

## Certificate of Analysis

### M-MLV Reverse Transcriptase:

Part No.	Size (units)
M170A	10,000
M170B	50,000

**Enzyme Storage Buffer:** M-MLV Reverse Transcriptase is supplied in 20mM Tris-HCl (pH 7.5), 200mM NaCl, 0.1mM EDTA, 1mM DTT, 0.01% Nonidet® P-40 and 50% glycerol.

**M-MLV Reverse Transcriptase 5X Reaction Buffer (M531A):** When the M-MLV Reverse Transcriptase 5X Reaction Buffer supplied with this enzyme is diluted 1:5, it has a composition of 50mM Tris-HCl (pH 8.3 at 25°C), 75mM KCl, 3mM MgCl<sub>2</sub> and 10mM DTT.

**Source:** Purified from an *E. coli* strain expressing a recombinant clone (1).

**Storage Conditions:** Store at -30°C to -10°C. Avoid exposure to frequent temperature changes. See the expiration date on the product label.

**Unit Definition:** One unit is defined as the amount of enzyme required to catalyze the transfer of 1nmol of deoxynucleotide into acid-precipitable material in 10 minutes at 37°C. The reaction conditions are: 50mM Tris-HCl (pH 8.3), 7mM MgCl<sub>2</sub>, 40mM KCl, 10mM DTT, 0.1mg/ml BSA, 0.5mM [<sup>3</sup>H]dTTP, 0.025mM oligo(dT), 0.25mM poly(A) and 0.01% NP-40. See the unit concentration on the product label.

**Usage Note:** M-MLV Reverse Transcriptase is less processive than AMV Reverse Transcriptase, and therefore, more units of M-MLV enzyme are required to generate the same amount of cDNA as in the AMV reaction. Thus, starting with 1µg of mRNA in a first-strand cDNA synthesis, 200 units of the M-MLV enzyme are recommended as opposed to 25 units of AMV enzyme.

Part# 9PIM170

Revised 1/24



AF9PIM170 0124M170



**Promega**

#### Promega Corporation

2800 Woods Hollow Road	
Madison, WI 53711-5399	USA
Telephone	608-274-4330
Toll Free	800-356-9526
Fax	608-277-2516
Internet	www.promega.com

## Quality Control Assays

### Activity Assay

**First-Strand cDNA Synthesis:** Two hundred units of enzyme are used to produce cDNA from 1µg of 1.2kb and 6.5kb control RNAs in separate reactions, using [<sup>32</sup>P] dCTP as a tracer. The minimum specification is 120ng of first-strand cDNA made from 1µg of RNA. The cDNA product must be >90% full length as determined by gel electrophoresis and autoradiography.

### Contaminant Activity

**DNase and RNase Assay:** To test for nuclease activity, 50ng of radiolabeled DNA or radiolabeled RNA is incubated with 200 units of M-MLV Reverse Transcriptase in 1X Reaction Buffer for 1 hour at 37°C, and the release of radiolabeled nucleotides is monitored by scintillation counting of TCA-soluble material. Minimum passing specification is <1% release for both DNase and RNase.

**Endonuclease Assay:** To test for endonuclease activity, 1µg of Type I supercoiled plasmid DNA is incubated with 500 units of M-MLV Reverse Transcriptase in 1X Reaction Buffer for 1 hour at 37°C. Following incubation, the supercoiled DNA is visualized on an ethidium bromide-stained agarose gel to verify the absence of visible nicking or cutting (analysis on 0.4µg of DNA).

**Physical Purity:** The purity is >90% as judged by SDS-polyacrylamide gels with Coomassie® blue staining.

#### PRODUCT USE LIMITATIONS, WARRANTY, DISCLAIMER

Promega manufactures products for a number of intended uses. Please refer to the product label for the intended use statements for specific products. Promega products contain chemicals which may be harmful if misused. Due care should be exercised with all Promega products to prevent direct human contact.

Each Promega product is shipped with documentation stating specifications and other technical information. Promega products are warranted to meet or exceed the stated specifications. Promega's sole obligation and the customer's sole remedy is limited to replacement of products free of charge in the event products fail to perform as warranted. Promega makes no other warranty of any kind whatsoever, and SPECIFICALLY DISCLAIMS AND EXCLUDES ALL OTHER WARRANTIES OF ANY KIND OR NATURE WHATSOEVER, DIRECTLY OR INDIRECTLY, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, AS TO THE SUITABILITY, PRODUCTIVITY, DURABILITY, FITNESS FOR A PARTICULAR PURPOSE OR USE, MERCHANTABILITY, CONDITION, OR ANY OTHER MATTER WITH RESPECT TO PROMEGA PRODUCTS. In no event shall Promega be liable for claims for any other damages, whether direct, incidental, foreseeable, consequential, or special (including but not limited to loss of use, revenue or profit), whether based upon warranty, contract, tort (including negligence) or strict liability arising in connection with the sale or the failure of Promega products to perform in accordance with the stated specifications.

© 1997–2024 Promega Corporation. All Rights Reserved.

RNasin is a registered trademark of Promega Corporation.

Coomassie is a registered trademark of Imperial Chemical Industries. Nonidet is a registered trademark of Shell International Petroleum Company, Ltd.

Products may be covered by pending or issued patents or may have certain limitations. Please visit our Web site for more information.

All specifications are subject to change without prior notice.

Product claims are subject to change. Please contact Promega Technical Services or access the Promega online catalog for the most up-to-date information on Promega products.

Part# 9PIM170

Printed in USA. Revised 1/24.

Signed by:

R. Wheeler, Quality Assurance

## 1. Description

Moloney Murine Leukemia Virus Reverse Transcriptase (M-MLV RT) is an RNA-dependent DNA polymerase that can be used in cDNA synthesis with long messenger RNA templates (>5kb). M-MLV RT is the preferred reverse transcriptase for long mRNA templates because the RNase H activity of M-MLV RT is weaker than the commonly used Avian Myeloblastosis Virus (AMV) reverse transcriptase.

Application of M-MLV RT includes:

- First-strand cDNA synthesis from RNA molecules

**Note:** M-MLV Reverse Transcriptase is less processive than AMV Reverse Transcriptase, and therefore, more units of the M-MLV enzyme are required to generate the same amount of cDNA as in the AMV reaction.

## 2. First-Strand cDNA Synthesis

### Materials to Be Supplied by the User

(Buffer composition is provided in Section 3.)

- Recombinant RNasin® Ribonuclease Inhibitor (Cat.# N2511)
  - dATP, 10mM (Cat.# U1201, 100mM)
  - dCTP, 10mM (Cat.# U1221, 100mM)
  - dGTP, 10mM (Cat.# U1211, 100mM)
  - dTTP, 10mM (Cat.# U1231, 100mM)
  - Nuclease-Free Water (Cat.# P1193)
1. The following procedure uses 2µg of total RNA. In a sterile RNase-free microcentrifuge tube, add 0.5µg of the primer or primer-adaptor per microgram of the total RNA sample in a total volume of ≤13.38µl in water. Heat the tube to 70°C for 5 minutes to melt secondary structure within the template. Cool the tube immediately on ice to prevent secondary structure from reforming, then spin briefly to collect the solution at the bottom of the tube.
  2. Add the following components to the annealed primer/template in the order shown.

**Note:** Do not alter the ratio of primer to RNA.

M-MLV 5X Reaction Buffer	5.00µl
dATP, 10mM	1.25µl
dCTP, 10mM	1.25µl
dGTP, 10mM	1.25µl
dTTP, 10mM	1.25µl
Recombinant RNasin® Ribonuclease Inhibitor	25 units
M-MLV RT	<u>200 units</u>
Nuclease-Free Water to final volume	25.00µl

3. Mix gently by flicking the tube, and incubate for 60 minutes at 37°C for random primers or 42°C for other primers or primer-adaptors. The extension temperature may be optimized between 37°C and 42°C.
4. Perform second-strand synthesis using a protocol of your choice. Standard protocols for second-strand synthesis may be found in reference 2.

**Note:** The M-MLV RT Reaction Buffer is compatible with enzymes used in a number of downstream applications. Phenol extractions and ethanol precipitations typically are not necessary before performing second-strand synthesis and amplification.

## 3. Composition of Buffer

### M-MLV RT 5X Reaction Buffer (provided)

250mM	Tris-HCl (pH 8.3 at 25°C)
375mM	KCl
15mM	MgCl <sub>2</sub>
50mM	DTT

## 4. References

1. Roth, M.J., Tanese, N. and Goff, S.P. (1985) Purification and characterization of murine retroviral reverse transcriptase expressed in *Escherichia coli*. *J. Biol. Chem.* **260**, 9326–35.
2. Sambrook, J., Fritsch, E.F. and Maniatis, T. (1989) In: *Molecular Cloning: A Laboratory Manual*, Cold Spring Harbor Laboratory, Cold Spring Harbor, New York, 8.64.