omega BIO-TEK
innovations in nucleic acid isolation

Product Manual

Mag-Bind® FFPE RNA 96 Kit

M2551-00	1 x 96 preps
M2551-01	4 x 96 preps

Manual Date: August 2026
Revision Number: v7.0

For Research Use Only

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Intended Use

For professional research use.

The Mag-Bind® FFPE RNA 96 Kit is intended for isolation of RNA from fixed, paraffin-embedded (FFPE) tissue samples. For first time users, we recommend using 1-3 FFPE sections of 10 µm thickness each.

The Mag-Bind® FFPE RNA 96 Kit utilizes magnetic bead-based technology and can be processed either manually or automated on most open-ended liquid handling platforms as well as magnetic processors.

Intended User

The Mag-Bind® FFPE RNA 96 Kit is designed for the isolation of RNA from the same formalin-fixed, paraffin-embedded (FFPE) tissue sample. The protocol utilizes a specially formulated buffer system that not only partially reverses the formaldehyde-induced crosslinking but also ensures inhibitor-free purification of DNA. Magnetic bead-based extraction makes it suitable for both manual as well as automated processing on most open-ended liquid handling platforms as well as magnetic processors.

The Mag-Bind® FFPE RNA 96 Kit integrates a unique buffer system with the highly efficient binding properties of Mag-Bind® technology to isolate RNA. The protocol utilizes non-toxic mineral oil in combination with heat for efficient deparaffinization of the FFPE sample eliminating the use of hazardous xylene.

Samples are first lysed in FDR Buffer aided by the presence of Proteinase K enzyme. The lysate is then heated to denature the proteinase and reverse the chemical crosslinking of the nucleic acids. Post-heating, the lysate is mixed with MB4 Buffer, isopropanol and Mag-Bind® Particles CH to bind nucleic acids to the particles. Genomic DNA bound to the beads is eliminated through a DNase I digestion step while preserving the integrity of the RNA bound to the beads. The beads are subjected to several wash steps to remove contaminants. High-quality RNA is then eluted in Endo-free water and is ready for use in a wide range of downstream applications such as RT-PCR, RT-qPCR, microarray analysis, next-generation RNA sequencing (RNA-Seq) etc.

Introduction

The Mag-Bind® FFPE RNA 96 Kit provides a rapid and reliable method for the isolation of total RNA from formalin-fixed, paraffin-embedded (FFPE) tissue sections. Nucleic acids in FFPE samples are heavily fragmented and often modified by formaldehyde due to fixation and embedding procedures. The specially formulated buffers in Mag-Bind® FFPE RNA 96 Kit are designed to minimize the effects of the formaldehyde modification and partially reverse cross-linking without the need for overnight digestion resulting in high-yielding, high-quality nucleic acids. Purified RNA is suitable for a variety of downstream applications including qRT-PCR, reverse transcription PCR, primer extension, expression array assays, microarray analyses, and next generation sequencing.

The Mag-Bind® FFPE RNA 96 Kit combines highly efficient binding properties of Mag-Bind® technology with a specially designed buffer system to isolate total RNA from FFPE samples. There are two protocols included in this manual — one that uses heat for paraffin removal and one that uses traditional xylene to remove paraffin from the sample. Samples are first lysed in RML Buffer aided by the presence of Proteinase K enzyme. The lysate is heated to denature the proteinases and reverse the chemical crosslinking of the nucleic acids. The lysate is then mixed with MFB Buffer and Mag-Bind® Particles SC to bind RNA to the magnetic particles. Post-binding genomic DNA is removed by DNase I digestion. After two rapid wash steps, purified RNA is eluted with Nuclease-free Water.

Starting Materials

Since standard formalin fixation and paraffin embedding procedures cause significant fragmentation of nucleic acids, we recommend following these guidelines to limit the extent of DNA/RNA fragmentation: 1) Use 4-10% formalin to fix tissue samples; 2) Limit the fixation time to 14-24 hours; 3) Completely dehydrate samples before embedding. Always use freshly cut sections of FFPE tissue for RNA isolation. For the first time user, we recommend using less than 3-5 sections of 10 µm thickness each. Depending on the yield and purity obtained, it may be possible to increase the starting material.

Kit Contents

Product Number	M2551-00	M2551-01
Preparations	1 x 96	4 x 96
FDR Buffer	50 mL	180 mL
MB4 Buffer	75 mL	275 mL
Nuclease-free Water	30 mL	125 mL
DNase Digestion Buffer	25 mL	2 x 25 mL
PHM Buffer	10 mL	50 mL
Proteinase K Solution	2.2 mL	8.8 mL
Mag-Bind® DNase I	220 µL	4 x 220 µL
Mag-Bind® Particles CH	1.1 mL	4.4 mL
User Manual	✓	✓

Storage and Stability

All of the Mag-Bind® FFPE RNA 96 Kit components are guaranteed for at least 12 months from the date of purchase when stored as follows. Mag-Bind® DNase I, DNase Digestion Buffer, and PHM Buffer should be stored at -20°C. Store PHM Buffer at room temperature after addition of ethanol. Mag-Bind® Particles CH should be stored at 2-8°C for long-term use. Proteinase K Solution can be stored at room temperature for up to 12 months. For long-term storage, store Proteinase K Solution at 2-8°C. Store all other components at room temperature and away from bright light. During shipment or storage in cool ambient conditions, precipitates may form. Dissolve such deposits by warming the solution at 37°C and gently shaking.

Preparing Reagents

Please take a few minutes to read this manual thoroughly to become familiar with the protocol before beginning the procedure. Prepare all materials required before starting to minimize RNA degradation. Wear gloves/protective goggles and take care when working with chemicals

1. Dilute PHM Buffer with 100% ethanol and store at room temperature.

Kit	100% Ethanol to be Added
M2551-00	20 mL
M2551-01	100 mL

Warnings

This kit is for research use only.

Please read all instructions carefully before using the kit.

Decontaminate and dispose of all potentially infectious materials in accordance with applicable local, state, and national regulations. Please refer to safety data sheets (SDSs) for information on disposal of different components included in this kit.

Safety and Handling Information

All chemicals and biological materials are potentially hazardous.

Biological samples such as plasma, serum, tissues, body fluids, blood etc. are potentially infectious and must be treated as biohazardous materials. Conduct all work in properly equipped facilities following universal precautions and using appropriate personal safety equipment such as disposable gloves, lab coats, safety glasses etc. as required by policies and procedures outlined by your facility. Use appropriate decontaminations and disposal methods in adherence to all applicable local state/provincial, and/or national regulations

Please refer to safety data sheets (SDSs) for information on safe handling, transport, clean-up, and disposal of different components included in this kit. SDSs are made available in PDF format on the product page at www.omegabiotek.com. Discard all waste in accordance with the local safety regulations.

Some of the buffers included in the product contain guanidine-based chaotropic agents, which can form highly reactive compounds when combined with bleach. DO NOT add bleach or acidic solutions to guanidine-containing waste. Please access the SDSs online for detailed information on the reagents.

Where allowed, packaging for non-hazardous buffers, kit boxes, or other packaging materials may be recycled in accordance with local regulations. Reference product labelling or www.omegabiotek.com for guidance.

Precautions

Some of the buffers included in the Mag-Bind® FFPE RNA 96 Kit contain guanidine-based chaotropic agents, which can form highly reactive compounds when combined with bleach. **DO NOT add bleach or acidic solutions to guanidine containing sample-preparation waste.** Please access the SDSs online for detailed information on the reagents.

Component	Description
FDR Buffer 	Contains: Anionic detergent. Warning! Causes serious eye irritation. May cause an allergic skin reaction. Wear protective gloves, protective clothing, eye protection and face protection. Avoid breathing mist/vapors. Wash all exposed external body areas thoroughly after handling. Contaminated work clothing must not be allowed out of the workplace. IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If irritation persists: Get medical advice/attention. ON SKIN: Wash with plenty of water and soap. If skin irritation or rash occurs: Get medical advice/attention. Take off contaminated clothing and wash it before reuse.
Proteinase K Solution 	Contains: Proteinase K. Danger! Causes mild skin irritation. May cause allergy or asthma symptoms or breathing difficulties if inhaled. Avoid breathing dust/fume/gas/mist/vapors/spray. Wear protective gloves/protective clothing/eye protection/face protection. Wear respiratory protection. If exposed or concerned: Call a poison center or doctor/physician. Remove victim to fresh air and keep at rest in a position comfortable for breathing.
MB4 Buffer  	Contains: Guanidine hydrochloride and non-ionic detergent. Danger! Harmful if swallowed. Causes severe skin burns and eye damage. May cause an allergic skin reation. Wear protective gloves, protective clothing, eye protection and face protection. Wash all exposed external body areas thoroughly after handling. Contaminated work clothing must not be worn outside of the workplace. Do not eat, drink or smoke when using this product. Do not breathe mist/vapors/spray. IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. SWALLOWED: Rinse mouth. Do NOT induce vomiting. Immediately call a POISON CENTER/doctor/physician/first aider. INHALED: Remove person to fresh air and keep comfortable for breathing. ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. Wash with plenty of water and soap. Wash contaminated clothing before reuse.

Mag-Bind® FFPE RNA 96 Kit Protocol

Important: If automating this procedure on a liquid handler or a magnetic processor, please contact your Omega Bio-tek representative for instrument-specific instructions.

Materials and Equipment to be Supplied by User:

- Centrifuge with swing bucket rotor capable of 2,000*g*
- Rotor adaptor for 96-well deep-well plates
- Magnetic separation device
- Vortexer
- Incubator capable of 90°C
- 96-well processing plates with at least a 2 mL capacity compatible with the magnetic separation device used
- 96-well microplate (for eluted RNA)
- 1.5 mL or 2.0 mL microcentrifuge tube
- 80% ethanol
- 100% ethanol
- 100% isopropanol
- Mineral oil (Recommend VWR, Cat# 97064-128)
- Sealing film (Recommend Omega Bio-tek, Cat# AC1200)

Before Starting:

- Prepare PHM Buffer according to the Preparing Reagents section on Page 4.
- Prepare 80% ethanol.
- Set incubator to 90°C.

Important: For optimal yields, incubation must be carried out at the recommended temperature.

1. Transfer the FFPE samples to a 96-well processing plate with a well capacity of at least 2.0 mL (not provided) or a 2.0 mL microcentrifuge tube (not provided).

2. Add 300 µL mineral oil (not provided) to the 96-well processing plate or tube. Seal the 96-well processing plate with sealing film (not provided) or close the tube.

   Note: Other non-xylene solvent alternatives such as HistoChoice, HistoClear, HistoClear II, or hexadecane can be used for deparaffinization in place of mineral oil. Add 900 µL of the solvent if following the mineral oil-free option. Follow Safety Data Sheet (SDS) guidelines for safe handling of the solvent used.

3. Incubate at 90°C for 3 minutes. Remove the sealing film from the 96-well processing plate or open the tube.

4. Add 400 µL FDR Buffer. Seal the 96-well processing plate with sealing film or close the tube.

5. Centrifuge at 2,000*g* for 1 minute to create two phases within the solution: an upper oil phase and a lower aqueous phase. Ensure the tissue is in contact with FDR Buffer in the lower aqueous phase.

   Note: The upper mineral oil layer may turn opaque or cloudy but this will not affect RNA extraction.

6. Incubate at 90°C with constant shaking at 300 rpm for 30 minutes. Remove the sealing film from the 96-well processing plate or open the tube.

   Note: It is important for incubation to be carried out at recommended temperatures for optimal yields

7. Add 20 µL Proteinase K Solution to the lower aqueous layer. Seal the 96-well processing plate with sealing film or close the tube.

8. Shake the 96-well processing plate at 600 rpm or vortex the tube for 30 seconds to mix thoroughly.

9. Incubate at room temperature for 30 minutes.

10. Incubate at 90°C with constant shaking at 300 rpm for 1 hour.

11. Centrifuge at 2,000*g* for 1 minute to create two phases within the solution: an upper oil phase and a lower aqueous phase.

12. Transfer 325 µL of the lower aqueous layer to a new 96-well processing plate capable of at least 2.0 mL or a new 2.0 mL microcentrifuge tube. Avoid disturbing the mineral oil layer as much as possible.

13. Add 650 µL MB4 Buffer, 10 µL Mag-Bind® Particles CH, and 845 µL 100% isopropanol. Vortex or tip mix samples for 10 minutes.

    Note:
    - MB4 Buffer and Mag-Bind® Particles CH can be prepared as a mastermix. Prepare only what is needed for each run.
    - If constant vortexing for 10 minutes is not possible, vortex for 30 seconds every 2 minutes for 10 minutes.

14. Place the 96-well processing plate or tube on the magnetic separation device to magnetize the Mag-Bind® Particles CH. Let sit at room temperature until the Mag-Bind® Particles CH are completely cleared from solution.

15. Aspirate and discard the cleared supernatant. Do not disturb the Mag-Bind® Particles CH.

16. Remove the 96-well processing plate or tube containing the Mag-Bind® Particles CH from the magnetic separation device.

17. Add 400 µL 80% ethanol (not provided). Vortex for 2 minutes.

    Note: Prepare enough 80% ethanol for all wash steps.

18. Place the 96-well processing plate or tube on the magnetic separation device to magnetize the Mag-Bind® Particles CH. Let sit at room temperature until the Mag-Bind® Particles CH are completely cleared from solution.

19. Aspirate and discard the cleared supernatant. Do not disturb the Mag-Bind® Particles CH.

20. Leave the 96-well processing plate or tube on the magnetic separation device for 3 minutes to air dry the Mag-Bind® Particles CH. Remove any residual liquid with a pipette.

21. Remove the 96-well processing plate or tube containing the Mag-Bind® Particles CH from the magnetic separation device.

22. Add 73.5 µL DNase Digestion Buffer and 1.5 µL Mag-Bind® DNase I. Pipet up and down 20 times to mix.

    Note: A mastermix of DNase Digestion Buffer and Mag-Bind® DNase I can be made. Prepare only what is needed for each run.

23. Let sit at room temperature for 15 minutes.

24. Add 225 µL PHM Buffer. Vortex for 5 minutes.

    Note:
    - PHM Buffer must be diluted with 100% ethanol prior to use. Please see instructions on Page 4.
    - If constant vortexing for 5 minutes is not possible, vortex for 30 seconds every 2 minutes for 5 minutes.

25. Place the 96-well processing plate on the magnetic separation device or tube to magnetize the Mag-Bind® Particles CH. Let sit at room temperature until the Mag-Bind® Particles CH are completely cleared from solution.

26. Aspirate and discard the cleared supernatant. Do not disturb the Mag-Bind® Particles CH.

27. Remove the 96-well processing plate or tube containing the Mag-Bind® Particles CH from the magnetic separation device.

28. Add 400 µL 80% ethanol. Vortex for 2 minutes.

29. Place the 96-well processing plate or tube on the magnetic separation device to magnetize the Mag-Bind® Particles CH. Let sit at room temperature until the Mag-Bind® Particles CH are completely cleared from solution.

30. Aspirate and discard the cleared supernatant. Do not disturb the Mag-Bind® Particles CH.

31. Repeat Steps 27-30 for a second 80% ethanol wash step.

32. Leave the 96-well processing plate or tube on the magnetic separation device. Wait 1 minute. Remove residual liquid with a pipette. Air dry the Mag-Bind® Particles CH for an additional 10 minutes.

33. Remove the 96-well processing plate or tube containing the Mag-Bind® Particles CH from the magnetic separation device.

34. Add 50-100 µL Nuclease-free Water.

35. Vortex for 5 minutes to mix.

    Note: If constant vortexing for 5 minutes is not possible, vortex for 15 seconds every 1-2 minutes for 5 minutes.

36. Place the 96-well processing plate or tube on the magnetic separation device to magnetize the Mag-Bind® Particles CH. Let sit at room temperature until the Mag-Bind® Particles CH are completely cleared from solution.

37. Transfer the cleared supernatant containing purified RNA to a clean 96-well plate (not provided) or a new microcentrifuge tube.

38. Store RNA at -80°C.

Troubleshooting Guide

Please use this guide to troubleshoot any problems that may arise. For further assistance, please contact our technical support staff, toll free, at **1-800-832-8896.**

Possible Problems and Suggestions

Troubleshooting Guide		
Problem	**Likely Cause**	**Suggestions**
Low RNA yields	Incomplete resuspension of magnetic particles	Resuspend the magnetic particles by vortexing before use.
	RNA degraded during sample storage	Make sure the sample is properly stored and make sure the samples are processed immediately after collection or removal from storage.
	Loss of magnetic particles during operation	Increase the collection time for magnetic particles.
	PHM Buffer was not prepared correctly	Prepare PHM Buffer according to the instructions on Page 4.
DNA contamination	Incomplete digestion of DNA during DNase Digestion Step	After Step 21 of the Protocol (Page 9), perform the following: 1. Add 100 µL Nuclease-free Water to each sample and vortex for 5 minutes. 2. Add 73.5 µL DNase Digestion Buffer and 1.5 µL Mag-Bind DNase I. 3. Let sit at room temperature for 15 minutes. 4. Add 525 µL PHM Buffer and vortex for 5 minutes. 5. Continue with Step 25 of the Protocol (Page 10). This will require additional PHM Buffer that is not provided with this kit. Please contact your Omega Bio-tek representative at **1-800-832-8896** for ordering information.

Troubleshooting Guide		
Problem	**Likely Cause**	**Suggestions**
Poor $A_{260/230}$ purity	Contamination carry-over in plasticware	When performing the extraction manually, follow the steps outlined below to reduce contamination. • After adding 80% ethanol (Page 10, Step 28), transfer the mixed contents to a new 1.5 mL microcentrifuge tube then proceed with the procedure.
Carryover of the magnetic beads in the elution	Carryover of the magnetic particles in the eluted RNA will not effect downstream applications.	To remove the carryover magnetic particles from the eluted RNA, simply magnetize the magnetic particles and carefully transfer the RNA eluate to a new plate.

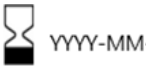
Contact Information

To reorder supplies, report a device failure, or complaint, please contact:

	**Manufacturer** Omega Bio-tek, Inc. 400 Pinnacle Way Suite 450 Norcross, GA 30071 Website: www.omegabiotek.com Email: info@omegabiotek.com SRN: US-MF-000024148

Symbols

The following symbols may appear in the instructions for use or on the packaging and labeling:

Picture	Description
	Use-by date
	Check components for storage conditions
	Lot number
	Manufacturer
	No additional hazards or not classified as hazardous according to GHS. Also see hazardous symbols as defined in the Precautions Section.
	Website
	Telephone
	Fax
	Email
	LinkedIn
	X
	Facebook
	Recycling Guidance at https://omegabiotek.com/company/recycling

Document Revision History

Revision	Description
v7.0 August 2026	The protocol has been updated to reflect new sample processing procedure.
v6.1, March 2020	Storage and Stability section has been updated with change in GFC Buffer storage conditions.
v6.0, July 2019	DNase I Digestion Buffer has been renamed DNase Digestion Buffer. This is a name change only. The formulation has not changed.
v5.1, February 2019	DEPC Water has been replaced with Nuclease-free Water. DEPC Water is no longer provided in this kit. PR032 (DEPC Water, 100 mL) and 96-well Magnetic Separation Devices (MSD-01, MSD-01B) have been discontinued and are no longer available to purchase.
v5.0, March 2018	The storage temperature for DNase I Digestion Buffer has changed. DNase I Digestion Buffer should now be stored at -20°C along with the Mag-Bind® DNase I. The 200 prep size of M2551, Mag-Bind® FFPE RNA 96 Kit, has been discontinued and is no longer available to purchase. M2555, Mag-Bind® FFPE RNA Kit, has been discontinued and is no longer available to purchase.
v4.0, January 2014	DNase I has been renamed Mag-Bind® DNase I. This is a name change only.
v3.0, May 2012	Proteinase K is now supplied in a liquid form eliminating the step to resuspend prior to use. Proteinase Storage Buffer is no longer included in the kit.
v2.0, September 2011	General update.
v1.0, June 2009	Initial release.

Notices & Disclaimers

For European Union Use.

MB4 Buffer contains Triton X-100, 2-[4-(2,4,4-trimethylpentan-2-yl)phenoxy]ethanol (CAS 9002-93-1), a substance included in the European Authorisation list (Annex XIV) of REACH Regulation (EC) No 1907/2006. Substances and mixtures used for the purpose of Scientific Research and Development (SR&D) are exempt from authorization requirements if used below 1 tonne per year in volume.

Scientific Research and Development includes experimental research or analytical activities at a laboratory scale such as synthesis and testing of applications of chemicals, release tests, etc. as well as the use of the substance in monitoring and routine quality control or in vitro diagnostics.

Trademarks and Licenses

Notes:

Notes:

For more purification solutions, visit **www.omegabiotek.com**

AVAILABLE FORMATS


Spin Columns

96-Well Silica Plates


Mag Beads

SAMPLE TYPES


Blood / Plasma

Plasmid


Cultured Cells


Plant & Soil


NGS Clean Up


Tissue


FFPE


Fecal Matter

omega BIO-TEK

innovations in nucleic acid isolation

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