



HighFidelity RED PCR Labeling Testkit

Preparation of Cy5-, AF647- and ATTO643-labeled DNA probes by PCR

Cat. No.	Amount
APP-101-RED	1 kit

For general laboratory use.

Shipping: shipped on gel packs

Storage Conditions: store at -20 °C

Additional Storage Conditions: avoid freeze/thaw cycles, store dark

Shelf Life: 12 months

Spectroscopic Properties:

Cy5:

λ_{exc} 649 nm, λ_{em} 670 nm, ϵ 250.0 L mmol⁻¹ cm⁻¹ (Tris-HCl pH 7.5)

AF647:

λ_{exc} 648 nm, λ_{em} 671 nm, ϵ 270.0 L mmol⁻¹ cm⁻¹ (Tris-HCl pH 7.5)

ATTO643:

λ_{exc} 643 nm, λ_{em} 665 nm, ϵ 150.0 L mmol⁻¹ cm⁻¹ (Tris-HCl pH 7.5)

Description:

HighFidelity RED PCR Labeling Testkit is designed to produce randomly Cy5-, AF647- and ATTO643-modified DNA probes by PCR to find the optimal label for the red emission wavelength range. Such probes are ideally suited for Fluorescence *in situ* hybridization (FISH) and Northern Blot experiments. PCR-based labeling is superior to random-primed labeling with Klenow fragment if template amounts are limited or amplification of a specific DNA fragments is required. Amplification of probes up to 4kbp is feasible.

All labeled-dUTP are efficiently incorporated into DNA as substitute for its natural counterpart dTTP using an optimized reaction buffer and a High Fidelity Polymerase blend consisting of *Taq* polymerase and a proofreading enzyme. 50 % labeled-dUTP substitution typically results in an optimal balance between reaction and labeling efficiency. Individual optimization of labeled-dUTP/dTTP ratio however, can easily be achieved with the single nucleotide format.

Content:

High Fidelity Polymerase

in storage buffer with 50% glycerol (v/v)
1x 40 μ l (100 units, 2.5 units/ μ l)

High Fidelity Labeling Buffer

1x 500 μ l (10x)

dATP - Solution

1x 20 μ l (100 mM)

dGTP - Solution

1x 20 μ l (100 mM)

dCTP - Solution

1x 20 μ l (100 mM)

dTTP - Solution

1x 20 μ l (100 mM)

dUTP-Cy5

1x 10 μ l (1 mM)

dUTP-XX-AF647

1x 10 μ l (1 mM)

dUTP-ATTO-643

1x 10 μ l (1 mM)

Lambda DNA

1x 20 μ l (100 ng/ μ l)

500 bp forward primer

1x 20 μ l (10 μ M)



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500 bp reverse primer

1x 20 µl (10 µM)

PCR-grade water

1x 1.2 ml

To be provided by user

DNA template

Primer

DNA purification tools (optional)

1. Preparation of working solutions

1.1 Preparation of 1 mM dATP/dCTP/dGTP working solution

- Thaw 100 mM dATP, 100 mM dCTP and 100 mM dGTP solutions on ice, vortex and spin-down briefly.
- Prepare a 1:100 dilution with PCR-grade water to achieve a final concentration of 1 mM (e.g. 2 µl 100 mM dATP + 2 µl 100 mM dCTP + 2 µl 100 mM dGTP + 194 µl PCR-grade water).
- 1 mM ATP/CTP/GTP working solution can be stored at -20°C. Prepare aliquots to avoid freeze/thaw cycles.

1.2 Preparation of 1 mM dTTP working solution

- Thaw 100 mM dTTP solution on ice, vortex and spin-down briefly.
- Prepare a 1:100 dilution with PCR-grade water to achieve a final concentration of 1 mM (e.g. 2 µl 100 mM dTTP + 198 µl PCR-grade water).
- 1 mM dTTP working solution can be stored at -20 °C. Prepare aliquots to avoid freeze/thaw cycles.

3. Standard PCR Labeling protocol

The standard protocol is set-up for labeling of a 500 bp DNA fragment. An optimal balance between reaction and labeling efficiency is typically achieved with 50% labeled-dUTP substitution following the standard protocol below however, individual optimization might improve results for individual applications.

- Assemble the PCR on ice in the order stated below (DNase-free reaction tube).
- Vortex and spin-down briefly.
- Perform assay set-up and reaction under low-light conditions.

Component	Volume	Final concentration
PCR-grade water	X µl	
High Fidelity Labeling Buffer (10x)	2 µl	1x
1 mM dATP/dCTP/dGTP working solution (s. 1.1)	2 µl	100 µM
1 mM dTTP working solution (s. 1.2)	1 µl	50 µM
1 mM labeled-dUTP	1 µl	50 µM
forward primer (10 µM)	X µl	0.1 - 1 µM (e.g. 0.3 µM 500 bp forward primer)
reverse primer (10 µM)	X µl	0.1 - 1 µM (e.g. 0.3 µM 500 bp reverse primer)
template DNA	X µl	1 - 10 ng genomic DNA (e.g. 1 ng Lambda DNA)
High Fidelity Polymerase (2.5 units/µl)	1 µl	2.5 units
Total volume	20 µl	

Recommended cycling conditions

Cycle step	Temperature	Time	Cycles
Initial denaturation	95°C	2 min	1x
Denaturation	95°C	20 sec	30x
Annealing ¹⁾	58°C	30 sec	
Elongation ²⁾	68°C	60 sec	
Final Elongation	68°C	2 min	1x

¹⁾The annealing temperature depends on the melting temperature of primers used.

²⁾The elongation time depends on the length of fragments to be amplified. A time of 2 min/kbp is recommended. Elongation at 72°C works as well.

For optimal amplification results and high incorporation rates an individual optimization of the recommended PCR assay and cycling conditions may be necessary for each new primer-template pair.



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4. Probe purification:

Probe purification is not required for most hybridization experiments. If a downstream application requires purification (e.g. concentration determination by absorbance measurement) we recommend silica-membrane or gel filtration-based purification.

Related Products:

Aminoallyl-dUTP-Cy5, #NU-803-Cy5

Aminoallyl-dUTP-XX-AF647, #NU-803-XX-AF647

Aminoallyl-dUTP-ATTO-643, #NU-803-643