AFTMag NGS DNA Clean Beads

RK20257



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Version：N19C24v1.1

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1. Product Introdcution

ABclonal AFTMag NGS DNA Clean Beads are high-performance magnetic beads designed for DNA purification and size selection in NGS library preparation workflows. These beads are compatible with major NGS library prep kits (for both DNA and RNA), and provide comparable performance in terms of handling, yield, and size distribution to AMPure XP Beads, making them a cost-effective alternative.

2. Kit Components

Table 1. Kit Components

Component Name	Product Size		
AFTMag NGS DNA Clean Beads	5 mL	60 mL	500 mL

3. Storage

All components are stable for up to two years when stored properly. Store at 4 °C upon receipt.

4. Required Materials (Not Provided)

- Freshly prepared 80% ethanol
- Nuclease-free water
- PCR tubes

- Magnetic rack
- Pipette tips with filters
- Mini centrifuge
- Vortex mixer
- Single and multi-channel pipettes
- Agilent 2100 Bioanalyzer or equivalent DNA QC platform

5. Operating Instructions

The AFTMag NGS DNA Clean Beads can be used following the magnetic bead handling instructions provided in various library preparation kits.

5.1 DNA Purification

5.1.1. Remove the bead solution from 2-8°C storage and let it equilibrate to room temperature for at least 15 minutes.

5.1.2. Mix the bead solution thoroughly by inversion or vortexing. Based on your sample volume (refer to **Figure 1** for guidance), add the appropriate volume of bead solution to the DNA sample. Mix gently by pipetting up and down 10 times.

5.1.3. Incubate at room temperature for 5 minutes to allow the DNA to bind to the beads.

5.1.4. Place the sample on a magnetic rack. Once the solution becomes clear (approximately 5 minutes), carefully remove the supernatant.

5.1.5. Keeping the sample on the magnetic rack, add 200 μL of freshly prepared 80% ethanol to wash the beads. Let stand for 30 seconds, then carefully remove the supernatant.

5.1.6. Repeat **step 5.1.5** once more for a total of two ethanol washes.

Ensure all residual liquid is removed.

5.1.7. While keeping the sample on the magnetic rack, air-dry the beads with the tube open at room temperature for approximately 2–3 minutes.

5.1.8. Remove the sample from the magnetic rack and add an appropriate volume of nuclease-free water. Vortex briefly or pipette up and down to mix thoroughly. Let the sample sit at room temperature for 2 minutes. Then place it back on the magnetic rack for 1 minute. Once the solution is clear, carefully transfer the supernatant to a new nuclease-free microcentrifuge tube.

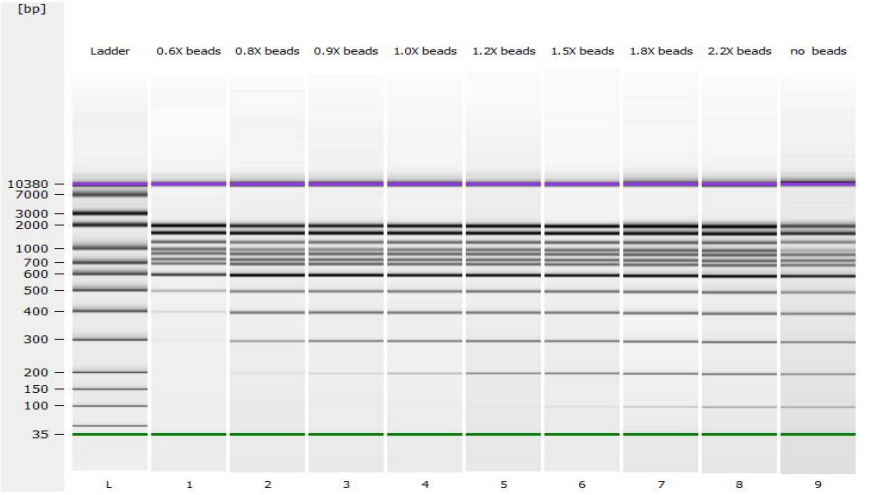


Figure 1. DNA Purification Results.

Using the 100 bp DNA Marker (Invitrogen, 15628019), purification was performed with different bead-to-sample ratios. The results show that varying the bead ratio allows selection of different fragment sizes. A 1.2× ratio effectively recovers fragments larger than 100 bp.

5.2 DNA Size Selection

5.2.1. Remove the bead solution from 2–8°C storage and allow it to equilibrate to room temperature for at least 15 minutes.

5.2.2. Mix the bead solution thoroughly by inversion or vortexing. Based on the size selection protocol of your library prep kit, add the appropriate volume of bead solution (for the first round of size selection) to the purified DNA sample. Mix gently by pipetting up and down 10 times.

5.2.3. Incubate at room temperature for 5 minutes to allow DNA to bind to the beads.

5.2.4. Place the sample on a magnetic rack. Once the solution becomes clear (approximately 5 minutes), carefully transfer the supernatant to a new nuclease-free microcentrifuge tube.

Note: Do not discard the supernatant — it must be retained for the second round.

5.2..5 Add the appropriate volume of bead solution for the second round of size selection. Mix gently by pipetting up and down 10 times.

5.2.6. Incubate at room temperature for 5 minutes to allow DNA binding.

5.2.7. Place the sample on a magnetic rack. Once the solution becomes clear (approximately 5 minutes), carefully remove and discard the supernatant.

5.2.8. Keeping the sample on the magnetic rack, add 200 µL of freshly prepared 80% ethanol to wash the beads. Let sit at room temperature for 30 seconds, then carefully remove the ethanol.

5.2.9. Repeat step 5.2.8 once more for a total of two ethanol washes.

5.2.10. While keeping the sample on the magnetic rack, air-dry the beads

at room temperature with the cap open for approximately 2-3 minutes.

5.2.11. Remove the sample from the magnetic rack and add an appropriate volume of nuclease-free water. Vortex briefly or pipette up and down to mix thoroughly. Let stand at room temperature for 2 minutes. Then return the sample to the magnetic rack and let sit for 1 minute. Once the solution is clear, carefully transfer the supernatant to a new nuclease-free microcentrifuge tube.

5.3 DNA Size Selection Reference Guide

DNA libraries were constructed using Tn5 Transposase (1 mg/mL) (Cat: RK20547). For libraries ranging from 200 to 1500 bp, size selection was performed using Clean Beads according to the conditions listed in the table below. The resulting libraries of different size distributions were analyzed using the Agilent 2100 Bioanalyzer.

Table 2. Recommended Bead Ratios for Library Size Selection

Library Average Length (bp)	300 bp	350 bp	400 bp	500 bp	600 bp	650 bp
1st Round Volume Ratio (Beads: DNA)	0.80X	0.70X	0.60X	0.55X	0.50X	0.45X
2nd Round Volume Ratio (Beads: DNA)	0.2X	0.2X	0.2X	0.15X	0.15X	0.15X

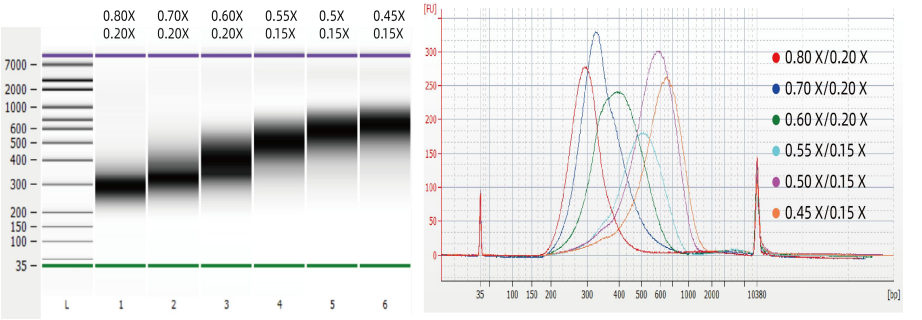


Figure 2. Fragment Size Analysis by Agilent 2100 Bioanalyzer

5.4 Nucleic Acid Purification Reference Guide

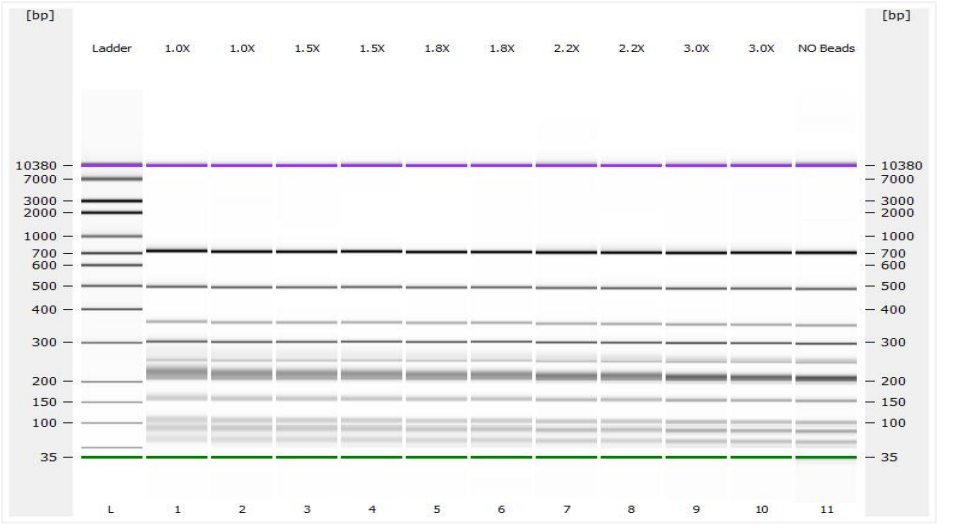


Figure 3. Purification Results of Small Fragment DNA

Using 25 bp–766 bp DNA Marker (NEB, N3233L), different bead-to-sample ratios were tested. The results show that fragments as small as ~60 bp can be efficiently captured.

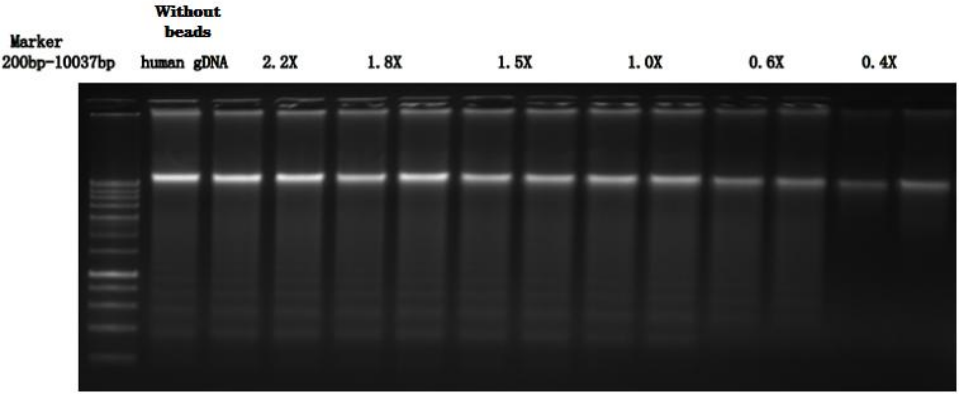


Figure 4. Purification Results of Large Fragment DNA

Using human gDNA (ABclonal, STB0092) as the template.

6. Precautions

- Remove AFTMag NGS DNA Clean Beads from 2 – 8 °C storage approximately 15 minutes in advance and allow them to equilibrate to room temperature. This helps ensure optimal DNA recovery. Before use, vortex or invert thoroughly to mix well.
- During the 80% ethanol wash step, keep the sample tubes on the magnetic rack without disturbing the beads. When drying the beads, avoid over-drying. Cracking of the beads indicates excessive drying, which can reduce DNA elution efficiency.
- When analyzing the library with the Agilent 2100 Bioanalyzer, tailing at higher molecular weights may occasionally be observed. This is typically due to trace amounts of magnetic bead residue in the purified PCR product. To avoid this, use a strong magnetic rack during the final supernatant removal step and handle carefully to prevent bead

disturbance.

- Various components in the starting sample may interfere with the performance of bead-based selection. The optimal bead usage ratios for dual-round purification may vary depending on where the size selection is applied in the workflow.

7. Related Products

Cat No.	Product Name
AI20021	1.5 ml (8-well) Magnetic Separation Device
AI20022	1.5 mL (16-well) Magnetic Separation Device Plus
AI20027	96-well PCR Plates Magnetic Separation Device

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