# Advance™ DNA Polymerase

**(Cat# M1151-250, -1000; 5 U/µl; Store at -20°C)**

**I. Introduction:**

BioVision's Advance™ Taq DNA Polymerase is a novel DNA polymerase with strategically engineered mutations resulting in a robust, high fidelity polymerase. Advance™ Taq DNA Polymerase has exceptional 3' to 5' exonuclease activity that endows it with superior accuracy over competitor polymerases. This novel enzyme has intrinsically high processivity and is engineered to have an improved binding affinity for DNA resulting in highly successful PCR. The Advance™ 2X PCR sophisticated buffer system not only tolerates high AT and GC content, but also many PCR inhibitors commonly found in a typical DNA sample. **BioVision's Advance™ Taq DNA Polymerase is the ultimate solution for a robust PCR system with high fidelity and yield.**

**II. Application:**

- Routine PCR amplification
- PCR success with AT and GC Rich sequences
- High-throughput PCR
- RACE
- NGS Library construction

**III. Key Features**:

- High fidelity PCR
- Robust PCR performance, resistant to most PCR inhibitors commonly found in samples (including plant samples)
- PCR success with A/T and G/C rich templates
- Highly processive, for high yield amplification

**IV. Unit Definition**:

- One unit of the enzyme catalyzes the incorporation of 10 nmol of deoxy ribonucleotides into a polynucleotide fraction in 30 mins at 74°C.

**V. Package Contents:**

| **Cat. No.** | **M1151-250** | **M1151-1000** | **Part Number** |
|---|---|---|---|
| **Concentration** | **250 U** | **1000 U** | **-** |
| Advance™ DNA Polymerase (5 U/µl) | 50 µl | 200 µl | M1151-XX-1 |
| 2X PCR Buffer, with $Mg^{2+}$ | 2 x 1 ml | 6 x 1 ml | M1151-XX-2 |
| 25 mM $MgSO_4$ | 1 ml | 1 ml | M1151-XX-3 |

**VI. Storage Buffer Components:**

- 50 mM Tris-HCl (pH 8.0), 100 mM NaCl, 0.1 mM EDTA, 5 mM DTT, 50% glycerol and 1.0% Triton X-100.

**VII. Shipment and Storage:**

Upon arrival, Advance™ Taq DNA Polymerase should be stored at -20°C. Avoid repeated freeze-thaw cycles of all the Advance™ Taq components to retain maximum performance. All Advance™ Taq components are stable for 1 year from the date of shipping if stored and handled properly. Briefly centrifuge small vials prior to opening.

**VIII. PCR Protocol:**

- The following basic protocol serves as a general guideline and starting point for any PCR amplification. Optimal reaction conditions (incubation times, temperatures, concentration of Taq DNA Polymerase, primers, MgSO4 and template DNA) may vary and need to be optimized for each specific PCR.
- All PCR experiments should be assembled in a nuclease-free environment. In addition, DNA sample preparation, reaction set-up and subsequent reaction(s) should be performed in separate areas to avoid cross contamination.
- A negative control reaction (omitting template DNA) should always be performed in tandem with sample PCR to confirm the absence of DNA contamination.

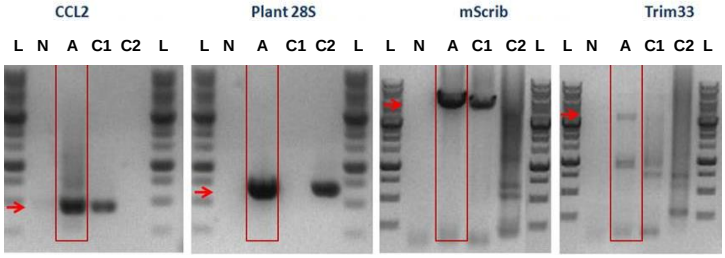
1. Add the following components to a sterile 0.2 ml PCR tube sitting on ice.

| **Components** | **Volume** | **Final concentration** |
|---|---|---|
| Advance™ Taq DNA Polymerase (5 U/µl) | 1 µl | 5 U |
| 10 µM Forward Primer | 1-2.5 µl | 200-500 nM |
| 10 µM Reverse Primer | 1-2.5 µl | 200-500 nM |
| Template DNA | ~100 ng | ~2 ng/µl |
| 2X PCR buffer, with $Mg^{2+}$ | 25 µl | 1X |
| 25 mM $MgSO_4$ (optional)* | 0-3 µl | 1.5-3 mM |
| dNTP Mix (10 mM) | 1 µl | 200 µM |
| Water, Nuclease-free | Up to 50 µl | - |

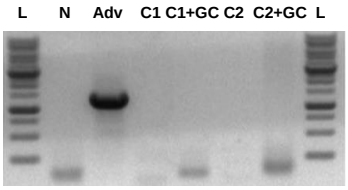
**Optimal $Mg^{2+}$ concentration is specific to each DNA template-primer set and can only be determined experimentally.*
**We recommend preparing a master mix for multiple reactions to minimize reagent loss and enable accurate pipetting.*

2. Mix contents of tube and centrifuge briefly.
3. Incubate tube in a thermal cycler at 94°C for 3 mins to completely denature the template.
4. Perform 30-35 cycles of PCR amplification as follows:
   **Denature: 94°C for 30 sec; Anneal: 45 - 72°C for 30 sec; Extend: 72°C for 1 min/1 kb template**
5. Incubate for an additional 5 mins at 72°C and maintain the reaction at 4°C. The samples can be stored at -20°C until use.
6. Analyze the amplified products by agarose gel electrophoresis and visualize by ethidium bromide staining. Use appropriate molecular weight standards.

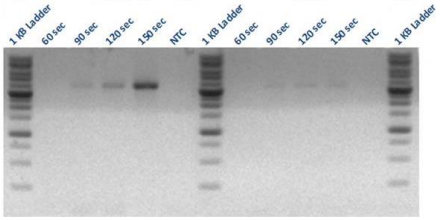
## IX. Sensitivity:




**Advance™ Polymerase's Robustness:** Selected difficult templates including a plant gDNA sample were amplified using Advance (A) and Competitor's DNA polymerase (C1 & C2); L: Ladder; N: Neg Ctrl.




**High GC tolerance of Advance™ Taq DNA Polymerase:** L: Ladder; N: Neg ctrl; Adv: Advance™ DNA Polymerase; C1: Competitor1; C1+GC: Competitor1+GC enhancer; C2: Competitor2; C2+GC: Competitor2+GC enhancer.




**Speed of Advanced™ Polymerase:** A 3.5 kb target was amplified with various extension time using Advance™ or Ready™ Taq DNA polymerase.

## X. Related Products:

| BV product name | BV Cat. No. |
|---|---|
| Ready™ DNA Polymerase | M1146-1000 |
| Ready™ DNA Polymerase | M1146-5000 |
| Ready™ DNA Polymerase | M1146-10,000 |
| Robust Ready™ DNA Polymerase | M1147-250 |
| Robust Ready™ DNA Polymerase | M1147-1000 |
| Breeze™ DNA Polymerase | M1148-250 |
| Breeze™ DNA Polymerase | M1148-1000 |
| Fire Start™ DNA Polymerase | M1149-250 |
| Fire Start™ DNA Polymerase | M1149-1000 |
| Distant™ DNA Polymerase | M1150-250 |
| Distant™ DNA Polymerase | M1150-1000 |
| Advance™ DNA Polymerase | M1151-250 |
| Advance™ DNA Polymerase | M1151-1000 |
| Outstretched™ DNA Polymerase | M1152-250 |
| Outstretched™ DNA Polymerase | M1152-1000 |
| Blood Advance™ DNA Polymerase | M1153-100 |
| Blood Advance™ DNA Polymerase | M1153-400 |
| Image Green™ 100 bp DNA Marker | M1155-500 |
| Image Green™ 1 kb DNA Marker | M1156-500 |

*FOR RESEARCH USE ONLY! Not to be used on humans.*