

FastGene® Optima

Technical Data Sheet

Product Description

The FastGene® Optima PCR system is a blend of Taq DNA polymerase and an engineered archaeal (B-family) DNA polymerase. Both enzymes possess 5' – 3' polymerase activity, but only Taq possesses 5' – 3' exonuclease activity, and only the B-family DNA polymerase possesses 3' – 5' exonuclease activity. This two-enzyme system is designed to support robust, long-range, and sensitive PCR.

Product Applications

The FastGene® Optima (HotStart ReadyMix kit with dye) is ideally suited for:

- Routine PCR
- PCR using complex templates
- SNP Analysis
- Any standard PCR application for which a hot start formulation of a high-quality thermostable DNA polymerase is required.

Shipping and Storage

FastGene® Optima PCR kits are shipped on ice packs. Upon arrival, store kit components at -20 °C in a constant-temperature freezer. When stored under these conditions and handled correctly, full activity of the kit is retained until the expiry date indicated on the kit label.

Handling

Always ensure that the product has been fully thawed and mixed before use. Reagents may be stored at 4 °C for short-term use (up to 1 month). Return to -20 °C for long-term storage.

Kit Codes and Components		
LS28	FastGene® Optima	250 U/ml
Related Products		
LS20	FastGene® Taq DNA Polymerase	100 Units
LS21	FastGene® Taq DNA Polymerase	500 Units
LS22	FastGene® Taq DNA Polymerase	2000 Units
LS23	FastGene® HotStart TAQ DNA Polymerase	100 Units
LS24	FastGene® HotStart TAQ DNA Polymerase	250 Units
LS25	FastGene® HotStart TAQ DNA Polymerase	1000 Units
LS26	FastGene® TAQ Ready Mix PCR Kit	50 x 50µl rxns
LS27	FastGene® TAQ Ready Mix PCR Kit	250 x 50µl rxns
LS29	FastGene® Optima HotStart ReadyMix	500 x 25 µl rxns
Direct PCR		
LS05	DNAreleasy Advance	10 preps
LS06	DNAreleasy Advance	50 preps
LS07	FastGene® Direct PCR Kit	10 preps/20 PCR rxns
LS08	FastGene® Direct PCR Kit	50 preps/100 PCR rxns
LS09	FastGene® Direct PCR Kit	50 preps/200 PCR rxns
LS10	FastGene® Direct PCR Kit	10 preps/100 PCR rxns
Quick Notes		
<ul style="list-style-type: none"> • Denature at 94°C, increase denaturation times for fast-block instruments. • Extend at 68°C, especially for long range/high sensitivity PCR. • Replace Taq for Standard PCR, with no protocol change. • Half concentration of enzyme (1.25 U/50 µl) can be used for midrange targets (up to 5 kb). • Buffer is supplied at 5x concentration with separate magnesium for optimization. • Products can be cloned in T-overhang cloning vectors. 		

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FastGene® Optima Protocol

FastGene® Optima DNA Polymerase blend can be used to replace any commercial Taq DNA polymerase in an existing protocol. To allow the most seamless integration of FastGene® Optima into existing protocols, be sure to match reaction conditions, particularly the MgCl₂, primer and enzyme concentrations, as closely as possible.

Step 1: Prepare the PCR master mix

- Ensure that all reagents are properly thawed and mixed.
- Prepare a PCR master mix containing the appropriate volume of all reaction components common to all or a subset of the reactions to be performed.
- Calculate the required volumes of each component based on the following table:

Component	50 µl rxn ¹	Final conc.
PCR-grade water	Up to 50 µl	N/A
5 U/µl of FastGene® Optima	0.25 µl	1.25 U
5X FastGene® Optima Buffer	10.0 µl	1X
25 mM MgCl ₂	3.5 µl	1.75 mM ³
dNTP Mix (10 mM each)	1.5 µl	0.3 mM each
Forward Primer (10 µM)	2.5 µl	0.5 µM
Reverse Primer (10 µM)	2.5 µl	0.5 µM
Template DNA ⁴	As required	As required

¹ Reaction volumes of 10 – 50 µl are recommended. For volumes smaller than 50 µl, scale reagents down proportionally.

² For small to midrange products, half the concentration of enzyme can be used. For GC-rich and other difficult templates, higher enzyme concentrations (up to 5 U per 50 µl reaction) may be required.

³ A final MgCl₂ concentration of 1.75 mM is sufficient for most standard applications. For assays that do not perform well with 1.75 mM MgCl₂, the optimal MgCl₂ concentration for each primer–template combination should be determined empirically.

⁴ ≤100 ng for genomic DNA; ≤1 ng for less complex DNA (e.g. plasmid, lambda).

Step 2: Set up individual reactions

- Transfer the appropriate volume of PCR master mix, template and primer to individual PCR tubes/wells or a PCR plate.
- Cap or seal individual reactions, mix and centrifuge briefly.

Step 3: Run the PCR

- Perform PCR with the following cycling protocol:

Step	Temperature	Duration	Cycles
Initial denaturation	95 °C	3 min ¹	1
Denaturation	95 °C	15 sec	20-40 ⁴
Annealing ²	T _m – 5 °C	15 sec	
Extension ³	72 °C	1 min/kb	
Final extension (optional) ⁵	72 °C	1 min/kb	1
Store	4 – 10 °C	HOLD	1

¹ Initial denaturation for 3 min at 95 °C is recommended for most assays. For GC-rich targets (>65% GC), 5 min at 95 °C may be used.

² An annealing temperature 5 °C lower than the calculated melting temperature (T_m) of the primer set is recommended as a first approach. If low yields and/or nonspecific amplification is obtained, an annealing temperature gradient PCR is recommended to determine the optimal annealing temperature of the primer pair.

³ An extension temperature of 68 °C is recommended for long-range (5 kb to 10 kb) PCR products.

⁴ 35 cycles are sufficient for most assays. A higher number of cycles may be necessary for assays requiring higher sensitivity, while lower cycle numbers can be used if the template copy number is high.

⁵ Final extension should be included if PCR products are to be cloned into TA cloning vectors.

For information on product use limitations and licenses:
<http://nippongenetics.eu/contact/terms/>

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