HoppeSyler M4 *Taq* DNA Polymerase

Hot start · supplied with 5X M4 PCR Buffer (contains $MgCl_2$) · no dNTPs

Cat. M0902-010 · M0902-050

DESCRIPTION

HoppeSyler M4 *Taq* DNA Polymerase is an engineered, full-length thermostable DNA polymerase developed for fast, robust endpoint PCR across a wide range of sample types. It is supplied only in hot start format: the enzyme is inactive during reaction setup and becomes active under PCR cycling conditions, which improves specificity and reduces primer-dimer and non-specific amplification. M4 is optimized for fast cycling, high product yield and tolerance of common PCR inhibitors, and amplifies directly from bacterial colonies, overnight cultures, crude lysates and other challenging inputs. Developed and manufactured in Canada. **Because M4 extends faster than conventional *Taq*, protocols written for other polymerases should not be used unchanged: start from the Quick Guide settings on page 2.**

FEATURES

- Hot start built into the engineered enzyme: inactive during setup, fully active under cycling, no separate activation step
- Fast cycling: 15 s per kb extension; 2 kb amplified with a 20 s extension step
- Tolerates PCR inhibitors, including humic acid in soil extracts
- Direct PCR from bacterial colonies and overnight cultures
- Room-temperature stable up to 2 weeks

APPLICATIONS

- Colony PCR and direct PCR from culture
- Genotyping from crude lysates (for example mouse tail)
- Routine endpoint PCR
- Inhibitor-rich templates (soil-associated samples)

SPECIFICATIONS

Enzyme type	Engineered hot start thermostable DNA polymerase (recombinant)
Format	Hot start only
Concentration	5 units / µL
Supplied buffer	5X M4 PCR Buffer with 12.5 mM $MgCl_2$ (2.5 mM at 1X)
Extension rate	15 s / kb
Demonstrated amplicon	5 kb (lambda DNA)
Storage	−20 °C

PURITY & QUALITY

Lot-release testing: each polymerase lot is tested for DNase activity, mycoplasma DNA, host genomic DNA and PCR activity; lot-to-lot activity within ±5%.

ORDERING INFORMATION

CAT. NO.	UNITS	REACTIONS
M0902-010	1,000 U	400
M0902-050	5,000 U	2,000

KIT CONTENTS

COMPONENT	1,000 U	5,000 U
M4 *Taq* DNA Polymerase (5 U/µL)	1 × 200 µL	1 × 1 mL
5X M4 PCR Buffer (with $MgCl_2$)	4 × 1 mL	1 × 50 mL
GC Enhancer	1 × 1 mL	1 × 10 mL

GC Enhancer is provided for GC-rich and difficult templates. Store all components at −20 °C.

BUFFER COMPOSITION

5X M4 PCR Buffer: Proprietary buffered salt solution, pH 8.8, supplied at 5X; contains 12.5 mM $MgCl_2$ (2.5 mM at 1X).

Storage Buffer: 50 mM Tris-HCl (pH 8.0), 100 mM NaCl, 0.1 mM EDTA, 1 mM DTT, 0.1% Brij-58, 50% glycerol.

Unit definition: One unit incorporates 10 nmol of deoxyribonucleotide into acid-precipitable material in 30 minutes at 74 °C.

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HoppeSyler M4 *Taq* DNA Polymerase

Standard 50 µL PCR · hot start · supplied with 5X M4 PCR Buffer (no dNTPs)

Switching from another *Taq*? Do not reuse your old program. M4 is faster: carried-over extension times and cycle numbers give smears and extra bands, not more product.

- **Extension:** 15 s/kb (20 s up to 2 kb). Longer adds no yield.
- **Enzyme:** 2.5 U per 50 µL (5 U for crude samples). More is not better.
- **Cycles:** 20–30; M4 needs fewer than conventional enzymes.
- **Buffer:** supplied 5X M4 buffer only; it contains 12.5 mM $MgCl_2$ (2.5 mM at 1X). Add no Mg.

1 REACTION SETUP

COMPONENT	VOLUME	FINAL CONC.
Template DNA (up to 500 ng)	up to 10 µL	–
10 µM forward primer	0.5–2.5 µL	100–500 nM
10 µM reverse primer	0.5–2.5 µL	100–500 nM
5X M4 PCR Buffer	10 µL	1X
10 mM dNTP mix	1 µL	0.2 mM
M4 *Taq* DNA Polymerase	0.5–1.0 µL	2.5–5 U
GC Enhancer (optional)*	5–15 µL	–
Nuclease-free water	to 50 µL	–
Total reaction	**50 µL**	

*GC Enhancer is for difficult or GC-rich templates (GC content > 60% or amplicons > 2.5 kb). Optimize the 5–15 µL volume for each template and primer pair.

Assemble on ice. **Mix** by pipetting several times or a brief vortex, **centrifuge** briefly to collect, then proceed to the amplification program.

2 THERMOCYCLING PROGRAM

	STEP	TEMP.	TIME	CYCLES
1	Denaturation	94 °C	30 s	20–30
	Annealing	55–60 °C	10–30 s	
	Extension	72 °C	15 s / kb	
2	Final extension	72 °C	7 min	1
3	Hold	4 °C	∞	1

Begin with an initial denaturation of 94 °C for 3 min. Hot start is inherent to the enzyme; no separate activation step is required. Set extension time to 15 s per kb of expected product. Annealing 10–30 s suits most primer pairs.

OPTIMIZATION

- **Hot start:** assemble on ice; the enzyme stays inactive until cycling begins, with no separate activation step.
- **Fast cycling:** a 20 s extension step is sufficient for products up to 2 kb; scale at 15 s per kb for longer targets.
- **Direct PCR:** pick a colony directly into the reaction, or add 0.5–4 µL of overnight culture as template.
- **Annealing:** start ~5 °C below primer T_m; 55–60 °C works for most pairs.

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