Promega

# GENOMICS ESSENTIALS

A product guide for successful Genomics research

# GENOMICS ESSENTIALS: THE FOUNDATION OF SUCCESSFUL RESEARCH

High-quality, reliable genomics products allow you to get answers to your research questions quickly, without worrying about reagent performance. As one of the first and largest manufacturers of biological reagents in the world, we develop our Genomics Essentials products in close dialog with our customers to ensure you get the quality and performance you need. You can concentrate on your experiments, knowing that the reagents you are using are quality tested for excellent performance the first time and every time.

For over 35 years, Promega has supported the needs of genomics researchers. As the field of molecular biology has grown, we have grown with it, developing a large product portfolio to meet the ever-changing needs of the research community. From restriction enzymes to RNasin® Ribonuclease Inhibitor, and simple polymerases to sophisticated, state-of-the art cloning systems, you will find essential enzymes, reagents and kits to support every stage in your genomics research.

Use this brochure to find the essential tools you need to advance your genomics research, and let our experience be the foundation for your success.

**Curiosity, a good idea and courage are often the keys to success. In 1978 William A. Linton recognized scientists' needs for quality, dependable DNA analysis tools and founded Promega as a manufacturer of restriction enzymes and other basic molecular biology tools. Our genomics portfolio expanded at an early stage to encompass the first DNA and RNA purification kits and innovative products such as RNasin® Ribonuclease Inhibitor. Today we offer more than 3,000 products for basic research, pharmacology, molecular diagnostics and forensics.**

# Contacts

**Technical support:**

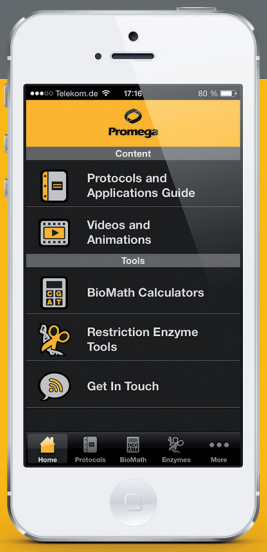
Contact your local Promega Branch Office or Distributor with your technical questions. Our team of scientists are here to help you.

techserv@promega.com

**Order by phone:** 608-274-4330 or find your local contact at www.promega.com/worldwide

**Order by e-mail:** custserv@promega.com

**Order online:** www.promega.com




Download on the App Store

ANDROID APP ON Google play

TOOLS FOR PROFESSIONALS

## Promega App

The free Promega App offers reference information and helpful tools for scientists. It includes a useful calculator for use at the bench, video protocols and detailed reference materials on key topics in molecular and cellular biology.

- **BioMath Calculators**
  Rapid calculation of melting temperatures, molarity, dilutions, DNA and protein concentrations, and much more.
- **Protocols & Application Guide**
  Useful information on molecular and cellular biology as well as common protocols. The chapters cover topics such as apoptosis, cloning, cell signaling pathways, DNA purification, PCR amplification, bioluminescent reporters and transfection.
- **Multimedia**
  Video protocols and animated demonstrations can be accessed via the *Protocols & Applications Guide* or a separate menu.
- **Custom PCR Protocols**
  Create, save, comment on and send PCR protocols via e-mail.
- **Restriction Enzyme Tool**
  Search restriction enzymes by name, recognition sequence or overhangs. Quickly and easily find enzymes suitable for double digestion.


**PURIFICATION** . . . . . 4
- DNA Purification . . . . . 5
- RNA Purification . . . . . 11
- Purification Without Centrifugation . . . . . 14
- Automated Purification with the Maxwell® Purification Systems . . . . . 16

**QUANTIFICATION AND DETECTION** . . . 18
- DNA and RNA Quantification . . . . . 19
- Detection . . . . . 21

**PCR** . . . . . 22
- Routine PCR . . . . . 23
- High-Fidelity PCR . . . . . 23
- Hot-Start PCR . . . . . 24
- Long PCR . . . . . 24
- dUTP . . . . . 24
- dNTPs . . . . . 25
- Nuclease-Free Water . . . . . 25

**REVERSE TRANSCRIPTION AND RT-PCR** . 26
- Reverse Transcriptases . . . . . 27
- Reverse Transcription Systems . . . . . 28
- Oligonucleotides and Primers . . . . . 29

**RIBONUCLEASE INHIBITORS** . . . . . 30

**REAL-TIME qPCR** . . . . . 32
- Choosing the Right Real-Time qPCR Technology for Your Application . . . . . 33
- Dye-Based Real-Time qPCR . . . . . 33
- Probe-Based Real-Time qPCR . . . . . 34

**CLONING SYSTEMS** . . . . . 36
- PCR Cloning . . . . . 37
- Flexi® Cloning Systems . . . . . 39
- cDNA Library Construction . . . . . 40
- RNA Interference . . . . . 41

**MARKERS** . . . . . 42
- BenchTop DNA Markers . . . . . 43
- DNA Step Ladders . . . . . 44
- DNA Ladders . . . . . 45
- Conventional DNA Markers . . . . . 46
- RNA Markers . . . . . 47

**RESTRICTION ENZYMES** . . . . . 48
- Restriction Enzymes . . . . . 49

**MODIFYING ENZYMES** . . . . . 54
- Alkaline Phosphatases . . . . . 55
- Polymerases . . . . . 55
- Ligases . . . . . 56
- Kinase and DNA 5′–End Labelling System . . . 56
- Nucleases . . . . . 57
- Other Enzymes . . . . . 57

**EXPRESSION VECTORS** . . . . . 58
- Flexi® Expression Vectors . . . . . 59
- Standard Multiple Cloning Site Vectors . . . . 61

**COMPETENT CELLS** . . . . . 62

**PRODUCT INDEX** . . . . . 64


Helix

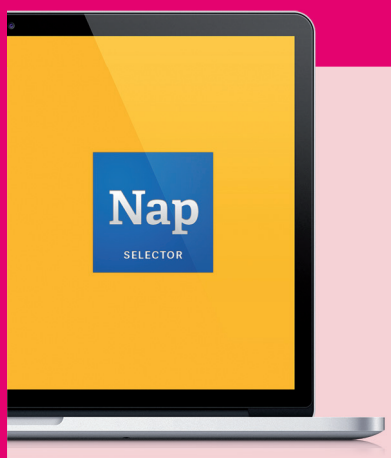
Products marked with the Helix® logo are available through the innovative Helix® on-site stocking program.

Learn more about Helix® at: **www.promega.com/helix**

# PURIFICATION

We provide a large selection of DNA and RNA purification kits for a wide range of starting materials and applications.

- Plasmid purification kits in mini-, midi- and maxiprep format
- Genomic DNA purification systems optimized for DNA extraction from mammalian cells, tissues or plants in manual or automated formats
- PCR and DNA cleanup systems for dependable purification of DNA fragments from reaction mixes or gels
- RNA purification systems designed for worry-free RNA extraction from mammalian cells, tissues or plant samples in manual or automated formats




TOOLS FOR PROFESSIONALS

## Nucleic acid purification product selector

Which purification kit is right for you?
Get help selecting the right product at:

**www.promega.com/nap-selector**

# DNA Purification

## Plasmid Purification—from Miniprep to Maxiprep

### PureYield™ Plasmid Systems

- Rapid purification of transfection-quality plasmid DNA
- Special wash buffer removes proteins, RNA and endotoxin contamination, improving performance in applications such as transfection, in vitro transcription and coupled in vitro transcription/translation
- Alcohol precipitation or centrifugation is not required

### PureYield™ Plasmid Miniprep System

- Fast: six preps can be processed in 12 minutes, including the wash step to remove endotoxins
- For 600 µl to 3 ml of bacterial culture

10 min | 30 µg | M

| CAT.# | | QUANTITY |
|---|---|---|
| A1223 | Helix | 100 preps |
| A1222 | Helix | 250 preps |

### PureYield™ Plasmid Midiprep System

- For 25–100 ml of bacterial culture
- Rapid: requires only 30 minutes
- Direct elution from the column without ethanol carryover

30 min | 200 µg | M

| CAT.# | | QUANTITY |
|---|---|---|
| A2492 | Helix | 25 preps |
| A2495 | Helix | 100 preps |
| A2496 | | 300 preps |

**Watch a Video Demo**

See for yourself how fast and easy PureYield™ Plasmid preps are to use.

www.promega.com/pureyield-midipreps-fast-video

### PureYield™ Plasmid Maxiprep System

- For up to 250 ml of bacterial culture
- Particularly high yield—also can be used for megapreps

60 min | 1 mg | M

| CAT.# | | QUANTITY |
|---|---|---|
| A2392 | Helix | 10 preps |
| A2393 | Helix | 25 preps |

AVAILABLE SEPARATELY

### Cell Resuspension Solution (CRA)

| CAT.# | | QUANTITY |
|---|---|---|
| A7115 | Helix | 315 ml |

### Cell Lysis Solution (CLA)

| CAT.# | | QUANTITY |
|---|---|---|
| A7125 | Helix | 315 ml |

### Neutralization Solution (NSB)

| CAT.# | | QUANTITY |
|---|---|---|
| A1485 | Helix | 500 ml |

≤30 min Processing Time | 1 mg Yield *V=Variable | M/A Format Manual/Automated

### Wizard® Plus SV Miniprep DNA Purification System

- For 1–10 ml of bacterial culture
- Silica membrane-based system
- The purified DNA can be used directly for automated fluorescent sequencing or other standard molecular biology applications
- No phenol extraction and no precipitation steps necessary
- SV = For use with microcentrifuge (spin) or vacuum protocol e.g., Vac-Man® Laboratory Vacuum Manifold

45 min | 20 µg | M

| CAT.# | | QUANTITY |
|---|---|---|
| A1330 | Helix | 50 preps |
| A1460 | Helix | 250 preps |
| A1465 | | 1,000 preps |

### Wizard® SV 96 Plasmid DNA Purification System

- Silica membrane-based system in a 96-well format
- The purified plasmid DNA can be used directly for automated fluorescent sequencing or other standard molecular biology applications
- Manual or automated purification on laboratory liquid handlers

45 min | 20 µg | M/A

| CAT.# | | QUANTITY |
|---|---|---|
| A2250 | Helix | 1×96 preps |
| A2255 | Helix | 5×96 preps |
| A2258 | | 100×96 preps |

### Wizard® MagneSil® Tfx™ System

- Rapid isolation of transfection-quality plasmid DNA in a 96-well, high-throughput format
- No centrifugation or vacuum manifolds needed
- Automation-compatible
- Endotoxin carryover reduced by up to 95 % over standard sequencing-grade automated plasmid systems
- Validated automated methods available at: **www.promega.com/automethods/**

45 min | 20 µg | A

| CAT.# | | QUANTITY |
|---|---|---|
| A2380 | Helix | 4×96 preps |

## DNA from Cells, Tissues, Plants or Foods

### ReliaPrep™ gDNA Tissue Miniprep System

- Pure, intact genomic DNA without alcohol precipitation from 25 mg of tissue, a buccal swab or 1 cm mouse tail
- Ready-to-use reagents
- High yield and purity in a 50 µl elution volume
- Better $A_{260}/A_{230}$ ratio than conventional DNA purification systems

20–30 min | 30 µg | M

| CAT.# | | QUANTITY |
|---|---|---|
| A2051 | Helix | 100 preps |
| A2052 | Helix | 250 preps |



≤30 min Processing Time | 1 mg Yield V=Variable | M/A Format Manual / Automated

## Wizard® Genomic DNA Purification Kit

- Simple, solution-based DNA purification from white blood cells, cell culture, animal and plant tissues, yeast, Gram-positive and Gram-negative bacteria
- $1 \times 10^5$ to $8 \times 10^5$ cultured cells
- 11 mg of mouse liver, 0.5–1 cm mouse tail or 40 mg of tomato leaf
- The reagent volumes can be adapted to the amount of starting material

60 min | V | M

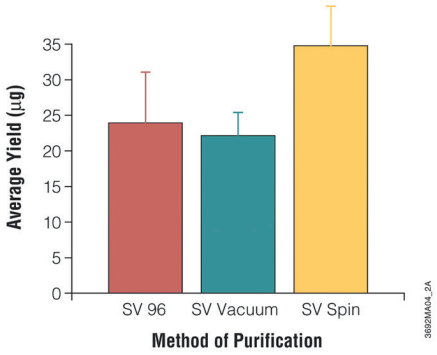
| CAT.# | | QUANTITY |
|---|---|---|
| A1120 | Helix | 100 isolations × 300 µl |
| A1125 | Helix | 500 isolations × 300 µl |
| A1620 | | 100 isolations × 10 ml |

## Wizard® SV Genomic DNA Purification System

- $1 \times 10^4$ to $5 \times 10^6$ cultured cells
- Fast, simple membrane-based system for isolating pure DNA with high yields
- For cells, mouse tail or up to 20 mg of plant tissue
- SV = For use with microcentrifuge (spin) or vacuum protocol (using the Vac-Man® Laboratory Vacuum Manifold)

45 min | 20 µg | M

| CAT.# | | QUANTITY |
|---|---|---|
| A2360 | Helix | 50 preps |
| A2361 | Helix | 250 preps |




**DNA yield with the Wizard® SV or SV 96 Genomic DNA Purification Systems.**
Average yield of genomic DNA from 20 mg of mouse tail is shown.

## Wizard® Magnetic 96 DNA Plant System

- For manual or automated purification of DNA from plant leaves or seeds in a 96-well format
- Proven protocols, including protocols for automated liquid handlers
- Tested with corn and tomato leaves, as well as rapeseed and sunflower seeds

15 min | V | M/A

| CAT.# | | QUANTITY |
|---|---|---|
| FF3760 | Helix | 2 × 96 preps |
| FF3761 | Helix | 4 × 96 preps |

## Wizard® Magnetic DNA Purification System for Food

- DNA purification from a variety of food samples such as corn, corn flour, wheat flour, soybean, soy flour or soy milk
- Protocols for processed foods like chips, chocolate, lecithin, soy and soy products and vegetable oils
- Purified DNA can be used for PCR-based tests, such as GMO sequencing

60 min | V | M

| CAT.# | | QUANTITY |
|---|---|---|
| FF3750 | Helix | 200 preps |
| FF3751 | Helix | 400 preps |

# DNA Purification from FFPE Samples

## ReliaPrep™ FFPE gDNA Miniprep System

- Complete system for formalin-fixed, paraffin-embedded tissue
- No harmful solvents or overnight digestion necessary
- Minimum time required for purification (reduced hands-on time due to fewer manual steps)
- Optimized lysis reverses modifications caused by tissue fixation
- The result is intact DNA suitable for amplification

2.5 hr | V | M

| CAT.# | | QUANTITY |
|---|---|---|
| A2351 | Helix | 10 preps |
| A2352 | Helix | 100 preps |

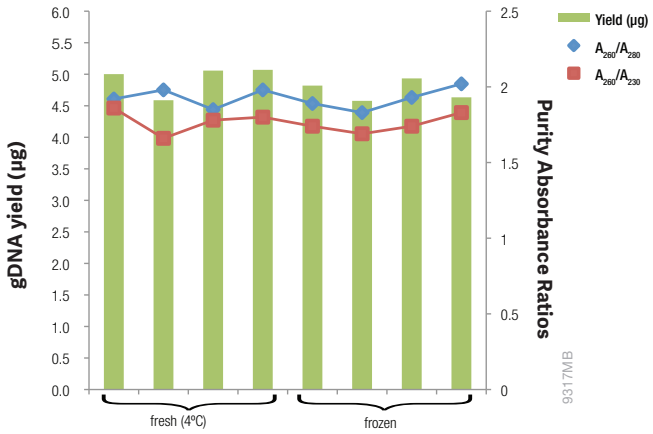
# DNA from Blood

## ReliaPrep™ Blood gDNA Miniprep System

- Very good yield even with little starting material
- No hidden costs: DNase is included
- Purification of pure, intact genomic DNA without ethanol precipitation from fresh or frozen blood samples
- Complete kit with ready-to-use reagents
- Good yield and high purity in 50 µl elution volume
- Higher $A_{260}/A_{230}$ ratios than conventional purification systems
- DNA purification from ≤200 µl of blood

<30 min | 20 µg | M

| CAT.# | | QUANTITY |
|---|---|---|
| A5081 | Helix | 100 preps |
| A5082 | Helix | 250 preps |




**Consistent yield and purity of genomic DNA isolated using the ReliaPrep™ Blood gDNA Miniprep System.** DNA was purified from fresh blood or blood that was frozen and thawed three times.

## Wizard® Genomic DNA Purification Kit

- Simple, solution-based DNA purification from white blood cells, mammalian cells, animal and plant tissues, yeast, and Gram-positive and Gram-negative bacteria
- Reagent volumes can be adapted to the amount of starting material to reduce waste
- DNA purification from 50 µl–10 ml of whole blood

60 min | V | M

| CAT.# | | QUANTITY |
|---|---|---|
| A1120 | Helix | 100 isolations × 300 µl |
| A1125 | Helix | 500 isolations × 300 µl |
| A1620 | | 100 isolations × 10 ml |



≤30 min Processing Time | 1 mg Yield V=Variable | M/A Format Manual / Automated

## ReliaPrep™ Large Volume HT gDNA Isolation System

- Fully automated isolation of DNA from 1 ml to 10 ml of blood. Different volumes can be processed in one automated run
- Isolation of DNA from buffy coat, packed cell pellets and other types of samples
- DNA isolation from 1 to 32 samples
- Complete automated solutions available for the Tecan Freedom EVO® HSM workstation

4 hr | 200–400 µg | A

**See how the ReliaPrep™ HT System simplifies purification**

www.promega.com/reliaprep-hsm

**Complete solution with robotic platform and reagents is available.**

Freedom EVO®-HSM Workstation

TECAN.

# DNA Fragment Purification

## Wizard® DNA Clean-Up System

The Wizard® DNA Clean-Up System provides a simple and effective way to clean up linear and circular DNA (200–50,000 bp) with no organic extractions or ethanol precipitations.

- Versatile: easy and rapid DNA cleanup from molecular biology reactions

15 min | V | M

| CAT.# | | QUANTITY |
|---|---|---|
| A7280 | Helix | 100 preps |

## Wizard® SV Gel and PCR Clean-Up System

- One system for two applications!
- Extract DNA fragments of 100 bp to 10 kb from standard or low-melting agarose gels
- Purify up to 40 µg of DNA directly from amplification reactions and restriction digests, with a recovery rate of up to 95 %
- Use purified DNA for automated fluorescent sequencing, cloning, labelling or in vitro transcription directly without further processing steps
- Purify DNA from up to 300 mg of agarose gel pieces or 1 ml of enzyme reaction
- SV = For use with microcentrifuge (spin) or vacuum protocol (using the Vac-Man® Laboratory Vacuum Manifold)

15 min | 95 % | M

| CAT.# | | QUANTITY |
|---|---|---|
| A9281 | Helix | 50 preps |
| A9282 | Helix | 250 preps |
| A9285 | | 1,000 preps |

| FRAGMENT SIZE | RECOVERY |
|---|---|
| 55 bp | 26 % |
| 70 bp | 39 % |
| 85 bp | 55 % |
| 100 bp | 84 % |
| 500 bp | 89 % |
| 1,000 bp | 92 % |
| 3,199 bp | 95 % |
| 9,416 bp | 95 % |
| 23,130 bp | 47 % |

## Wizard® SV 96 PCR Clean-Up System

- High-throughput isolation of 100 bp to 10 kb PCR products
- Removal of nucleotides, primers and primer-dimers with a yield of over 90 %
- The purified DNA can be used for techniques such as automated fluorescent sequencing, cloning, labelling, restriction or microarray analysis directly without further processing steps
- Protocols for automated purification on Beckman Coulter, Eppendorf, PerkinElmer and Tecan instruments available

20 min | 90 % | M

| CAT.# | | QUANTITY |
|---|---|---|
| A9340 | Helix | 1 × 96 preps |
| A9341 | Helix | 4 × 96 preps |
| A9342 | Helix | 8 × 96 preps |
| A9345 | | 100 × 96 preps |

## Wizard® MagneSil® Sequencing Reaction Clean-Up System

- High-throughput purification of sequencing reactions including BigDye® terminator reactions
- No user intervention necessary until the sample is ready for loading onto the sequencer
- Protocols for automated purification on Beckman Coulter, Eppendorf, PerkinElmer and Tecan instruments available

35–90 min | ≈650 bases | A

| CAT.# | | QUANTITY |
|---|---|---|
| A1831 | Helix | 4 × 96 preps |
| A1832 | Helix | 8 × 96 preps |
| A1835 | | 100 × 96 preps |

# RNA Purification

## RNA from Cells, Tissues, Plants and Blood

### ReliaPrep™ RNA Miniprep Systems

- High yields in only 30 minutes
- Complete kit includes RNase-free DNase
- Efficient RNA binding, even with low amounts of starting material
- Elute in as little as 15 µl; no further concentration necessary
- DNase treatment is performed directly on the minicolumn membrane, eliminating substances that can interfere with downstream applications
- No phenol:chloroform extraction or ethanol precipitation

#### ReliaPrep™ RNA Cell Miniprep System

- 100 to $5 \times 10^6$ mammalian cells

20–30 min | 0.5 ng –1.34 µg | M

| CAT.# | | QUANTITY |
|---|---|---|
| Z6010 | Helix | 10 preps |
| Z6011 | Helix | 50 preps |
| Z6012 | Helix | 250 preps |

#### ReliaPrep™ RNA Tissue Miniprep System

- 0.25 mg to 20 mg tissue

20–30 min | 30 µg | M

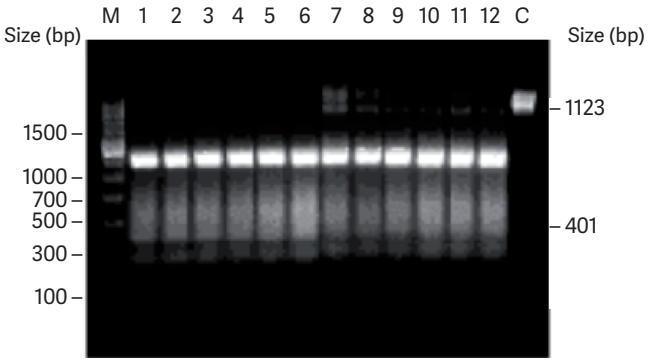
| CAT.# | | QUANTITY |
|---|---|---|
| Z6110 | Helix | 10 preps |
| Z6111 | Helix | 50 preps |
| Z6112 | Helix | 250 preps |

## SV Total RNA Isolation System

- Quick and easy preparation of intact total RNA from tissues, cells or white blood cells
- DNase treatment in membrane spin columns reduces genomic DNA contamination, which interferes with downstream PCR applications
- No phenol:chloroform extraction or ethanol precipitation necessary
- Purify RNA from up to $5 \times 10^5$ mammalian cells or 15–60 mg of tissue
- SV = For use with microcentrifuge (spin) or vacuum protocol, (using the Vac-Man® Laboratory Vacuum Manifold)

60 min | 0.27–5.3 µg/mg | M

| CAT.# | | QUANTITY |
|---|---|---|
| Z3101 | Helix | 10 preps |
| Z3100 | Helix | 50 preps |
| Z3105 | Helix | 250 preps |




**RNA purity analysis after purification using the SV Total RNA Isolation System.** RNA isolated from mouse liver was reverse transcribed, amplified and analyzed in an agarose gel. In contrast to the competitor's product (lanes 7–12), the SV Total RNA Isolation System (lanes 1–6) yielded RNA with no visible genomic DNA contamination (visible as a band at 1,123 bp) with comparable yields. Lane C. PCR amplification of genomic DNA as a positive control.

## SV 96 Total RNA Isolation System

- High-throughput vacuum manifold eliminates waste handling and frequent tip changes, reducing the use of plastic consumables
- Novel plate design avoids cross-contamination
- DNase significantly reduces the risk of genomic DNA contamination
- No phenol:chloroform extraction or ethanol precipitation necessary
- Purify RNA from $5 \times 10^5$ mammalian cells or 15–60 mg of tissue

<1 hr | 0.33–0.44 µg/$10^5$ Cells | M/A

| CAT.# | | QUANTITY |
|---|---|---|
| Z3500 | Helix | 1 × 96 preps |
| Z3505 | Helix | 5 × 96 preps |

## MagneSil® Total RNA mini-Isolation System

- High-throughput preparation of intact total RNA from cells, tissue or fresh whole blood in a 96-well or 384-well format
- Protocol enables automated high-throughput purification on a variety of liquid-handling workstations
- No vacuum filtration, centrifugation or precipitation necessary
- Low elution volume of 15 µl results in concentrated RNA for applications such as endpoint or real-time RT-PCR
- Purify RNA from ≤2 mg of tissue (≤2 mg tissue lysate in 100 µl) or $\leq 1 \times 10^5$ cells

30 min | 2 µg/$10^5$ Cells | A

| CAT.# | | QUANTITY |
|---|---|---|
| Z3351 | Helix | 4 × 96 preps |



≤30 min Processing Time | 1 mg Yield V=Variable | M/A Format Manual / Automated

## PureYield™ RNA Midiprep System

- Purify RNA from a wide range of sample types such as tissue, cultured cells, bacteria, yeast, plants and blood. The RNA is suitable for many applications, including RT-PCR
- Rapid purification of total RNA with undetectable levels of genomic DNA contamination without using DNase
- No organic solvents, protease digestion or alcohol precipitation necessary
- Designed for microcentrifuge (spin) or vacuum format (using the Vac-Man® Laboratory Vacuum Manifold)
- Purify RNA from up to 300 mg of most tissues

<2 hr | 0.33–0.44 µg/10⁶ Cells | M

| CAT.# | | QUANTITY |
|---|---|---|
| Z3740 | Helix | 10 preps |
| Z3741 | Helix | 50 preps |

## MagneSil® Total RNA mini-Isolation System

- High-throughput preparation of intact total RNA from mammalian cells, tissue or fresh whole blood in a 96-well or 384-well format
- Protocol enables automated high-throughput purification on a variety of liquid-handling workstations
- No vacuum filtration, centrifugation or precipitation necessary
- Low elution volume of only 15 µl results in concentrated RNA for applications such as endpoint or real-time RT-PCR
- Purify RNA from up to 20 µl blood

30 min | 2 µg/10⁵ Cells | A

| CAT.# | | QUANTITY |
|---|---|---|
| Z3351 | Helix | 4 × 96 preps |

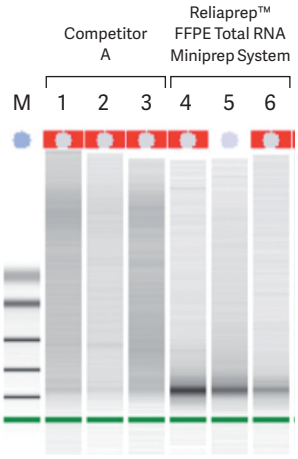
# RNA from FFPE Samples

## ReliaPrep™ FFPE Total RNA Miniprep System

- Complete system for RNA purification from formalin-fixed, paraffin-embedded tissue
- No hazardous solvents or overnight digestion necessary
- Total RNA from FFPE tissue can be isolated quickly, with less hands-on time
- Intact, amplifiable high-quality RNA
- Purify RNA from 5–50 µg tissue sections

90 min | V | M

| CAT.# | | QUANTITY |
|---|---|---|
| Z1001 | Helix | 10 reactions |
| Z1002 | Helix | 100 reactions |




**RNA purified from FFPE mouse liver samples.** Samples 1–3 were purified using a kit from Competitor A. Samples 4–6 were purified using the ReliaPrep™ FFPE Total RNA Miniprep System. Analysis was performed using the Agilent 2100 Bioanalyzer.

# Purification without Centrifugation with the Vac-Man® Laboratory Vacuum Manifold

Purify nucleic acids in next to no time.

**Advantages compared to conventional centrifugation protocols:**

- DNA and RNA purification in the shortest time
- Up to 20 parallel purifications
- No time spent waiting for the centrifuge
- Adjustable and constant pressure
- No unnecessary water is used

**We have attractive starter packages for vacuum purification.**

Your startup purification bundle contains:

- Reagents for purification
- Vac-Man® Laboratory Vacuum Manifold
- Eluator™ Vacuum Elution Device (depending on the purification package)
- Free Welch® Vacuum Pump!

## Eluator™ Vacuum Elution Device

The Eluator™ Vacuum Elution Device makes the final centrifugation step during purification unnecessary. Perform all operations directly on your lab bench.

## See how the Eluator™ Vacuum Elution Device Works!

www.promega.com/vacuum-eluator-video

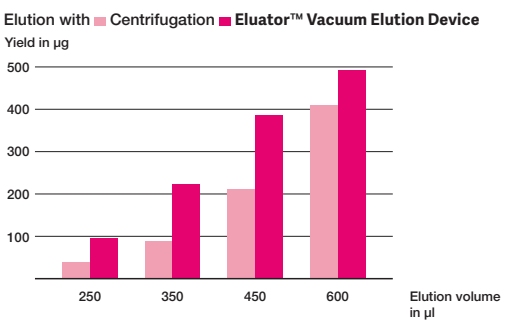
### Eluator™ Vacuum Elution Device

**Higher yields:** 20 % more plasmid in the eluate due to reduced dead volume

**Practical:** Fewer pipetting steps because elution occurs directly into a 1.5 ml microcentrifuge tube

**Rapid:** Elution in less than 1 minute

| CAT.# | QUANTITY |
|---|---|
| A1071 | 4 each |




**Plasmid DNA yield using the Eluator™ Vacuum Elution Device.** Plasmid was purified using the PureYield™ Plasmid Midiprep System and either centrifugation or the Eluator™ Vacuum Elution Device for the elution step, and the yields were measured and compared at different elution volumes. The yield with the Eluator™ Vacuum Elution Device was higher at each elution volume compared to that of the centrifugation method.

## Plasmid Purification Bundles

| STARTUP PURIFICATION BUNDLE | CONTENTS | CAT.# |
|---|---|---|
| PureYield™ Plasmid Miniprep Start-Up Kit | 750 Preps (3 × A1222)<br>+ Vac-Man® Vacuum Manifold (A7231)<br>+ free vacuum pump! | A6812 |
| PureYield™ Plasmid Midiprep Start-Up Kit | 100 Preps (1 × A2495)<br>+ Vac-Man® Vacuum Manifold (A7231)<br>+ 4 Eluators™ Vacuum Elution Device (1 × A1071)<br>+ free vacuum pump! | A6742 |
| PureYield™ Plasmid Maxiprep Start-Up Kit | 50 Preps (1 × A2393)<br>+ Vac-Man® Vacuum Manifold (A7231)<br>+ 4 Eluators™ Vacuum Elution Device (1 × A1071)<br>+ free vacuum pump! | A6732 |
| Wizard® *Plus* SV Minipreps Start-Up Kit | 750 Preps (3 × A1470)<br>+ Vac-Man® Vacuum Manifold (A7231)<br>+ Vacuum Adapters (A1331)<br>+ free vacuum pump! | A6762 |

## Genomic DNA Purification Bundles

| STARTUP PURIFICATION BUNDLE | CONTENTS | CAT.# |
|---|---|---|
| Wizard® SV Genomic DNA Purification Start-Up Kit | 500 Preps (2 × A2361)<br>+ Vac-Man® Vacuum Manifold (A7231)<br>+ Vacuum Adapters (A1331)<br>+ free vacuum pump! | A6772 |
| Wizard® SV 96 Genomic DNA Purification Start-Up Kit | 4×96 Preps (1 × A2371)<br>+ Vac-Man® 96 (A2291)<br>+ free vacuum pump! | A6782 |

## DNA Fragment Purification Bundles

| STARTUP PURIFICATION BUNDLE | CONTENTS | CAT.# |
|---|---|---|
| Wizard® SV Gel and PCR Clean-Up Start-Up Kit | 500 Preps (1 × A9282)<br>+ Vac-Man® Vacuum Manifold (A7231)<br>+ Vacuum Adapters (A1331)<br>+ free vacuum pump! | A6752 |
| Wizard® SV 96 PCR Clean-Up Start-Up Kit | 8 × 96 Preps (A9342)<br>+ Vac-Man® 96 Vacuum Manifold (A2291)<br>+ free vacuum pump! | A6792 |

## RNA Purification Bundles

| STARTUP PURIFICATION BUNDLE | CONTENTS | CAT.# |
|---|---|---|
| SV Total RNA Isolation Start-Up Kit | 250 Preps (1 × Z3105)<br>+ Vac-Man® Vacuum Manifold (A7231)<br>+ Eluator™ Vacuum Adapters (A1331)<br>+ free vacuum pump! | Z3382 |
| PureYield™ RNA Midiprep Start-Up Kit | 100 Preps (2 × Z3741)<br>+ Vac-Man® Vacuum Manifold (A7231)<br>+ Vacuum Elution Device (1 × A1071)<br>+ free vacuum pump! | Z3372 |

## Vac-Man® Laboratory Vacuum Manifold, 20-sample capacity

| CAT.# | QUANTITY |
|---|---|
| A7231 | 1 each |

## Vac-Man® 96 Vacuum Manifold

| CAT.# | QUANTITY |
|---|---|
| A2291 | 1 each |

## One-Way Luer-Lok® Stopcocks

| CAT.# | QUANTITY |
|---|---|
| A7261 | 10 each |

# Automated DNA and RNA Purification with the Maxwell® Systems

**Automated isolation of DNA and RNA from various samples with reproducible results and high yields.**

The Maxwell® Instruments provide rapid, user-friendly purification of high-quality DNA or RNA. The instruments are compact, with a footprint similar in size to that of a laptop, and fit easily in any laboratory. Nucleic acids are purified using paramagnetic particles, which are provided in prefilled disposable cartridges. Pre-installed protocols and a touch screen interface make purification simple.

**Rapid:** Processes 1–16 samples in approximately 30 minutes

**Reliable:** Consistently high yields

**Clean:** No detectable cross-contamination

**Versatile:** Automated homogenization of solid samples such as tissue

We offer a wide range of Maxwell® kits for extraction of DNA or RNA from various sample types including tissue, blood, FFPE, viruses, plants, cell culture and other biological, forensic or human samples.

Protocols for various starting materials are also available, including:

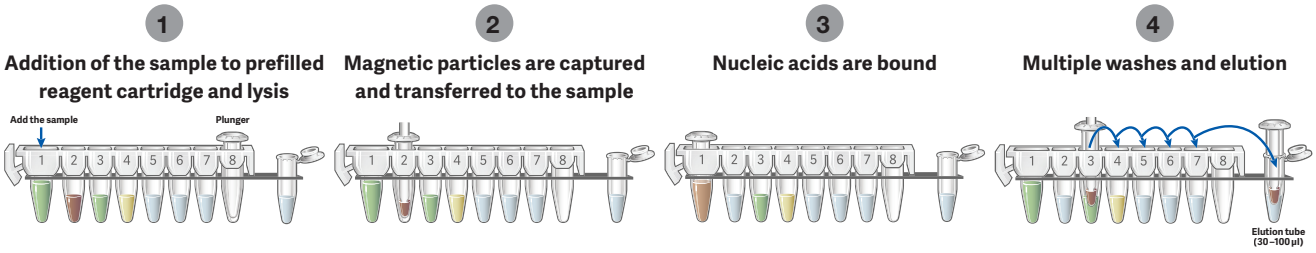
- Total nucleic acids from plasma
- RNA from tissues or cells
- Viral nucleic acids from stool samples
- DNA or RNA from FFPE tissue
- DNA from forensic samples
- DNA from grains for GMO analysis

## Try the Maxwell® System with no commitment!

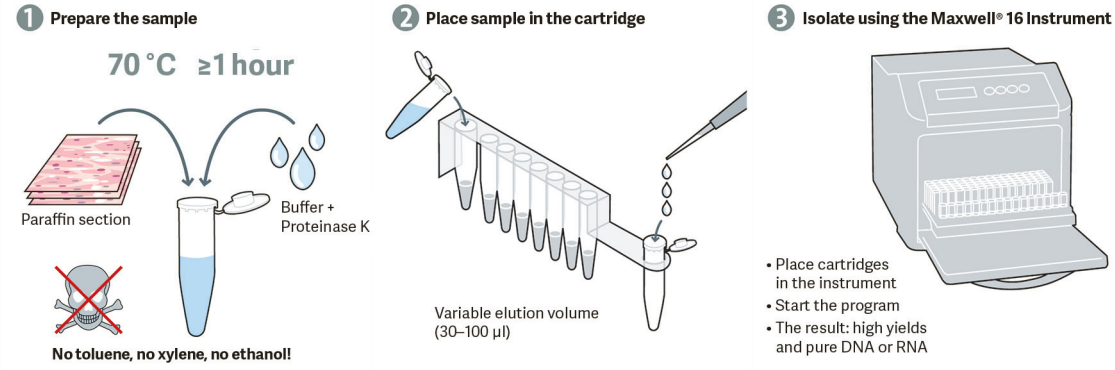
Please contact us to make an appointment for demonstration.

www.promega.com/maxwell16

### Purification Principle



## Isolation of DNA or RNA from FFPE sections with the Maxwell® System




## Examples of available Maxwell® purification kits (partial listing):

| CAT.# | | PRODUCT | SIZE |
|---|---|---|---|
| AS1400 | Felix | Maxwell® RSC Blood DNA Kit | 48 preps |
| AS1370 | Felix | Maxwell® RSC Cell DNA Purification Kit | 48 preps |
| AS1450 | Felix | Maxwell® RSC DNA FFPE Kit | 48 preps |
| AS1330 | Felix | Maxwell® RSC Viral Total Nucleic Acid Purification Kit | 48 preps |
| AS1460 | Felix | Maxwell® RSC miRNA Tissue Kit | 48 preps |
| AS1440 | Felix | Maxwell® RSC RNA FFPE Kit | 48 preps |
| AS1380 | Felix | Maxwell® RSC simplyRNA Blood Kit | 48 preps |
| AS1340 | Felix | Maxwell® RSC simplyRNA Tissue Kit | 48 preps |
| AS1390 | Felix | Maxwell® RSC simplyRNA Cells Kit | 48 preps |
| AS1420 | Felix | Maxwell® 16 LEV Plant DNA Kit | 48 preps |
| AS1430 | Felix | Maxwell® 16 LEV Plant RNA Kit | 48 preps |

For a complete listing of Maxwell® 16 Instruments and kits, please visit www.promega.com/maxwell16

## Maxwell® Instruments

| CAT.# | PRODUCT | DESCRIPTION | FEATURES |
|---|---|---|---|
| AS2000 | Maxwell® 16 Instrument | Standard purification instrument | • For research use only |
| AS3050 | Maxwell® 16 IVD Instrument | Instrument for automated isolation of genomic DNA from human whole blood and buffy coat samples and viral total nucleic acid from human plasma or serum samples | • With barcode tracking system, touch screen operation and UV lamp<br>• Not intended for use with nonhuman samples or clinical samples from body fluids or tissues other than blood, plasma or serum |
| AS4500 | Maxwell® RSC Instrument | Newest generation DNA and RNA purification instrument integrates with the Quantus™ Fluorometer (supplied) for DNA and RNA quantification | • For research use only<br>• Tablet PC to operate instrument, with UV lamp, Quantus™ Fluorometer and optional barcode tracking system<br>• Modified cartridge and instrument design |

# QUANTIFICATION AND DETECTION

## Reliable quantification of nucleic acids in picogram quantities.

Fluorescence-based DNA and RNA quantification provides increased sensitivity compared to absorption-based methods. QuantiFluor® Systems are available to quantify double-stranded or single-stranded nucleic acids and provide more accurate quantification than measurement of absorption at 260 nm. Fluorescence-based quantification is particularly suitable for sample preparation prior to molecular biology applications such as next-generation sequencing. The QuantiFluor® System dyes can be used with multiwell-plate readers or a single-tube fluorometer such as the Quantus™ Fluorometer.

# DNA and RNA Quantification

## The Complete Solution for your Nucleic Acid Quantification

**The Quantus™ Fluorometer and QuantiFluor® Dye Systems are designed for sensitive quantification of double-stranded and single-stranded DNA and RNA.**

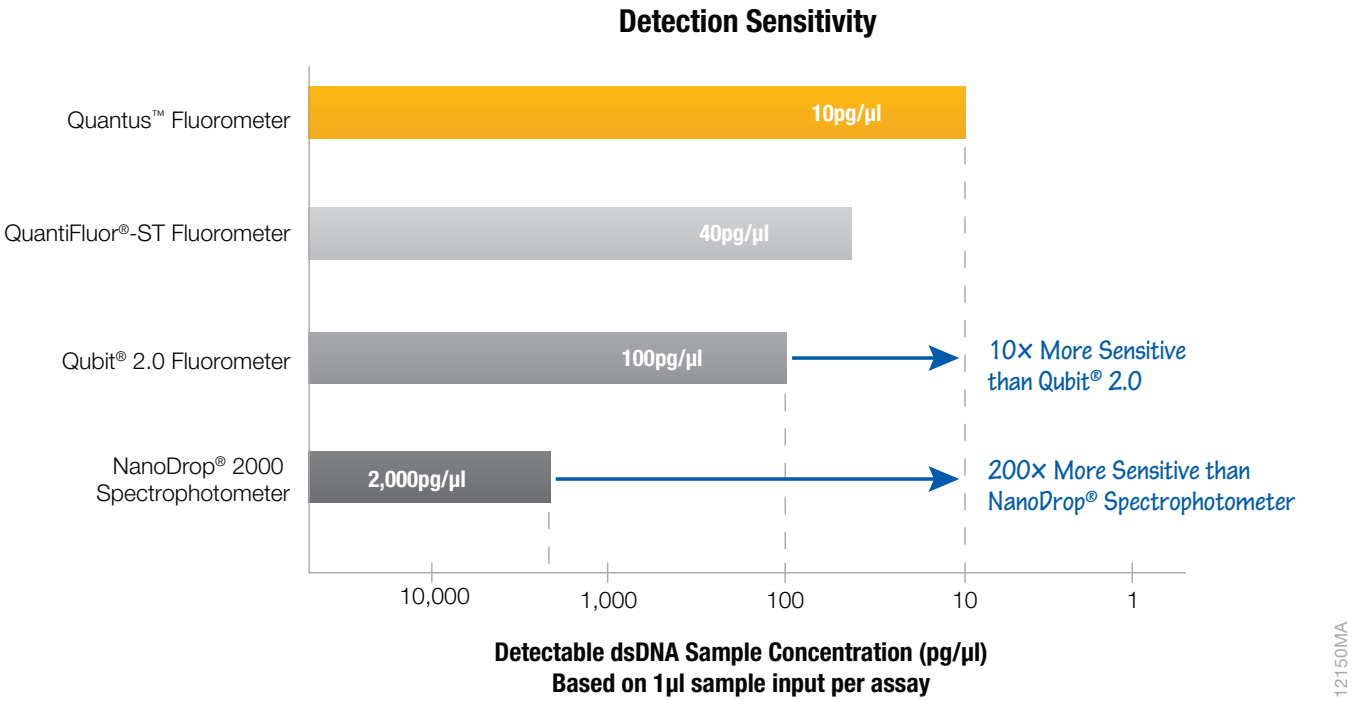
The Quantus™ Fluorometer is compatible with the QuantiFluor® Dye Systems and other fluorescence-based quantification kits. The Quantus™ Fluorometer is designed to operate as a standalone instrument, but by installing the free Quantus™ software and connecting the instrument to a computer, data can be transmitted in real time.

Using the Quantus™ Fluorometer with the QuantiFluor® Dyes, you can achieve a sensitivity 200 times higher than absorption-based methods. Due to its high sensitivity and broad linear range, the Quantus™ Fluorometer is ideal for samples with small amounts of DNA or RNA, such as formalin-fixed, paraffin-embedded tissues (FFPE sections) or next-generation sequencing samples.

QuantiFluor® Dyes also can be used with other fluorometers such as the Qubit® 2.0 Fluorometer or GloMax® Multimode Readers.

### Try the Quantus™ Fluorometer in your laboratory now with no commitment!

Please contact us to make an appointment for a demonstration:
www.promega.com/quantus-fluorometer




12150MA

## Quantus™ Fluorometer

- Excitation filter: red, 640 nm shortpass; blue, 495 nm shortpass
- Emission filter: red, 660–720 nm; blue, 510–580 nm

| CAT.# | | QUANTITY |
|---|---|---|
| E6150 | | 1 each |

## QuantiFluor® ONE dsDNA Dye

- 100×200 µl reactions (10×2 ml)
- Detectable DNA concentration and sensitivity:
  - Original DNA concentration of sample*: 0.2–400 ng/µl
  - DNA concentration in the QuantiFluor® Assay: 1–2,000 ng/ml

| CAT.# | | QUANTITY |
|---|---|---|
| E4891 | Helix | 20 ml |

## QuantiFluor® ONE dsDNA System

- System contains QuantiFluor® ONE dsDNA Dye, QuantiFluor® ONE Lambda DNA and 1X TE Buffer (pH 7.5)
- Detectable DNA concentration and sensitivity:
  - Original DNA concentration of sample*: 0.2–400 ng/µl
  - DNA concentration in the QuantiFluor® Assay: 1–2,000 ng/ml

| CAT.# | | QUANTITY |
|---|---|---|
| E4871 | Helix | 100 reactions |
| E4870 | Helix | 500 reactions |

## QuantiFluor® dsDNA System

- 200×2 ml reactions or 2,000×200 µl reactions
- System contains QuantiFluor® dsDNA Dye, Lambda DNA Standard and 20XTE Buffer (pH 7.5)
- Detectable DNA concentration and sensitivity:
  - Original DNA concentration of sample*: 0.1–200 ng/µl
  - DNA concentration in the QuantiFluor® Assay: 0.05–1,000 ng/ml

| CAT.# | | QUANTITY |
|---|---|---|
| E2670 | Helix | 1 ml |

## QuantiFluor® ssDNA System

- 200×2 ml reactions or 2,000×200 µl reactions
- System contains QuantiFluor® ssDNA Dye, ssDNA Standard and 20XTE Buffer (pH 7.5)
- Detectable DNA concentration and sensitivity:
  - Original DNA concentration of sample*: 0.2–400 ng/µl
  - DNA concentration in the QuantiFluor® Assay: 1–2,000 ng/ml

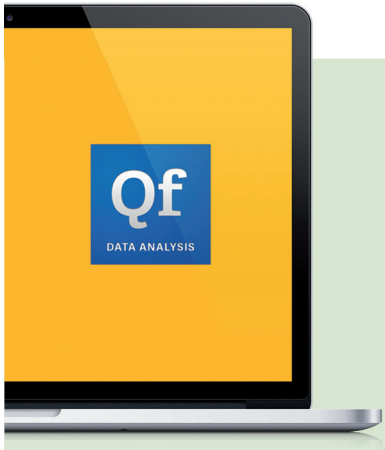
| CAT.# | | QUANTITY |
|---|---|---|
| E3190 | Helix | 1 ml |

## QuantiFluor® RNA System

- 200×2 ml reactions or 2,000×200 µl reactions
- System contains QuantiFluor® RNA Dye, RNA Standard and 20XTE Buffer (pH 7.5)
- Detectable RNA concentration and sensitivity:
  - Original RNA concentration of sample*: 0.1–500 ng/µl
  - RNA concentration in the QuantiFluor® Assay: 0.5–2,500 ng/ml

| CAT.# | | QUANTITY |
|---|---|---|
| E3310 | Helix | 1 ml |

*Based on the addition of 1 µl of sample




TOOLS FOR PROFESSIONALS

## QuantiFluor® Dye Systems Data Analysis

QuantiFluor® Dye data can be easily and conveniently analyzed using an Excel® worksheet. The worksheet includes a template so that you can set up your experimental design in a plate format or enter individual measurements prior to analysis of results generated using the QuantiFluor® ONE dsDNA, QuantiFluor® dsDNA, ssDNA or RNA Systems.

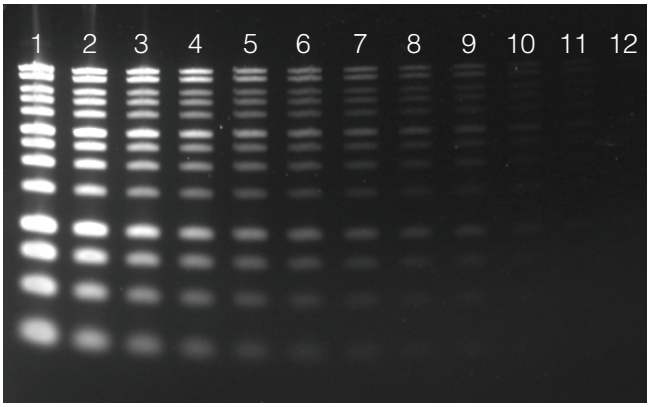
www.promega.com/quantus-data-analysis

# Detection

### Diamond™ Nucleic Acid Dye

- Sensitive fluorescent dye that binds single- or double-stranded DNA and RNA
- Detects even the smallest amounts of nucleic acid
- For staining and visualization of nucleic acids in gels
- Can be used in both agarose and polyacrylamide gels
- Significantly less mutagenic than ethidium bromide and comparable to the safety of SYBR® Safe
- Stable at room temperature

| CAT.# | | QUANTITY |
|---|---|---|
| H1181 | Helix | 500 µl |




**Staining of DNA with Diamond™ Nucleic Acid Dye on a 1.2% clear E-Gel®.** The BenchTop 1kb DNA Ladder (G7541) was combined with 1X Blue/Orange Loading Dye (G1881), and 10 µl was loaded in lane 1. The marker was then serially diluted twofold, and 10µl was loaded into each subsequent lane (lanes 2–12) such that each lane contained half of the amount in the previous lane. After electrophoresis, the gel was incubated for 20 minutes in Diamond™ Nucleic Acid Dye. The gel was visualized using the Molecular IMAGER® Gel Doc™ XR + system with Image Lab™ software and SYBR® Gold application.

SYBR® is a registered trademark of Molecular Probes.
E-Gel® is a registered trademark of Life Technologies.
Molecular IMAGER® Gel Doc™ XR + and Image Lab™ Software are registered trademarks of Bio-Rad.

# PCR

## Reproducible results and inhibitor resistance with GoTaq® products.

GoTaq® PCR reagents ensure optimal results in amplification-based assays used in genetic identification, quality assurance, next-generation sequencing and many other applications.

GoTaq® G2 DNA Polymerases are provided as standalone enzymes and as master mixes.

Each GoTaq® G2 Polymerase product is available in various formats, including hot-start formulations, for maximum flexibility and convenience . Choose from GoTaq® G2 products that include a complete reaction buffer containing $MgCl_2$ or choose GoTaq® G2 Flexi polymerases, where $MgCl_2$ is supplied separately.

GoTaq® G2 Polymerases include colorless and green buffers. The green buffer contains gel loading dye so that the reaction can be loaded directly onto a gel after thermal cycling.

For applications that require absorption or fluorescence measurement of PCR fragments before purification, a colorless reaction buffer is supplied.

### PCR Satisfaction Guarantee

Promega 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.

# Routine PCR

## GoTaq® G2 DNA Polymerase

- Consistently high yields for different target sequences
- Amplification of small DNA amounts due to high sensitivity
- $MgCl_2$ concentration: 1.5 mM

| CAT.# | | QUANTITY |
|---|---|---|
| M7841 | Helix | 100 U |
| M7845 | Helix | 500 U |
| M7848 | Helix | 2,500 U (5 × 500 U) |

## GoTaq® G2 Flexi DNA Polymerase

- Consistently high yield from different target sequences
- Amplification of small DNA amounts due to high sensitivity
- $MgCl_2$ concentration can be adjusted

| CAT.# | | QUANTITY |
|---|---|---|
| M7801 | Helix | 100 U |
| M7805 | Helix | 500 U |
| M7806 | Helix | 2,500 U (5 × 500 U) |
| M7808 | Helix | 10,000 U (20 × 500 U) |

## GoTaq® G2 Green Master Mix

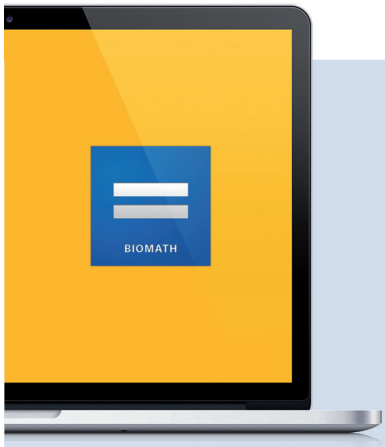
- Ready-to-use mix of GoTaq® G2 DNA Polymerase, dNTPs and reaction buffer
- Nuclease-free water supplied separately
- Green dye in buffer for direct loading onto a gel

| CAT.# | | QUANTITY |
|---|---|---|
| M7822 | Helix | 100 reactions at 50 µl |
| M7823 | Helix | 1,000 reactions at 50 µl |

## GoTaq® G2 Colorless Master Mix

- Ready-to-use mix of GoTaq® G2 DNA Polymerase, dNTPs and reaction buffer
- Nuclease-free water supplied separately
- Colorless reaction buffer

| CAT.# | | QUANTITY |
|---|---|---|
| M7832 | Helix | 100 reactions at 50 µl |
| M7833 | Helix | 1,000 reactions at 50 µl |




TOOLS FOR PROFESSIONALS

## BioMath Calculators

Rapid calculation of melting temperatures, molarity, dilutions, DNA and protein concentrations, and much more.

www.promega.com/biomath

# High-Fidelity PCR

## *Pfu* DNA Polymerase

- 3´→ 5´ exonuclease (proofreading) activity
- Lowest error rate among thermostable DNA polymerases
- Produces PCR products with blunt ends

**Note:** Product may not be available in all countries. Please contact your local representative for more information.

| CAT.# | | QUANTITY |
|---|---|---|
| M7741 | Helix | 100 U |
| M7745 | Helix | 500 U |

# Hot-Start PCR

### GoTaq® G2 Hot Start Polymerase

- Increased processivity, sensitivity and specificity
- Reaction assembly at room temperature
- $MgCl_2$ concentration can be adjusted

| CAT.# | | QUANTITY |
|---|---|---|
| M7401 | Promega | 100 U |
| M7405 | Promega | 500 U |
| M7406 | Promega | 2,500 U (5 × 500 U) |
| M7408 | Promega | 10,000 U (20 × 500 U) |

### GoTaq® G2 Hot Start Green Master Mix

- Ready-to-use master mix containing GoTaq® G2 Hot Start Polymerase, dNTPs and reaction buffer
- Nuclease-free water supplied separately
- Green dye in the buffer for direct loading onto a gel

| CAT.# | | QUANTITY |
|---|---|---|
| M7422 | Promega | 100 reactions at 50 µl |
| M7423 | Promega | 1,000 reactions at 50 µl |

### GoTaq® G2 Hot Start Colorless Master Mix

- Ready-to-use master mix containing GoTaq® G2 Hot Start Polymerase, dNTPs and reaction buffer
- Nuclease-free water supplied separately
- Colorless reaction buffer

| CAT.# | | QUANTITY |
|---|---|---|
| M7432 | Promega | 100 reactions at 50 µl |
| M7433 | Promega | 1.000 reactions at 50 µl |

# Long PCR

### GoTaq® Long PCR Master Mix

- Amplification of up to 30 kb of human genomic DNA or 40 kb from less complex templates such as lambda DNA
- Master mix of GoTaq® Polymerase and thermostable proofreading polymerase, dNTPs and reaction buffer
- Control primers, human genomic DNA and nuclease-free water are supplied

| CAT.# | | QUANTITY |
|---|---|---|
| M4021 | Promega | 100 reactions at 50 µl |

# dUTP

### dUTP

- High quality (> 98 % pure)
- Supplied at a concentration of 100 mM in water with a pH of 7.5

| CAT.# | | QUANTITY |
|---|---|---|
| U1191 | Promega | 40 µmol |

### Set of dATP, dCTP, dGTP, dUTP

- Packaged separately
- High quality (> 98 % pure)
- All dNTPs are supplied at a concentration of 100 mM in water with a pH of 7.5

| CAT.# | | QUANTITY |
|---|---|---|
| U1335 | Promega | 4 × 10 µmol |
| U1245 | Promega | 4 × 40 µmol |

# dNTPs

## Set of dATP, dCTP, dGTP, dTTP

- Packaged separately
- Individual nucleotides can be mixed as needed
- High quality (> 98 % pure)
- All dNTPs are supplied at a concentration of 100 mM in water with a pH of 7.5

dNTPs are also available as single nucleotides (see www.promega.com)

| CAT.# | | QUANTITY |
|---|---|---|
| U1330 | Hélix | 4 × 10 µmol |
| U1420 | Hélix | 4 × 25 µmol |
| U1240 | Hélix | 4 × 40 µmol |
| U1410 | Hélix | 4 × 200 µmol |

## dNTP Mix

- Ready-to-use mix of dATP, dCTP, dGTP and dTTP (10 mM each)
- High quality (> 98 % pure)

| CAT.# | | QUANTITY |
|---|---|---|
| U1511 | Hélix | 200 µl |
| U1515 | Hélix | 1000 µl |

## PCR Nucleotide Mix

- Ready-to-use mix of dATP, dCTP, dGTP and dTTP (10 mM each)
- High quality (> 98 % pure)
- PCR tested

| CAT.# | | QUANTITY |
|---|---|---|
| C1141 | Hélix | 200 µl |
| C1145 | Hélix | 1000 µl |

# Nuclease-Free Water

## Nuclease-Free Water

- No inhibitors: the water is untreated and has no chemical additives
- Guaranteed nuclease-free: intensive quality control

| CAT.# | | QUANTITY |
|---|---|---|
| P1193 | Hélix | 50 ml (2 × 25 ml) |
| P1195 | | 150 ml |
| P1197 | | 500 ml |

TOOLS FOR PROFESSIONALS

## Custom PCR Protocols

Create, save, comment and send PCR protocols via e-mail.

www.promega.com/custom-pcr-protocols

# REVERSE TRANSCRIPTION AND RT-PCR

## Convenient enzymes and kits for cDNA synthesis and RT-PCR.

Choose from a variety of reverse transcriptases and RT-PCR kits for easy and reliable synthesis of full-length cDNA.

These dependable solutions provide efficient reverse transcription, even from difficult templates where secondary structure is an issue.

# Reverse Transcriptases

## GoScript™ Reverse Transcriptase

| CAT.# | | QUANTITY |
|---|---|---|
| A5003 | Helix | 100 reactions/16,000 U |
| A5004 | Helix | 500 reactions/80,000 U |

## AMV Reverse Transcriptase

| CAT.# | | QUANTITY |
|---|---|---|
| M5101 | Helix | 300 U |
| M5108 | Helix | 1,000 U |
| M9004 | | 600 U |

## M-MLV Reverse Transcriptase

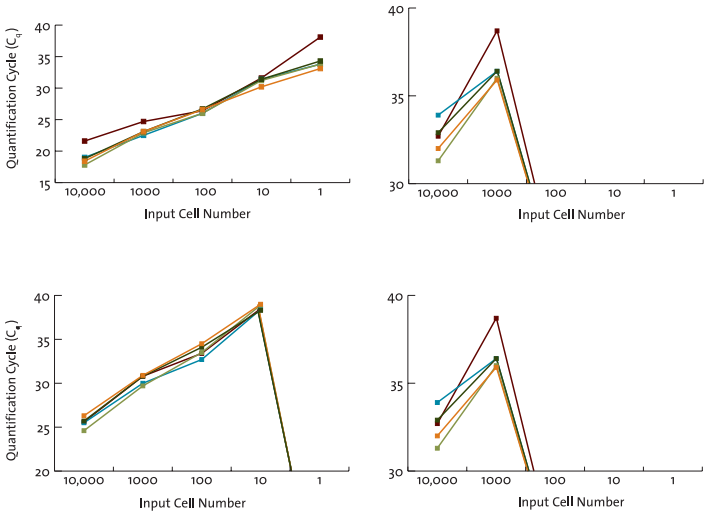
| CAT.# | | QUANTITY |
|---|---|---|
| M1701 | Helix | 10,000 U |
| M1705 | Helix | 50,000 U |

## M-MLV Reverse Transcriptase RNase H–, Point Mutant

| CAT.# | | QUANTITY |
|---|---|---|
| M3681 | Helix | 2,500 U |
| M3682 | Helix | 10,000 U |
| M3683 | Helix | 50,000 U |

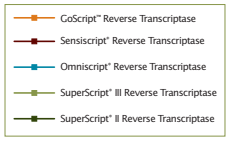
| FEATURES | AMV Reverse Transcriptase | M-MLV Reverse Transcriptase | M-MLV Reverse Transcriptase RNase H–, Point Mutant | GoScript™ Reverse Transcriptase |
|---|---|---|---|---|
| OPTIMAL REACTION TEMPERATURE | 42°C | 42°C | up to 50°C | 37–42°C |
| RNASE H ACTIVITY | Yes | Low | No | Low |
| cDNA LENGTH | up to 4 kb | up to 5 kb | up to 7.5 kb | up to 9 kb |
| SUITABLE FOR RNAs WITH SECONDARY STRUCTURE | ★★★ | ★☆☆ | ★★★ | ★☆☆ |
| ERROR RATE | Approximately 5 errors in 10,000 bases | Approximately 1 error in 10,000 bases | Approximately 1 error in 10,000 bases | Not determined |
| SENSITIVITY | ★★★ | ★★☆ | ★★★ | ★★☆ |
| MAIN APPLICATIONS | • Reverse transcription<br>• Primer extension/RACE | • Reverse transcription<br>• Primer extension/RACE | • Reverse transcription<br>• Primer extension/RACE | • Reverse transcription<br>• RT-PCR and RT-qPCR<br>• Incorporation of labelled nucleotides<br>• Primer extension/RACE |
| ADVANTAGE | • Especially suitable for RNA with secondary structures<br>• For cDNA up to 4 kb<br>• High processivity | • Low RNase H activity<br>• For cDNA up to 5 kb | • No RNase H activity<br>• For cDNA over 7.5 kb<br>• Reaction temperature up to 55°C<br>• Very stable<br>• High selectivity | • Low RNase H activity<br>• For cDNA up to 9 kb<br>• Optimized conditions for one-tube RT-PCR and RT-qPCR |

## Comparing GoScript™ Reverse Transcriptase




**GoScript™ Reverse Transcriptase shows equal or higher sensitivity at every level of RNA expression.**

- **Sensitive:** Transcribe difficult templates
- **Efficient:** Transcribe long mRNA
- **Convenient:** Use directly in qPCR
- **Reliable:** Transcribe GC-rich templates




Serial dilutions of mouse RNA representing the indicated number of cells were reverse transcribed using random primers and the indicated reverse transcriptase. cDNA products then were amplified by qPCR.

Data kindly provided by: Hochschule Mannheim, Department of Molecular and Cell Biology, M. Ammerschläger, P. Kioschis

# Reverse Transcription Systems

### GoScript™ Reverse Transcription System

- Robust full-length cDNA synthesis for reproducible analysis of rare and long RNA sequences
- All components in one kit: GoScript™ Reverse Transcriptase, 5X GoScript™ Reaction Buffer, PCR Nucleotide Mix, Oligo(dT)$_{15}$ Primer, Random Primers, Recombinant RNasin® Ribonuclease Inhibitor, $MgCl_2$ and Nuclease-Free Water

| CAT.# | | QUANTITY |
|---|---|---|
| A5000 | Promega | 50 reactions |
| A5001 | Promega | 100 reactions |

### Reverse Transcription System

- Reverse transcription in only 15 minutes
- First-strand synthesis of cDNA molecules with a length of up to 5 kb
- All reagents in one kit: AMV Reverse Transcriptase (HC), 10X Reverse Transcription Buffer, dNTP Mix, Oligo(dT)$_{15}$ Primer, Random Primers, Recombinant RNasin® Ribonuclease Inhibitor, Nuclease-Free Water, $MgCl_2$ and Positive Control RNA

| CAT.# | | QUANTITY |
|---|---|---|
| A3500 | Promega | 100 reactions |

### Access RT-PCR System

- All RT-PCR reagents in one kit: AMV Reverse Transcriptase, *Tfl* DNA Polymerase, 5X AMV/*Tfl* Reaction Buffer, $MgSO_4$, Nuclease-Free Water, Positive Control RNA, and Upstream and Downstream Control Primers

| CAT.# | | QUANTITY |
|---|---|---|
| A1260 | Promega | 20 reactions |
| A1250 | Promega | 100 reactions |
| A1280 | | 500 reactions |

### AccessQuick™ RT-PCR System

- Convenient master mix for 1-step RT-PCR
- 2X AccessQuick™ Master Mix, AMV Reverse Transcriptase and Nuclease-Free Water

| CAT.# | | QUANTITY |
|---|---|---|
| A1701 | Promega | 20 reactions |
| A1702 | Promega | 100 reactions |
| A1703 | Promega | 500 reactions |

| | REVERSE TRANSCRIPTION FOLLOWED BY PCR | | REVERSE TRANSCRIPTION AND PCR IN ONE STEP | |
|---|---|---|---|---|
| **FEATURES** | **Reverse Transcription System** | **GoScript™ Reverse Transcription System** | **Access RT-PCR System** | **AccessQuick™ RT-PCR System** |
| **APPLICATION/NATURE OF THE SOURCE MATERIAL** | • RNA with strong secondary structure<br>• Multiple PCRs after RT | • Low-abundance mRNA<br>• Synthetic RNA<br>• Long RNA<br>• Incorporation of modified nucleotides<br>• (Cy®3/Cy®5 labelling for microarray analysis) | • RT and PCR in one reaction step<br>• Gene-specific RT-PCR<br>• Low-abundance mRNA<br>• RNA with strong secondary structure | • RT and PCR in one reaction step<br>• Gene-specific RT-PCR<br>• Low-abundance mRNA<br>• RNA with strong secondary structure<br>• Fewer pipetting steps |
| **FEATURES** | • For difficult RNAs with secondary structure<br>• Compatible with various types of PCR | • Highest sensitivity<br>• Can be used in one-step RT-PCR by incorporating *Taq* DNA polymerase | • One-step RT-PCR eliminates pipetting between RT and PCR<br>• High sensitivity | • One-step RT-PCR eliminates pipetting between RT and PCR<br>• Components already combined in a master mix<br>• High sensitivity |
| **RECOMMENDED RT PRIMER** | Oligo(dT)$_{15}$ or random primers | Oligo(dT)$_{15}$, random primers or gene-specific primer | Gene-specific primer | Gene-specific primer |
| **PRIMER INCLUDED** | Oligo(dT)$_{15}$ or random primers | Oligo(dT)$_{15}$, random primers and control primer | RT-PCR control primer | None |
| **OPTIMAL REACTION TEMPERATURE** | 42°C | 37–42°C | 42°C | 42°C |
| **RNASE H ACTIVITY** | ✔ | ✔ | ✔ | ✔ |
| **LENGTH OF THE RESULTING cDNA** | • Up to 5 kb | • Up to 9 kb | • Up to 5 kb | • Up to 5 kb |
| **SENSITIVITY** | • 1 µg total RNA<br>1 pg–1 µg poly(A)+ RNA | • 1 pg–1 µg total RNA, 10 copies | • 1 pg–1 µg total RNA<br>1–10 ng poly(A)+ RNA | • 1 pg–1 µg total RNA<br>• 1–10 ng poly(A)+ RNA |
| **SOURCE MATERIAL** | • Total RNA<br>• Poly(A)+ RNA | • Total RNA<br>• Poly(A)+ RNA<br>• Synthetic RNA | • Total RNA<br>• Poly(A)+ RNA | • Total RNA<br>• Poly(A)+ RNA |

# Oligonucleotides and Primers

## Oligo(dT)$_{15}$ Primer

- Primer for first-strand cDNA synthesis with a reverse transcriptase
- Hybridizes to the poly(A) tail of mRNA

| CAT.# | | QUANTITY |
|---|---|---|
| C1101 | Helix | 20 µg |

## Random Primers

- Primer for first-strand cDNA synthesis and cloning

| CAT.# | | QUANTITY |
|---|---|---|
| C1181 | Helix | 20 µg |

# Nuclease-Free Water

## Nuclease-Free Water

- No inhibitors: The water is untreated and has no chemical additives
- Guaranteed nuclease-free: intensive quality control

| CAT.# | | QUANTITY |
|---|---|---|
| P1193 | Helix | 50 ml (2×25 ml) |
| P1195 | | 150 ml |
| P1197 | | 500 ml |

# RIBONUCLEASE INHIBITORS

## Worry-free RNA isolation and analysis.

RNasin® Ribonuclease Inhibitor has been featured in more than 10,000 publications over the last 25 years and is the most widely used protection against RNases worldwide. RNasin® Inhibitor protects your RNA from degradation by RNases A, B and C, bringing you peace of mind when working with RNA from valuable source materials.

Use RNasin® Ribonuclease Inhibitor for RNA isolation, RT-PCR, in vitro transcription or any situation where RNase is a concern.

# If you haven't thought about protecting your RNA, maybe you should!

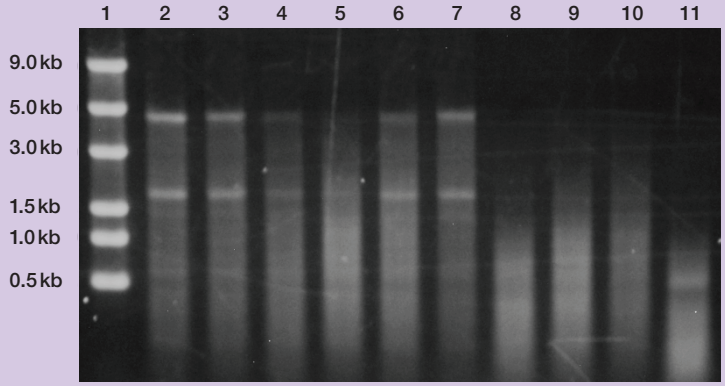
**"RNase-free" buffer and water samples from academic laboratories were tested for RNase contamination.**

The samples were in use for 1 to 14 months. Thirty-five microliters of each sample was collected, split and mixed with 5 µg of RNA and RNase ONE™ 10X buffer. Forty units of RNasin® Ribonuclease Inhibitor were added to one of the two samples, and both samples were incubated overnight at 37 °C. Lane 1, marker; lane 2, RNA control; lanes 3–11, samples from the laboratory.

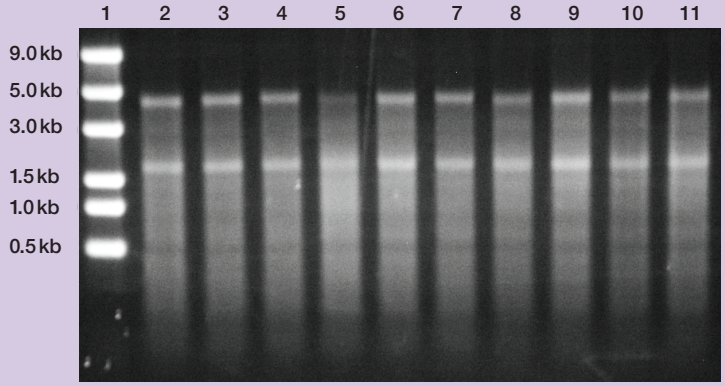
Of the nine samples tested, seven showed varying degrees of RNase contamination. For all samples tested, the RNA remained intact during the overnight incubation at 37°C when Recombinant RNasin® Ribonuclease Inhibitor was added.

Details of this experiment can be found at: www.promega.com/pubs/tpub_047

Samples without RNasin® Ribonuclease Inhibitor




Samples with RNasin® Ribonuclease Inhibitor




## Recombinant RNasin® Ribonuclease Inhibitor

- Inhibits RNase A, B and C as well as human placental RNase
- Does not inhibit other RNases and modifying enzymes like reverse transcriptases
- Results in higher yield in RNA extractions and better performance in RT-PCR, cDNA synthesis, microarrays and in vitro transcription/translation

| CAT.# | | QUANTITY |
|---|---|---|
| N2511 | Helix | 2,500 U |
| N2515 | Helix | 10,000 U |

## RNasin® Plus RNase Inhibitor

- Possesses all the proven features of Recombinant RNasin® Ribonuclease Inhibitor
- Stable against oxidation and heat, leading to higher stability—up to 15 minutes at 70 °C
- Particularly suitable for long-term storage of RNA samples

| CAT.# | | QUANTITY |
|---|---|---|
| N2611 | Helix | 2,500 U |
| N2615 | Helix | 10,000 U |

# REAL-TIME qPCR

## For all your qPCR and RT-qPCR applications.

We offer a range of high-quality reagents for dye-based and probe-based qPCR and RT-qPCR. Dye-based real-time qPCR reagents combine robust amplification and high sensitivity through the use of BRYT Green® Dye. Probe-based real-time qPCR reagents also provide reliable and sensitive results. Refer to the following pages to decide which of the two technologies is best suited for your experiment.

# Choosing the Right Real-Time qPCR Technology for Your Application

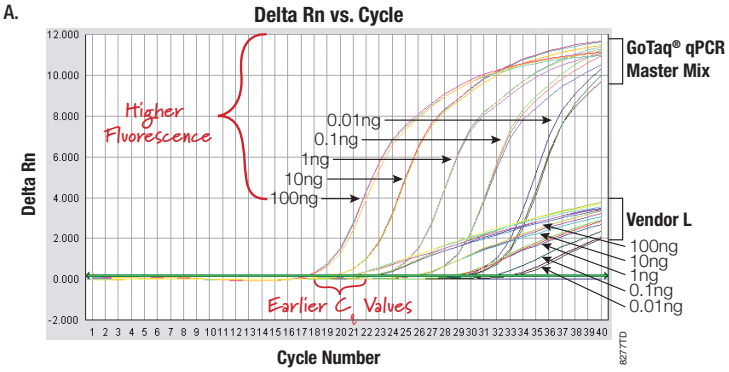
| | DYE-BASED REAL-TIME qPCR | PROBE-BASED REAL-TIME qPCR |
|---|---|---|
| **PRODUCT** | GoTaq® qPCR Master Mix<br>GoTaq® RT-qPCR Systems | GoTaq® Probe qPCR Master Mix<br>GoTaq® Probe RT-qPCR Systems |
| **TECHNOLOGY** | dsDNA-binding dyes such as BRYT Green® Dye detect accumulation of product during PCR. | Sequence-specific probes with fluorophore and quencher are hydrolyzed during PCR, and the accumulation of PCR product is detected. |
| **SPECIFICITY** | Medium | High |
| **SENSITIVITY (MINIMUM DETECTABLE COPY NUMBER)** | Varies | 1–10 copies |
| **MULTIPLEXING** | No | Yes (with the use of multiple dyes) |
| **APPLICATIONS** | • Gene expression<br>• DNA quantification<br>• Chromatin immunoprecipitation<br>• SNP genotyping | • Gene expression<br>• DNA quantification<br>• Chromatin immunoprecipitation<br>• SNP genotyping<br>• Copy number variation detection<br>• Signaling pathway analysis<br>• microRNA and small RNA detection<br>• Detection of mutations<br>• Multiplex PCR |

# Dye-Based Real-Time qPCR

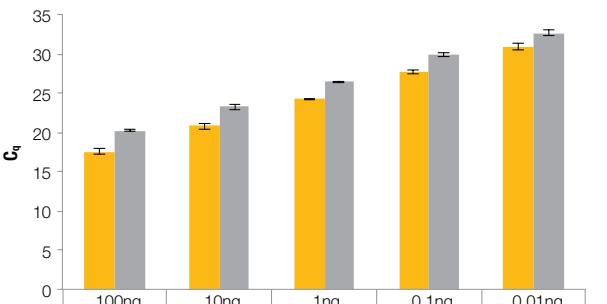
## Improved Sensitivity with the Strong Fluorescent Signal of BRYT Green® Dye

- **Sensitive:** Detection of sequences with low expression
- **Robust:** Optimized buffer in combination with hot-start polymerase ensures reproducible results
- **Convenient:** Fully compatible with SYBR® Green I protocol

A.




B.




| | 100ng | 10ng | 1ng | 0.1ng | 0.01ng |
|---|---|---|---|---|---|
| Promega | 17.57 | 20.75 | 24.19 | 27.65 | 30.89 |
| Vendor L | 20.26 | 23.23 | 26.43 | 29.87 | 32.60 |

A series of five tenfold dilutions of human gDNA was amplified with GoTaq® qPCR Master Mix or Vendor L's equivalent master mix to examine GAPDH expression. GoTaq® qPCR Master Mix shows a higher fluorescent signal (Panel A) and earlier $C_q$ values (Panel B) for all sample input amounts. All no-template control reaction wells were blank.

### GoTaq® qPCR Master Mix

- 2X GoTaq® qPCR Master Mix with GoTaq® DNA Polymerase, BRYT Green® Dye, $MgCl_2$, dNTPs and buffer
- CXR Reference Dye, both in the mix and available separately
- Nuclease-Free Water supplied separately

| CAT.# | | QUANTITY |
|---|---|---|
| A6001 | Promega | 200 × 50 µl reactions (5 × 1 ml) |
| A6002 | Promega | 1,000 × 50 µl reactions (25 × 1 ml) |

### GoTaq® 1-Step RT-qPCR System

- System for RNA analysis through quantitative 1-step RT-qPCR

| CAT.# | | QUANTITY |
|---|---|---|
| A6020 | Promega | 200 reactions |

### GoTaq® 2-Step RT-qPCR System

- 2-step RT-qPCR for RNA quantification
- cDNA synthesis with the GoScript™ Reverse Transcription System and quantification using GoTaq® qPCR Master Mix
- All reagents in one kit: 2X GoTaq® qPCR Master Mix, GoScript™ Reverse Transcriptase, 5X GoScript™ Reaction Buffer, PCR Nucleotide Mix, $Oligo(dT)_{15}$ Primer, Random Primers, Recombinant RNasin® Ribonuclease Inhibitor, CXR Reference Dye, $MgCl_2$ and Nuclease-Free Water

| CAT.# | | QUANTITY |
|---|---|---|
| A6010 | Promega | 50 × 20 µl RT reactions and 200 × 50 µl qPCR reactions |

# Probe-Based Real-Time qPCR

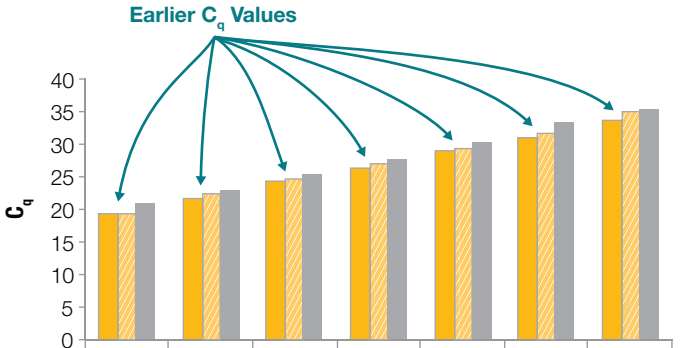
**GoTaq® Probe qPCR Master Mix is optimized for probe-based quantitative PCR (e.g., using TaqMan® probes).** This 2X master mix contains all required components; just add probe, primer and template.

GoTaq® Probe qPCR Master Mix allows probe-based real-time qPCR with high reproducibility and sensitivity. Its resistance to PCR inhibitors makes this a highly efficient product for gene expression analysis. Reaction setup in large quantities is possible because the master mix is stable at room temperature.

GoTaq® Probe qPCR Master Mix is compatible with all major thermal cyclers, using both standard and FAST cycling protocols.

TaqMan® is a registered trademark of Life Technologies.

## Comparison: Standard vs. FAST Cycling




| | 100ng | 10ng | 1ng | 0.1ng | 10pg | 1pg | 0.1pg |
|---|---|---|---|---|---|---|---|
| Promega—Standard | 19.3 | 21.7 | 24.3 | 26.3 | 29.0 | 31.1 | 33.8 |
| Promega—FAST | 19.2 | 22.2 | 24.7 | 26.9 | 29.3 | 31.7 | 34.9 |
| Vendor L—FAST | 20.9 | 23.1 | 25.4 | 27.8 | 30.3 | 33.2 | 35.5 |

11724MA

GoTaq® Probe qPCR Master Mix gives comparable results when GAPDH is amplified from human pancreas cDNA using standard and fast thermal cycling conditions. Earlier $C_q$ values were observed for both standard and fast thermal cycling conditions when GoTaq® Probe qPCR Master Mix was compared to a competing product (Vendor L).

### GoTaq® Probe qPCR Master Mix

- 2X GoTaq® Probe qPCR Master Mix with GoTaq® Polymerase, BRYT Green® Dye, $MgCl_2$, dNTPs and buffer
- Separate CXR Reference Dye

| CAT.# | | QUANTITY |
|---|---|---|
| A6101 | Helix | 200 × 20 µl reactions (2 × 1 ml) |
| A6102 | Helix | 1,000 × 20 µl reactions (10 × 1 ml) |

### GoTaq® Probe 1-Step RT-qPCR System

- System for RNA analysis through quantitative 1-step RT-qPCR
- Inclusion of dUTP allows control of carryover DNA contamination through the use of uracil-DNA glycosylase (UNG)

| CAT.# | | QUANTITY |
|---|---|---|
| A6120 | Helix | 200 reactions |

### GoTaq® Probe 2-Step RT-qPCR System

- Two-step RT-qPCR for RNA quantification
- cDNA synthesis with the GoScript™ Reverse Transcription System and quantification using GoTaq® qPCR Master Mix
- All reagents in one kit: 2X GoTaq® qPCR Master Mix, GoScript™ Reverse Transcriptase, 5X GoScript™ Reaction Buffer, PCR Nucleotide Mix, $Oligo(dT)_{15}$ Primer, Random Primers, Recombinant RNasin® Ribonuclease Inhibitor, CXR Reference Dye, $MgCl_2$ and Nuclease-Free Water

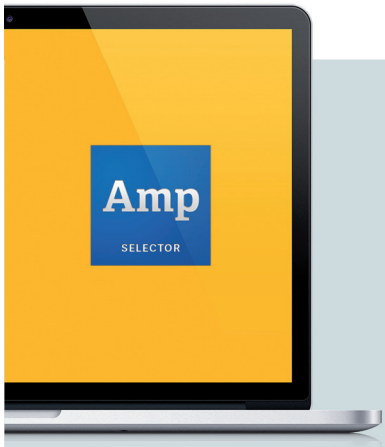
| CAT.# | | QUANTITY |
|---|---|---|
| A6110 | Helix | 50 × 20 µl RT reactions and 200 × 50 µl qPCR reactions |

# Nuclease-Free Water

### Nuclease-Free Water

- No inhibitors: The water is untreated and has no chemical additives
- Guaranteed nuclease-free: intensive quality control

| CAT.# | | QUANTITY |
|---|---|---|
| P1193 | Helix | 50 ml (2 × 25 ml) |
| P1195 | Helix | 150 ml |




TOOLS FOR PROFESSIONALS

## Amplification Product Selector

Which Promega PCR product is right for you? Decision guidance is available online:

www.promega.com/amplification-product-selector

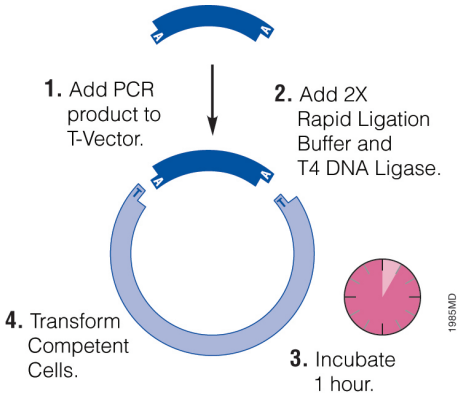
# CLONING SYSTEMS

Promega cloning systems include trusted T-vector systems for PCR cloning, flexible systems for cloning and transferring open reading frames in protein expression studies, and a variety of other vectors for your everyday cloning needs. cDNA libraries can be created quickly and easily with the Universal RiboClone® cDNA Synthesis System. To clone human target sequences for expression of short hairpin RNAs (shRNAs), use the GeneClip™ U1 Hairpin Cloning System.

# PCR Cloning

## Clone PCR Products Rapidly and Efficiently with Proven T-Vector Systems.

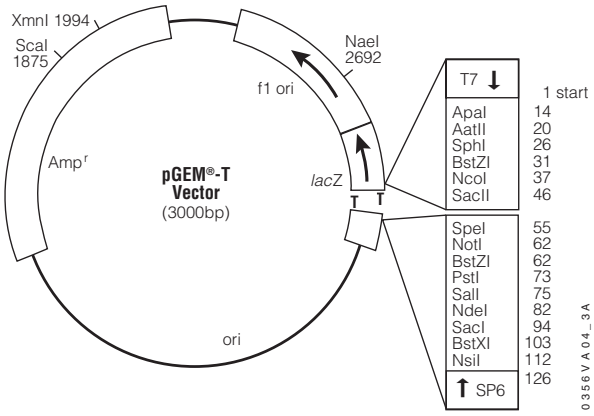
In PCR, A-overhangs are usually produced at the ends of the amplicon. Linearized vectors with corresponding T-overhangs provide a convenient solution for successful cloning. We offer various T-cloning vectors, with an extended multiple cloning site, with or without competent cells, and for expression in mammalian cells.




### pGEM®-T Vector System I

- System for easy cloning of PCR products with a 3´ A overhang
- Linearized pGEM®-5Zf (+) Vector with 3´-T overhangs on both ends
- Rapid ligation buffer enables cloning in 1 hour at room temperature

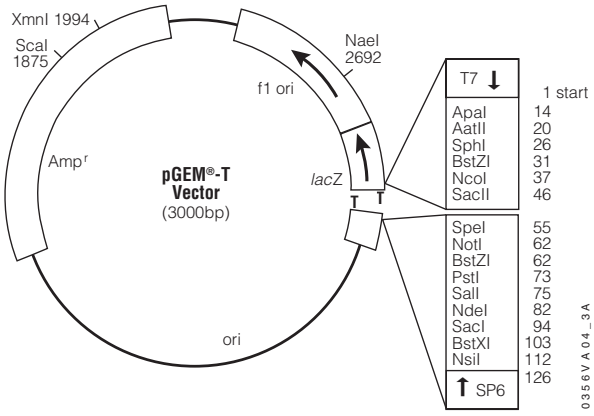
| CAT.# | QUANTITY |
|---|---|
| A3600 | 20 reactions |




### pGEM®-T Vector System II

- Identical to the pGEM®-T Vector System I, with JM109 Competent Cells included

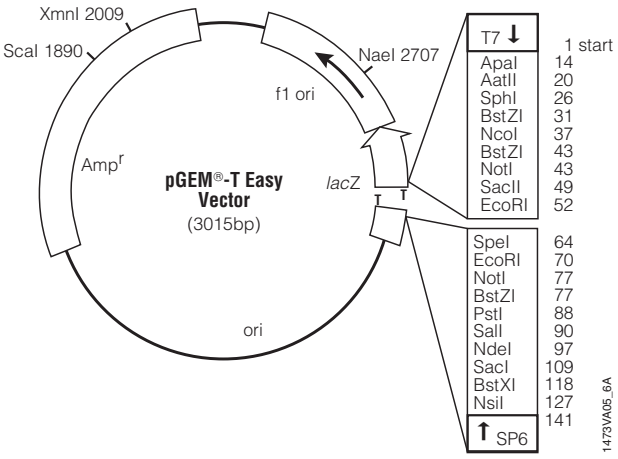
| CAT.# | QUANTITY |
|---|---|
| A3610 | 20 reactions |



## pGEM®-T Easy Vector System I

- System for cloning PCR products
- Identical to the pGEM®-T Vector System I, with additional restriction sites flanking the insertion site
- Rapid ligation buffer enables cloning in 1 hour at room temperature

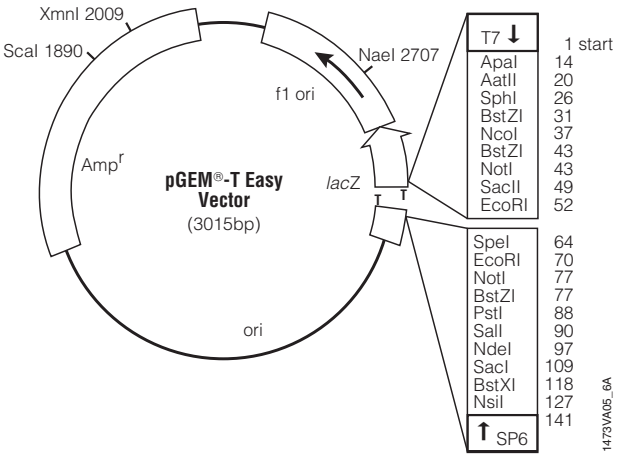
| CAT.# | QUANTITY |
|---|---|
| A1360 | 20 reactions |




## pGEM®-T Easy Vector System II

- Identical to the pGEM®-T Easy Vector System I, with JM109 Competent Cells included

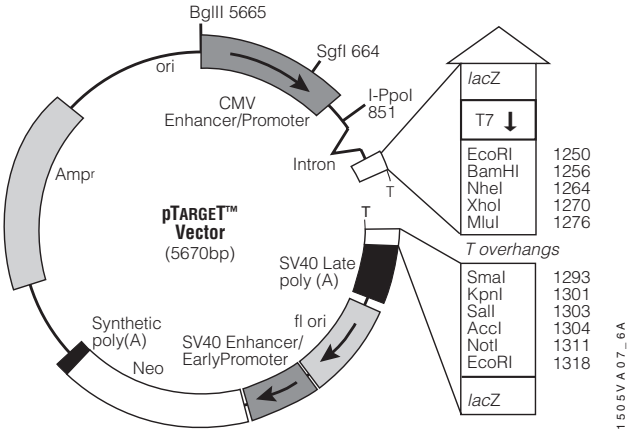
| CAT.# | QUANTITY |
|---|---|
| A1380 | 20 reactions |




## pTargeT™ Mammalian Expression Vector System

- For easy cloning of PCR products
- Enables direct expression of the cloned sequence in mammalian cells

| CAT.# | QUANTITY |
|---|---|
| A1410 | 20 reactions |

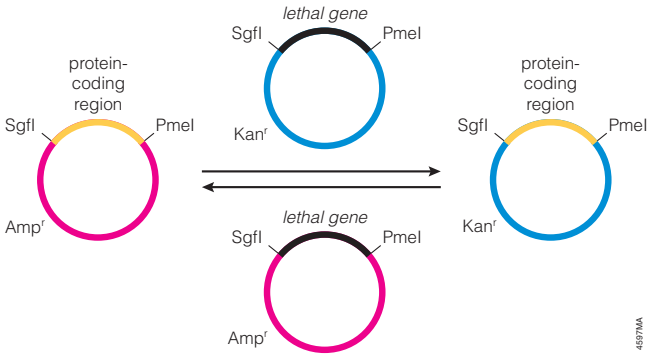


# Flexi® Cloning Systems

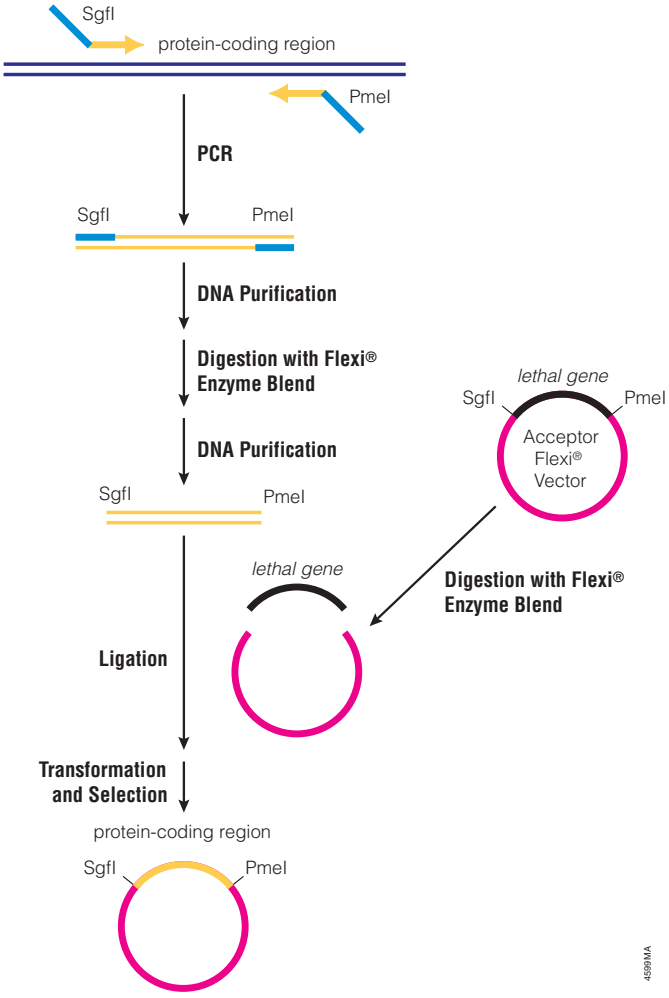
## Directional Cloning System for Recombinant Protein Expression

The Flexi® Vector System provides a method for directional cloning of protein-coding sequences based on two rare-cutting restriction enzymes, SgfI and PmeI. The system provides a quick and efficient way to transfer inserts between vectors without the need to resequence.

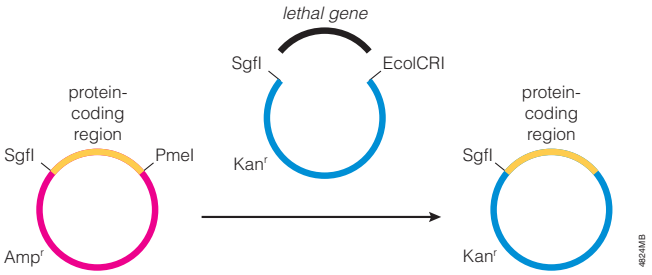
- Directional cloning of open reading frames (ORF)
- Particularly suitable for the preparation of N- or C-terminal tagged fusion proteins
- Easy transfer of ORF in a variety of vectors—no resequencing
- Wide range of vectors for protein expression in mammalian cells or *E. coli*




**Transfer of a protein-coding region between Flexi® Vectors:** The Flexi® Vector System provides a flexible method for directional cloning to produce plasmids for protein expression. The Flexi® Vectors contain the deadly barnase gene and an antibiotic-resistance marker for positive selection of clones.




Cloning of a protein-coding sequence into a Flexi® Vector




**Transferring protein-coding regions into C-terminal Flexi® Vector Systems.** C-terminal Flexi® Vectors contain SgfI and EcoICRI sites and are designed for expression of C-terminal-tagged proteins. Joining PmeI and EcoICRI blunt ends eliminates the stop codon present in the PmeI site and allows readthrough to the C-terminal protein-coding sequences in the C-terminal Flexi® Vectors. Since both restriction sites are destroyed by ligation, transfer into C-terminal Flexi® Vectors is not reversible (i.e., it is a one-way exchange).

### Flexi® System, Entry/Transfer

| CAT.# | QUANTITY |
|---|---|
| C8640 | 5 entry reactions and 20 transfer reactions |

### Flexi® System, Transfer

| CAT.# | QUANTITY |
|---|---|
| C8820 | 100 transfer reactions |

### Carboxy Flexi® System, Transfer

| CAT.# | QUANTITY |
|---|---|
| C9320 | 50 transfer reactions |

**Faster Cloning Means Faster Results. Read more about the Flexi® Cloning Systems.**

www.promega.com/flexi-vector-system

# cDNA Library Construction

### Universal RiboClone® cDNA Synthesis System

- For creating a cDNA library from RNA
- Contains all reagents required for the synthesis of double-stranded cDNA from mRNA and for subsequent ligation into a vector using EcoRI Adapters

| CAT.# | QUANTITY |
|---|---|
| C4360 | 1 system |

# RNA Interference

The GeneClip™ Hairpin Cloning System is a DNA-directed RNA interference system (ddRNAi), developed specifically for the expression of small hairpin RNAs in mammalian cells. The system allows fast and efficient cloning and expression of shRNAs.

pGeneClip™ Basic and pGeneClip™ hMGFP Vectors are recommended for transient transfection. pGeneClip™ Puromycin, Hygromycin and Neomycin Vectors contain antibiotic-resistance genes for production of stably transfected cells.

### GeneClip™ U1 Hairpin Cloning System—Basic

| CAT.# | QUANTITY |
|---|---|
| C8750 | 1 system |

### GeneClip™ U1 Hairpin Cloning System—Puromycin

| CAT.# | QUANTITY |
|---|---|
| C8760 | 1 system |

### GeneClip™ U1 Hairpin Cloning System—Hygromycin

| CAT.# | QUANTITY |
|---|---|
| C8770 | 1 system |

### GeneClip™ U1 Hairpin Cloning System—Neomycin

| CAT.# | QUANTITY |
|---|---|
| C8780 | 1 system |

### GeneClip™ U1 Hairpin Cloning System—hMGFP

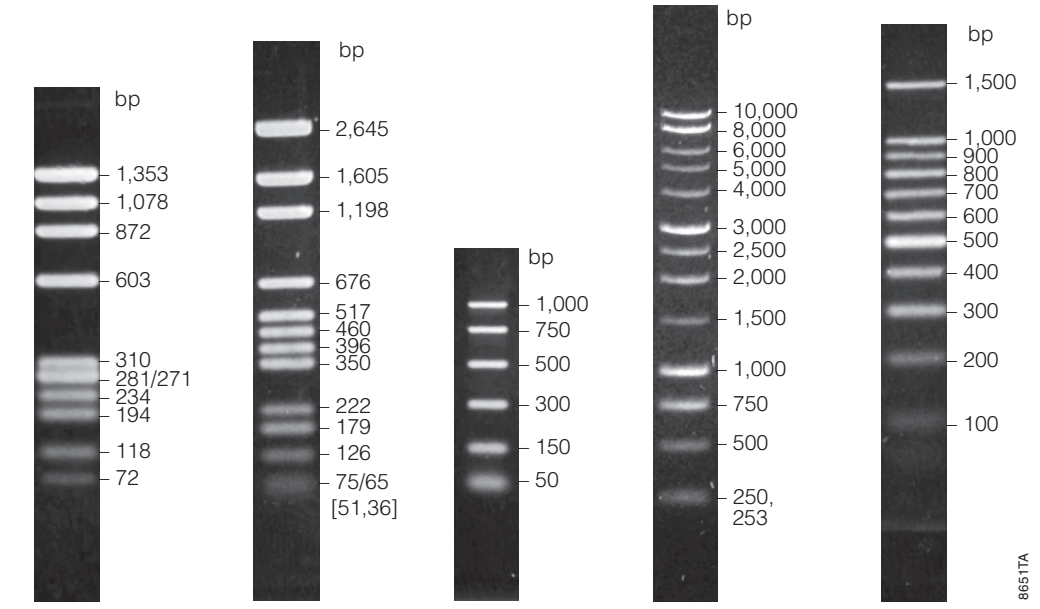
| CAT.# | QUANTITY |
|---|---|
| C8790 | 1 system |

# MARKERS

Promega BenchTop DNA Markers can be stored at room temperature, providing the ultimate in ready-to-use convenience. We also offer a wide range of conventional markers, including DNA Step Ladders, RNA Markers and a selection of other markers covering a range of fragment sizes.

# BenchTop DNA Markers

The BenchTop DNA Markers are supplied in 1X Blue/Orange Loading Dye. They can be stored conveniently at room temperature (22–25 °C) and loaded directly onto agarose gels without addition of loading buffer. The DNA fragments can be stained with ethidium bromide or Diamond™ Nucleic Acid Dye.




2% agarose

BenchTop ϕX174 DNA/HaeIII Markers
Cat.# G7511
Load 5µl/lane.

2% agarose

BenchTop pGEM® DNA Markers
Cat.# G7521
Load 5µl/lane.

2% agarose

BenchTop PCR Markers
Cat.# G7531
Load 6µl/lane.

0.7% agarose

BenchTop 1kb DNA Ladder
Cat.# G7541
Load 6µl/lane.

2% agarose

BenchTop 100bp DNA Ladder
Cat.# G8291
Load 6µl/lane.

## BenchTop ΦX174 DNA/HaeIII Markers

| CAT.# | | QUANTITY |
|---|---|---|
| G7511 | Helix | 250 µl (50 lanes) |

## BenchTop pGEM® DNA Markers

| CAT.# | | QUANTITY |
|---|---|---|
| G7521 | Helix | 250 µl (50 lanes) |

## BenchTop PCR Markers

| CAT.# | | QUANTITY |
|---|---|---|
| G7531 | Helix | 300 µl (50 lanes) |

## BenchTop 1kb DNA Ladder

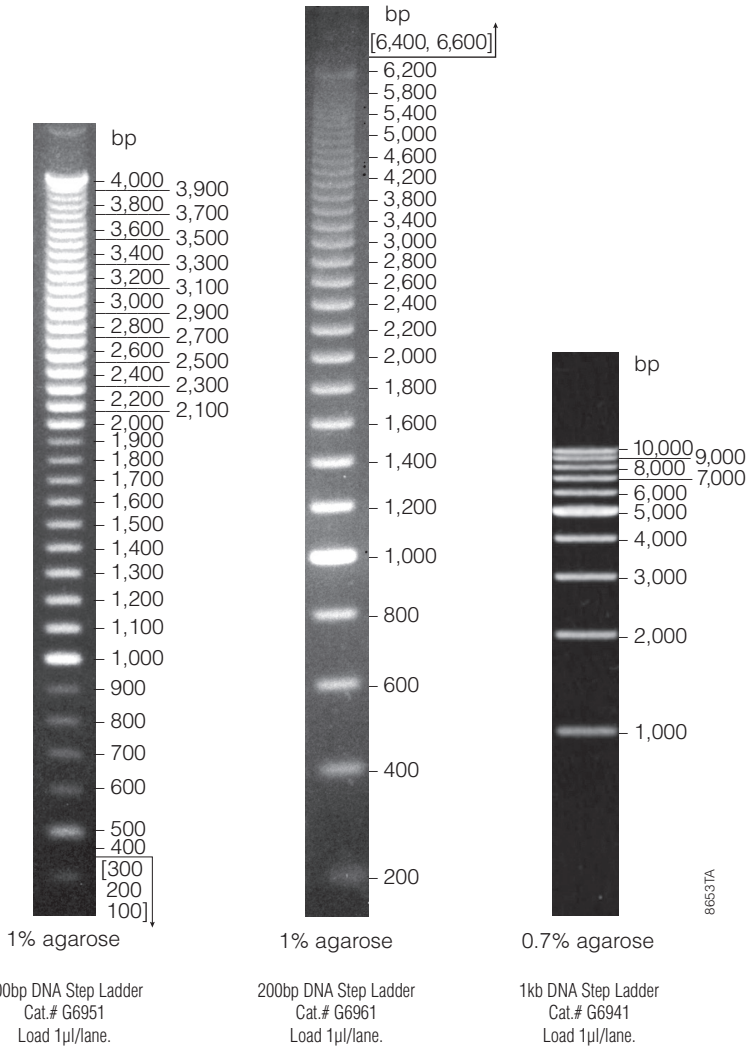
| CAT.# | | QUANTITY |
|---|---|---|
| G7541 | Helix | 600 µl (100 lanes) |

## BenchTop 100bp DNA Ladder

| CAT.# | | QUANTITY |
|---|---|---|
| G8291 | Helix | 300 µl (50 lanes) |

# DNA Step Ladders

The DNA Step Ladders are DNA markers with equal intervals between bands. Each ladder is supplied with 6X Blue/Orange Loading Dye. The fragments can be stained with ethidium bromide or Diamond™ Nucleic Acid Dye.




100bp DNA Step Ladder
Cat.# G6951
Load 1µl/lane.

200bp DNA Step Ladder
Cat.# G6961
Load 1µl/lane.

1kb DNA Step Ladder
Cat.# G6941
Load 1µl/lane.

## 10bp DNA Step Ladder

| CAT.# | | QUANTITY |
|---|---|---|
| G4471 | Helix | 32.5 µg (50 lanes) |

## 25bp DNA Step Ladder

| CAT.# | | QUANTITY |
|---|---|---|
| G4511 | Helix | 100 µg (55 lanes) |

## 50bp DNA Step Ladder

| CAT.# | | QUANTITY |
|---|---|---|
| G4521 | Helix | 90 µg (52 lanes) |

## 100bp DNA Step Ladder

| CAT.# | | QUANTITY |
|---|---|---|
| G6951 | Helix | 100 µg (100 lanes) |

## 200bp DNA Step Ladder

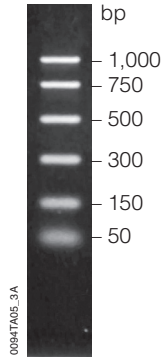
| CAT.# | | QUANTITY |
|---|---|---|
| G6961 | Helix | 100 µg (100 lanes) |

## 1kb DNA Step Ladder

| CAT.# | | QUANTITY |
|---|---|---|
| G6941 | Helix | 90 µg (300 lanes) |

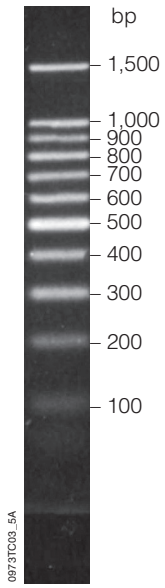
# DNA Ladders

The DNA Ladders have fragment sizes of approximately equal intensity on the gel. They are supplied with 6X Blue/Orange Loading Dye. The fragments can be stained with ethidium bromide or Diamond™ Nucleic Acid Dye.



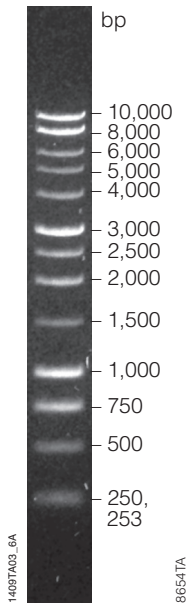

2% agarose

PCR Markers
Cat.# G3161
Load 5µl/lane.




2% agarose

100bp DNA Ladder
Cat.# G2101
Load 5µl/lane.




0.7% agarose

1kb DNA Ladder
Cat.# G5711
Load 5µl/lane.

## PCR Markers

| CAT.# | | QUANTITY |
|---|---|---|
| G3161 | Helix | 250 µl (50 lanes) |

## 100bp DNA Ladder

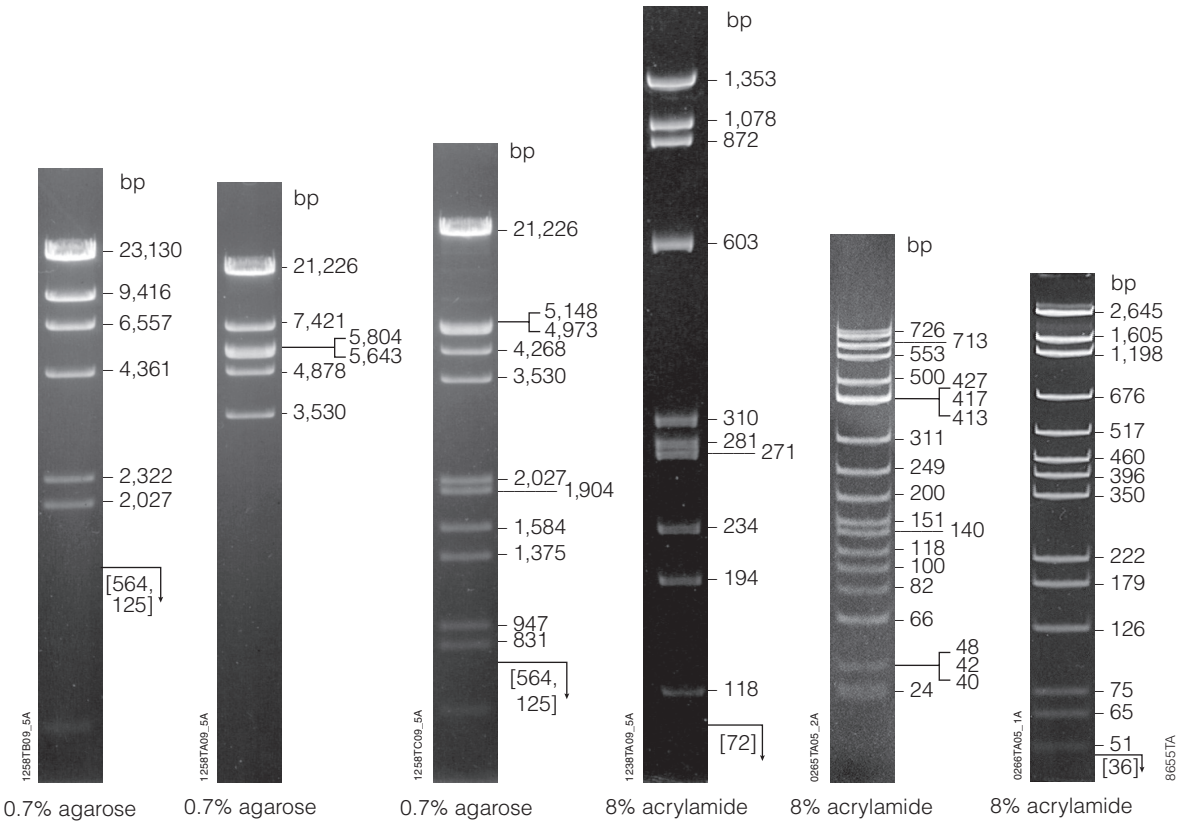
| CAT.# | | QUANTITY |
|---|---|---|
| G2101 | Helix | 250 µl (50 lanes) |

## 1kb DNA Ladder

| CAT.# | | QUANTITY |
|---|---|---|
| G5711 | Helix | 500 µl (100 lanes) |

# Conventional DNA Markers

Conventional DNA markers are generated by the complete restriction digestion of lambda DNA, PhiX174 phage DNA (replicative form) or plasmids. The fragments can be stained with ethidium bromide or Diamond™ Nucleic Acid Dye.




## Lambda DNA/HindIII Markers

| CAT.# | QUANTITY |
|---|---|
| G1711 | 100 µg (200 lanes) |

## Lambda DNA/EcoRI Markers

| CAT.# | QUANTITY |
|---|---|
| G1721 | 100 µg (200 lanes) |

## Lambda DNA/EcoRI + HindIII Markers

| CAT.# | QUANTITY |
|---|---|
| G1731 | 100 µg (200 lanes) |

## ΦX174 DNA/HaeIII Markers

| CAT.# | QUANTITY |
|---|---|
| G1761 | 50 µg (50 lanes) |

## ΦX174 DNA/HinfI Markers

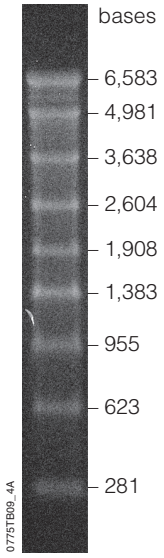
| CAT.# | QUANTITY |
|---|---|
| G1751 | 50 µg (50 lanes) |

## pGEM® DNA Markers

| CAT.# | QUANTITY |
|---|---|
| G1741 | 50 µg (50 lanes) |

# RNA Markers

RNA Markers are suitable for determining the size of single-stranded RNA of 0.28–6.58 kb in glyoxal or formaldehyde-agarose gels. After electrophoresis, the fragments can be visualized with ethidium bromide staining.




1% formaldehyde-agarose

| RNA Markers | CAT.# | | QUANTITY |
|---|---|---|---|
| | G3191 | Helix | 50 µl (50 lanes) |

# RESTRICTION ENZYMES

Restriction enzymes are an integral part of our Genomics Essentials, offering you fast, reliable DNA digestion at an affordable price.

TOOLS FOR PROFESSIONALS

## Restriction Enzyme Tool

With the restriction enzyme tool, you can search restriction enzymes by name, recognition sequence or overhang, and can quickly and easily find enzymes for double digestion. (The tool is available free on the App Store for Apple devices and on Google Play for Android devices.)

www.promega.com/restriction-enzyme-tool

# Restriction Enzymes

## Save Time and Money with Restriction Enzymes from Promega

### Rapid and efficient DNA digestion

www.promega.com/rapid-digest

You need restriction enzymes that cut DNA quickly and efficiently. We have tested the most common restriction enzymes for DNA digestion in 15 minutes or less using standard enzymes and buffers.

Helix applies to all restriction enzymes available in the Helix® freezers

For more information about restriction endonucleases, visit:
www.promega.com/restriction-enzyme-tool

| ENZYME | CAT.# | QUANTITY | SEQUENCE | RAPID DIGESTION | RECOMMENDED BUFFER | ACTIVITY IN BUFFER | | | | | | | HEAT INACTIVATION | INCUBATION TEMPERATURE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | A | B | C | D | E | H | MULTI-CORE™ | | |
| **AccI** | **R6411** | 100 U | GT▾(A/C)(T/G) AC<br>CA (T/G)(A/C)▴TG | ☑ | G | 50–75% | 25–50% | 25–50% | 10–25% | <10% | <10% | 25–50% | ⊖ | 37°C |
| | **R6415** | 500 U | | | | | | | | | | | | |
| **AccIII** | **R6581** | 200 U | T▾CCGG A<br>A GGCC▴T | | F | <10% | 10–25% | 25–50% | 25–50% | n.d. | n.d. | <10% | ⊖ | 65°C |
| **AgeI** | **R7251** | 100 U | A▾CCGG T<br>T GGCC▴A | ☑ | K | 25–50% | 25–50% | 25–50% | 50–75% | n.d. | n.d. | 100% | ⊕ | 37°C |
| **AluI** | **R6281** | 500 U | AG▾CT<br>TC▴GA | ☑ | B | 75–100% | 100% | 75–100% | 10–25% | n.d. | n.d. | 10–25% | ⊕ | 37°C |
| **ApaI** | **R6361** | 5,000 U | G GGCC▾C<br>C▴CCGG G | | A | 100% | 50–75% | 50–75% | <10% | 10–25% | <10% | 75–100% | ⊕ | 37°C |
| | **R4364** | 25,000 U | | | | | | | | | | | | |
| **AvaII** | **R6131** | 100 U | G▾G(A/T)C C<br>C C(T/A)G▴G | | C | 50–75% | 50–75% | 100% | 25–50% | n.d. | n.d. | 25–50% | ⊕ | 37°C |
| | **R6135** | 1,000 U | | | | | | | | | | | | |
| **BalI** | **R6691** | 50 U | TGG▾CCA<br>ACC▴GGT | | G | 10–25% | <10% | <10% | <10% | n.d. | n.d. | <10% | ⊕ | 37°C |
| | **R6695** | 250 U | | | | | | | | | | | | |
| **BamHI** | **R6021** | 2,500 U | G▾GATC C<br>C CTAG▴G | ☑ | E | 75–100%* | 75–100% | 75–100% | 50–75% | 100% | 50–75% | 75–100% | ⊕ | 37°C |
| | **R6025** | 12,500 U | | | | | | | | | | | | |

* Not recommended, due to possible star activity.
** Unit activity is based on the recommended buffer. In Buffer H some enzymes have increased activity.
n.d. = not determined.

| ENZYME | CAT.# | QUANTITY | SEQUENCE | RAPID DIGESTION | RECOMMENDED BUFFER | ACTIVITY IN BUFFER | | | | | | | HEAT INACTIVATION | INCUBATION TEMPERATURE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | A | B | C | D | E | H | MULTI-CORE™ | | |
| **BanI** | **R6891** | 200 U | G▾G(T/C)(A/G)C C<br>C C(A/G)(T/C)G▴G | | G | 25–50% | 25–50% | 10–25% | <10% | n.d. | n.d. | 100% | ⊖ | 50°C |
| **BclI** | **R6651** | 1,000 U | T▾GATC A<br>A CTAG▴T | | C | 10–25% | 75–100% | 100% | 50–75% | 50–75% | 50–75% | 10–25% | ⊖ | 50°C |
| **BglI** | **R6071** | 1,000 U | GCCN NNN▾NGGC<br>CGGN▴NNN NCCG | | D | 10–25% | 25–50% | 75–100% | 100% | 25–50% | 75–100% | 100% | ⊕ | 37°C |
| | **R6077** | 5,000 U | | | | | | | | | | | | |
| **BglII** | **R6081** | 500 U | A▾GATC T<br>T CTAG▴A | | D | 25–50% | 75–100% | 75–100% | 100% | n.d. | n.d. | <10% | ⊖ | 37°C |
| | **R6085** | 2,500 U | | | | | | | | | | | | |
| | **R6087** | 10,000 U | | | | | | | | | | | | |
| **BssHII** | **R6831** | 100 U | G▾CGCG C<br>C GCGC▴G | | H | 75–100% | 50–75% | 75–100% | 50–75% | n.d. | 100% | 75–100% | ⊖ | 50°C |
| | **R6835** | 500 U | | | | | | | | | | | | |
| **BstEII** | **R6641** | 2,000 U | G▾GTNAC C<br>C CANTG▴G | | D | 25–50% | 50–75% | 50–75% | 100% | n.d. | n.d. | 100% | ⊖ | 60°C |
| **BstXI** | **R6471** | 250 U | CCAN NNNN▾NTGG<br>GGTN▴NNNN NACC | | D | <10% | 10–25% | 25–50% | 100% | 100% | 75–100% | 10–25% | ⊕/⊖ | 50°C |
| | **R6475** | 1,000 U | | | | | | | | | | | | |
| **CfoI** | **R6241** | 3,000 U | G CG▾C<br>C▴GC G | | B | 75–100% | 100% | 75–100% | 25–50% | n.d. | n.d. | 100% | ⊕/⊖ | 37°C |
| **ClaI** | **R6551** | 500 U | AT▾CG AT<br>TA GC▴TA | | C | 75–100% | 75–100% | 100% | 75–100% | 100% | 50–75% | 100% | ⊕ | 37°C |
| | **R6555** | 2,500 U | | | | | | | | | | | | |
| **DdeI** | **R6291** | 200 U | C▾TNA G<br>G ANT▴C | | D | 25–50% | 25–50% | 50–75% | 100% | n.d. | n.d. | 25–50% | ⊕/⊖ | 37°C |
| | **R6295** | 1,000 U | | | | | | | | | | | | |
| **DpnI** | **R6231** | 200 U | G$^{me}$A▾TC<br>CT▴$^{me}$AG | ☑ | B | 50–75% | 100% | 75–100% | 50–75% | n.d. | n.d. | 100% | ⊕ | 37°C |
| **DraI** | **R6271** | 2,000 U | TTT▾AAA<br>AAA▴TTT | | B | 75–100% | 100% | 75–100% | 50–75% | n.d. | n.d. | 25–50% | ⊕ | 37°C |
| **Eco47III** | **R6731** | 50 U | AGC▾GCT<br>TCG▴CGA | | D | <10% | 25–50% | 50–75% | 100% | n.d. | n.d. | 25–50% | ⊕ | 37°C |
| **EcoICRI** | **R6951** | 1,000 U | GAG▾CTC<br>CTC▴GAG | | B | 10–25% | 100% | 75–100% | <10% | 25–50% | n.d. | 100% | ⊕ | 37°C |
| **EcoRI** | **R6011** | 5,000 U | G▾AATT C<br>C TTAA▴G | ☑ | H | 25–50% | 50–75% | 50–75% | 50–75% | 75–100% | 100% | 100%* | ⊕ | 37°C |
| | **R6017** | 15,000 U | | | | | | | | | | | | |
| **EcoRV** | **R6351** | 2,000 U | GAT▾ATC<br>CTA▴TAG | ☑ | D | 10–25% | 25–50% | 50–75% | 100% | 25–50% | 50–75% | 100% | ⊕ | 37°C |
| | **R6355** | 10,000 U | | | | | | | | | | | | |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **HaeII** | **R6661** | 1,000 U | (A/G) GCGC▾(T/C)<br>(T/C)▴CGCG (A/G) | | B | 50–75% | 100% | 50–75% | 10–25% | n.d. | n.d. | 100% | ⊖ | 37°C |
| **HaeIII** | **R6171** | 2,500 U | GG▾CC<br>CC▴GG | ☑ | C | 75–100% | 75–100% | 100% | 50–75% | n.d. | n.d. | 100% | ⊖ | 37°C |
| | **R6175** | 10,000 U | | | | | | | | | | | | |
| **HhaI** | **R6441** | 1,000 U | G CG▾C<br>C▴GC G | | C | 50–75% | 75–100% | 100% | 50–75% | n.d. | n.d. | 75–100% | ⊕ | 37°C |
| **HincII** | **R6031** | 200 U | GT(T/C)▾(A/G)AC<br>CA(A/G)▴(T/C)TG | | B | 25–50% | 100% | 25–50% | 50–75% | 75–100% | 50–75% | 100% | ⊕ | 37°C |
| | **R6035** | 1,000 U | | | | | | | | | | | | |
| | **R6037** | 5,000 U | | | | | | | | | | | | |
| **HindIII** | **R6041** | 5,000 U | A▾AGCT T<br>T TCGA▴A | ☑ | E | 25–50% | 100% | 75–100% | 10–25% | 100% | 25–50% | 50–75% | ⊕ | 37°C |
| | **R6045** | 15,000 U | | | | | | | | | | | | |
| **HinfI** | **R6201** | 1,000 U | G▾ANT C<br>C TNA▴G | | B | 50–75% | 100% | 75–100% | 75–100% | n.d. | n.d. | 50–75% | ⊖ | 37°C |
| | **R6205** | 5,000 U | | | | | | | | | | | | |
| **HpaI** | **R6301** | 100 U | GTT▾AAC<br>CAA▴TTG | | J | 25–50% | 50–75% | 25–50% | 10–25% | n.d. | n.d. | 100% | ⊖ | 37°C |
| | **R6305** | 500 U | | | | | | | | | | | | |
| **HpaII** | **R6311** | 1,000 U | C▾CG G<br>G GC▴C | | A | 100% | 50–75% | 50–75% | 10–25% | n.d. | n.d. | 100% | ⊖ | 37°C |
| | **R6315** | 5,000 U | | | | | | | | | | | | |
| **Hsp92I** | **R7151** | 500 U | G(A/G)▾CG (T/C)C<br>C(T/C) GC▴(A/G)G | | F | 10–25% | 75–100% | 50–75% | 25–50% | n.d. | n.d. | 10–25% | ⊕ | 37°C |
| **Hsp92II** | **R7161** | 1,000 U | CATG▾<br>▴GTAC | | K | 10–25% | 25–50% | 25–50% | <10% | n.d. | n.d. | <10% | ⊕ | 37°C |
| **I-PpoI** | **R7031** | 10,000 U | CTCTC TTAA▾GGTAGC<br>GAGAG▴AATT CCATCG | | I-PpoI | 10–25% | 25–50% | 25–50% | 25–50% | n.d. | n.d. | n.d. | ⊕ | 37°C |
| **KpnI** | **R6341** | 2,500 U | G GTAC▾C<br>C▴CATG G | ☑ | J | 100%* | 25–50% | 25–50% | <10% | 25–50% | <10% | 75–100% | ⊕/⊖ | 37°C |
| | **R6345** | 10,000 U | | | | | | | | | | | | |
| **MboI** | **R6711** | 200 U | ▾GATC<br>CTAG▴ | | C | 10–25% | 75–100% | 100% | 50–75% | n.d. | n.d. | <10% | ⊕ | 37°C |
| **MboII** | **R6723** | 100 U | GAAGA(N)$_8$▾<br>CTTCT(N)$_7$▴ | | B | 10–25% | 100% | 50–75% | 75–100% | n.d. | n.d. | 100% | ⊕ | 37°C |
| **MluI** | **R6381** | 1,000 U | A▾CGCG T<br>T GCGC▴A | | D | 10–25% | 25–50% | 50–75% | 100% | 25–50% | 100–125%** | 10–25% | ⊕/⊖ | 37°C |
| **MspI** | **R6401** | 2,000 U | C▾CG G<br>G GC▴C | | B | 75–100% | 100% | 75–100% | 25–50% | n.d. | n.d. | 25–50% | ⊕ | 37°C |
| | **R6405** | 10,000 U | | | | | | | | | | | | |
| **MspA1I** | **R7021** | 1,000 U | C(A/C)G▾C(G/T)G<br>G(T/G)C▴G(C/A)C | | C | 25–50% | 100%* | 100% | 10–25% | n.d. | n.d. | 100% | ⊕ | 37°C |

* Not recommended, due to possible star activity.
** Unit activity is based on the recommended buffer. In Buffer H some enzymes have increased activity.
n.d. = not determined.

| ENZYME | CAT.# | QUANTITY | SEQUENCE | RAPID DIGESTION | RECOMMENDED BUFFER | ACTIVITY IN BUFFER | | | | | | | HEAT INACTIVATION | INCUBATION TEMPERATURE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | A | B | C | D | E | H | MULTI-CORE™ | | |
| **NarI** | **R6861** | 200 U | GG▾CG CC<br>CC GC▴GG | | G | 75–100% | 50–75% | 75–100% | 25–50% | n.d. | n.d. | 50–75% | ⊕ | 37°C |
| **NciI** | **R7061** | 1,000 U | CC▾(C/G) GG<br>GG (G/C)▴CC | | B | 100%* | 100% | 25–50% | 25–50% | n.d. | n.d. | 50–75% | ⊕ | 37°C |
| **NcoI** | **R6513** | 200 U | C▾CATG G<br>G GTAC▴C | ☑ | D | 50–75% | 75–100% | 75–100% | 100% | 100% | 100–125%** | 75–100% | ⊕ | 37°C |
| | **R6515** | 1,000 U | | | | | | | | | | | | |
| **NdeI** | **R6801** | 500 U | CA▾TA TG<br>GT AT▴AC | ☑ | D | <10% | <10% | 25–50% | 100% | n.d. | n.d. | 25–50% | ⊕ | 37°C |
| **NheI** | **R6501** | 250 U | G▾CTAG C<br>C GATC▴G | ☑ | B | 75–100% | 100% | 75–100% | 10–25% | 75–100% | 10–25% | 100% | ⊕ | 37°C |
| | **R6505** | 1,250 U | | | | | | | | | | | | |
| **NotI** | **R6431** | 200 U | GC▾GGCC GC<br>CG CCGG▴CG | ☑ | D | <10% | 10–25% | 25–50% | 100% | 25–50% | 100–125%** | 25–50% | ⊕ | 37°C |
| | **R6435** | 1,000 U | | | | | | | | | | | | |
| **NruI** | **R7091** | 200 U | TCG▾CGA<br>AGC▴GCT | | K | <10% | <10% | <10% | 50–75% | n.d. | n.d. | 10–25% | ⊕ | 37°C |
| **NsiI** | **R6531** | 250 U | A TGCA▾T<br>T▴ACGT A | | D | 10–25% | 50–75% | 50–75% | 100% | 25–50% | <125%** | 10–25% | ⊕/⊖ | 37°C |
| **PstI** | **R6111** | 3,000 U | C TGCA▾G<br>G▴ACGT C | ☑ | H | 10–25% | 50–75% | 50–75% | 50–75% | 25–50% | 100% | 25–50% | ⊕ | 37°C |
| | **R6115** | 15,000 U | | | | | | | | | | | | |
| **PvuI** | **R6321** | 100 U | CG AT▾CG<br>GC▴TA GC | | D | 10–25% | 25–50% | 50–75% | 100% | n.d. | n.d. | <10% | ⊖ | 37°C |
| | **R6325** | 500 U | | | | | | | | | | | | |
| **PvuII** | **R6331** | 1,000 U | CAG▾CTG<br>GTC▴GAC | ☑ | B | 25–50% | 100% | 50–75% | 25–50% | n.d. | n.d. | 50–75% | ⊕ | 37°C |
| | **R6335** | 5,000 U | | | | | | | | | | | | |
| **RsaI** | **R6371** | 1,000 U | GT▾AC<br>CA▴TG | ☑ | C | 75–100% | 75–100% | 100% | <10% | n.d. | n.d. | <10% | ⊕ | 37°C |
| **SacI** | **R6061** | 1,000 U | G AGCT▾C<br>C▴TCGA G | | J | 75–100% | 25–50% | 25–50% | <10% | 100% | 25–50% | 100% | ⊕ | 37°C |
| | **R6065** | 5,000 U | | | | | | | | | | | | |
| **SacII** | **R6221** | 500 U | CC GC▾GG<br>GG▴CG CC | | C | 100% | 50–75% | 100% | 50–75% | 25–50% | <125%** | <10% | ⊕ | 37°C |
| **SalI** | **R6051** | 2,000 U | G▾TCGA C<br>C AGCT▴G | ☑ | D | <10% | 10–25% | 25–50% | 100% | 25–50% | 25–50% | <10% | ⊕ | 37°C |
| | **R6055** | 10,000 U | | | | | | | | | | | | |
| **Sau3AI** | **R6191** | 100 U | ▾GATC<br>CTAG▴ | | B | 25–50% | 100% | 75–100% | <10% | n.d. | n.d. | 100% | ⊕ | 37°C |
| | **R6195** | 500 U | | | | | | | | | | | | |
| **ScaI** | **R6211** | 1,000 U | AGT▾ACT<br>TCA▴TGA | ☑ | K | <10% | 100%* | 50–75% | 75–100% | n.d. | n.d. | 10–25% | ⊕ | 37°C |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **SfiI** | **R6391** | **250 U** | GGCCN NNN˅NGGCC<br>CCGGN ˄NNN NCCGG | | B | 75–100% | 100% | 75–100% | 25–50% | 75–100% | 50–75% | 75–100% | ⊖ | 50°C |
| **SgfI** | **R7103** | **250 U** | GCG AT˅CGC<br>CGC˄TA GCG | | C | 25–50% | 25–50% | 100% | <10% | n.d. | n.d. | <10% | ⊕/⊖ | 37°C |
| **SmaI** | **R6121** | **1,000 U** | CCC˅GGG<br>GGG˄CCC | | J | <10% | <10% | <10% | <10% | <10% | <10% | 100% | ⊕ | 25°C |
| | **R6125** | **5,000 U** | | | | | | | | | | | | |
| **SnaBI** | **R6791** | **100 U** | TAC˅GTA<br>ATG˄CAT | | B | 50–75% | 100% | 50–75% | <10% | n.d. | n.d. | 100% | ⊖ | 37°C |
| | **R6795** | **500 U** | | | | | | | | | | | | |
| **SpeI** | **R6591** | **200 U** | A˅CTAG T<br>T GATC˄A | ☑ | B | 75–100% | 100% | 75–100% | 75–100% | 100% | 25–50% | 100% | ⊕ | 37°C |
| | **R6595** | **1,000 U** | | | | | | | | | | | | |
| **SphI** | **R6261** | **200 U** | G CATG˅C<br>C˄GTAC G | ☑ | K | 75–100% | 75–100% | 100%* | 75–100% | 100% | <125%** | 10–25% | ⊕ | 37°C |
| | **R6265** | **1,000 U** | | | | | | | | | | | | |
| **SspI** | **R6601** | **500 U** | AAT˅ATT<br>TTA˄TAA | | E | 10–25% | 50–75% | 50–75% | 75–100% | 100% | 100–125%** | 50–75% | ⊕ | 37°C |
| **StuI** | **R6421** | **400 U** | AGG˅CCT<br>TCC˄GGA | | B | 75–100% | 100% | 75–100% | 50–75% | n.d. | n.d. | 50–75% | ⊕ | 37°C |
| **TaqI** | **R6151** | **1,000 U** | T˅CG A<br>A GC˄T | | E | 10–25% | 25–50% | 50–75% | 50–75% | 100% | n.d. | 100% | ⊖ | 65°C |
| | **R6155** | **10,000 U** | | | | | | | | | | | | |
| **Tru9I** | **R7011** | **200 U** | T˅TA A<br>A AT˄T | | F | 75–100% | 50–75% | 75–100% | 25–50% | n.d. | n.d. | 25–50% | ⊖ | 65°C |
| **VspI** | **R6851** | **500 U** | AT˅TA AT<br>TA AT˄TA | | D | <10% | 25–50% | 75–100% | 100% | n.d. | n.d. | <10% | ⊕ | 37°C |
| **XbaI** | **R6181** | **2,000 U** | T˅CTAG A<br>A GATC˄T | ☑ | D | 50–75% | 75–100% | 75–100% | 100% | 100% | 100–125%** | 100% | ⊖ | 37°C |
| | **R6185** | **10,000 U** | | | | | | | | | | | | |
| **XhoI** | **R6161** | **3,000 U** | C˅TCGA G<br>G AGCT˄C | ☑ | D | 25–50% | 75–100% | 75–100% | 100% | 25–50% | 100–125%** | 10–25% | ⊕ | 37°C |
| | **R6165** | **10,000 U** | | | | | | | | | | | | |
| **XmaI** | **R6491** | **50 U** | C˅CCGG G<br>G GGCC˄C | ☑ | B | 50–75% | 100% | 25–50% | <10% | 25–50% | <10% | 50–75% | ⊕ | 37°C |
| | **R6495** | **250 U** | | | | | | | | | | | | |
| **XmnI** | **R7271** | **500 U** | GAANN˅NNT TC<br>CTTNN˄NNAAG | | B | 75–100% | 100% | 75–100% | 10–25% | n.d. | n.d. | 75–100% | ⊕ | 37°C |
| | **R7273** | **2,500 U** | | | | | | | | | | | | |

* Not recommended, due to possible star activity.
** Unit activity is based on the recommended buffer. In Buffer H some enzymes have increased activity.
n.d. = not determined.

# MODIFYING ENZYMES

Essential tools for the quality-minded molecular biologist: alkaline phosphatases, various DNA and RNA polymerases, ligases and kinases.

Leave nothing to chance. Choose enzymes of the highest quality.

# Alkaline Phosphatases

Alkaline phosphatases catalyze the hydrolysis of the 5´-phosphate group of DNA and RNA, along with ribo- and deoxyribonucleoside triphosphates. They are used to prevent religation of linearized vectors during cloning.

**Comparison of Alkaline Phosphatases**

| | TSAP | CIAP |
|---|---|---|
| Heat inactivation | ✓ | ✗ |
| Inactivation temperature | 74 °C | N/A |
| Incubation time | 15 min | 60 min |
| Special buffer required/recommended | ✗ | ✓ |
| Active in all Promega restriction enzymes buffers | ✓ | ✗ |
| Required amount (in units) for different RE buffers | 1–2 | N/A |
| Qualified for blue-white screening | ✓ | ✓ |

### Alkaline Phosphatase, Calf Intestinal (CIAP)

| CAT.# | | QUANTITY |
|---|---|---|
| M1821 | Helix | 1,000 U |

### TSAP Thermosensitive Alkaline Phosphatase

| CAT.# | | QUANTITY |
|---|---|---|
| M9910 | Helix | 100 U |

# Polymerases

### DNA Polymerase I

- DNA-dependent DNA polymerase with 5´→ 3´ and 3´→ 5´ exonuclease activity
- Can be used for a variety of applications such as radioactive labelling of DNA through nick translation and second-strand cDNA synthesis

| CAT.# | | QUANTITY |
|---|---|---|
| M2051 | Helix | 500 U |
| M2055 | Helix | 2,500 U |

### DNA Polymerase I Large (Klenow) Fragment

- DNA-dependent DNA polymerase with 3´→ 5´ exonuclease activity but without 5´→ 3´ exonuclease activity
- For filling protruding 5´ ends with unlabelled or labelled dNTPs, single- or double-stranded DNA for sequencing templates and other applications

| CAT.# | | QUANTITY |
|---|---|---|
| M2201 | Helix | 150 U |
| M2206 | Helix | 500 U |

### DNA Polymerase I Large (Klenow) Fragment, Exonuclease Minus

- DNA-dependent DNA polymerase without exonuclease activity
- For labelling random primers
- Generates a single-base 3´ overhang

| CAT.# | | QUANTITY |
|---|---|---|
| M2181 | Helix | 100 U |

### T4 DNA Polymerase

- Catalyzes the 5´→ 3´ synthesis of DNA from a primed single-stranded DNA template
- High-fidelity enzyme of choice for applications where misincorporation is a concern

| CAT.# | | QUANTITY |
|---|---|---|
| M4211 | Helix | 100 U |
| M4215 | Helix | 500 U |

## Polymerases (continued)

### SP6 RNA Polymerase

- Has extremely high affinity and specificity to SP6 promoter sequences
- > 90 % pure as determined by SDS-polyacrylamide gel electrophoresis
- Incorporates $^{32}P$, $^{33}P$, $^{3}H$ and $^{35}S$ nucleotide triphosphates

| CAT.# | | QUANTITY |
|---|---|---|
| P1085 | Helix | 1,000 U |
| P1081 | Helix | 5,000 U |

### T3 RNA Polymerase

- Extremely high affinity and specificity to T3 promoter sequences
- > 90 % pure as determined by SDS-polyacrylamide gel electrophoresis
- Incorporates $^{32}P$, $^{33}P$, $^{3}H$ and $^{35}S$ nucleotide triphosphates

| CAT.# | | QUANTITY |
|---|---|---|
| P2083 | Helix | 1,000 U |

### T7 RNA Polymerase

- Extremely high affinity and specificity to T7 promoter sequences
- > 90 % pure as determined by SDS-polyacrylamide gel electrophoresis
- Incorporates $^{32}P$, $^{33}P$, $^{3}H$ and $^{35}S$ nucleotide triphosphates

| CAT.# | | QUANTITY |
|---|---|---|
| P2075 | Helix | 1,000 U |
| P2077 | Helix | 5,000 U |

# Ligases

### T4 DNA Ligase

- Catalyzes the ligation of two DNA strands at the 5´-phosphate and 3´-hydroxyl groups
- Suitable for DNA inserts with 5´ or 3´ overhangs or blunt ends
- Qualified for blue-white screening
- Also available at high concentration

| CAT.# | | QUANTITY |
|---|---|---|
| M1801 | Helix | 100 U |
| M1804 | Helix | 500 U |

### LigaFast™ Rapid DNA Ligation System

- Ligation of cohesive ends in 5 minutes and blunt ends in 5 minutes at room temperature
- Qualified for blue-white screening
- Also available at high concentration

| CAT.# | | QUANTITY |
|---|---|---|
| M8221 | Helix | 30 reactions |
| M8225 | Helix | 150 reactions |

### T4 RNA Ligase

- Catalyzes the ATP-dependent ligation of single-stranded RNA or DNA onto the 5´-phosphoryl termini of single-stranded RNA or DNA

| CAT.# | | QUANTITY |
|---|---|---|
| M1051 | Helix | 500 U |

# Kinase and 5´ End-DNA Labelling System

### T4 Polynucleotide Kinase

- Catalyzes the transfer of the γ-phosphate of ATP to the 5´-terminus of polynucleotides or to mononucleotides bearing a 5´-hydroxyl group

| CAT.# | | QUANTITY |
|---|---|---|
| M4101 | Helix | 100 U |
| M4103 | Helix | 1,000 U |

### DNA 5' End-Labelling System

- Complete system for phosphorylating both double- and single-stranded DNA and RNA with T4 Polynucleotide Kinase and [γ-$^{32}P$]ATP

| CAT.# | | QUANTITY |
|---|---|---|
| U2010 | Helix | 10 reactions |

# Nucleases

## Exonuclease III

- 3′ → 5′ exonuclease specific for double-stranded DNA
- Catalyzes the step-by-step removal of mononucleotides
- Degradation rate can be controlled by varying the incubation temperature
- Heat inactivated at 75 °C

| CAT.# | | QUANTITY |
|---|---|---|
| M1811 | Hélix | 5,000 U |
| M1815 | Hélix | 25,000 U |

## Ribonuclease H

- Specifically hydrolyzes the phosphodiester bonds of RNA hybridized to DNA; produces 3′-OH and 5′-P-terminated products

| CAT.# | | QUANTITY |
|---|---|---|
| M4281 | Hélix | 50 U |
| M4285 | Hélix | 250 U |

## Mung Bean Nuclease

- Catalyzes the degradation of single-stranded DNA and RNA endonucleolytically; results in 5′-P-terminated products

| CAT.# | | QUANTITY |
|---|---|---|
| M4311 | Hélix | 2,000 U |

## RNase ONE™ Ribonuclease

- Catalyzes the degradation of RNA

| CAT.# | | QUANTITY |
|---|---|---|
| M4261 | Hélix | 1,000 U |
| M4265 | Hélix | 5,000 U |

## RQ1 RNase-Free DNase

- Degrades single- or double-stranded DNA to produce 3′-OH oligonucleotides
- Qualified for applications in which maintaining RNA integrity is critical

| CAT.# | | QUANTITY |
|---|---|---|
| M6101 | Hélix | 1,000 U |

## S1 Nuclease

- Degrades single-stranded DNA and RNA endonucleolytically to yield 5′-P-terminated products
- Double-stranded nucleic acids are resistant to degradation except with extremely high concentrations of enzyme

| CAT.# | | QUANTITY |
|---|---|---|
| M5761 | Hélix | 10,000 U |

# Other Enzymes

## Terminal Deoxynucleotidyl Transferase, Recombinant

- Catalyzes the repetitive addition of mononucleotides to the terminal 3′-OH of a DNA initiator accompanied by the release of inorganic phosphate

| CAT.# | | QUANTITY |
|---|---|---|
| M1871 | Hélix | 300 U |
| M1875 | Hélix | 1,500 U |

## Topoisomerase I

- Removes negative supercoils from covalently closed circular DNA

| CAT.# | QUANTITY |
|---|---|
| M2851 | 200 U |

# EXPRESSION VECTORS

We provide a choice of expression vectors suitable for cell-free and cell-based protein production. Native expression vectors, HQ and GST tag vectors for protein labelling and NanoLuc® Protein Fusion Vectors are available.

**Flexi® Vectors:** Provide maximum flexibility and easy generation of N- or C-terminal fusion proteins

**Standard MCS vectors:** Use for conventional cloning via multiple cloning site (MCS)

TOOLS FOR PROFESSIONALS

## Flexi® Vector Primer Design Tool

The Flexi® Vector Primer Design Tool designs PCR primers for use with Flexi® Cloning System Vectors to amplify a compatible coding region from your input sequence.

www.promega.com/primer-design-tool

# Flexi® Expression Vectors

All Flexi® Vectors contain the lethal barnase gene to reduce background colonies without inserts during the subcloning procedure. The barnase gene is used for positive selection of clones containing inserts. Inserts cloned using the Flexi® Vector Cloning Systems replace the barnase gene. These vectors, as purchased, cannot be cultured in normal laboratory strains of *E. coli* without an insert.

For maximum flexibility:

- Directional cloning of open reading frames (ORF)
- Easy transfer of ORF to a variety of vectors without resequencing
- Fast and flexible generation of N- or C-terminal tagged fusion proteins

| | | | EXPRESSION PROMOTER | | | PEPTIDE FUSION MARKER | | |
|---|---|---|---|---|---|---|---|---|
| PRODUCT | SELECTION MARKER | APPLICATIONS | *E. coli* | Mammalian cells | Cell-free transcription/ translation | N-Terminal tag | C-Terminal tag | CAT.# |
| **pF1A T7 Flexi® Vector** | Amp | Inducible expression of native protein | T7 | | T7 | | | **C8441** |
| **pF1K T7 Flexi® Vector** | Kan | | | | | | | **C8451** |
| **pFN2A (GST) Flexi® Vector** | Amp | Soluble protein expression and purification via N-terminal GST tag | T7 | | T7 | GST | | **C8461** |
| **pFN2K (GST) Flexi® Vector** | Kan | | | | | | | **C8471** |
| **pF3A WG (BYDV) Flexi® Vector** | Amp | In vitro expression of the native protein in wheat germ extracts | | | T7, SP6 | | | **L5671** |
| **pF3K WG (BYDV) Flexi® Vector** | Kan | | | | | | | **L5681** |
| **pF25A ICE T7 Flexi® Vector** | Amp | In vitro expression of the native protein in insect cell extracts | | | T7 | | | **L1061** |
| **pF25K ICE T7 Flexi® Vector** | Kan | | | | | | | **L1081** |
| **pFN6A (HQ) Flexi® Vector** | Amp | Inducible expression and protein purification on a nickel affinity column | T7 | | T7 | HQHQHQ | | **C8511** |
| **pFN6K (HQ) Flexi® Vector** | Kan | | | | | | | **C8521** |
| **pFC7A (HQ) Flexi® Vector** | Amp | Inducible expression and protein purification on a nickel affinity column | T7 | | T7 | | HQHQHQ | **C8531** |
| **pFC7K (HQ) Flexi® Vector** | Kan | | | | | | | **C8541** |
| **pF4A CMV Flexi® Vector** | Amp | High constitutive expression of native proteins | | CMV | T7 | | | **C8481** |
| **pF4K CMV Flexi® Vector** | Kan | | | | | | | **C8491** |
| **pF5A CMV-neo Flexi® Vector** | Amp/Neo | High constitutive expression of native proteins with selection marker for stable expression | | CMV | T7 | | | **C9401** |
| **pF5K CMV-neo Flexi® Vector** | Kan/Neo | | | | | | | **C9411** |
| **pF9A CMV *hRluc*-neo Flexi® Vector** | Amp/Neo | High constitutive expression of native proteins with selection marker for stable expression | | CMV | T7 | | | **C9361** |
| **pFN18A HaloTag® T7 Flexi® Vector** | Amp | Protein interaction analysis and protein purification | T7 | | T7 | HaloTag® | | **G2751** |
| **pFN18K HaloTag® T7 Flexi® Vector** | Kan | | | | | | | **G2681** |
| **pFN19A HaloTag® T7 SP6 Flexi® Vector** | Amp | Protein interaction analysis | T7 | | T7, SP6 | HaloTag® | | **G1891** |
| **pFN19K HaloTag® T7 SP6 Flexi® Vector** | Kan | | | | | | | **G1841** |
| **pFC20A HaloTag® T7 SP6 Flexi® Vector** | Amp | Protein interaction analysis | T7 | | T7, SP6 | | HaloTag® | **G1681** |
| **pFC20K HaloTag® T7 SP6 Flexi® Vector** | Kan | | | | | | | **G1691** |
| **pFC14A HaloTag® CMV Flexi® Vector** | Amp | Cell imaging and protein interaction analysis; high constitutive expression | | CMV | T7 | | HaloTag® | **G9651** |
| **pFC14K HaloTag® CMV Flexi® Vector** | Kan | | | | | | | **G9661** |

## Flexi® Expression Vectors (continued)

| PRODUCT | SELECTION MARKER | APPLICATIONS | EXPRESSION PROMOTER | | | PEPTIDE FUSION MARKER | | CAT.# |
|---|---|---|---|---|---|---|---|---|
| | | | *E. coli* | Mammalian cells | Cell-free transcription/ translation | N-Terminal tag | C-Terminal tag | |
| **pFC15A HaloTag® CMV*d1* Flexi® Vector** | Amp | Cell imaging and protein interaction analysis; medium constitutive expression | T7 | CMVd1 | T7, SP6 | | HaloTag® | **G1611** |
| **pFC15K HaloTag® CMV*d1* Flexi® Vector** | Kan | | | | | | | **G1601** |
| **pFC16A HaloTag® CMV*d2* Flexi® Vector** | Amp | Cell imaging and protein interaction analysis; low constitutive expression | T7 | CMVd2 | T7, SP6 | | HaloTag® | **G1591** |
| **pFC16K HaloTag® CMV*d2* Flexi® Vector** | Kan | | | | | | | **G1571** |
| **pFC17A HaloTag® CMV*d3* Flexi® Vector** | Amp | Cell imaging and protein interaction analysis; very low constitutive expression | T7 | CMVd3 | T7, SP6 | | HaloTag® | **G1551** |
| **pFC17K HaloTag® CMVd3 Flexi® Vector** | Kan | | | | | | | **G1321** |
| **pFN21A HaloTag® CMV Flexi® Vector** | Amp | Cell imaging and protein interaction analysis; high constitutive expression | | CMV | T7 | HaloTag® | | **G2821** |
| **pFN21K HaloTag® CMV Flexi® Vector** | Kan | | | | | | | **G2831** |
| **pFN22A HaloTag® CMV*d1* Flexi® Vector** | Amp | Cell imaging and protein interaction analysis; medium constitutive expression | T7 | CMVd1 | T7, SP6 | HaloTag® | | **G2841** |
| **pFN22K HaloTag® CMV*d1* Flexi® Vector** | Kan | | | | | | | **G2851** |
| **pFN23A HaloTag® CMV*d2* Flexi® Vector** | Amp | Cell imaging and protein interaction analysis; low constitutive expression | T7 | CMVd2 | T7, SP6 | HaloTag® | | **G2861** |
| **pFN23K HaloTag® CMV*d2* Flexi® Vector** | Kan | | | | | | | **G2871** |
| **pFN24A HaloTag® CMV*d3* Flexi® Vector** | Amp | Cell imaging and protein interaction analysis; very low constitutive expression | T7 | CMVd3 | T7, SP6 | HaloTag® | | **G2881** |
| **pFN24K HaloTag® CMV*d3* Flexi® Vector** | Kan® | | | | | | | **G2981** |
| **pFC27A HaloTag® CMV-neo Flexi® Vector** | Amp/Neo | Cell imaging and protein interaction analysis; high constitutive expression with selection marker for stable expression | | CMV | T7 | | HaloTag® | **G8421** |
| **pFC27K HaloTag® CMV-neo Flexi® Vector** | Kan/Neo | | | | | | | **G8431** |
| **pFN31A *Nluc* CMV-Hygro Flexi® Vector** | Amp/ Hygro | NanoLuc® protein fusion; NanoBRET™ | | CMV | | NanoLuc® | | **N1311** |
| **pFN31K *Nluc* CMV-neo Flexi® Vector** | Kan/Neo | | | | | | | **N1321** |
| **pFC32A *Nluc* CMV-Hygro Flexi® Vector** | Amp/ Hygro | NanoLuc® protein fusion; NanoBRET™ | | CMV | | | NanoLuc® | **N1331** |
| **pFC32K *Nluc* CMV-neo Flexi® Vector** | Kan/Neo | | | | | | | **N1341** |

# Standard Multiple Cloning Site Vectors

For conventional cloning using a multiple cloning site (MCS)

| PRODUCT | SELECTION MARKER | APPLICATIONS | EXPRESSION PROMOTER | | | PEPTIDE FUSION MARKER | | CAT.# |
|---|---|---|---|---|---|---|---|---|
| | | | *E. coli* | Mammalian cells | Cell-free transcription/ translation | N-Terminal tag | C-Terminal tag | |
| **pHTC HaloTag® CMV-neo Vector** | Amp/Neo | Cell imaging and protein interaction analysis; high constitutive expression with selection marker for stable expression | | CMV | T7 | | HaloTag® | **G7711** |
| **pHTN HaloTag® CMV-neo Vector** | Amp | | | CMV | T7 | HaloTag® | | **G7721** |
| **pCI-neo Mammalian Expression Vector** | | High constitutive expression of native proteins with selection marker for stable expression | | CMV | T7 | | | **E1841** |
| **pSI Mammalian Expression Vector** | | High constitutive expression of native proteins | | SV40 | T7 | | | **E1721** |
| **Monster Green® Fluorescent Protein phMGFP Vector** | | Cell imaging and other fluorescence-based applications through a fusion protein with enhanced green fluorescent protein | | CMV | T7 | MGFP | | **E6421** |
| **pNLF1-N [CMV/Hygro] Vector** | Amp/Neo | NanoLuc® protein fusion; NanoBRET™ | | CMV | | NanoLuc® | | **N1351** |
| **pNLF1-C [CMV/Hygro] Vector** | Amp/Neo | NanoLuc® protein fusion; NanoBRET™ | | CMV | | | NanoLuc® | **N1361** |
| **pNLF1-secN [CMV/Hygro] Vector** | Amp/Neo | Secreted Nanoluc® protein fusion; NanoBRET™ | | CMV | | NanoLuc® | | **N1371** |

**You can find information on all our vectors:**

www.promega.com/vectors

# COMPETENT CELLS

Highly competent cells are available in a range of configurations.

# Competent Cells

Newly constructed plasmids are transformed into competent *E. coli* cells to propagate the desired clone. Competent bacterial cells are able to take up foreign DNA and reproduce. High-quality *E. coli* competent cells are an essential part of a successful cloning protocol.

## Single-Use JM109 Competent Cells, >$10^8$cfu/µg

- Highly chemically competent *E. coli* cells in practical, 50 µl quantities
- No need to aliquot; direct transformation in tube
- Blue-white screening

| CAT.# | QUANTITY |
|---|---|
| L2005 | 1 ml |

## Single-Use HB101 Competent Cells, >$10^8$cfu/µg

- Highly chemically competent *E. coli* cells in practical, 50 µl quantities
- No need to aliquot; direct transformation in tube
- Blue-white screening

| CAT.# | QUANTITY |
|---|---|
| L2015 | 1 ml |

## JM109 Competent Cells, >$10^7$cfu/µg

- K strain, which is *rec*A– and *end*A–, minimizes recombination
- Blue-white screening

| CAT.# | QUANTITY |
|---|---|
| L1001 | 1 ml |

## JM109 Competent Cells, >$10^8$cfu/µg

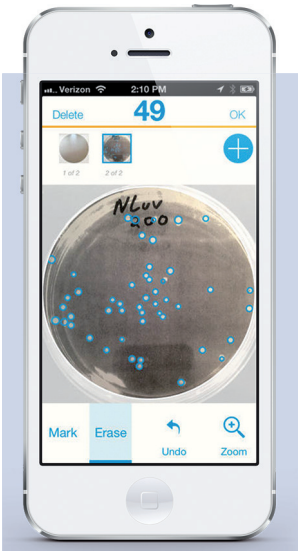
- K strain, which is *rec*A– and *end*A–, minimizes recombination
- Blue-white screening

| CAT.# | QUANTITY |
|---|---|
| L2001 | 1 ml |

## Explanation of genotypes

An explanation of the genotypes of these bacterial strains is available on our web site under “Technical References”

www.promega.com/genetic-markers




TOOLS FOR PROFESSIONALS

## Promega Colony Counter

Quickly and easily count colonies on LB agar plates with the Colony Counter app from Promega. Simply take a picture of the plate, and the colonies will be counted in seconds. The data can be processed rapidly by marking additional colonies and masking.

- Count a single plate, or calculate an average from a series of plates
- Zoom into a quadrant of a plate to adjust the count
- Manually mark additional colonies or remove false-positives
- Store images of the plates and count data

Download on the App Store

# PRODUCT INDEX


0–9

1kb DNA Ladder **45**
1kb DNA Step Ladder **44**
10bp DNA Step Ladder **44**
25bp DNA Step Ladder **44**
50bp DNA Step Ladder **44**
100bp DNA Ladder **45**
100bp DNA Step Ladder **44**
200bp DNA Step Ladder **44**

A

AccessQuick™ RT-PCR System **28**
Access RT-PCR System **28**
AccI **49**
AccIII **49**
AgeI **49**
Alkaline Phosphatase, Calf Intestinal (CIAP) **55**
AluI **49**
Amplification Product Selector **35**
AMV Reverse Transcriptase **27**
ApaI **49**
AvaII **49**

B

BalI **49**
BamHI **49**
BanI **50**
BclI **50**
BenchTop 1kb DNA Ladder **43**
BenchTop 100bp DNA Ladder **43**
BenchTop PCR Markers **43**
BenchTop pGEM® DNA Markers **43**
BenchTop ΦX174 DNA/HaeIII Markers **43**
BglI **50**
BglII **50**
BioMath Calculators **23**
BssHII **50**
BstEII **50**
BstXI **50**

C

Carboxy Flexi® System, Transfer **40**
Cell Lysis Solution (CLA) **5**
Cell Resuspension Solution (CRA) **5**
CfoI **50**
ClaI **50**

D

DdeI **50**
Diamond™ Nucleic Acid Dye **21**
DNA 5´ End-Labelling System **56**
DNA Polymerase I **55**
DNA Polymerase I Large (Klenow) Fragment **55**
DNA Polymerase I Large (Klenow) Fragment, Exonuclease Minus **55**
dNTP Mix **25**
dNTPs **25**
DpnI **50**
DraI **50**
dUTP **24**

E

Eco47III **50**
EcoICRI **50**
EcoRI **50**
EcoRV **50**
Eluator™ Vacuum Elution Device **14**
Exonuclease III **57**

F

Flexi® Vector Primer Design Tool **58**
Flexi® System, Entry/Transfer **40**
Flexi® System, Transfer **40**

G

GeneClip™ U1 Hairpin Cloning System—Basic **41**
GeneClip™ U1 Hairpin Cloning System—hMGFP **41**
GeneClip™ U1 Hairpin Cloning System—Hygromycin **41**
GeneClip™ U1 Hairpin Cloning System—Neomycin **41**
GeneClip™ U1 Hairpin Cloning System—Puromycin **41**
GoScript™ Reverse Transcriptase **27**
GoScript™ Reverse Transcription System **28**
GoTaq® 1-Step RT-qPCR System **34**
GoTaq® 2-Step RT-qPCR System **34**
GoTaq® qPCR Master Mix **34**
GoTaq® G2 Colorless Master Mix **23**
GoTaq® G2 DNA Polymerase **23**
GoTaq® G2 Flexi DNA Polymerase **23**
GoTaq® G2 Green Master Mix **23**
GoTaq® G2 Hot Start Colorless Master Mix **24**
GoTaq® G2 Hot Start Green Master Mix **24**
GoTaq® G2 Hot Start Polymerase **24**
GoTaq® Long PCR Master Mix **24**
GoTaq® Probe 1-Step RT-qPCR System **35**
GoTaq® Probe 2-Step RT-qPCR System **35**
GoTaq® Probe qPCR Master Mix **35**

H

HaeII **51**
HaeIII **51**
HhaI **51**
HincII **51**
HindIII **51**
HinfI **51**
HpaI **51**
HpaII **51**
Hsp92I **51**
Hsp92II **51**

I

I-PpoI **51**

J

JM109 Competent Cells, >$10^7$cfu/µg **63**
JM109 Competent Cells, >$10^8$cfu/µg **63**

K

KpnI **51**

L

Lambda DNA/EcoRI + HindIII Markers **46**
Lambda DNA/EcoRI Markers **46**
Lambda DNA/HindIII Markers **46**
LigaFast™ Rapid DNA Ligation System **56**

M

MagneSil® Total RNA mini-Isolation System **12**
Maxwell® 16 Blood DNA Kit **17**
Maxwell® 16 Cell DNA Purification Kit **17**
Maxwell® 16 DNA FFPE Kit **17**
Maxwell® 16 Instrument **17**
Maxwell® 16 IVD Instrument **17**
Maxwell® 16 LEV Plant DNA Kit **17**
Maxwell® 16 LEV Plant RNA Kit **17**
Maxwell® 16 miRNA Tissue Kit **17**
Maxwell® 16 RNA FFPE Kit **17**
Maxwell® 16 simplyRNA Blood Kit **17**
Maxwell® 16 simplyRNA Cells Kit **17**
Maxwell® 16 simplyRNA Tissue Kit **17**
Maxwell® 16 RSC Instrument **17**
Maxwell® 16 Viral Total Nucleic Acid Purification Kit **17**
MboI **51**
MboII **51**
MluI **51**
M-MLV Reverse Transcriptase **27**
M-MLV Reverse Transcriptase RNase H–, Point Mutant **27**
Monster Green® Fluorescent Protein phMGFP Vector **61**
MspA1I **51**
MspI **51**
Mung Bean Nuclease **57**

N

NarI **52**
NciI **52**
NcoI **52**
NdeI **52**
Neutralization Solution (NSB) **5**
NheI **52**
NotI **52**
NruI **52**
NsiI **52**
Nuclease-Free Water **25** **29** **35**

O

Oligo(dT)$_{15}$ Primer **29**
One-Way Luer-Lok® Stopcocks **15**

P

ΦX174 DNA/HaeIII Markers **46**
ΦX174 DNA/HinfI Markers **46**
pCI-neo Mammalian Expression Vector **61**
PCR Markers **45**
PCR Nucleotide Mix **25**
pF1A T7 Flexi® Vector **59**
pF1K T7 Flexi® Vector **59**
pF3A WG (BYDV) Flexi® Vector **59**
pF3K WG (BYDV) Flexi® Vector **59**
pF4A CMV Flexi® Vector **59**
pF4K CMV Flexi® Vector **59**
pF5A CMV-neo Flexi® Vector **59**
pF5K CMV-neo Flexi® Vector **59**
pF9A CMV *hRluc*-neo Flexi® Vector **59**
pF25A ICE T7 Flexi® Vector **59**
pF25K ICE T7 Flexi® Vector **59**
pFC7A (HQ) Flexi® Vector **59**
pFC7K (HQ) Flexi® Vector **59**
pFC14A HaloTag® CMV Flexi® Vector **59**
pFC14K HaloTag® CMV Flexi® Vector **59**
pFC15A HaloTag® CMV*d1* Flexi® Vector **60**
pFC15K HaloTag® CMV*d1* Flexi® Vector **60**
pFC16A HaloTag® CMV*d2* Flexi® Vector **60**
pFC16K HaloTag® CMV*d2* Flexi® Vector **60**
pFC17A HaloTag® CMV*d3* Flexi® Vector **60**
pFC17K HaloTag® CMV*d3* Flexi® Vector **60**
pFC20A HaloTag® T7 SP6 Flexi® Vector **59**
pFC20K HaloTag® T7 SP6 Flexi® Vector **59**
pFC27A HaloTag® CMV-neo Flexi® Vector **60**
pFC27K HaloTag® CMV-neo Flexi® Vector **60**
pFC32A *Nluc* CMV-Hygro Flexi® Vector **60**
pFC32K *Nluc* CMV-neo Flexi® Vector **60**
pFN2A (GST) Flexi® Vector **59**
pFN2K (GST) Flexi® Vector **59**
pFN6A (HQ) Flexi® Vector **59**
pFN6K (HQ) Flexi® Vector **59**
pFN18A HaloTag® T7 Flexi® Vector **59**
pFN18K HaloTag® T7 Flexi® Vector **59**
pFN19A HaloTag® T7 SP6 Flexi® Vector **59**
pFN19K HaloTag® T7 SP6 Flexi® Vector **59**
pFN21A HaloTag® CMV Flexi® Vector **60**
pFN21K HaloTag® CMV Flexi® Vector **60**
pFN22A HaloTag® CMV*d1* Flexi® Vector **60**
pFN22K HaloTag® CMV*d1* Flexi® Vector **60**
pFN23A HaloTag® CMV*d2* Flexi® Vector **60**
pFN23K HaloTag® CMV*d2* Flexi® Vector **60**
pFN24A HaloTag® CMV*d3* Flexi® Vector **60**
pFN24K HaloTag® CMV*d3* Flexi® Vector **60**
pFN31A *Nluc* CMV-Hygro Flexi® Vector **60**
pFN31K *Nluc* CMV-neo Flexi® Vector **60**
*Pfu* DNA Polymerase **23**
pGEM® DNA Markers **46**
pGEM®-T Easy Vector System I **38**
pGEM®-T Easy Vector System II **38**

pGEM®-T Vector System I **37**
pGEM®-T Vector System II **37**
pHTC HaloTag® CMV-neo Vector **61**
pHTN HaloTag® CMV-neo Vector **61**
pNLF1-C [CMV/Hygro] Vector **61**
pNLF1-N [CMV/Hygro] Vector **61**
pNLF1-secN [CMV/Hygro] Vector **61**
pSI Mammalian Expression Vector **61**
PstI **52**
pTARGET™ Mammalian Expression Vector System **38**
PureYield™ Plasmid Maxiprep Systems **5** **15**
PureYield™ Plasmid Midiprep Systems **5** **15**
PureYield™ Plasmid Miniprep Systems **5** **15**
PureYield™ Plasmid Systems **5** **15**
PvuI **52**
PvuII **52**

Q

QuantiFluor® dsDNA System **20**
QuantiFluor® Dye Systems Data Analysis **21**
QuantiFluor® ONE dsDNA Dye **20**
QuantiFluor® ONE dsDNA System **20**
QuantiFluor® RNA System **20**
QuantiFluor® ssDNA System **20**
Quantus™ Fluorometer **20**

R

Random Primers **29**
Recombinant RNasin® Ribonuclease Inhibitor **31**
ReliaPrep™ Blood gDNA Miniprep System **8**
ReliaPrep™ FFPE gDNA Miniprep System **8**
ReliaPrep™ FFPE Total RNA Miniprep System **13**
ReliaPrep™ gDNA Tissue Miniprep System **6**
ReliaPrep™ Large Volume HT gDNA Isolation System **9**
ReliaPrep™ RNA Cell Miniprep System **11**
ReliaPrep™ RNA Tissue Miniprep System **11**
Reverse Transcription System **28**
Ribonuclease H **57**
RNA Markers **47**
RNase ONE™ Ribonuclease **57**
RNasin® Plus RNase Inhibitor **31**
RQ1 RNase-Free DNase **57**
RsaI **52**

S

S1 Nuclease **57**
SacI **52**
SacII **52**
SalI **52**
Sau3AI **52**
ScaI **52**
Set of dATP, dCTP, dGTP, dTTP **25**
Set of dATP, dCTP, dGTP, dUTP **24**
SfiI **53**
SgfI **53**
Single-Use HB101 Competent Cells, >$10^8$cfu/µg **63**
Single-Use JM109 Competent Cells, >$10^8$cfu/µg **63**
SmaI **53**
SnaBI **53**
SP6 RNA Polymerase **56**
SpeI **53**
SphI **53**
SspI **53**
StuI **53**
SV 96 Total RNA Isolation System **12**
SV Total RNA Isolation System **12** **15**

T

T3 RNA Polymerase **56**
T4 DNA Ligase **56**
T4 DNA Polymerase **55**
T4 Polynucleotide Kinase **56**
T4 RNA Ligase **56**
T7 RNA Polymerase **56**
TaqI **53**
Terminal Deoxynucleotidyl Transferase, Recombinant **57**
Topoisomerase I **57**
Tru9I **53**
TSAP Thermosensitive Alkaline Phosphatase **55**

U

Universal RiboClone® cDNA Synthesis System **40**

V

Vac-Man® 96 Vacuum Manifold **15**
Vac-Man® Laboratory Vacuum Manifold, 20-sample capacity **15**
VspI **53**

W

Wizard® DNA Clean-Up System **9**
Wizard® Genomic DNA Purification Kit **7** **8**
Wizard® MagneSil® Sequencing Reaction Clean-Up System **10**
Wizard® MagneSil® Tfx™ System **6**
Wizard® Magnetic 96 DNA Plant System **7**
Wizard® Magnetic DNA Purification System for Food **7**
Wizard® *Plus* SV Miniprep DNA Purification Systems **6** **15**
Wizard® SV 96 PCR Clean-Up Systems **10** **15**
Wizard® SV 96 Plasmid DNA Purification Systems **6** **16**
Wizard® SV Gel and PCR Clean-Up Systems **9** **15**
Wizard® SV Genomic DNA Purification Systems **7** **15**

X

XbaI **53**
XhoI **53**
XmaI **53**
XmnI **53**

Promega

Helix

# The products you need, when you need them. Helix®— freedom in research!

Helix® provides a personal storage solution for Promega products in your laboratory. Choose from freezers, room-temperature or refrigerated storage cabinets with intelligent stocking and automated accounting technology. Packed with exactly the Promega products that you and your colleagues require on site, Helix® guarantees unlimited availability and access to these products 24 hours a day, 7 days a week.

Helix

All products marketed under this brand may be stored in your Helix® freezer, refrigerator or room-temperature storage cabinet.

*Learn more about Helix®*

**www.promega.com/Helix**

© 2013 Promega Corporation. All Rights Reserved. 9888878

Promega

# PCR. Straight up, no ice.

## GoTaq G2 Hot Start

Upgrade to GoTaq® G2 Polymerase and enjoy the convenience of room-temperature setup, improved yield, sensitivity and specificity.

- Choose a master mix or standalone enzyme
- Simplify reaction setup and save time with a ready-to-use master mix
- Prepare your reaction at room temperature, not on ice
- Use at no risk—backed by our PCR Satisfaction Guarantee

***Confidence in your downstream applications with an enzyme that works every time.***

**Promega Corporation**
2800 Woods Hollow Road
Madison, WI 53711-5399 *USA*
Tel: 608-274-4330
Fax: 608-277-2516
Toll-Free Tel: 800-356-9526
Toll-Free Fax: 800-356-1970
Internet: www.promega.com

**Promega Biosciences, LLC**
San Luis Obispo, CA, *USA*

**Promega BioSystems, Inc.**
Seoul, *Korea*

**Promega BioSystems Sunnyvale, Inc.**
Sunnyvale, CA, *USA*

**Shanghai Promega Biological Products, Ltd.**
Shanghai, *China*

**Terso Solutions, Inc.**
Madison, WI, *USA*



©2015 Promega Corporation


16768119 | PART #BR281



**Australia, *Sydney***
Tel: 02 8338 3800
Fax: 02 8338 3855
Freecall: 1800 225 123
Freefax: 1800 626 017
E-mail: auscustserv@promega.com

**Brazil, *São Paulo***
Tel/Fax: +55 11 5096 3770
E-mail: promega.brasil@promega.com

**China, *Beijing***
Tel: 10 5825 6268
Fax: 10 5825 6160
Toll-Free: 800 810 8133
E-mail: info@promega.com.cn

**France, *Lyon***
Tel: 04 37 22 50 00
Fax: 04 37 22 50 10
Numero Vert: 0 800 48 79 99
E-mail: contactfr@promega.com

**Germany/Austria/Poland, *Mannheim***
Tel (D, AT): +49 621 8501 291
Tel (PL): +48 22 531 06 67
Fax (D, AT): +49 621 8501 222
Fax (PL): +48 22 531 06 69
Free Phone: 00800 77663422
Free Fax: 00800 77663423
E-mail (D, AT):de_custserv@promega.com
E-mail (PL): pl_custserv@promega.com

**India, *New Delhi***
Tel: +91 11 43005814/15
Fax: +91 11 41035028
E-mail: ind_custerv@promega.com

**Italy, *Milan***
Tel: +39 02 54 05 01 94
Fax: +39 02 55 18 56 64
Numero Verde: 800 69 18 18
E-mail: custserv.it@promega.com

**Japan, *Tokyo***
Tel: 03 3669 7981
Fax: 03 3669 7982
E-mail: jptechserv@jp.promega.com

**Korea, *Seoul***
Tel: 82 1588 3718
Fax: 82 2 2638-5418
E-mail: customerservice_kr@promega.com

**Belgium/Luxembourg/ The Netherlands, *Leiden***
Tel: +31 (0)71-532 42 44
Fax: +31 (0)71-532 49 07
E-mail: benelux@promega.com

**Pacific Asia Region, Singapore**
Tel: 65 65133450
Fax: 65 67735210
E-mail: sg_custserv@promega.com

**Spain, *Madrid***
Tel: 902 538 200
Fax: 902 538 300
E-mail: esp_custserv@promega.com

**Nordic Region, Sweden, *Stockholm***
Tel: +46 8 452 2450
Fax: +46 8 452 2455
E-mail: sweorder@promega.com

**Switzerland, *Dübendorf***
Customer Service
Tel: 044 878 90 00
Fax: 044 878 90 10
E-mail: ch_custserv@promega.com
Technical Service
Tel: 044 878 90 20
E-mail: ch_techserv@promega.com

**United Kingdom, *Southampton***
Tel: 023 8076 0225
Fax: 023 8076 7014
Free Phone: 0800 378994
Free Fax: 0800 181037
E-mail: ukcustserve@promega.com


Promega


2800 Woods Hollow Road
Madison, WI 53711-5399 USA


Change Service Requested

For more information about Promega Branch Offices and Distributors visit: www.promega.com/support/worldwide-contacts