### Bioneer Product Selection Guide

#### DNA Amplification

<table>
<thead>
<tr>
<th>Application</th>
<th>AccuPower® PCR PreMix</th>
<th>AccuPower® Taq PCR PreMix</th>
<th>HotStart PCR PreMix</th>
<th>AccuPower® HotStart PCR PreMix (with UDG)</th>
<th>AccuPower® PyroHotStart Taq PCR PreMix</th>
<th>AccuPower® Pfu PCR PreMix</th>
<th>AccuPower® Multiplex PCR PreMix</th>
<th>AccuPower® Gold Multiplex PCR PreMix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard PCR</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td>HotStart PCR</td>
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<td>Prevent carryover contamination</td>
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<td>PCR for Gene cloning</td>
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</tr>
</tbody>
</table>

#### Enzyme

<table>
<thead>
<tr>
<th>Application</th>
<th>DNA Polymerase</th>
<th>HotStart DNA Polymerase</th>
<th>ProFi Taq DNA Polymerase</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TOP</td>
<td>Taq</td>
<td>Pfu</td>
</tr>
<tr>
<td>PCR</td>
<td></td>
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AccuPower® PCR PreMix
PCR Master Mix with a novel Top DNA Polymerase

Overview
AccuPower® PCR PreMix kit includes Bioneer’s superprocessive Top DNA Polymerase for fast amplification, which is three-times faster than Taq polymerase. Maximize your convenience by replacing Taq polymerase with Bioneer’s AccuPower® PCR PreMix kit for fast application of your target genes. If your experiment requires more accurate amplification, we would like to introduce you our premium amplification kits such as HotStart PCR or High Fidelity PCR (see our AccuPower® HotStart PCR and related pages for more information). AccuPower® PCR PreMix kits are available with or without tracking dye, and with tracking dye version you can simply load your amplicon on an agarose gel directly after PCR.

Features and Benefits
Easy-to-use: Start your PCR by just adding template and primers. All other required components are lyophilized and included in PCR premix.

Stability: Stable for a month at room temperature and for 2 years in a -20°C freezer.

Gel loading: Available with or without a tracking dye for ease of use.

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

Specifications
- 5’->3’ exonuclease activity : No
- 3’->5’ exonuclease activity : No
- 3’– A Overhang : Yes
- Fragment Size : ~ 10 kb

Experimental Data

Figure 1. Signature thermal-stability of Bioneer’s AccuPower® PCR PreMix kits compared to competitor’s solution type of Master Mix kits. AccuPower® PCR PreMix and the competing products (solution type’s Master Mix) were incubated at 95°C with various time interval.

A: AccuPower® PCR PreMix (Batch-1)
B: AccuPower® PCR PreMix (Batch-2)
C: T company’s Taq DNA polymerase
Lane 1 : 90 mins
Lane 2 : 60 mins
Lane 3 : 40 mins
Lane 4 : 30 mins
M : 100 bp plus DNA ladder (Bioneer Cat. No: D-1035)
AccuPower® PCR PreMix (with UDG)

Containing UDG to prevent carryover/crossover contamination

Overview
The polymerase chain reaction (PCR) can amplify a single molecule over a billion-fold. Thus, even minuscule amounts of contaminant can be amplified and lead to false positive results. Such contaminants are often products from previous PCR amplifications (carry-over contamination). Therefore, our researchers have developed methods to avoid such contamination. AccuPower® PCR PreMix (with UDG) is a ready-to-use master mix containing all components, except primers, 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 AccuPower® PCR PreMix (with UDG) prevent the re-amplification of carryover PCR products between reactions. dUTP is incorporated into any amplified DNA instead of dTTP, and the uracil is readily removed from single- or double-stranded DNA by UDG, preventing dU-containing DNA from serving as template in the ensuing PCRs. A UDG incubation step (37°C, 2 min) before PCR cycling eliminates any dU-containing contaminant from previous reactions. UDG is then inactivated at high temperatures during normal PCR cycling, thereby allowing the amplification of genuine target sequences only.

Easy-to-use: All reaction components required for PCR, including thermostable DNA polymerase and dNTPs are contained within each tube in a lyophilized “PreMix” form. A user needs only to add template DNA, primers and distilled water. Reagents necessary for loading agarose gels for electrophoresis is already present in the reaction, and there is no need to add loading dye after PCR is completed.

Reproducibility: AccuPower® PCR PreMix (with UDG) that is produced under strict quality control provides accurate and reproducible results.

Application
- Conventional PCR
- Primer extension
- TA cloning
- Gene sequencing
- Molecular Diagnosis

Specifications
- 5’ -> 3’ exonuclease activity: No
- 3’ -> 5’ exonuclease activity: No
- Terminal transferase activity: Yes
- Fragment Size: Up to 10 kb

Experimental Data

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

Efficiency test of uracil DNA glycosylase was operated using serially 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.
The copy number of PCR products used to test is represented below.

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)
**AccuPower® Taq PCR PreMix**

**Global Standard PCR kit - all reagents are lyophilized for PCR**

**Overview**

*AccuPower® Taq* PCR PreMix is a convenient lyophilized PCR PreMix containing *Taq* DNA polymerase, dNTPs, reaction buffer, tracking dye, and patented stabilizer and is pre- aliquoted into 8-tube PCR strips. 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 a tracking dye, depending on application. If purchased with a tracking dye, the PCR products can be loaded on an agarose gel without adding loading buffer.

**Features and Benefits**

**Flexible:** *Taq* provides accurate amplification of target gene and is highly suitable for all PCR applications.

**Easy to use:** All reaction components required for PCR, including thermostable DNA polymerase and dNTPs, are contained in each tube as a lyophilized “PreMix” form.

**Reproducibility:** Bioneer’s strict quality-controlled production system ensures reproducible results experiments after experiments.

**Convenient:** Just add template and primers and start your reaction, dNTPs, buffer and enzyme are provided in the kit.

**Stability:** Stable for a month at room temperature and for 2 years in a -20°C freezer.

**Application**

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

**Specifications**

- Source: thermus aquatics
- 5' -> 3' exonuclease activity: Yes
- 3' -> 5' exonuclease activity: No
- 3' - A overhang: Yes

**Experimental Data**

![Figure 1. Comparison of PCR amplification efficiency between AccuPower® Taq PCR PreMix from Bioneer and other suppliers' PCR Master Mix.](image)

Lane M: 100 bp DNA Ladder (Bioneer, Cat. No. D-1030)
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
**AccuPower® ProFi Taq PCR PreMix**

*AccuPower® ProFi Taq PCR PreMix for high efficiency and amplification of long range PCR*

**Overview**

*AccuPower® ProFi Taq PCR PreMix* is a convenient lyophilized PCR PreMix 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 template DNA, and especially effective in amplifying long genomic DNA fragments around 20 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 PCR:** ProFi Taq is especially effective in amplifying long genomic DNA fragments around 20 kb and Lambda DNA up to 30 kb.

**Easy to use:** All reaction components required for PCR, including thermostable DNA polymerase and dNTPs are contained within each tube as a lyophilized “PreMix” form.

**Reproducibility:** Bioneer’s strict quality controlled production system ensures that your results will be reproducible experiments after experiments.

**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.

**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

**Specifications**

- 5’ -> 3’ exonuclease activity: Yes
- 3’ -> 5’ exonuclease activity: No
- 3’ – A overhang: Yes
- PCR product size: ~ 30 kb

**Experimental Data**

<table>
<thead>
<tr>
<th>M1</th>
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<th>2</th>
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**Figure 1.** Comparison of PCR amplification of long targets between *AccuPower® ProFi Taq PCR PreMix* from Bioneer and other suppliers’ PCR Master Mix.

- Lane M1: Lambda/Hind III marker (Bioneer, Cat. No. D-1050)
- Lane M2: 1 kb DNA Ladder (Bioneer, Cat. No. D-1040)
- Lane 1: 11 kb fragment
- Lane 2: 13.5 kb fragment
- Lane 3: 17.6 kb fragment
- Lane 4: 21.4 kb fragment
**Overview**

AccuPower® Pfu PCR PreMix is a lyophilized mixture of Pfu DNA polymerase, dNTPs and reaction buffer in a convenient premix format. AccuPower® offers easy set-up for every PCR application. Simply add template, primers and distilled water to the Premix. 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 = 1.9x10⁻⁶) 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 experiments after experiments.

**Convenient:** Just add template and primers and start your reaction. dNTPs, buffer and enzyme are provided.

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**Application**

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

**Specifications**

- 5'→3' exonuclease : No
- 3'→5' exonuclease : Yes
- 3'→ A Overhang : No
- Fragment Size: ~10 kb

**Experimental Data**

Figure 1. Amplification of genomic DNA of 1 kb to 10 kb with AccuPower® Pfu PCR PreMix.

M: 1kb DNA Ladder
Line 1: 1 kb fragment  Line 6: 6 kb fragment
Line 2: 2 kb fragment  Line 7: 7 kb fragment
Line 3: 3 kb fragment  Line 8: 8 kb fragment
Line 4: 4 kb fragment  Line 9: 9 kb fragment
Line 5: 5 kb fragment  Line 10: 10 kb fragment
AccuPower® Multiplex PCR PreMix

It can simultaneously detect one or more targets in a single tube.

Overview

AccuPower® Multiplex PCR PreMix is an innovative item to obtain 20 PCR products with only a single reaction in a tube, by performing a multiplex PCR that can detect up to 20 target genes at a time. It is supplied as a single-use lyophilized premix, containing all the components required for PCR such as dNTP, reaction buffer and HotStart Top DNA polymerase that amplifies only a target sequence. The reasonable price accomplished by the Bioneer’s vertically integrated production system increases the accessibility of multiplex PCR reagent to the researchers who have been hesitating the purchase due to the high price. AccuPower® Multiplex PCR PreMix is also applicable to molecular diagnostic genotyping assays and semi-quantitative gene expression tests using cDNA.

Features and Benefits

Flexibility: Up to 20 different target genes from human genomic DNA can be amplified in a single tube.

Easy-to-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 distilled water to perform up to 20-plex PCR. Reagents necessary for agarose gel electrophoresis are already present in the reaction, and there is no need to add loading dye after PCR is completed.

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

Application

- STR analysis
- Molecular diagnostic analysis
- Genotyping assay
- Qualitative, semi-qualitative gene expression assay
- Mutant screening Transgenic organism analysis

Specifications

- 5’ -> 3’ exonuclease: No
- 3’ -> 5’ exonuclease: No
- 3’ – A Overhang: Yes
- Fragment Size: ~1 kb

Experimental Data

![Figure 1. Comparison of amplification quality between AccuPower® Multiplex PCR PreMix and other supplier’s Multiplex PCR Kit.](image)

6-plex primers were added into AccuPower® Multiplex PCR PreMix and other supplier’s 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 machine (Applied Bioneer co).

Supplier Q: Q company Multiplex PCR Kit
Supplier S: S company Multiplex PCR Kit
Supplier I: I company Taq polymerase for Mutiplex 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 (cat. No. D-1020)
**AccuPower® Gold Multiplex PCR PreMix**

Amplify up to 20 targets in a single tube

**Overview**

*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 Mg²⁺. By adding PPi to the reaction mixture, the Mg²⁺ ions necessary for normal PCR are bound, preventing DNA polymerase activity. This PPi-Mg²⁺ binding prevents non-specific amplification 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 Mg²⁺, which is then available for DNA polymerase to use and resume normal activity.

**Easy-to-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 distilled water to perform up to 20-plex PCR. Reagents necessary for loading agarose gels for electrophoresis are also added in the reaction, and there is no need to add loading dye after PCR is completed.

**Reproducibility:** Each batch is produced under strict quality control. 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 streamlined set up using a lyophilized PreMix enhances reproducibility by minimizing set up variables.

<table>
<thead>
<tr>
<th>Target</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human and Animal</td>
<td>STR analysis for determining genetic profiles in forensic cases</td>
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<tr>
<td>Molecular diagnostic analysis</td>
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<tr>
<td>Genotyping assay</td>
<td></td>
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<td>Qualitative and semi-qualitative gene expression assay</td>
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<td>Mutant screening</td>
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<td>Transgenic organism analysis</td>
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<td>Plant</td>
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<td>Detection of pathogens/bacterial infection</td>
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</table>

**Application Specifications**

- 5’ -> 3’ exonuclease : No
- 3’ -> 5’ exonuclease : No
- 3’ – A Overhang : Yes
- Fragment Size : Up to 1 kb

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**Figure 1. Single PCR and Multiplex PCR using AccuPower® Gold Multiplex PCR PreMix.**

Each lane from left to right indicates the single and multiplex PCR products using *AccuPower® Gold Multiplex PCR PreMix*. The last lane labeled Multirepresents all amplicons amplified in a single reaction.

a) 10-plex Multiplex PCR, b) 20-plex Multiplex PCR M, 25/100 bp Mixed DNA Ladder (cat. No. D-1020).
What is HotStart PCR?

HotStart PCR is a general way to obtain the greatest amount of desired PCR product by minimizing the non-specific amplification. There is a possibility to produce non-specific amplicon by mis-annealing at the first step of PCR because Taq DNA Polymerase has an activity even at room temperature. HotStart PCR technology allows Taq DNA Polymerase to have an activity only at a higher temperature and prevents non-specific amplification by mis-annealing at room temperature. HotStart PCR is accomplished by a method using antibody or enzyme.

Bioneer’s PyroHotStart?

Apart from other companies using Taq antibody technology, Bioneer’s HotStart PCR technology employs an enzyme, Pyrophosphatase (PPase), that eliminates Pyrophosphate (PPI) generated during HotStart PCR. Bioneer’s enzyme-mediated HotStart PCR technology, PyroHotStart, is superior in terms of the activity and for its long-lasting effect. PPI binds to Mg$^{2+}$ ion with high affinity, which inhibits DNA Polymerase activity and reduces the generation of undesired products at zero cycle. At more than 70°C, PPase dissociates the binding of PPI and Mg$^{2+}$ and the dissociated Mg$^{2+}$ ion reacts with DNA polymerase to proceed PCR.

Patented PyroHotStart method increases PCR specificity and efficiency by hydrolyzing PPI, a polymerase inhibitor generated in every PCR cycle and resolves problems in data analysis caused by non-specific amplification especially when using multiple primer sets in multiplex format.
**AccuPower® HotStart PCR PreMix**

**HotStart PCR Master Mix, unique HotStart method for DNA amplification**

**Overview**

AccuPower® HotStart PCR PreMix is a ready-to-use PCR master mix containing a thermostable DNA polymerase, thermostable pyrophosphatase, reaction buffer, dNTPs, tracking dye, and patented stabilizer. Bioneer uses a unique Enzyme-mediated HotStart PCR that provides robust and reliable results. Bioneer’s Top DNA Polymerase activity is inhibited at lower than 70°C by pyrophosphate. However, it restores its full activity at temperatures above 70°C via pyrophosphate hydrolysis by our thermostable pyrophosphatase. This prevents the formation of mis-primed products and primer-dimers during the reaction setup process, and improves PCR specificity and amplification efficiency. AccuPower® HotStart PCR PreMix is ideal for various nucleic acid amplification reactions involving complex genomic DNA, cDNA templates, very low copy targets, or multiple primer pairs.

**Features and Benefits**

*Easy-to-use:* Just add template and primers and start your PCR. dNTPs, buffer and enzyme are provided.

*Stability:* Stable at room temperature for a month or for 2 years in a -20°C freezer.

*HotStart:* Unique enzyme-mediated HotStart results in greater specificity and more robust reactions.

**Application**

- Genome template’s PCR
- Low copy target’s PCR
- Multiple primer pair’s PCR
- cDNA templates PCR

**Specifications**

- 5’→3’ exonuclease activity: No
- 3’→5’ exonuclease activity: No
- 3’→A Overhang: Yes
- Fragment Size: Up to 12 kb

**Experimental Data**

![Figure 1. Specificity Test](image)

Lane 1: Primer Set P75/P73  
Lane 2: Primer Set P55/P53  
Lane 3: Primer Set P75/P83  
Lane 4: Primer Set P55/P73  
Lane 5: Primer Set P65/P83
**AccuPower® HotStart PCR PreMix (with UDG)**

**Containing UDG to prevent carryover/crossover contamination**

**Overview**

Due to the powerful amplification ability of PCR technique, even minuscule amounts of contaminant can be amplified, which leads to a false positive results. Such contaminants are often products from previous PCR amplifications carryover contamination. Therefore, methods have been developed to avoid such contamination. AccuPower® HotStart PCR PreMix (with UDG) is a ready-to-use Master Mix designed to prevent carryover contamination or crossover contamination by containing UDG (uracil DNA glycosylase), as well as for highly specific DNA amplification by employing Enzyme-mediated HotStart PCR technology.

**Features and Benefits**

**Prevention of carryover contamination:** UDG and dUTP in the AccuPower® HotStart PCR PreMix (with UDG) prevent the re-amplification of carryover PCR products between reactions. dUTP is incorporated into any amplified DNA instead of dTTP, and the uracil is readily removed from single- or double-stranded DNA by UDG, preventing dU-containing DNA from serving as template in the ensuing PCRs. A UDG incubation step (37°C, 2min) before PCR cycling destroys any dU-containing contaminant from previous reactions. UDG is then inactivated at high temperatures during normal PCR cycling, thereby allowing the amplification of genuine target sequences only.

**Specificity:** Pyrophosphate (PPI) has high affinity for Mg²⁺. By adding PPI to reaction mixture, Mg²⁺ ions necessary for normal PCR bind to PPI, preventing DNA polymerase activity. This PPI-Mg²⁺ binding prevents non-specific product formation before starting PCR (zero-cycle). During the PCR cycles, the pyrophosphatase (PPase) in the mixture is activated at temperatures over 70°C and hydrolyzes the PPI to 2 phosphate groups and facilitates the release of Mg²⁺, which helps DNA polymerase to resume its normal activity.

**Easy-to-use:** All reaction components required for PCR, including thermostable DNA polymerase and dNTPs, are contained within each tube as a lyophilized "PreMix" form. A user needs only to add template DNA, primers and water. Material necessary for loading onto agarose gels for electrophoresis is also added in the PreMix, and there is no need to add loading dye after PCR is completed.

**Application**

- Genome template's PCR
- Low-copy target's PCR
- Multiple primer pair's PCR
- cDNA templates PCR
- Molecular Diagnosis

**Specifications**

- 5’→ 3’ exonuclease activity : No
- 3’→ 5’ exonuclease activity : No
- 3’ → A Overhang : Yes
- Fragment Size : Up to 12kb

**Experimental Data**

![Experimental Data Figure](image)

Figure 1. Efficiency of UDG using PCR product (including uracil base). Efficiency test of UDG 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 2min followed by 95°C for 5min, 30 cycles of 20sec at 95°C, 20sec at 55°C, 30sec at 72°C. AccuPower® HotStart PCR PreMix(with UDG) contains dUTP besides dATP, dGTP, dCTP and dTTP.

Lane 1 : 10¹³-copy
Lane 2 : 10¹¹-copy
Lane 3 : 10¹⁰-copy
Lane 4 : 10⁹-copy
Lane 5 : 10⁸-copy
Lane 6 : 10⁷-copy
Lane 7 : 10⁶-copy
Lane 8 : 10⁵-copy
Lane N : No template control

M : 100 bp plus DNA ladder(Bioneer Cat. No: D-1030-1)
AccuPower® PyroHotStart Taq PCR PreMix
Bioneer’s patented DNA amplification product with high specificity

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

Features and Benefits

Specificity: Pyrophosphate (PPi) has high affinity for Mg²⁺ ion, which is essential for PCR reaction. The binding of PPi to Mg²⁺ inhibits DNA polymerase activity. This prevents the formation of misprimed products and primer-dimers at low temperature. Pyrophosphatase is activated above 70°C and hydrolyzes PPi to Pi which then releases Mg²⁺ to activate DNA polymerase. Thus, it increases PCR efficiency and provides high PCR specificity.

Stability: Stable at room temperature for a month or for 2 years in a -20°C freezer.

Easy-to-use: All reaction components required for PCR, including thermostable DNA polymerase and dNTPs, are contained within each tube as a lyophilized “PreMix” form. A user needs only to add template DNA, primers and distilled water. Reagents necessary for loading onto agarose gels for electrophoresis is also added in the PreMix, and there is no need to add loading dye after PCR is completed.

Reproducibility: AccuPower® PyroHotStart Taq PCR PreMix that is produced under strict quality control provides accurate and reproducible results.

Application
- Highly specific PCR
- Highly sensitive PCR
- Low-copy target PCR
- Multiple primer pairs PCR
- cDNA template PCR
- T-A cloning

Specifications
- 5’→ 3’ exonuclease activity : Yes
- 3’→ 5’ exonuclease activity : No
- 3’→ A Overhang : Yes
- PCR product size : ~ 5 kb (Human)

Experimental Data

Figure 1. 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. 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 M: 100 bp DNA Ladder (Bioneer, Cat. No. D-1030)
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)
**AccuPower® HotStart Pfu PCR PreMix**

*AccuPower® HotStart Pfu PCR PreMix* for highly specific amplification

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**Overview**

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

**Features and Benefits**

- **High fidelity:** *AccuPower® HotStart Pfu PCR PreMix* demonstrates high fidelity which reduces the mis-priming during DNA amplification.
- **Ease-of-Use:** Just add template and primers and start your reaction.
- **High specificity:** Pyrophosphate (PPI) in the reaction mixture binds to Mg²⁺ with high affinity, which prevents DNA polymerase activity. Therefore, this PPI-Mg²⁺ binding prevents non-specific product formation before starting PCR (zero-cycle). During the PCR cycles, the pyrophosphatase (PPase) in the mixture is activated at temperatures over 70°C and hydrolyzes the PPI to 2 phosphate groups and facilitates the release of Mg²⁺, which helps DNA polymerase to resume its normal activity.
- **Reproducibility:** *AccuPower® HotStart Pfu PCR PreMix* that is produced under strict quality control provides high specific and reproducible results.

**Application**

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

**Specifications**

- 5’->3’ exonuclease activity: No
- 3’->5’ exonuclease activity: Yes
- 3’- A Overhang: No
- Fragment Size: ≥ 5kb

**Experimental Data**

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

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, D-1030)
• **Top DNA Polymerase**

Enzymes for everyday PCR, faster than Taq DNA Polymerase, and TA Cloning compatible

Features and Benefits

Fast:
Three times more processive than standard Taq DNA Polymerase.

High performance:
Amplifies fragments up to 10 kb.

Value:
No license fee to pay!

• **Taq DNA polymerase**

Versatile DNA polymerase for everyday routine PCR

Features and Benefits

Improved yield & sensitivity:
Perform PCR with high yield and high sensitivity 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.

• **Pfu DNA Polymerase**

Novel enzyme for high fidelity PCR with DNA proofreading

Features and Benefits

High fidelity PCR:
3’→5’ exonuclease (proofreading) activity.

Thermostability:
Retaining 94-99% of the activity after one hour incubation at 95°C.

No Terminal Transferase Activity:
Devoid of terminal transferase activity, it generates blunt-ended PCR products.
• **ProFi Taq polymerase**

ProFi Taq DNA polymerase for highly efficient long-range PCR

Features and Benefits

Long PCR:
ProFi Taq is especially effective in amplifying large genomic DNA fragments around 20 kb and Lambda DNA up to 30 kb.

Flexible:
ProFi Taq provides accurate long-range PCR of standard and low-copy targets for all applications.

Reproducibility:
Bioneer’s product is produced under strict quality control and provides accurate and reproducible results.

• **HotStart DNA polymerase**

Unique enzyme-mediated HotStart DNA Polymerase

Features and Benefits

Fast:
Three times more processive than standard Taq DNA Polymerase.

High performance
Amplifies fragments up to 12 kb.

Value:
No license fee to pay!

• **HotStart Taq polymerase**

Antibody-based HotStart Taq DNA polymerase with increased specificity and robust sensitivity

Features and Benefits

Maximized specificity:
Virtually eliminates non-specific amplification. Ideal for multiplex PCR with 2-6 different targets.

Improved sensitivity:
Excellent for PCR of 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.
## Ordering Information

### PreMix Type

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<th>Cat. No</th>
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<td>AccuPower® PCR PreMix, 96 tubes, 20 μl reaction</td>
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<td>K-2013</td>
<td>AccuPower® PCR PreMix, 96 tubes, 50 μl reaction</td>
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<td>AccuPower® PCR PreMix(with UDG), 96 tubes, 20 μl reaction</td>
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<td>AccuPower® ProFi PCR PreMix, 96 tubes, 20 μl reaction</td>
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### Enzymes

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<td>Pfu DNA Polymerase 500 Units</td>
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<td>ProFi DNA Polymerase 250 Units</td>
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<td>E-3150</td>
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<td>E-2017</td>
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