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All about Real-Time PCR

BIONEER
Innovation • Value • Discovery

Bioneer Corporation is Korea's leading biotech company.
Bioneer is the first Korean biotechnology company when it was established in 1992.

Real-Time PCR Reagents Selection Guide

Products	Application		
	qPCR	qRT-PCR	Prevent Carryover Contamination
dsDNA Binding Dye Method			
AccuPower® GreenStar™ qPCR PreMix & Master Mix	√		
AccuPower® GreenStar™ RT-qPCR PreMix & Master Mix		√	
Hydrolysis Probe Method			
AccuPower® DualStar™ qPCR PreMix	√		
AccuPower® Plus *DualStar™* qPCR PreMix & Master Mix	√		
AccuPower® Plus *DualStar™* qPCR PreMix & Master Mix (with UDG)	√		√
AccuPower® Dual-HotStart™ RT-qPCR PreMix & Master Mix		√	

*PreMix type can use on *Exicycler™* 96 / ABI7500 / CFX 96 while Master Mix type is compatible with every instrument.

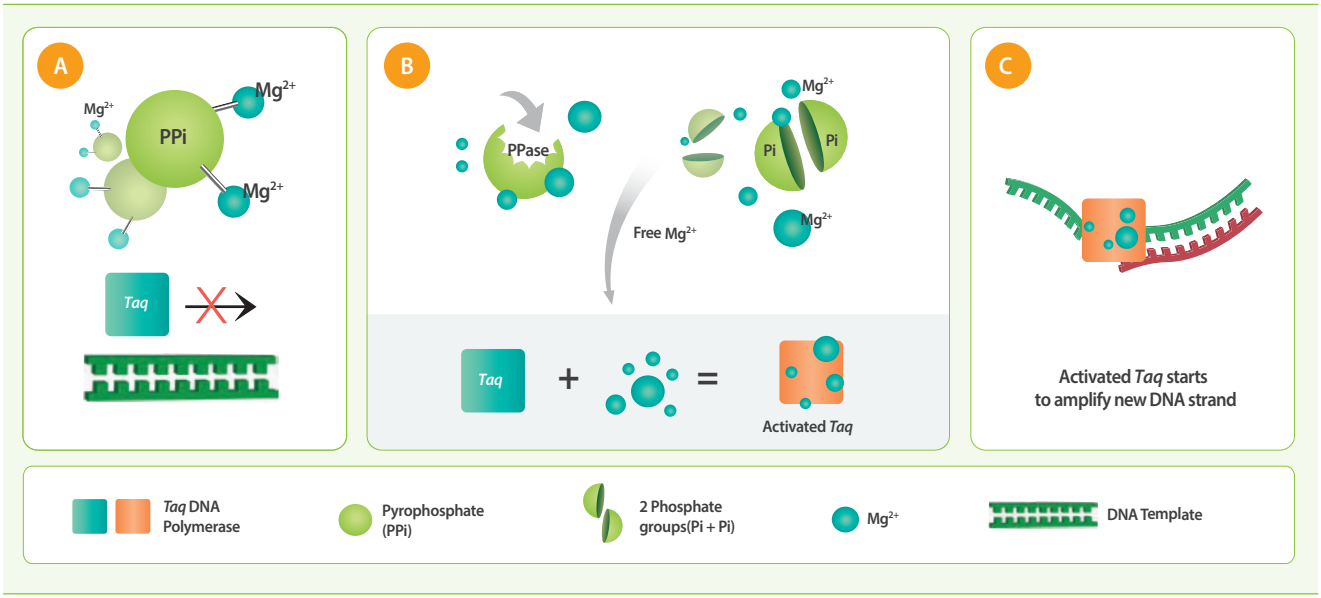
CONTENTS

PyroHotStart Technology

- Enzyme-mediated Hotstart
- Eliminate non-specific products synthesized at zero cycle such as primer-dimers
- Improved PCR efficiency by removing the PPi generated every cycle

Our patented *PyroHotStart* technology method increases PCR specificity and efficiency by hydrolyzing pyrophosphate (PPi), a polymerase inhibitor generated in every PCR cycle, and resolves problems in data analysis caused by non-specific amplifications, especially in multiplex PCR. This technology employs PPi that reduces the generation of undesired products at zero cycle through affinity-binding to Mg^{2+} ion. Then, pyrophosphatase (PPase) is activated at 70°C to dissociate the binding of PPi on Mg^{2+} which facilitates PCR reaction by DNA polymerase.

Principle of *PyroHotStart*



A

Inhibition of PCR reaction in the zero cycle

After preparing the PCR mixture, PPi is used to prevent the formation of non-specific reactants before reaching the pre-denaturation temperature. Also, since DNA polymerase requires Mg^{2+} ions to activate, PPi, having high affinities with Mg^{2+} ions, traps them to inhibit the PCR.

B

Denaturation

PPase included in the mixture is activated when the temperature rises during the denaturation step to decompose PPi into Pi and dissociate Mg^{2+} ions. The isolated ions activate the DNA polymerase by binding on to it, allowing the PCR reaction to proceed.

C

Annealing & Extension

The activated DNA polymerase amplifies the target DNA as the PCR cycle progresses.

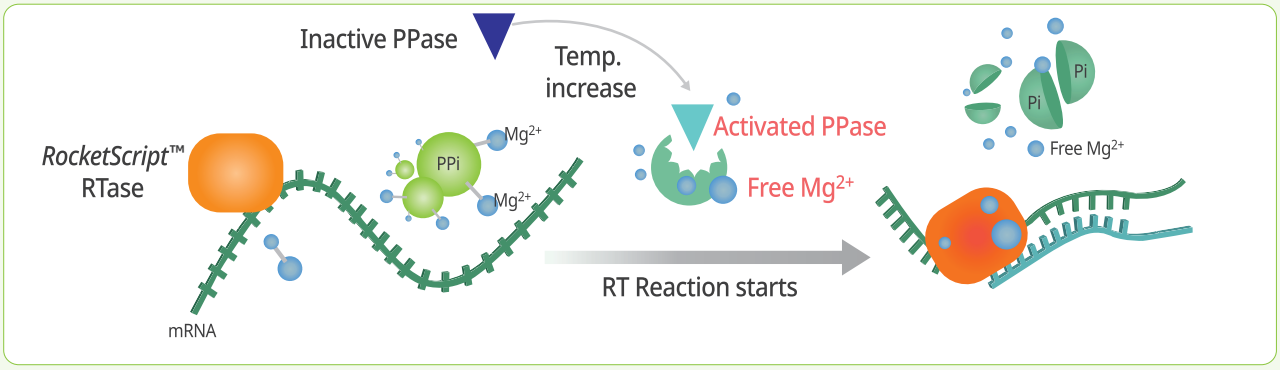
Dual-HotStart™ Technology

- Application the Hotstart method on both reverse transcription and real-time PCR for minimizing the non-specific reaction
- High sensitivity to detect up to low 10 copies of RNA
- Convenient with one-step RT-qPCR to undergo cDNA synthesis and amplification in a single tube

Dual-HotStart™ technology is a method to detect existence of target RNA from complex mixtures of RNA samples with high sensitivity and specificity. This technology utilizes Bioneer's patented enzyme-mediated Hotstart method (*PyroHotStart*) for reverse transcription and antibody-based Hotstart technology for PCR amplification. *Dual-HotStart*™ eliminates non-specific cDNA synthesis as well as non-specific DNA amplification, and enables the most sensitive one-step RT-PCR, multiplex RT-PCR and RT-qPCR assays.

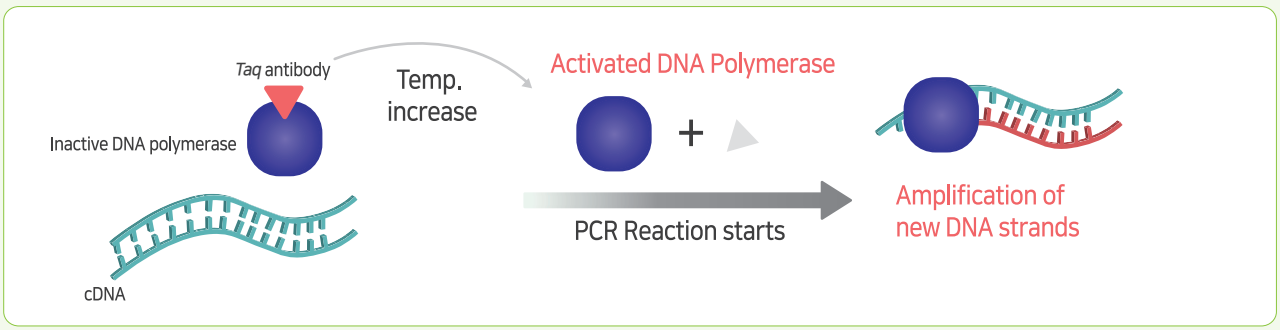
Principle of *Dual-HotStart*™

- **1st Hotstart Reaction at cDNA synthesis: Hotstart RT**



PyroHotStart removes non-specific background during cDNA synthesis by eliminating non-specific primer binding and self-priming of extracted RNA. The thermostability of *RocketScript*™ Reverse Transcriptase (>50°C) is the core element for the Hotstart technology to proceed in the cDNA synthesis step.

- **2nd Hotstart Reaction at cDNA amplification: Hotstart qPCR**



By applying the *HotStart Taq* DNA Polymerase, the Antibody-based *HotStart* method can be only activated when it reaches a certain temperature, allowing to obtain PCR products in a high specificity.

AccuPower® GreenStar™ qPCR PreMix & *AccuPower® 2X GreenStar™* qPCR Master Mix

• The HotStart Real-time PCR Reagents for dsDNA Binding Dye

Description

AccuPower® GreenStar™ qPCR PreMix & 2X Master Mix are real-time PCR reagents that have high specificity and efficiency using dsDNA binding dye and *PyroHotStart* technology.

Key Features

- **Compatibility**
  Wide choice of real-time PCR instruments for optimized results.
- **Convenience**
  Simplified products having all reactants essential for real-time PCR included in each tubes to directly start the Real-Time PCR by adding template DNA, probe & primer for target gene, and D.W.
- **Stability**
  Enhanced stability having more resistance to degradation compared to the solution type products with a stabilizer included in the Real-Time PCR reaction mixture.
- **Reproducibility**
  Mass production under ISO 9001 quality system allowing minimized deviation between lots and reproducible results even for replicates tested repeatedly under the same conditions and variables.

Application

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

Specifications

Enzyme: *Top* DNA Polymerase
5' → 3' exonuclease: No | 3' → 5' exonuclease: No | 3' – A overhang: Yes

Experimental Data

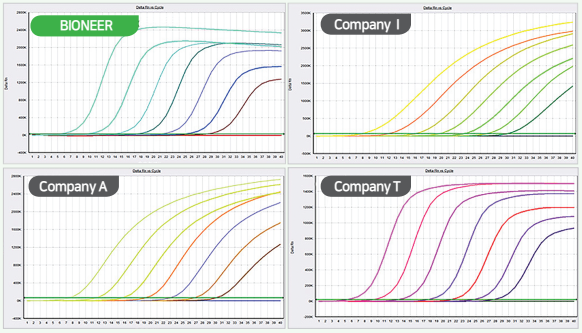


Figure 1. Comparison of amplification efficiency between *AccuPower*® *GreenStar*™ qPCR PreMix and other company's master mix products.

Amplification curve of *AccuPower*® *GreenStar*™ qPCR PreMix and other company's master mix kit. Lambda DNA primers were added into *AccuPower*® *GreenStar*™ qPCR PreMix and other company'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 company's protocol. All data were obtained using ABI 7500 Fast Real-time PCR machine (Applied Biosystems co.).

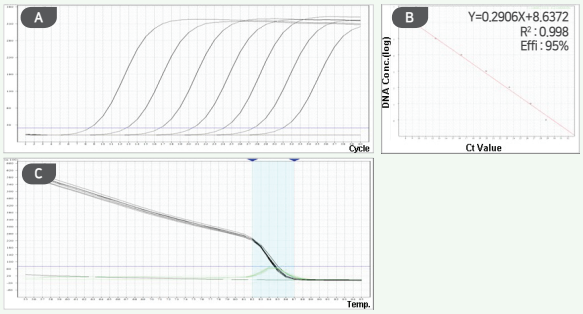


Figure 2. Real-Time PCR data of *AccuPower*® *GreenStar*™ qPCR PreMix.

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. R^2 - 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 (Cat. No. A-2060, Bioneer).

•Using ABI 7500

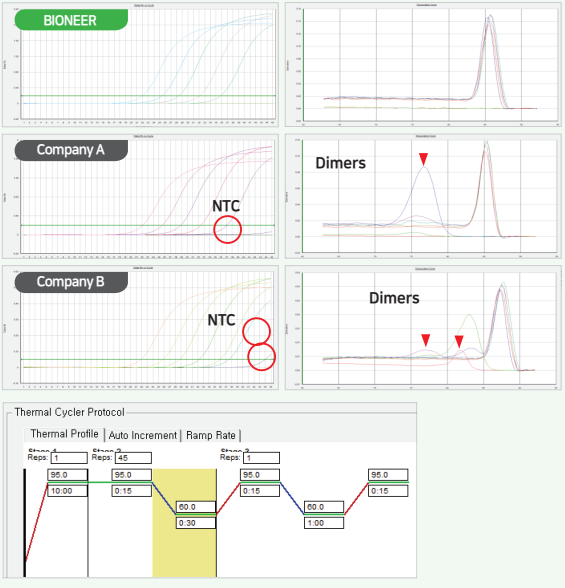


Figure 3. Comparison of the specificity of dsDNA binding dye based Real-Time PCR.

Amplification of a 90 bp target gene was detected using serially diluted LP (Legionella Pneumoniae) genomic DNA (10^n dilution: 10^5 ~10^1 copies) with *AccuPower*® 2X *GreenStar*™ qPCR Master Mix and other commercial products. As shown in Figure, very small amount of primer dimers was appeared in *AccuPower*® 2X *GreenStar*™ qPCR Master Mix than other kits.

AccuPower® GreenStar™ RT-qPCR PreMix & Master Mix

• The HotStart One-step RT-qPCR Reagents for dsDNA Binding Dye

Description

AccuPower® GreenStar™ RT-qPCR PreMix & Master Mix detects desired target gene precisely from various samples. This reagent, based on the dsDNA binding dye, measures real-time gene amplification through fluorescence evaluation at each cycle. It can selectively amplify target cDNA even from a miniscule amount of template RNA, which can be applied in viral RNA detection for a quantitative gene expression.

Key Features

• High Sensitivity

Amplification of target genes present even in a miniscule amount of 1 pg template RNA.

• High Specificity

Minimized experimental errors by non-specific amplification and effective amplification of template RNA existing in a small amount through the use *HotStart Taq* DNA polymerase, Thermostable RTase, and HotStart PCR.

• Advanced Performance

Comprehensive choice of template RNA for RT-qPCR reactions, even in a form of strong secondary structure, through the use of Thermostable *RocketScript*™ RTase, capable of performing RT reaction at high temperature.

• Convenience

Simplified procedure with all components necessary for one-step RT-qPCR such as DNA polymerase, thermostable RTase, reaction buffer, dNTPs, etc. RT-qPCR already mixed in tubes to easily start just by adding the primer, template RNA of the gene to be amplified and D.W.

• Reproducibility

Reproducible experimental results by mass production in one-batch system under ISO 9001 quality system with thorough QC for each batch, then supplied as uniform quality product to provide.

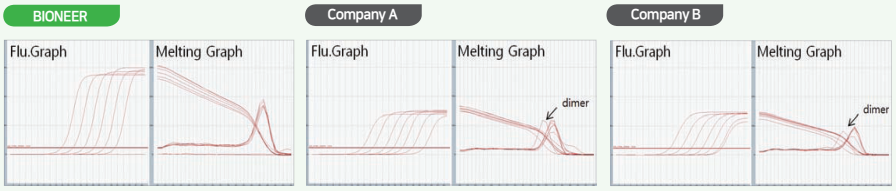
Application

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

Specifications

5' → 3' exonuclease: Yes | 3' → 5' exonuclease: No | 3' – A overhang: Yes
Fragment size: 200 bp

Experimental Data



RNA (ng)	BIONEER	Company A	Company B
100	17.79	17.38	19
10	21.46	20.82	22.67
1	25	24.67	26.17
0.1	27.31	27.45	29.85
0.01	30.34	30.34	32.82
0.001	33.28	33.58	35.58
NTC	UD	37.32	36.28

Figure 1. Comparison of specificity between *AccuPower® GreenStar™* RT-qPCR PreMix and other Company's master mixtures.

AccuPower® DualStar™ qPCR PreMix

• The Hotstart Real-time PCR Reagent applied *PyroHotStart* for Hydrolysis Probe

Description

AccuPower® DualStar™ qPCR PreMix enables accurate and rapid quantification of target genes in a wide range of samples through real-time PCR with Hydrolysis probe method.

Key Features

• Specificity

Minimized non-specific amplification by applying *PyroHotStart* technology, a Bioneer's proprietary patented technology that uses of pyrophosphate and pyrophosphatase enzymes to reduce non-specific reactions during zero cycles & Maximized PCR reaction efficiency through elimination of PCR inhibitor PPi in every amplification cycle, allowing amplification of template DNA present even in a trace amount.

• Convenience

Simplified procedure with all reactants essential for real-time PCR included in each tubes packaged with sufficient amounts for 1 run to readily start by adding template DNA, probe & primer for target gene, and D.W.

• Compatibility

Wide choice of real-time PCR instruments for optimized results.

• Comprehensiveness

Effective quantitative PCR results from a gene regardless of its type, including DNA, cDNA and high GC template.

• Stability

Enhanced stability allowing enzyme activity to stay stable for up to 2 years at -20℃ by including a stabilizer to the PCR reaction mixture.

• Reproducibility

Minimized deviation between lots and reproducible results even for replicates tested repeatedly under the same conditions and variables by mass production.

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

Specifications

Enzyme: *Taq* DNA Polymerase

5' → 3' exonuclease: Yes | 3' → 5' exonuclease: No | 3' – A overhang: Yes

Experimental Data

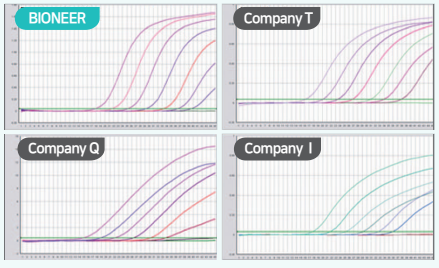


Figure 1. Comparison of detection sensitivity between *AccuPower® DualStar™* qPCR PreMix and other company's master mix.

West Nile Virus (WNV) primers and Hydrolysis-based probe were added into *AccuPower® DualStar™* qPCR PreMix and master mix kits from other company. A series of WNV positive control diluents were tested. Reaction mixtures were prepared, and qPCR was performed according to each Company's protocol. All data were obtained using ABI 7500 Fast Real-Time PCR system (Applied Biosystems co.).

AccuPower® Plus *DualStar*™ qPCR PreMix & Master Mix

• The HotStart Real-time PCR Reagents for Hydrolysis Probe

Description

AccuPower® Plus *DualStar*™ qPCR PreMix uses hydrolysis probe methods to accurately quantify the target gene in various kinds of samples. *HotStart Taq* DNA Polymerase is used to solely amplify the gene of interest, with excellent sensitivity capable of amplifying template DNA even present in a trace amount.

Key Features

• Dynamic Range
A wide range of 8 logs up to 10~10^8 copies.

• Specificity
Optimized amplification of target gene using *HotStart Taq* DNA Polymerase.

• Comprehensiveness
Effective quantitative PCR results from a gene regardless of its type, including DNA, cDNA and high GC template.

• Stability
Stabilizer included in the Real-Time PCR reaction mixture, being more stable the solution type products.

• Convenience
Effective quantitative PCR results form a gene regardless of its type, including DNA, cDNA and high GC template.

• Reproducibility
Minimized deviation between lots and reproducible results even for replicates tested repeatedly under the same conditions and variables by mass production.

Application

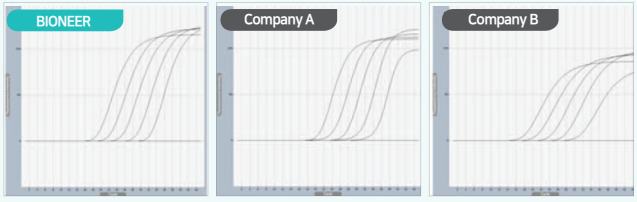
Gene expression profiling, Target DNA quantification, Microbial detection, Viral/bacterial pathogen load determination, Evaluation of primer pair performance for probe-based Real-Time PCR

Specifications

Enzyme: *HotStart Taq* DNA Polymerase
5' → 3' exonuclease: Yes | 3' → 5' exonuclease: No | 3' – A overhang: Yes

Experimental Data

▸ Sensitivity



Template DNA copies	Ct Value		
	BIONEER	A Company	B Company
10^3	32.6	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 1. Comparison of amplification quality between *AccuPower*® Plus *DualStar*™ qPCR PreMix and other Company's Real-Time qPCR kit.

AccuPower® Plus *DualStar*™ qPCR PreMix & Master Mix (with UDG)

• The Real-Time PCR Reagents for Hydrolysis Probe with No Carry-over Contamination

Description

AccuPower® Plus *DualStar*™ qPCR PreMix & Master Mix (with UDG) can accurately quantify the target gene of interest in a in various kinds of samples. *HotStart Taq* DNA Polymerase is used to solely amplify the gene of interest, with excellent sensitivity capable of amplifying template DNA even present in a trace amount, with no carryover contamination through the application of DNA glycosylase system.

Key Features

• Prevention of Carryover Contamination
Minimized false positives through the application of uracil DNA glycosylase system by preventing carryover contamination.

• Specificity
Optimized amplification of target gene using *HotStart Taq* DNA polymerase.

• Wide Range
A wide range of 8 logs up to 10~10^8 copies.

• Comprehensiveness
Effective quantitative PCR results from a gene regardless of its type, including DNA, cDNA and high GC template.

• Stability
Enhanced stability being more stable the solution type products by including a stabilizer in the Real-Time PCR reaction mixture.

• Convenience
Simplified procedure as all reactants essential for real-time PCR included in each tubes to readily start by adding template DNA, probe & primer for target gene, and D.W.

• Reproducibility
Minimized deviation between lots and reproducible results even for replicates tested repeatedly under the same conditions and variables by mass production.

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

Specifications

Enzyme: *HotStart Taq* DNA Polymerase
5' → 3' exonuclease: Yes | 3' → 5' exonuclease: No | 3' – A overhang: Yes

Experimental Data

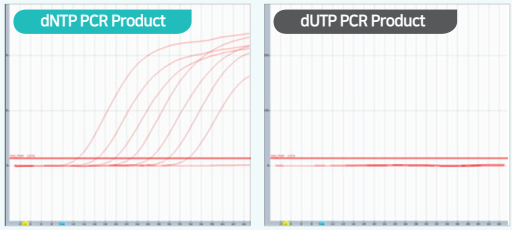


Figure 1. Efficiency of uracil DNA glycosylase using PCR products (including dN/dU base).

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

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

- The One-step RT-qPCR Reagents having high sensitivity & specificity using hydrolysis probe applied with HotStart Technology

Description

AccuPower® Dual-HotStart™ RT-qPCR PreMix & Master Mix is a one-step RT-PCR product using *Pyro-HotStart* RT and Hotstart PCR technology to substantially improve the problems of non-specific reverse reactions and enhance the sensitivity to effectively undergo reverse transcription of template RNA even if it is present in a miniscule amount.

Key Features

- **High Sensitivity**
  Detection of miniscule amounts of the target templates in a high concentration of RNA samples with a wide dynamic range of 10 logs up to $10\sim10^{10}$ copies, unable to be done with conventional methods.
- **High Specificity**
  Accurate selection of target genes only optimized with the world's first *Dual-HotStart™* RT-qPCR techniques applied with *PyroHotStart* RT reactions and *HotStart* PCR.
- **Multiplex**
  Compatible with many kinds of fluorescent dye (probes) to detect various kinds of target genes.
- **Comprehensive template RNA detection**
  RocketScript™ RTase included for undergoing RT reaction at high temperature and gaining RT-qPCR results from strong secondary template RNA structures.
- **Convenience**
  All reactants necessary for *RocketScript™* RTase, *HotStart Taq* DNA polymerase and cDNA synthesis and qPCR included in each tubes to readily start the one-step RT-qPCR by adding only the D.W., template DNA, and probe & primer for the target gene.
- **Reproducibility**
  Minimized deviation between lots and reproducible results even for replicates tested repeatedly under the same conditions and variables by mass production.

Application

Gene expression profiling, Target DNA quantification, Microbial detection, Viral/bacterial pathogen load determination

Specifications

Enzyme: *RocketScript™* RTase, *HotStart Taq* DNA Polymerase
5' → 3' exonuclease: Yes | 3' → 5' exonuclease: No | 3' – A overhang: Yes

Experimental Data

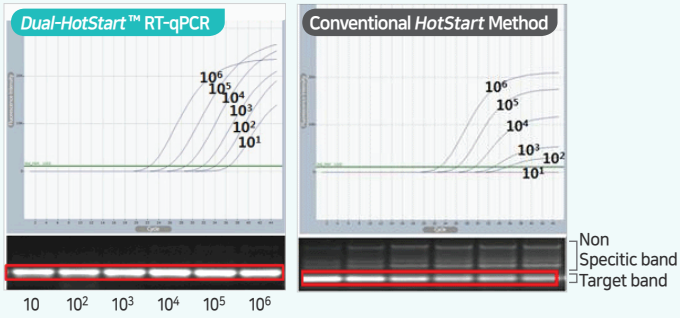


Figure 1. High specificity of *AccuPower*® *Dual-HotStart*™ RT-qPCR PreMix.

Experiment with HCV target. 10-fold serial dilution of Template RNA (10^6~10 copies) spiked in Human Total RNA. Conventional *HotStart* qPCR always generate non-specific amplification at low template concentration, which deteriorate the sensitivity of qPCR. *Dual-HotStart*™ RT-qPCR accurately amplifies target RNA without non-specific amplification, even at low concentration of template.

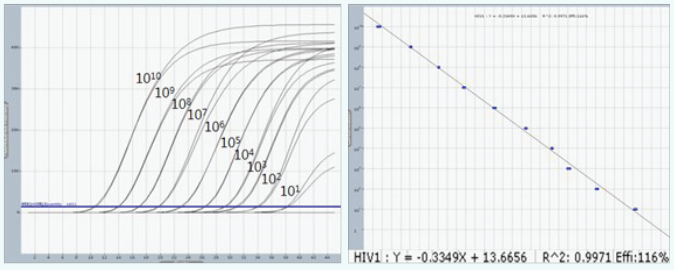


Figure 2. High sensitivity of *AccuPower*® *Dual-HotStart*™ RT-qPCR PreMix.

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

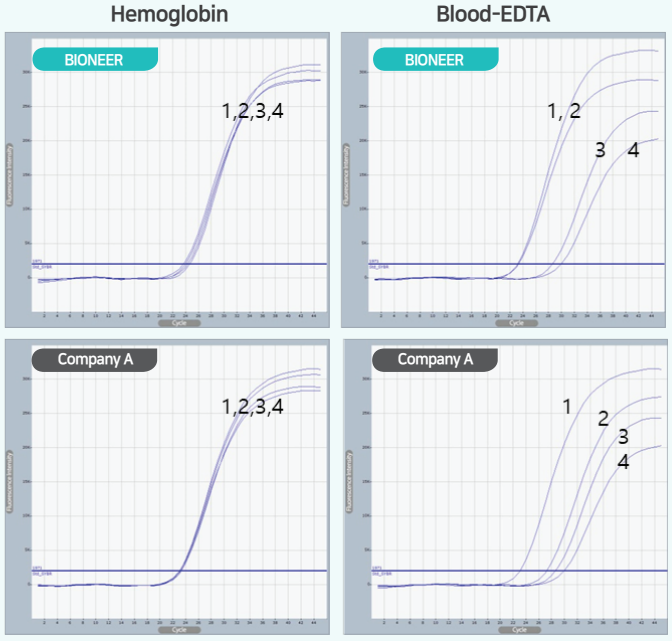


Figure 3. PCR inhibitor study using *AccuPower*® *Dual-HotStart*™ RT-qPCR PreMix.

Human blood has various inhibitors which suppress PCR, such as hemoglobin and/or blood-EDTA. The blocking effect of these PCR inhibitors in RT-qPCR using *AccuPower*® *Dual-HotStart*™ RT-qPCR PreMix was examined, when added directly to the reaction at a final concentration of 10 –10,000 PPM.Our results showed that *AccuPower*® *Dual-HotStart*™ RT-qPCR PreMix is either not affected (Hemoglobin) or affected less than (Blood-EDTA) Company A's product by PCR inhibitors in the RT-qPCR reaction.

PCR Inhibitor	BIONEER	Company A
	Totally inhibition (PPM)	
Blood-EDTA	1,000	100
Hemoglobin	*	*

Dual-Labeled Probe

- Simultaneous analysis of multiple genes at the same time by combining various reporter dyes and quenchers

Description

Dual-Labeled Probe service provides synthesis of oligos having the reporter positioned at the 5′ end and the quencher on the 3′ end. Those are mostly used for real-time PCR analysis, but can also be used for multiplex analysis, done through searching several genes at once, by using various fluorescent materials. Our Dual-labeled Probe guarantees high quality products by performing MALDI-TOF Mass Spectrometer QC method and fluorescence test using Fluoroskan.

Key Features

- High Sensitivity Dye: Fluorescence intensity measured by Fluoroskan.
- High Quality: Quality check by MALDI-TOF mass spectrometer.
- Free Dual-Labeled Probe Design Service.
- Competitive Pricing: Great value for your research dollar.

Combination of Dual-Labeled Probe

Dye	Excitation max (nm)	Emission max (nm)	Compatible Quencher				
			Dabcyl	TAMRA	BHQ1	BHQ2	EBQ
6-FAM	494	520					
JOE	529	555					
TET	521	541					
HEX	535	553					
VIC	538	554					
Cyanine 3	546	563					
NED	546	575					
TAMRA	556	580					
Cyanine 3.5	581	596					
ROX	588	608					
Texas Red	598	617					
Cyanine 5	646	662					
Cyanine 5.5	675	694					
IR700	685	705					
Cyanine 7	743	767					
IR800	787	807					
DABCYL	478	-					
BHQ-1	534	-					
BHQ-2	579	-					

EBQ-Next Generation Dark Quencher

• Next Generation Dark Quencher Modifications

Description

EBQ (**E**xcellent **B**ioneer **Q**uencher) is a new dark quencher material developed by Bioneer Corporation. EBQ has wider absorption range than conventional quenchers. With this characteristics, this product can effectively quench fluorescence of various reporter dyes while using dual-labeled probes. Moreover, this product has exceptional stability retaining its form even during pH and temperature changes. This allows efficient detection of samples during fluorescence spectroscopy and wide applications including fields of molecular diagnosis, pharmaceuticals, and other fields of biology.

Key Features

• Broad range wavelength coverage

A wide absorbance range of 400-700 nm for effective quenching of emission signal from dyes. You can unify quenchers into EBQ (Maximum absorption occurred at 570 nm).

• High Stability

A structurally stable as a quencher against changes in temperature or pH.

• Variety Option of Selectable Dyes

EBQ effectively quenches most commonly used reporter-dyes with emission of 400-700 nm wavelength range such as:

- Pacific Blue, Oregon Greens, AMCA, Bodipy derivatives
- FAM, JOE, TET, HEX, VIC, NED, TAMRA, ROX, Texas Red
- Cyanine 3, Cyanine 3.5, Cyanine 5, Cyanine 5.5

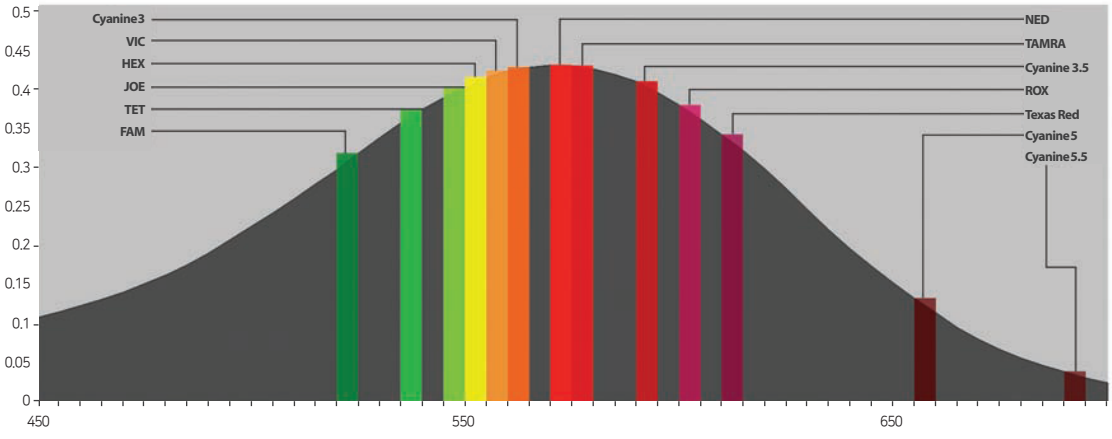


Figure 1. A diagram showing the wide wavelength coverage of EBQ effectively covering most of the absorption spectrum of commonly-used reporter-dyes.

Contact us

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High-Throughput Real-Time PCR System

• Superior 5-color Real-Time Quantitative PCR System

Description

Exicycler™ 96 and *Exicycler*™ 384 is a Real-Time qPCR instrument that can simultaneously detect 96/384 wells. Their light sensitivity and accuracy have been enhanced by using the BIONEER's patented Light Tunnel ("LT") technology and florescence detection technology utilizing polarized light. Additionally, the Ct deviation between wells have been drastically reduced, allowing to accurate analyze fluorescence values without the normalization step using the reference dyes.

Technology of *Exicycler*™

• Light Polarization Technology

Sensitivity and accuracy are improved by removing the noise signal reflected from an optical component that interferes the fluorescence generated from the sample.

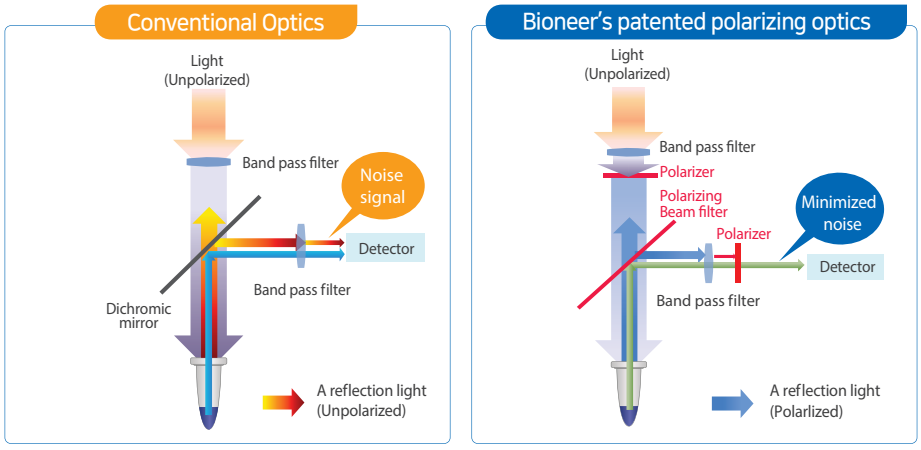

Figure 1. Separation of a reflection light from fluorescence by polarization.

• Light Tunnel(LT) Technology to Remove well-to-well Variation

It maintains the variation within 0.3 Ct in every well by transforming the light collected in condensing lens to uniform surface light source.

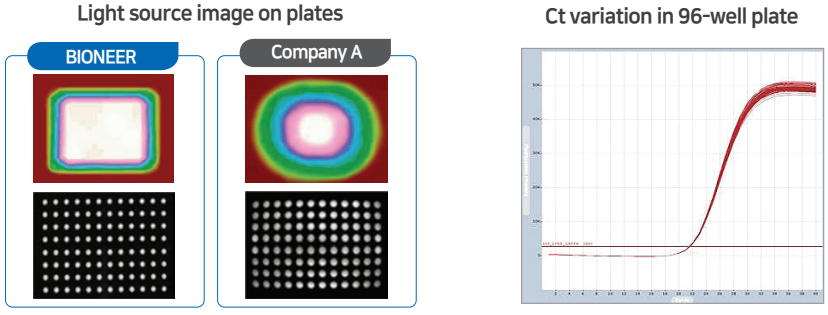

Figure 2. LT technology to remove well-to-well variation.

Exicycler™ 96 Real-Time PCR Quantitative Thermal Block

- Capable of analyzing maximum of 96 gene samples at once
- High uniformity and accuracy with small temperature deviation of 0.3℃
- Reduced experimental time with faster ramp rate of maximum of 5℃/sec (*Exicycler*™ Fast only)
- Capable of undergoing 5-multiplex qPCR without the use of reference dyes
- Dynamic range being more than 9-log
- Built with self-diagnosis function and software convenient to use

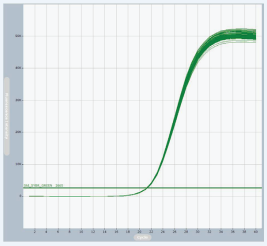

Figure 1. Excellent Uniformity.
Fluorescence data using 10^6 copies of IRF3 gene (FAM labeled) in each of 96 well positions. The average Ct of 96 well is 21.8 and the Ct variation range is 0.19.

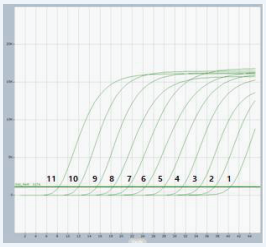

Figure 2. Wide dynamic range.
Graph shows standard curve of tenfold serial dilutions of 10 copies to 10^{11} copies MMP9 gene (FAM labeled). The PCR efficiency generated by the standard curve is 103%.

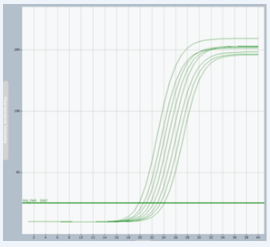

Figure 3. Precise discrimination.
Fluorescence data from a series of 1.33-fold dilutions of TMV gene (10^6 copies) amplified using reporter dyes to check one target: FAM/TMV. The PCR efficiency generated by the standard curve is 101%.

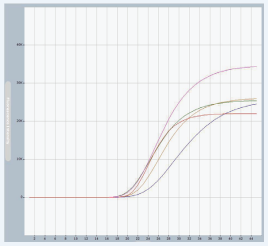

Figure 4. Real 5-color Multiplexing.
5 target genes can be detected in a single tube(FAM:T. vaginalis, TET: M. Hominis, TAMRA: TMV, Texas Red: HSV type1, Cyanine5: HSV type2).

Exicycler™ 384 Real-Time PCR Quantitative Thermal Block

384-well instrument with the lowest well-to-well Ct deviation

- Capable of analyzing 384 samples at once
- High uniformity and accuracy with small temperature deviation of 0.3℃
- Reduced solution cost requiring only a total volume of 5~20 μl reagents
- Reduced experimental time with faster ramp rate of maximum of 4.5℃/sec
- Capable of undergoing 5-multiplex qPCR without the use of reference dye
- Convenient software capable of showing organized and intuitive data

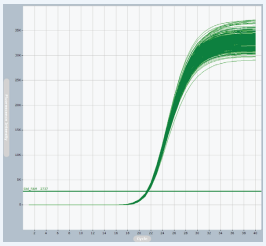

Figure 1. Excellent Uniformity.
qPCR result using $1x10^6$ copies of Lambda DNA(FAM labeled) in each of 384 well positions. The average Ct of 384 well is 21.6 and the Ct variation range is 0.43.

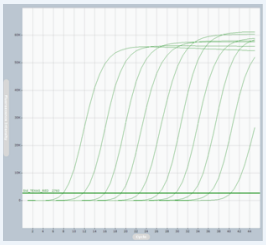

Figure 2. Wide dynamic range.
Ct values of 10-fold diluted samples show a wide dynamic range of quantifiction. Fluorescence data from a series of 10-fold dilution of PGK1 DNA(10^{10} copies) amplified using reporter dyes to check on target: FAM/PGK1.

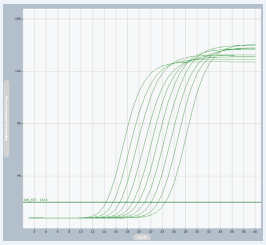

Figure 3. Precise discrimination.
Exicycler™ 384 provide sensitive detection and precise target discrimination down to 2-fold differences Fluorescence data from a series of 2-fold dilution of CSF2 DNA(10^8 copies) amplified using reporter dyes to check one target: TET/CSF2.

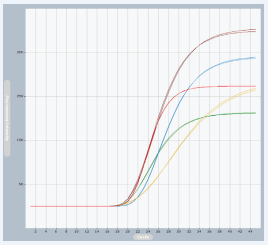

Figure 4. Real 5-color Multiplexing.
5 target genes can be detected in a single tube with a minimum volume of 5 μl (FAM:T. vaginalis, TET: M. Hominis, TAMRA: TMV, Texas Red: HSV type1, Cyanine5: HSV type2).

dsDNA Binding Dye Type Kit

Cat. No.	Product Description
AccuPower® GreenStar™ qPCR PreMix & 2X Master Mix	
K-6200	*AccuPower® GreenStar™* qPCR PreMix, 50 µl/rxn, 8-tube strips, 96 rxn, *Exicycler™* 96, optical film included
K-6201	*AccuPower® GreenStar™* qPCR PreMix, 50 µl/rxn, 8-tube strips, 96 rxn, ABI7500, optical film included
K-6202	*AccuPower® GreenStar™* qPCR PreMix, 50 µl/rxn, 8-tube strips with cap, 96 rxn, Opticon (CFX 96)
K-6203	*AccuPower® GreenStar™* qPCR PreMix, 50 µl/rxn, 96-well plate, 96 rxn, *Exicycler™* 96, optical film included
K-6204	*AccuPower® GreenStar™* qPCR PreMix, 50 µl/rxn, 96-well plate, 96 rxn, ABI7500, optical film included
K-6210	*AccuPower® GreenStar™* qPCR PreMix, 20 µl/rxn, 8-tube strips, 96 rxn, *Exicycler™* 96, optical film included
K-6211	*AccuPower® GreenStar™* qPCR PreMix, 20 µl/rxn, 8-tube strips, 96 rxn, ABI7500, optical film included
K-6212	*AccuPower® GreenStar™* qPCR PreMix, 20 µl/rxn, 8-tube strips with cap, 96 rxn, Opticon (CFX 96)
K-6213	*AccuPower® GreenStar™* qPCR PreMix, 20 µl/rxn, 96-well plate, 96 rxn, *Exicycler™* 96, optical film included
K-6214	*AccuPower® GreenStar™* qPCR PreMix, 20 µl/rxn, 96-well plate, 96 rxn, ABI7500, optical film included
K-6251	*AccuPower®* 2X *GreenStar™* qPCR Master Mix, 50 µl/rxn, 100 rxn, 80X ROX Dye (0.1 ml X 1 ea)
K-6252	*AccuPower®* 2X *GreenStar™* qPCR Master Mix, 50 µl/rxn, 200 rxn, 80X ROX Dye (0.1 ml X 1 ea)
K-6253	*AccuPower®* 2X *GreenStar™* qPCR Master Mix, 50 µl/rxn, 100 rxn, without ROX Dye
K-6254	*AccuPower®* 2X *GreenStar™* qPCR Master Mix, 50 µl/rxn, 200 rxn, without ROX Dye
AccuPower® GreenStar™ RT-qPCR PreMix & Master Mix	
K-6400	*AccuPower® GreenStar™* RT-qPCR PreMix, 50 µl/rxn, 8-tube strips, 96 rxn, *Exicycler™* 96, optical film included
K-6403	*AccuPower® GreenStar™* RT-qPCR Master Mix (2X), 2.5 ml, 100 rxn

Hydrolysis Probe Type Kit

Cat. No.	Product Description
AccuPower® DualStar™ qPCR PreMix	
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 (CFX 96)
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 (CFX 96)
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
AccuPower® Plus *DualStar™* qPCR PreMix & Master Mix	
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 µl/rxn, 8-tube strips with cap, 96 rxn, Opticon (CFX 96), optical film included
K-6603	*AccuPower®* Plus *DualStar™* qPCR Master Mix (2X), 2.5 ml, 100 rxn
AccuPower® Plus *DualStar™* qPCR PreMix & Master Mix (with UDG)	
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 (CFX 96), optical film included
K-6608	*AccuPower®* Plus *DualStar™* qPCR Master Mix (2X) (with UDG), 2.5 ml, 100 rxn
AccuPower® Dual-HotStart™ RT-qPCR PreMix & Master Mix	
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 (CFX 96), optical film included
K-6707	*AccuPower® Dual-HotStart™* RT-qPCR Master Mix (2X), 100 rxn

Instrument for Real-time PCR

Cat. No.	Product Description
K-2060-1	*Exicycler™* 96 (Ver.4) Real-Time Quantitative Thermal Block
K-2060-2	*Exicycler™* 96 (Ver.4) Fast Real-Time Quantitative Thermal Block
K-2061	*Exicycler™* 384 Real-Time Quantitative Thermal Block

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