

Hieff NGS™ DNA Selection Beads V2

Product description

Hieff NGS™ DNA Selection Beads V2 are based on the SPRI (Solid Phase Reverse Immobilization) principle and are formulated with an optimized buffer system. They are designed for DNA fragment size selection and purification during second-generation sequencing library preparation, as well as for large-fragment recovery in third-generation library construction. This product is compatible with library preparation kits from all major brands and is used in the same manner as the widely adopted AMPure XP Beads. Compared to the previous generation product from Yeasen (Cat#12601ES), this version offers improved recovery efficiency for large DNA fragments, making it particularly suitable for third-generation sequencing library preparation.

Specifications

Cat NO.	12418ES03 / 12418ES08 / 12418ES56 / 12418ES75
Size	1 mL / 5 mL / 60 mL / 450 mL

Components

Name	12418ES03	12418ES08	12418ES56	12418ES75
Hieff NGS™ DNA Selection Beads V2	1 mL	5 mL	60 mL	450 mL

Storage

This product should be stored at 2~8°C for 18 months.

Instructions

I. Preparation

Remove the beads from the refrigerator and allow them to equilibrate to room temperature for at least 30 minutes. Prepare fresh 80% ethanol.

II. Size Selection (Double-sided or "Double-round" Method)

The workflow for size selection is illustrated in Figure 1. Detailed steps are as follows:

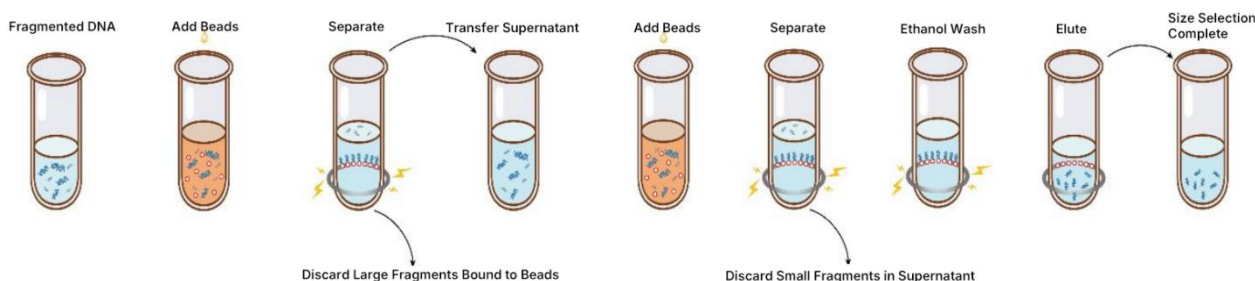


Figure 1: Workflow of double-round size selection

1. Vortex thoroughly or invert the bead suspension multiple times to ensure homogeneity.
2. Add the first-round volume of beads to the DNA solution according to Table 1. Mix by vortexing or pipetting up and down 10 times.

3. Incubate at room temperature for 5 minutes.

4. Briefly centrifuge the tube and place it on a magnetic rack. Wait until the supernatant becomes clear (approximately 5 minutes), then carefully transfer the supernatant to a new tube.

[Note]: When transferring the supernatant, leave approximately 2 μ L of liquid in the original tube to avoid aspirating magnetic beads, which could compromise size selection performance.

Example: For an initial DNA volume of 100 μ L and a first-round bead ratio of 0.8 $\times$, add 80 μ L of beads. It is recommended to transfer 178 μ L of supernatant.

5. Add the second-round volume of beads to the transferred supernatant, according to Table 1.

6. Mix by vortexing or pipetting up and down 10 times, then incubate at room temperature for 5 minutes.

7. Briefly centrifuge and place the tube on a magnetic rack. After the solution clears (~5 minutes), carefully remove and discard the supernatant.

8. While keeping the tube on the magnetic rack, add 200 μ L of freshly prepared 80% ethanol to wash the beads. Incubate at room temperature for 30 seconds, then carefully remove and discard the supernatant.

9. Repeat step 8.

10. With the tube remaining on the magnetic rack, air-dry the beads until they just begin to crack (~5 minutes).

[Note]: Do not over-dry the beads, as excessive drying will impair elution efficiency.

11. Remove the tube from the magnetic rack and add an appropriate volume of nuclease-free water (≥ 20 μ L). Vortex or gently pipette to mix thoroughly, then incubate at room temperature for 5 minutes.

12. Briefly centrifuge and place the tube back on the magnetic rack. Once the solution clears (~5 minutes), carefully transfer the supernatant to a clean tube. The size selection is now complete.

Reference Conditions for DNA Fragment Size Selection

Calf thymus DNA was fragmented by sonication to generate a smear of 100–1000 bp fragments (Figure 2b). Double-round size selection was performed according to Table 1. The resulting products were analyzed using an Agilent 2100 Bioanalyzer (Figure 2a).

Table 1: Recommended Bead Ratios for Library Size Selection

Target DNA Fragment Size (bp)	150–250	200–300	250–350	300–450	350–650	400–650
First-round Bead Ratio (Beads:DNA)	0.80 $\times$	0.70 $\times$	0.65 $\times$	0.60 $\times$	0.55 $\times$	0.55 $\times$
Second-round Bead Ratio (Beads:DNA)	0.20 $\times$	0.20 $\times$	0.15 $\times$	0.15 $\times$	0.15 $\times$	0.10 $\times$

[Note]: “ $\times$ ” refers to the volume of the DNA sample to be selected. For example, to select fragments centered around 200 bp from a 100 μ L DNA sample, use $0.80 \times 100 \mu\text{L} = 80 \mu\text{L}$ beads in the first round and $0.20 \times 100 \mu\text{L} = 20 \mu\text{L}$ beads in the second round.

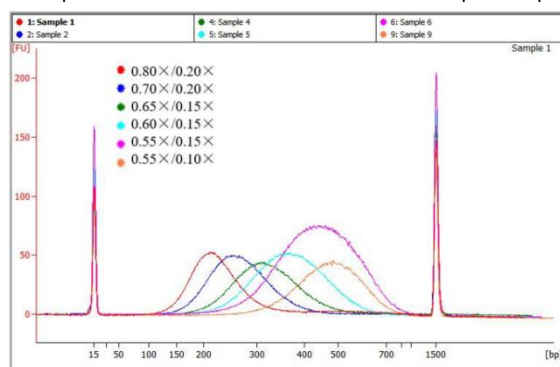


Figure 2a: Quality control of sonicated DNA samples after size selection with different bead ratios

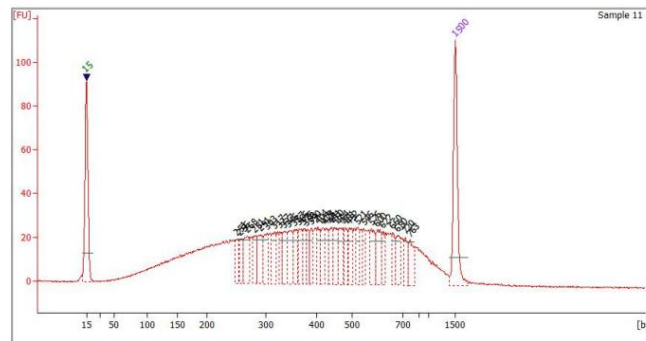


Figure 2b: Sonicated DNA sample prior to size selection

III. Nucleic Acid Purification

1. Vortex thoroughly or invert the bead suspension to ensure homogeneity.
2. Add beads to the DNA sample at the desired ratio. Mix by vortexing or pipetting up and down 10 times.
3. Incubate at room temperature for 5 minutes.
4. Briefly centrifuge and place the tube on a magnetic rack. After the solution clears (~5 minutes), carefully remove and discard the supernatant.
5. While keeping the tube on the magnetic rack, add 200 μ L of freshly prepared 80% ethanol. Incubate at room temperature for 30 seconds, then remove and discard the supernatant.
6. Repeat step 5.
7. With the tube remaining on the magnetic rack, air-dry the beads until they just begin to crack (~5 minutes).

[Note]: Avoid over-drying the beads, as this will reduce elution efficiency.

8. Remove the tube from the magnetic rack and add an appropriate volume of nuclease-free water (≥ 10 μ L). Vortex or gently pipette to mix thoroughly, then incubate at room temperature for 5 minutes.
9. Briefly centrifuge and place the tube back on the magnetic rack. Once the solution clears (~5 minutes), carefully transfer the supernatant to a clean tube. Purification is now complete.

Reference Conditions for DNA Purification

GoldBand 1 kb DNA Ladder (Cat: 10510ES) was used as the test sample and purified with varying ratios of 12418ES beads. Purified products were analyzed by gel electrophoresis (Figure 3).

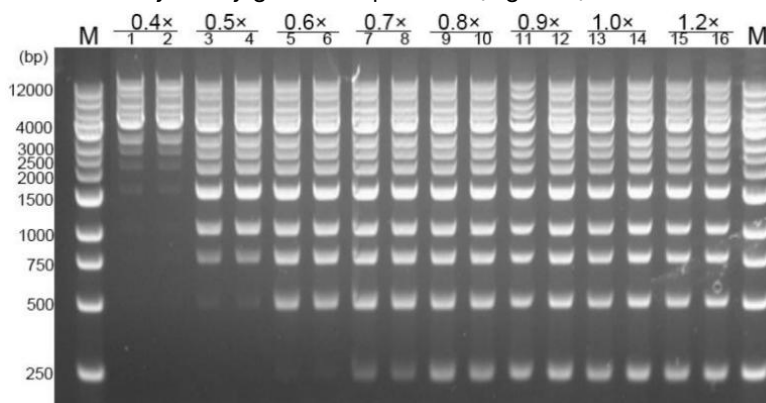


Figure 3: Gel electrophoresis quality control of 1 kb DNA ladder purified with different bead ratios

Human genomic DNA was fragmented using Yeasen's Hieff™ DNA Fragmentation Reagent for NanoporeSEQ (Cat: 13309ES) and purified with different ratios of 12418ES beads. Purified products were analyzed by gel electrophoresis (Figure 4).

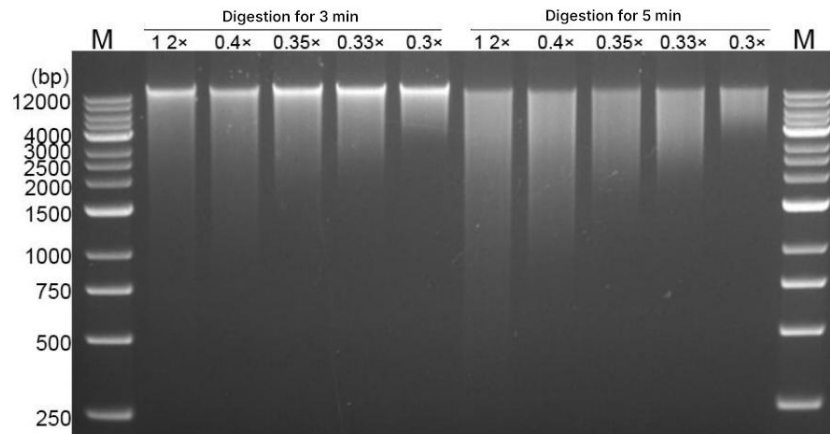


Figure 4: Gel electrophoresis quality control of enzymatically fragmented human gDNA purified with different bead ratios

Notes

1. For your safety and health, wear a lab coat and disposable gloves during operation.
2. Beads must be equilibrated to room temperature for at least 30 minutes before use.
3. Prepare 80% ethanol fresh; otherwise, recovery efficiency will be compromised.
4. For size selection, the initial sample volume must be $\geq 100 \mu\text{L}$. If the volume is insufficient, adjust to $100 \mu\text{L}$ with nuclease-free water. Smaller volumes increase pipetting errors and negatively affect selection accuracy.
5. This product is for research use only!