensitivity.

■ Features and Benefits

● High Specificity:

AccuPower® 2X GreenStar™ qPCR Master Mix provides accurate Real-Time PCR results using a unique enzyme-mediated Hot-Start method that use thermostable pyrophosphatase and PPi.

● Simplicity:

Ready-to-use, AccuPower® 2X GreenStar™ qPCR Master Mix contains everything you need for excellent and reproducible Real-Time PCR results. Simply add template and primers.

● Reproducibility:

Each batch is produced under strict ISO quality controls for reproducible results.

■ Specifications

- Enzyme: *Top* DNA polymerase
- 5' to 3' exonuclease: No
- 3' to 5' exonuclease: No
- 3' - A overhang: Yes

■ Application

- Real-Time quantification of DNA and cDNA targets
- Gene expression profiling
- Gene functional analysis
- Microbial & Viral pathogen detection

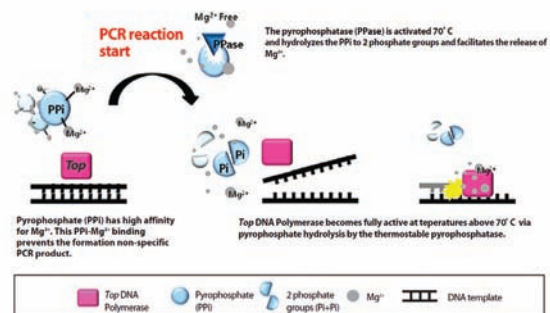
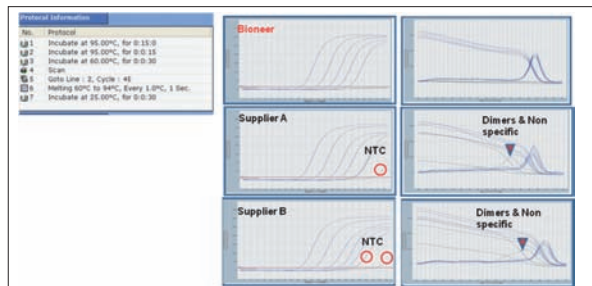


Figure 1. Enzyme-mediated HotStart PCR.

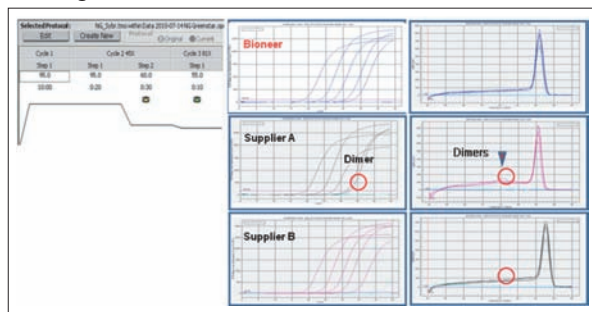
Experimental Data

Equipment Compatibility

▷ Exicycler™ 96 of BIONEER



▷ Using a Bio-Rad IQ5



▷ Using a ABI7500

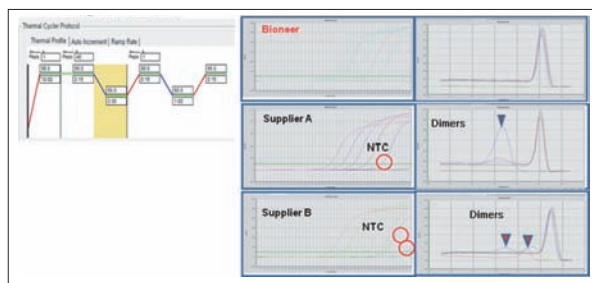
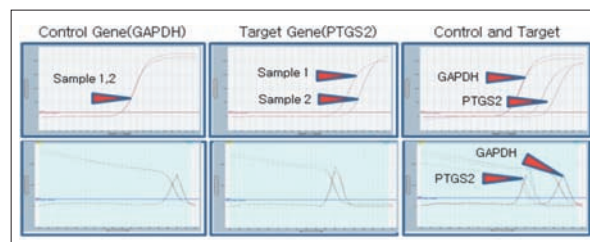


Figure 2. Comparison of the specificity of the intercalating dye based Real-Time PCR.

Amplification of an 90 bp target gene was detected using serially diluted LP (Legionella Pneumoniae) genomic DNA (10^5 ~ 10 copies) with *AccuPower® 2X GreenStar™* qPCR Master Mix. As shown in figure, very small amount of primer dimers was appeared in *AccuPower® 2X GreenStar™* qPCR Master Mix than other kits.

Ordering Information

Cat. no.	Product Description
K-6251	<i>AccuPower® 2X GreenStar™</i> qPCR Master Mix, 50 µl/rxn, 100 rxn, 80X ROX Dye (0.1 ml X 1 ea)
K-6252	<i>AccuPower® 2X GreenStar™</i> qPCR Master Mix, 50 µl/rxn, 200 rxn, 80X ROX Dye (0.1 ml X 1 ea)
K-6253	<i>AccuPower® 2X GreenStar™</i> qPCR Master Mix, 50 µl/rxn, 100 rxn, without ROX Dye
K-6254	<i>AccuPower® 2X GreenStar™</i> qPCR Master Mix, 50 µl/rxn, 200 rxn, without ROX Dye



Target Gene	hGAPDH	hPTGS2
Sample No.	1	2
Ct Value	23.7	23.46

Figure 3. Gene expression analysis.

AccuTarget™ Validated Real-Time PCR Primer Library for human is designed by Bioneer's bioinformatics tool and targeting for human genome. cDNA was synthesized using human PTGS2 target primer of those and human total RNA identically quantified from Hela cell and blood cell with *AccuPower®* CycleScript RT PreMix (Bioneer, Cat. no. K-2044). Gene analysis was carried out both Hela cell and blood cell by operating Real-Time PCR reaction (95°C 10 min, 1 cycle and 95°C 10 sec, 58°C 25 sec, 72°C 30 sec, 41 cycles) using the cDNA, *AccuPower® 2X GreenStar™* PCR Master Mix and *Exicycler™* 96 Real-Time Thermal Block (Bioneer, Cat. no. A-2060).

For Hotstart Real-Time PCR with TaqMan Probe, Dried-type Premix



■ Description

AccuPower® DualStar™ qPCR PreMix is lyophilized PCR master mix containing a thermostable DNA polymerase, thermostable pyrophosphatase, reaction buffer, dNTPs and patented stabilizer in a ready to use Hotstart qPCR master mix. AccuPower® DualStar™ qPCR PreMix eliminates nonspecific amplification, while providing high sensitivity, due to our novel hotstart methodology. Bioneer uses a unique enzyme-mediated hotstart PCR that provides robust and reproducible results. *Taq* DNA polymerase is inhibited at lower temperature (<70°C) by pyrophosphate. However, *Taq* is rendered fully active at temperatures above 70°C via pyrophosphate hydrolysis with our thermostable pyrophosphatase. This technology, a Bioneer exclusive, prevents the formation of mis-primed products and primer-dimers during the reaction set up process resulting in improved PCR specificity. It is ideal for nucleic acid amplification reactions involving complex genomic or cDNA templates, very low-copy targets, and multiplex reactions.

■ Features and Benefits

- Convenience:
Just add template, probe and primers for your target gene.
- Specificity:
Unique enzyme mediated HotStart results in greater specificity and more robust reactions.
- Equipment Compatibility:
Optimized for most Real-Time PCR instruments.
- Universality of Target Gene:
Excellent results regardless of your target gene.
- Stability:
Stable at room temperature for a month or for 2 years in a -20°C freezer.

■ Specifications

- Enzyme: *Taq* DNA polymerase
- 5' to 3' exonuclease: Yes
- 3' to 5' exonuclease: No
- 3' - A overhang: Yes

■ Application

- Gene expression profiling
- Target DNA quantification
- Microbial detection
- Viral/bacterial pathogen load determination
- Evaluation of primer pair performance for probe-based Real-Time PCR

■ Transport Temperature

Room temperature

■ Storage Temperature

-20°C

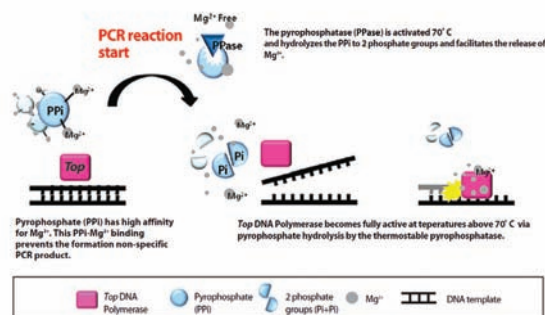


Figure 1. Enzyme-mediated HotStart PCR.

■ Experimental Data

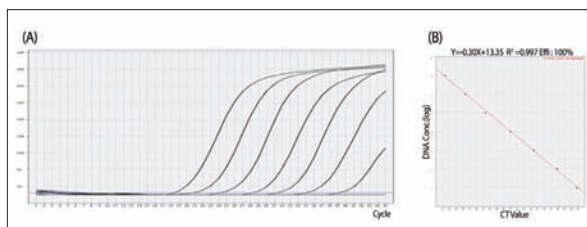


Figure 2. Real-Time PCR data of AccuPower® DualStar™ qPCR PreMix.

AccuPower® DualStar™ qPCR PreMix provides at least 7 orders of magnitude in dynamic range (10^7 - 10 copies/rxn).

A: Amplification curve. West Nile Virus (WNV) primers and TaqMan-based probe were added into AccuPower® DualStar™ qPCR PreMix. A series of WNV positive control diluents were tested.

B: Standard curve. All data were obtained using Exicycler™ 96 Real-Time Quantitative Thermal Block (Bioneer, Cat. no. A-2060).

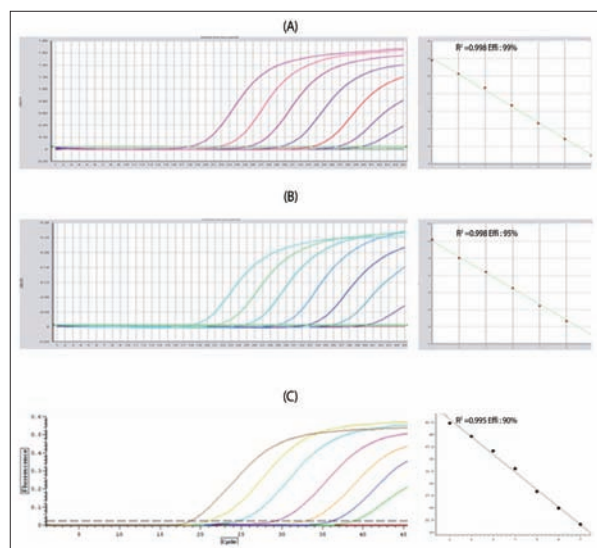


Figure 3. Data using various kinds of Real-Time PCR Instruments.

AccuPower® DualStar™ qPCR PreMix is applicable to most of commercially available Real-Time quantitative PCR instruments. West Nile Virus (WNV) primers and TaqMan-based probe were added into AccuPower® DualStar™ qPCR PreMix. A series of WNV positive control diluents were tested.

A: Amplification curve and standard curve using ABI7500 Fast Real-Time PCR machine (Applied Biosystems Co.).

B: Amplification curve and standard curve using ABI7500 Real-Time PCR machine (Applied Biosystems Co.).

C: Amplification curve and standard curve using Opticon Real-Time PCR machine (MJ Research, currently Bio-Rad Inc.).

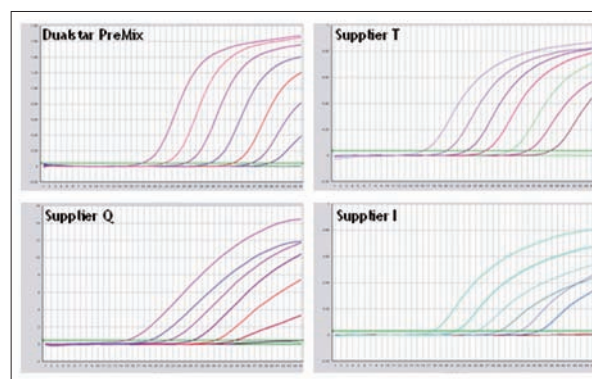


Figure 4. Comparison of detection sensitivity between AccuPower® DualStar™ qPCR PreMix and other suppliers' master mixture.

West Nile Virus (WNV) primers and TaqMan-based probe were added into AccuPower® DualStar™ qPCR PreMix and other suppliers' master mixture. A series of WNV positive control diluents were tested. Reaction mixtures were prepared and qPCR was performed according to each supplier's protocol. All data were obtained using ABI7500 Fast Real-Time PCR machine (Applied Biosystems Co.).

■ Ordering Information

Cat. no.	Product Description
K-6100	AccuPower® DualStar™ qPCR PreMix, 20 µl/rxn, 8-tube strips, 96 rxn, Exicycler™ 96, optical film included
K-6101	AccuPower® DualStar™ qPCR PreMix, 20 µl/rxn, 8-tube strips, 96 rxn, ABI7500, optical film included
K-6102	AccuPower® DualStar™ qPCR PreMix, 20 µl/rxn, 8-tube strips with cap, 96 rxn, Opticon
K-6103	AccuPower® DualStar™ qPCR PreMix, 20 µl/rxn, 96-well plate, 96 rxn, Exicycler™ 96, optical film included
K-6104	AccuPower® DualStar™ qPCR PreMix, 20 µl/rxn, 96-well plate, 96 rxn, ABI7500, optical film included
K-6110	AccuPower® DualStar™ qPCR PreMix, 50 µl/rxn, 8-tube strips, 96 rxn, Exicycler™ 96, optical film included
K-6111	AccuPower® DualStar™ qPCR PreMix, 50 µl/rxn, 8-tube strips, 96 rxn, ABI7500, optical film included
K-6112	AccuPower® DualStar™ qPCR PreMix, 50 µl/rxn, 8-tube strips with cap, 96 rxn, Opticon
K-6113	AccuPower® DualStar™ qPCR PreMix, 50 µl/rxn, 96-well plate, 96 rxn, Exicycler™ 96, optical film included
K-6114	AccuPower® DualStar™ qPCR PreMix, 50 µl/rxn, 96-well plate, 96 rxn, ABI7500, optical film included

Inhibitor-resistant Hotstart Real-Time PCR with TaqMan Probe, Dried-type Premix



Description

AccuPower® Plus DualStar™ qPCR PreMix provides exceptional data from your samples fast. This product is available as 2 formats: our AccuPower® lyophilized PreMix format as well as a liquid 2X Master Mix format for your convenience. Both products require only the addition of your primers, probe and template to begin your qPCR. AccuPower® Plus DualStar™ qPCR PreMix goes a step further by providing resistance to common inhibitors of PCR (Blood-EDTA, Hemoglobin, Humic Acid from various sources, etc.) providing you with robust and reliable results, even with poor quality samples. Tested for resistance against many common inhibitors of PCR, AccuPower® Plus DualStar™ qPCR Premix is the enzyme of choice for any PCR that you want to work right – the first time and every time.

Features and Benefits

- **User Convenience:**
Just add template and primers and start your PCR. dNTPs, buffer and enzyme are provided.
- **Dynamic Range:**
AccuPower® Plus DualStar™ qPCR products have a wide dynamic range (10 - 10⁸ copies).
- **Specificity:**
Unique enzyme mediated Hotstart results in greater specificity and more robust reaction.
- **Universality of Target Gene:**
Excellent results regardless of your target gene.
- **Compatibility:**
Optimized for most Real-Time PCR instruments.
- **Reproducibility:**
Each batch is produced under strict ISO 9001 quality controls.

Specifications

- Enzyme: HotStart Taq DNA polymerase
- 5' to 3' exonuclease activity: Yes
- 3' to 5' exonuclease activity: No
- 3' - A Overhang: Yes

Application

- Gene expression profiling
- Target DNA quantification
- Microbial detection
- Viral/bacterial pathogen load determination
- Evaluation of primer pair performance for probe-based Real-Time PCR

Transport Temperature

- PreMix: Room temperature
- Master Mix: -20°C

Storage Temperature

-20°C

Experimental Data

Specificity

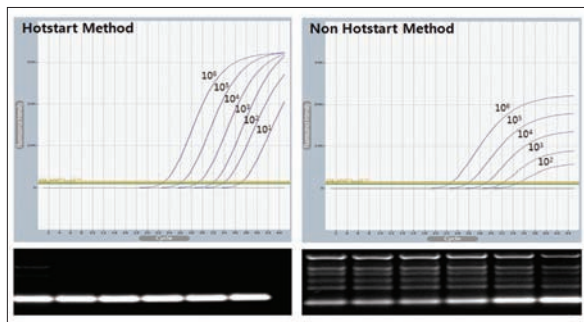
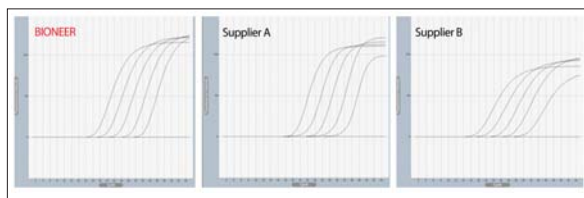


Figure 1. High specificity of AccuPower® Plus DualStar™ qPCR PreMix. Template concentration: 1x10¹ - 1x10⁸ copies/rxn.

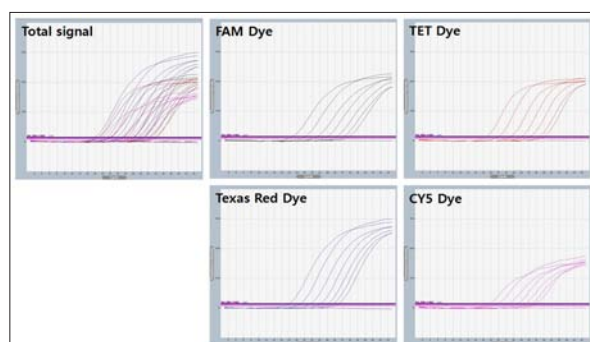
Sensitivity



Template DNA copies	Ct Value		
	BIONEER	Supplier A	Supplier B
10 ³	32.60	34.72	31.28
10 ⁴	29.18	31.31	27.75
10 ⁵	25.66	27.61	24.44
10 ⁶	22.43	24.48	21.99
10 ⁷	19.22	20.98	19.99
Efficiency/linearity	99%/1	96%/1	100%/0.9999

Figure 2. Comparison of amplification quality between AccuPower® Plus DualStar™ qPCR PreMix and other supplier's Real-Time qPCR Kit.

Multiplexing

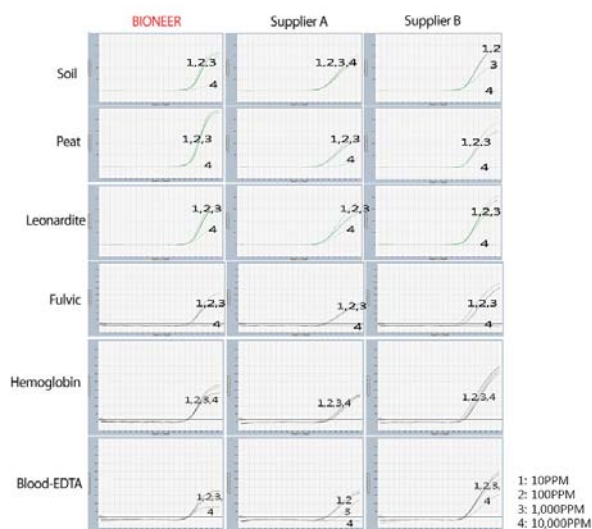


Day	Template DNA of copies							
	1.00E+07	1.00E+06	1.00E+05	1.00E+04	1.00E+03	1.00E+02	1.00E+01	NTC
FAM	19.47	22.74	25.97	28.58	31.07	32.87	34.35	UD
TET	19.38	22.59	25.87	28.62	31.06	33.37	34.6	UD
TEXAT_RED	18.47	21.48	24.23	26.78	28.68	30.15	31.49	UD
CY5	20.38	22.56	25.43	27.71	29.71	31.38	32.45	UD

Figure 3. Four-target multiplexing on the Exicycler™ 96 instrument using AccuPower® Plus DualStar™ qPCR PreMix.

Figure shows amplification of a 4-target multiplex assay. The dyes used were FAM, TET, Texas Red and CY5, respectively.

The data demonstrate that over a dilution series of input template, the AccuPower® Plus DualStar™ qPCR PreMix can successfully and reliably generate up to 4-target multiplex data on the Exicycler™ 96.



PCR inhibitor		Bioneer	Supplier A	Supplier B
		Totally inhibition (PPM)		
Humic acid	Soil	10,000	*	10,000
	Peat	10,000	10,000	10,000
	Leonardite	10,000	10,000	10,000
	Fulvic	10,000	10,000	10,000
Hemoglobin		*	*	*
Blood EDTA		10,000	10,000	10,000

*: No inhibition

Figure 4. PCR inhibitor study using AccuPower® Plus DualStar™ qPCR PreMix.

Ordering Information

Cat. no.	Product Description
K-6600	AccuPower® Plus DualStar™ qPCR PreMix, 50 µl/rxn, 8-tube strips, 96 rxn, Exicycler™ 96, optical film included,
K-6601	AccuPower® Plus DualStar™ qPCR PreMix, 50 µl/rxn, 8-tube strips, 96 rxn, ABI7500, optical film included
K-6602	AccuPower® Plus DualStar™ qPCR PreMix, 50/rxn, 8-tube strips with cap, 96 rxn, Opticon, optical film included
K-6603	AccuPower® Plus DualStar™ qPCR Master Mix (2X), 2.5 ml, 100 rxn

Inhibitor-resistant Hotstart Real-Time PCR with TaqMan Probe, Dried-type Premix / Prevention Carry-over Contamination



Description

AccuPower® Plus DualStar™ qPCR PreMix (with UDG) is the most appropriate kit for providing accurate data for multiple probes quickly from your various samples. All reaction components required for real-time PCR, except for the target-specific primers and probes, are provided in each tube in a lyophilized "PreMix" form. Just add primers and fluorescent dye-labeled probe for your target genes into AccuPower® Plus DualStar™ qPCR PreMix (with UDG) tube to obtain reproducible results. This product helps you monitor the progress of your gene amplification in every PCR cycle with primers and fluorescent probe you add. In addition, AccuPower® Plus DualStar™ qPCR PreMix (with UDG) can be stored for two years in -20°C freezer, and Bioneer provides several different types of formats of tubes and plates to satisfy your needs depending on your real-time PCR machine.

Features and Benefits

- **Prevention of Carryover Contamination:**
UDG and dUTP in the PreMix or in the Master Mix prevent the re-amplification of carryover 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® Plus DualStar™ qPCR 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 (Figure 1).
- **Ease-of-use:**
In this kit, the product format provided is either freeze-dried PreMix or Master Mix. Both include everything required for the reaction in an individual tube. Therefore, the users need to add only template RNA, primers and DEPC-treated water, then it is ready to run the real-time PCR. Can be used with a wide variety of qPCR systems.
- **Dynamic Range:**
It shows wide range of copies over 8 logs from 10 to 10⁸ copies.

- **High Specificity:**
A Non-specific reaction is dramatically eliminated by using Enzyme-mediated HotStart Technology (patented).
- **Universality of Target Gene:**
You can always achieve great real-time PCR result regardless of various types of template DNA - gDNA, cDNA, high GC-enriched template and more.
- **Reproducibility:**
Under ISO 9001 Quality Assurance System, our mass-produced product AccuPower® Plus DualStar™ qPCR PreMix or 2X Master Mix (with UDG) provides consistency for gene amplification.

Specifications

- Enzyme: HotStart Taq DNA polymerase
- 5' to 3' exonuclease activity: Yes
- 3' to 5' exonuclease activity: No
- 3' - A Overhang: Yes

Application

- Gene expression profiling
- Target DNA quantification
- Microbial detection
- Viral/bacterial pathogen load determination
- Evaluation of primer pair performance for probe-based Real-Time PCR

Transport Temperature

- PreMix: Room temperature
- Master Mix: -20°C

Storage Temperature

-20°C

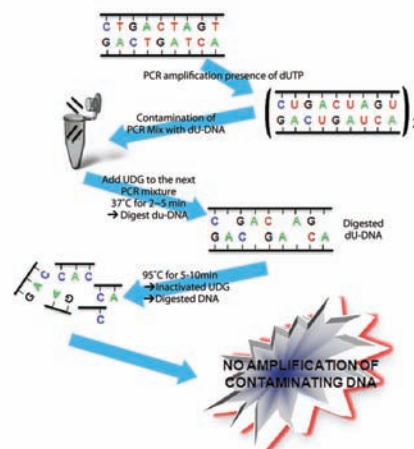
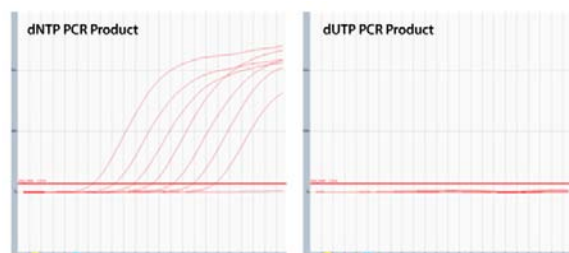


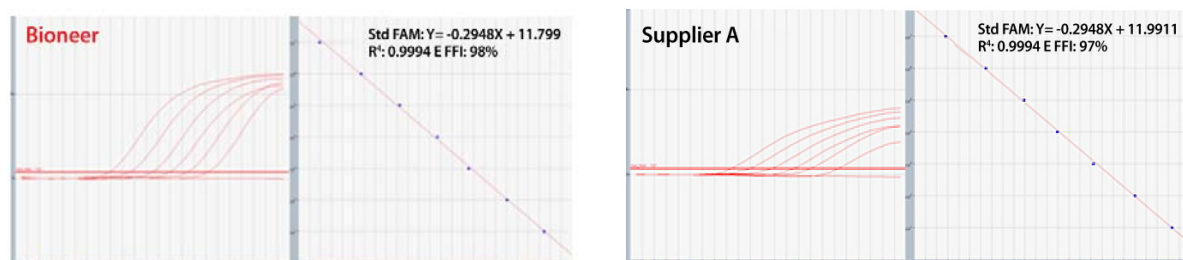
Figure 1. Prevention of carryover contamination.

Experimental Data



PCR product type	Linearity	Efficiency	10 ⁸	10 ⁷	10 ⁶	10 ⁵	10 ⁴	10 ³	10 ²	NTC
dNTPs	0.9988	98	12.81	16.41	19.72	22.84	26.37	29.76	33.48	UD
dNTPs including dUTPs	-	-	UD	UD	UD	UD	UD	UD	UD	UD

Figure 1. Efficiency of uracil DNA glycosylase using PCR products (including dN/dU base).



	Ct Value								
Company	Linearity	Efficiency	10 ⁷	10 ⁶	10 ⁵	10 ⁴	10 ³	10 ²	NTC
Bioneer	0.9999	98%	15.73	19.14	22.99	25.91	28.96	33.1	UD
A company	0.9994	97%	16.86	19.98	23.55	27.26	30.05	34.61	UD

Figure 2. Comparison of amplification quality between AccuPower® Plus DualStar™ qPCR PreMix (with UDG) and other supplier's Real-time qPCR kit.

Ordering Information

Cat. no.	Product Description
K-6605	AccuPower® Plus DualStar™ qPCR PreMix (with UDG), 50 µl/rxn, 8-tube strips, 96 rxn, Exicycler™ 96, optical film included,
K-6606	AccuPower® Plus DualStar™ qPCR PreMix (with UDG), 50 µl/rxn, 8-tube strips, 96 rxn, ABI7500, optical film included
K-6607	AccuPower® Plus DualStar™ qPCR PreMix (with UDG), 50 µl/rxn, 8-tube strips, 96 rxn, Opticon, optical film included
K-6608	AccuPower® Plus DualStar™ qPCR Master Mix (2X) (with UDG), 2.5 ml, 100 rxn

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



Description

AccuPower® Dual-HotStart™ RT-qPCR PreMix is an improved kit from RT reaction problem. Through this kit, you perform cDNA synthesis of your selective RNA and provide improved sensitivity from small amount of template RNA. In addition, you can get accuracy of your cDNA synthesis by performing PCR via using one-step reaction. Therefore, this is an excellent high sensitivity One-step RT-qPCR product and utilizes the several types of virus test and gene expression Real-Time analysis experiment. Furthermore, this product is ready to use. You just add Template RNA, Primer and Probe with great reproducibility. This product included Dual-labeled Probe (such as, Florescence) and Primer set. Therefore, you can measure Ct in every cycle and monitor your gene's Real-Time amplification. In addition, we provide the tubes and plate that you can use not only *Exicycler*™ 96 but also other similar Real-Time PCR machine. Additionally, we provide 2X Master mix type for your convenient.

Features and Benefits

- Sensitivity:
You can get great result with smallest amount of your target template and high concentrated RNA product. We have wide dynamic range such as 10^{-1} - 10^{10} copies.
- Specificity:
This product is idealized to get accurate target gene by using our premier *Dual-HotStart*™ RT-qPCR reaction which utilizing Pyro-HotStart RT reaction and HotStart PCR.
- Multiplexing:
This product can use with several different dye (Probe). So, you can use several types of target gene. *Exicycler*™ 96 Real-Time Quantitative Thermal Block from Bioneer.
- 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 template RNA.

- Applicable with Several Different Types of Samples:
This kit has feature of resistance to various PCR inhibitors so you can use and get accurate RT-qPCR result with template RNA from blood and soil.
- Ease-of-use:
This kit provides AccuPower® Dual-HotStart™ RT-qPCR PreMix (freeze and dried) or AccuPower® Dual-HotStart™ RT-qPCR Master Mix (frozen 2X Master mix) which included thermostable DNA polymerase, RTase, dNTPs and more for Real-Time RT-PCR performance. User only adds template RNA, Primers & Probe and DEPC distilled water in this kit.
- Reproducibility:
Under ISO 9001 Quality Assurance System, our mass produced product AccuPower® Dual-HotStart™ RT-qPCR PreMix, 2X Master mix give you great satisfactory with uniform amplified effectiveness in all your reaction tube.

Specifications

- Enzyme: *RocketScript*™ RTase, HotStart *Taq* DNA polymerase
- 5' to 3' exonuclease activity: Yes
- 3' to 5' exonuclease activity: No
- 3' - A Overhang: Yes
- RNase H activity: Yes

Application

- Gene expression profiling
- Target RNA quantification
- Microbial detection
- Viral/bacterial pathogen load determination

Transport Temperature

- PreMix: Room temperature
- Master Mix: -20°C

Storage Temperature

-20°C

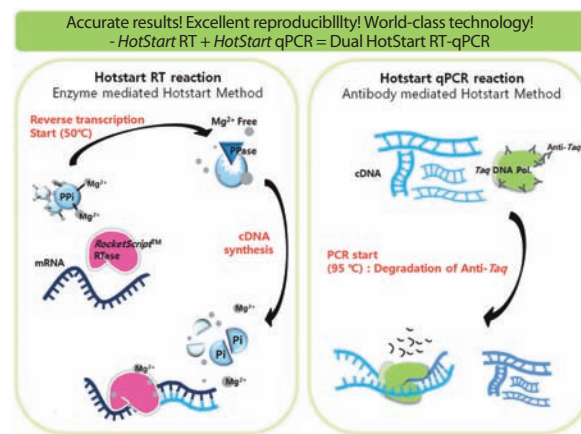


Figure 1. *Dual-HotStart*™ Technology.

Experimental Data

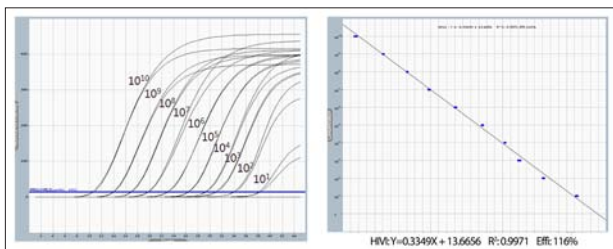


Figure 2. High sensitivity of AccuPower® Dual-HotStart™ RT-qPCR PreMix.

Experiment with HIV target. 10 fold serial dilution of template RNA (10^{10} copies-10 copies spiked in human total RNA).

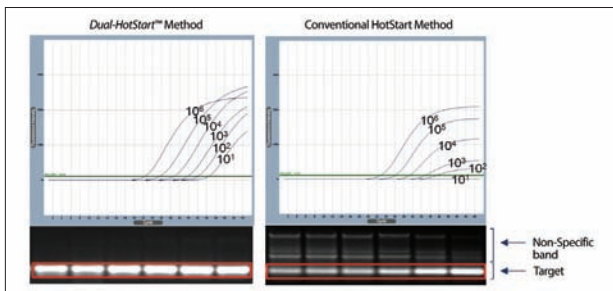


Figure 3. High specificity of AccuPower® Dual-HotStart™ RT-qPCR PreMix.

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-HotStart™ RT-qPCR PreMix accurately amplifies target RNA without non-specific amplification, even at low concentration of template

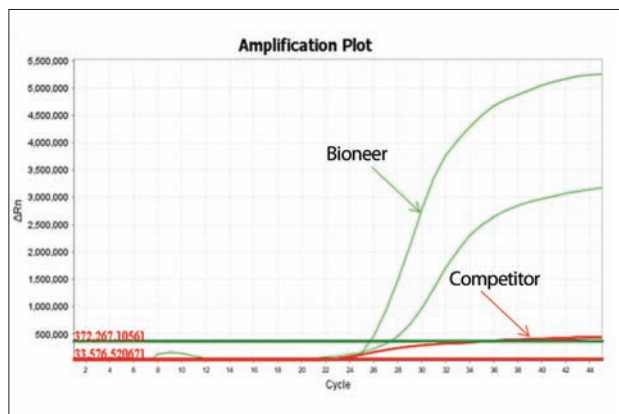


Figure 4. Comparison of amplification quality between AccuPower® Dual-HotStart™ RT-qPCR PreMix and other competitor's master mix.

Ordering Information

Cat. no.	Product Description
K-6704	AccuPower® Dual-HotStart™ RT-qPCR PreMix, 50 µl/rxn, 96-well plate, 96 rxn, Exicycler™ 96, optical film included
K-6705	AccuPower® Dual-HotStart™ RT-qPCR PreMix, 50 µl/rxn, 96-well plate, 96 rxn, ABI7500, optical film included
K-6706	AccuPower® Dual-HotStart™ RT-qPCR PreMix, 50 µl/rxn, 8-tube strips with cap, 96 rxn, Opticon, optical film included
K-6707	AccuPower® Dual-HotStart™ RT-qPCR Master Mix (2X), 100 rxn



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Customized PCR ●●●

Customized PCR, RT, RT-PCR PreMix Service90

Customized You Own

■ Overview

Bioneer's Custom *AccuPower*® PCR PreMix Service provides high reproducibility and convenience in use. Bioneer's *AccuPower*® PreMix technology has been setup during last 20 years.

Bioneer's Custom *AccuPower*® PCR PreMix Service provides all PCR reagents - thermostable DNA polymerase, dNTPs, reaction buffer, unique stabilizer and customer-requested primer set - in each tube as a lyophilized "PreMix" form. It is convenient to carry, to store, and to use. User needs only to add template DNA/RNA and water to perform PCR right away.

■ Description

PCR optimization usually takes long time and huge effort. Among many problems to solve in the optimization process, mis-priming and primer dimer that frequently occur in a PCR mixture at room temperature result in poor amplification and undesired amplicon production. Bioneer Custom *AccuPower*® PCR PreMix Service provides customers with optimized PCR Kits having high reproducibility and high accuracy by applying the *AccuPower*® PCR PreMix technology.

Bioneer Custom *AccuPower*® PCR PreMix Service products prevent the formation of mis-primed products and primer-dimers during the reaction process and result in an improved PCR specificity. This service is ideal for nucleic acid amplification reactions involving complex genomic or cDNA templates, very low copy targets, and multiplex reactions.

■ Specifications

Bioneer Custom *AccuPower*® PCR PreMix Service provides tailored "PreMix" that is aliquoted into single-use and lyophilized. Each PreMix tube contains thermostable DNA polymerase dNTPs, reaction buffer, stabilizer thermostable PPase for HotStart PCR and customer-designed primer set. Users need only to add template DNA and water to perform PCR.

■ Features and Benefits

- **Reproducibility:**
Large-scale batch production through automated processes and minimized user error through one-step pipetting provides constant results run after run.
- **Ease-of-use:**
All components for the assay are contained within the tube. Just Add Sample!
- **Stability:**
Lyophilization suspends reagent deterioration, leading to longest-in-class 2 years shelf-life.

■ Ordering Information

Minimum Quantity	1,920 tubes	
Production Period	Single Custom PreMix	~10 working days
	Multiplex Custom PreMix for 2-3 targets	~12 working days
	Multiplex Custom PreMix for 4 targets	~16 working days
	Multiplex Custom PreMix for 5 targets or more	Inquire

- When the template is not provided, the production period will be shortened by 4 business days.
- The oligo synthesis and sample validation periods are not included in the production period estimations.
- The fee for oligo synthesis will be separately added to the quoted price.

■ How to Order

Step 1	Please send the experimental information (below) necessary for producing the custom premix to: export1@bioneer.com or hbkim@bioneer.co.kr Informations: Amplicon size, Oligo sequence, Additional reaction conditions (besides Bioneer's standard conditions), Order quantity and Product type (PCR, HotStart, RT-PCR etc.
Step 1	Our AccuPower Team will respond via email with a production period estimate and a price quote based on the information you have provided.
Step 1	If you decide to go ahead with the Custom PreMix Service, let us know via email or phone. We will immediately initiate the service, starting with oligo synthesis.

- E-mail: export1@bioneer.com