

Taq DNA Polymerase, 5 U/μl

LOT: See product label

EXPIRY DATE: See product label

ORDERING INFORMATION

CAT. NO.	SIZE	PACKAGE CONTENT
BR0100102	500 Units	100 μl Taq DNA Polymerase 2 × 1.8 ml 5X PCR Reaction Buffer 1.5 ml 50 mM MgCl ₂

COMPONENT	COMPOSITION
Taq DNA Polymerase	Taq DNA Polymerase, 5 U/μl, in storage buffer containing 50% (v/v) glycerol
5X PCR Reaction Buffer	Optimized PCR buffer without magnesium ions
50 mM MgCl ₂	50 mM MgCl ₂ in water

STORAGE

-20°C (until expiry date – see product label)

FEATURES

- High product yields and robustness in a wide application range
- Highest quality utilized in molecular diagnostics and research
- Exceptionally pure Taq DNA Polymerase for routine and demanding PCR applications

APPLICATIONS

- Routine and applied PCR up to 3 kb
- RT-PCR
- TA cloning

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DESCRIPTION

biotechrabbit™ Taq DNA polymerase is a first-choice enzyme for all routine and molecular diagnostics PCR applications. The exceptional quality and purity of the enzyme ensures highest performance that is utilized by the diagnostics industry and research labs. The polymerase is suitable for standard and fast PCR applications giving high product yields from various templates with targets of up to 3 kb in size.

Taq DNA polymerase is a thermostable, highly processive 5'→3' DNA polymerase that has low 5'→3' exonuclease activity and lacks 3'→5' exonuclease (proofreading) activity. The latter allows incorporation of modified nucleotides. The enzyme also exhibits deoxynucleotidyl transferase activity that results in the addition of extra A overhang at the 3'-ends of PCR products, allowing easy cloning of PCR products into vectors with T overhangs.

Info: Recommended annealing temperature is 2°C above primer T_m (use gradient PCR to check).

PROTOCOL

Prevention of PCR contamination

When assembling the amplification reactions, care should be taken to eliminate the possibility of contamination with undesired DNA.

- Use separate clean areas for preparation of samples and reaction mixtures and for cycling.
- Wear fresh gloves. Use sterile tubes and pipette tips with aerosol filters for PCR setup.
- Use only water and reagents that are free of DNA and nucleases.
- With every PCR setup, perform a contamination control reaction that does not include template DNA.

Standard PCR setup

The standard PCR protocol using biotechrabbit reaction buffer provides excellent results for most applications. Optimization might be necessary for certain conditions, such as the amplification of long targets, high GC or AT content, strong template secondary structures or insufficient template purity. In such cases, optimization of template purification (see biotechrabbit nucleic acid purification kits), primer design and annealing temperature is recommended.

The best conditions for each primer-template can be optimized by choosing the optimal quantities of template and primers and optimizing cycling conditions.

Optimizing magnesium concentration

Many applications use the standard concentration of 1.5–2 mM MgCl₂. However, reactions with increased amounts of template (e.g., genomic DNA), primer and nucleotides might require higher MgCl₂ concentrations (2–3 mM). A separate 50 mM MgCl₂ solution is supplied with the enzyme and can be used to adjust the MgCl₂ concentration according to the table below:

Final concentration of MgCl ₂ in a 50 μl reaction, mM	2.00	2.25	2.5	2.75	3.0
Volume of 50 mM MgCl ₂ solution to add, μl	2.00	2.25	2.5	2.75	3.0

BASIC PROTOCOL

- Thaw on ice and mix all reagents well, especially the MgCl₂ solution and dNTPs.
- Keep all reagents and reactions on ice.

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- When setting up multiple reactions, prepare a master mix of water, buffer, dNTPs and polymerase. Prepare enough master mix for one more than the actual number reactions.
- Pipet the master mix into thin-walled 0.2 ml PCR tubes.
- Add template and primers separately if they are not used in all reactions.

COMPONENT	VOLUME	FINAL CONCENTRATION
5X Reaction Buffer	10 μl	1×
50 mM MgCl ₂	Variable (standard 2 μl)	2 mM
<i>Higher than 2 mM MgCl₂ might increase yield but reduce fidelity</i>		
10 mM dNTP Mix (BR0600202)	1 μl	200 μM
Forward primer	Variable	0.2–1 μM
Reverse primer	Variable	0.2–1 μM
Template DNA	Variable	10 pg–1 μg
<i>Use 0.01–1 ng for plasmid or phage DNA and 0.05–1 μg for genomic DNA</i>		
Taq DNA Polymerase (5 U/μl)	0.5 μl	2.5 U
Nuclease free water	Variable	
Total volume	50 μl	

- For total reaction volumes other than 50 μl, scale reagents proportionally.
- Mix and centrifuge briefly to collect the liquid in the bottom of the tube. Place in the PCR cyclor.

CYCLING PROGRAM

STEP	TEMPERATURE	TIME	CYCLES
Initial activation	95°C	2 min	1
Denaturation	95°C	30 s	25–35
Annealing*	(55–68°C)	15–30 s	25–35
<i>*Recommended annealing temperature is 2°C above T_m of primers. Use gradient PCR to optimize the annealing temperature.</i>			
Extension	72°C	30–60 s/kb	25–35
Final extension	72°C	5 min	1
<i>To extend all incomplete PCR products</i>			

Storage in the cyclor	4°C	Indefinitely	1
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- Add loading dye solution (see 6X DNA Loading Dye, BR0800301) to the reactions to analyze PCR products on a gel or store them at –20°C.

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CERTIFICATE OF ANALYSIS

Unit Definition

One unit is defined as the amount of enzyme required to catalyze the incorporation of 10 nmol of dNTP into acid-insoluble form in 30 minutes at 72°C in the presence of the reaction buffer.

Quality Control

Functional assay

Human genomic DNA was amplified using the DNA Polymerase and specific primers to produce a distinct band of 750 bp.

Self-priming activity

Standard PCR is carried out without primers, using the DNA Polymerase and human genomic DNA. No products were amplified.

Exonuclease assay

Linearized lambda/HindIII fragments are incubated with the DNA Polymerase in a 50 μl reaction mixture for 4 h at 37°C. No degradation of DNA was observed.

Endonuclease assay

lambda DNA is incubated with the DNA Polymerase in a 50 μl reaction mixture for 4 h at 37°C. No degradation of DNA was observed.

Nick Activity

Supercoiled plasmid DNA is incubated with the DNA Polymerase in a 50 μl reaction mixture for 4 h at 37°C. No conversion of covalently closed circular DNA to nicked DNA was detected.

E. coli DNA contamination assay

A sample of the denatured DNA Polymerase is analyzed with specific primers targeting the 16S rRNA gene in qPCR for the presence of contaminating *E. coli* DNA. No *E. coli* DNA was detectable.

Quality confirmed by: Head of Quality Control

SAFETY INSTRUCTIONS

For safety instructions please see Safety Data Sheets (SDS)/Sicherheitshinweise finden Sie in den SDS unter: <http://www.biotechrabbit.com/support/documentation.html>.

USEFUL HINTS

- Visit Applications at www.biotechrabbit.com for more products and product selection guides.
- Most biotechrabbit products are available in custom formulations and bulk amounts.

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