

## Certificate of Analysis

### PCR Nucleotide Mix:

Part No.	Size
U144A	200µl
U144B	1,000µl

**Description:** PCR Nucleotide Mix is a premixed solution containing the sodium salts of dATP, dCTP, dGTP and dTTP, each at a concentration of 10mM in water; the total concentration of nucleotides, therefore, is 40mM (pH 7.5). This solution is ready to use and is optimized for standard polymerase chain reactions and specialty approaches including hot-start and reverse transcription PCR (RT-PCR). The individual nucleotides and PCR Nucleotide Mix are manufactured under cGMP.

**Storage Conditions:** See the Product Information Label for storage recommendations. Avoid exposure to frequent temperature changes. Mix well prior to use.

**Usage Note:** Concentration gradients may form in frozen products and should be dispersed upon thawing. Mix well prior to use.

### Quality Control Assays

Test	Specification	Result
Physical Purity	The individual dNTPs contained in the PCR Nucleotide mix each contain $\geq 99.0\%$ triphosphate as measured by HPLC.	Pass
Purity: Nuclease Contamination	Endonuclease No observable nicking of 0.5µg of supercoiled DNA after incubation for 8 hours at 22°C, followed by 8 hours at 45°C.	Pass
	Exonuclease No observable degradation of 0.5µg of Lambda DNA/HindIII markers after incubation for 8 hours at 22°C, followed by 8 hours at 45°C.	Pass
	Ribonuclease No observable RNase activity after incubation for 1 hour at 37°C.	Pass
Function	Amplify a 360bp fragment from 100 copies of human genomic DNA.	Pass



#### PCR Satisfaction Guarantee

Promega's PCR Systems, enzymes and reagents are proven in PCR to ensure reliable, high performance results. Your success is important to us. Our products are backed by a worldwide team of Technical Support scientists. Please contact them for applications or technical assistance. If you are not completely satisfied with any Promega PCR product we will send a replacement or refund your account.  
*That's Our PCR Guarantee!*

Product must be within expiration date and have been stored and used in accordance with product literature. See Promega Product Insert for specific tests performed.

Signed by:

*R. Wheeler*  
R. Wheeler, Quality Assurance

## PCR Nucleotide Mix



REF C1141 LOT 0000292298  
-30°C to -10°C 2019-04-26  
Dispensed Lot# 0000252904  
200µl

For Laboratory Use

Country of Origin: USA

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Madison, WI 53711-5399 USA



ADC1141 00002922989

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PEEL  
HERE



## Promega

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## 1. Description

Applications of PCR Nucleotide Mix that have been tested include:

- PCR amplification by standard approaches.
- PCR amplification by specialty approaches such as hot-start and RT-PCR.

PCR Nucleotide Mix may be applicable to other specialty PCR approaches such as high-fidelity and long PCR.

## 2. Standard Applications

### Preparing the Reaction Mix for PCR Using *Taq* DNA Polymerase

#### Reagents to Be Supplied by the User

(Solution compositions are provided in Section 4.)

- MgCl<sub>2</sub>, 25mM (Cat.# A3511, A3512 or A3513)
- Nuclease-Free Water (Cat.# P1193)
- *Taq* DNA polymerase, 5u/μl
- 10X reaction buffer with 15mM MgCl<sub>2</sub>
- 10X reaction buffer without MgCl<sub>2</sub> (optional)
- upstream and downstream primers, each at 20μM

1. Completely thaw, vortex and centrifuge all reagents before beginning the procedure.

**Note:** Optimal conditions, including reaction times, temperatures and reagent concentrations are dependent on the *Taq* DNA polymerase, template and primers used. The **magnesium concentration is especially important** and should be titrated between the range of 1.5–3.0mM in order to ensure optimal results. In many cases, a magnesium concentration of 1.5mM will result in satisfactory amplification. Therefore, two reaction preparations are given below. The first reaction is for 10X reaction buffer with 15mM MgCl<sub>2</sub>. The second reaction is for 10X reaction buffer **without** 15mM MgCl<sub>2</sub>.

2. Prepare one of the reaction mixtures listed below by adding reagents to a sterile microcentrifuge tube in the specified order.
  - a. Reaction components for 10X reaction buffer with 15mM MgCl<sub>2</sub>:

Component	Component Volumes	Final Concentration
10X reaction buffer (with 15mM MgCl <sub>2</sub> )	5μl	1X
PCR Nucleotide Mix (10mM each dNTP)	1μl	*800μM
upstream primer, 20μM	0.25–2.5μl	0.1–1μM
downstream primer, 20μM	0.25–2.5μl	0.1–1μM
<i>Taq</i> DNA polymerase, 5u/μl	0.25μl	0.025u/μl
template DNA	Xμl	<250ng
Nuclease-Free Water to final volume of	50μl	

- b. Reaction components for 10X reaction buffer without 15mM MgCl<sub>2</sub>:

Component	Component Volumes	Final Concentration
MgCl <sub>2</sub> , 25mM	3μl	1.5mM
10X reaction buffer (without 15mM MgCl <sub>2</sub> )	5μl	1X
PCR Nucleotide Mix (10mM each dNTP)	1μl	*800μM
upstream primer, 20μM	0.25–2.5μl	0.1–1μM
downstream primer, 20μM	0.25–2.5μl	0.1–1μM
<i>Taq</i> DNA polymerase, 5u/μl	0.25μl	0.025u/μl
template DNA	Xμl	<250ng
Nuclease-Free Water to final volume of	50μl	

\*The final concentration of each dNTP is 200μM.

3. Vortex the mixture and centrifuge briefly to ensure all liquid is at the bottom of the tube.
4. If using a thermal cycler without a heated lid, overlay the surface of the reaction mixture with 25–50μl of mineral oil.
5. Place the reaction tubes in a thermal cycler. The times and temperatures for denaturation, annealing and extension phases of amplification are template- and primer-dependent. Follow the general amplification guidelines in Section 3 as a starting point.

## 3. General Guidelines for Amplification by PCR

The following guidelines apply to target sequences between 200 and 2,000bp and are optimal for the Perkin-Elmer Thermal Cycler Model 480 or comparable thermal cyclers.

**Note:** Optimal denaturation and annealing reaction times for the Perkin-Elmer Thermal Cycler Model 9600, or comparable thermal cyclers, are shorter.

### A. Denaturation

- Generally, a 2-minute initial denaturation step at 95°C is sufficient.
- Subsequent denaturation steps will be between 30 seconds and 1 minute.

### B. Annealing

- Optimize the annealing conditions by performing the reaction starting approximately 5°C below the calculated melting temperature of the primers and increasing the temperature in increments of 1°C to the annealing temperature.
- The annealing step is typically 30 seconds to 1 minute.

### C. Extension

- The extension reaction is typically performed at the optimal temperature for *Taq* DNA Polymerase, which is 72–74°C.
- Allow approximately 1 minute for every 1kb of DNA to be amplified.
- Minimum extension time should be 1 minute.
- A final extension of 5 minutes at 72–74°C is recommended.

### D. Soaking

- If the thermal cycler has a "soak" cycle, the cycling reaction can be programmed to end by holding the tubes at 4°C for several hours.
- This cycle can minimize any polymerase activity that might occur at higher temperatures, although this is not usually a problem.

### E. Cycle Number

- Generally, 25–30 cycles result in optimal amplification of desired products.
- Occasionally, up to 40 cycles may be performed, especially for detection of low-copy message.

## 4. Composition of Buffers and Solutions

### 10X reaction buffer with 15mM MgCl<sub>2</sub>

100mM	Tris-HCl (pH 9.0 at 25°C)
500mM	KCl
15mM	MgCl <sub>2</sub>
1%	Triton® X-100

### 10X reaction buffer without 15mM MgCl<sub>2</sub>

100mM	Tris-HCl (pH 9.0 at 25°C)
500mM	KCl
1%	Triton® X-100