Magnetic beads for molecular biology

# ExtraMag Beads for DNA/RNA isolation and purification

RUO

User manual

ExtraMag™ beads are silica coated magnetic particles designed for high-throughput and rapid extraction and purification of nucleic acids.

Application:

1) Genomic DNA/RNA extraction
2) Viral DNA/RNA extraction
3) Plasmid DNA purification
4) Purification of PCR products

Features:

1) Superparamagnetic particles with high magnetization
2) Easy to resuspend
3) High nucleic acids capacity
4) Fast and simple protocols
5) For manual and automatic use
6) Compatible with automatic stations (KingFisher Flex, Freedom EVO® or analogous)
7) Ideal option for COVID-19 PCR sample preparation

| **Specifications** | |
|---|---|
| Concentration | 25 mg/ml* |
| Composition | γ-$Fe_2O_3$–$SiO_2$ |
| Surface functional groups | Si–OH |
| Bead type | Controlled aglomerates of nanospheres |
| Average particle size | 1 μm |
| Surface area (BET) | ~150 $m^2/g$ |
| Sedimentation Stability | 3–5 min** |
| Time of full magnetic separation | < 1 min** |
| Magnetization type | Superparamagnetic |
| Magnetization value | ~45 emu/g |
| NA extraction purity | $A_{260}/A_{280}$ = 2.1–2.2*** |
| NA extraction capacity | 6-12 μg per 1 mg of sorbent**** |
| Storage conditions | 2–25 ºC |
| Transportation conditions | 2–25 ºC |
| Shelf life | 24 months |

*Can be supplied in any concentration (up to 200 mg/ml) on request

**Depends on the isolation conditions

***Estimated by analysis of NA isolated from HeLa cells with the ExtraMag 1 kit

****Genomic DNA per 200 μL of whole blood

## MATERIALS REQUIRED BUT NOT SUPPLIED

| | | |
|---|---|---|
| • Magnetic rack / equipment for automated isolation of nucleic acids | | |
| • Variable pipettors | • Pipettor tips | |
| • Polypropylene tubes / plates | | |
| • Mini-Centrifuge/Vortex | | |
| • Thermostat for Eppendorf type microtubes | | |
| • Lysis Buffer* | • Wash Buffer* | • Elution Buffer* |
| • Positive control (PC) ** | • Negative control (NC) ** | |
| * - *included in DNA/RNA isolation kits. For example, ExtraMag DNA/RNA Isonation Kits* | | |
| ** - *included in kits for PCR or RT-PCR. For example, SARS-CoV-2-Screen SARS-CoV-2 Real-time PCR Detection Kit* | | |

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## INSTRUCTIONS FOR USE

These instructions are provided for manual use and are advisory, the protocol may vary depending on the reagents.

1. If crystals are present in Lysis Buffer or Wash Buffer, follow the manufacturer's instructions to dissolve them completely.
2. Thoroughly mix the content of the ExtraMag Beads pack.
3. Prepare a Mixture of Lysis Buffer and ExtraMag Beads at the rate of 400 µl of Lysis Buffer and 10 µl of ExtraMag Beads for one extraction. It is necessary to take into account the stock – 1 additional sample.
4. Prepare and label the required number of tubes. Add 400 µl of Mixture of Lysis Buffer and ExtraMag Beads to each tube.
5. Add 100 µl of clinical samples to sample tubes. In a separate tube for the positive control add 100 µl of PC, in a separate tube for the negative control add 100 µl of NC.
6. Close the tubes tightly with lids, vortex and incubate in a thermostat for 10 minutes at +65 °C. After incubation, precipitate drops on a vortex and place the tubes in a magnetic rack. The separation of the sorbent in test tubes by centrifugation at 10 000 rpm for 30 seconds is also acceptable. When the magnetic beads have formed a precipitate (approximately 60 seconds for a magnetic rack), remove completely the supernatant using a vacuum aspirator and a separate tip for each sample. Transfer the tubes to a regular tube rack.
7. Add 700 µl of Wash Buffer 1 to each tube. Vortex the tubes, precipitate drops and place the tubes in a magnetic rack. The separation of the sorbent in test tubes by centrifugation at 10 000 rpm for 30 seconds is also acceptable. When the magnetic beads have formed a precipitate (approximately 60 seconds for a magnetic rack), remove completely the supernatant using a vacuum aspirator and a separate tip for each sample. Make sure that Wash Buffer is completely removed.
8. Repeat point 7.
9. Incubate the rack with open tubes for 10 minutes at +65 °C to remove residual moisture.
10. Add 100 µl of Elution buffer to each tube. Vortex the tubes and incubate in a thermostat for 5 minutes at +65 °C. After incubation, precipitate drops on a vortex and place the tubes in a magnetic rack. The separation of the sorbent in test tubes by centrifugation at 10 000 rpm for 30 seconds is also acceptable.
11. When the magnetic beads have formed a precipitate (approximately 60 seconds for a magnetic rack), collect the eluent and transfer it to new tubes. The eluent deletion is carried out without removing the tubes from the magnetic rack. The eluent contains a highly purified NA preparation.
12. After taking the eluent into tubes, NA samples can be stored for 30 minutes at temperatures from +2 to +8 °C or for 1 week at a temperature not higher than -16 °C.

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## TROUBLESHOOTING

1. Absence of a positive reaction with a known positive sample during PCR or RT-PCR.

| № | Possible reason | Solution |
|---|---|---|
| 1 | Incomplete cell lysis due to the presence of a crystalline precipitate in the Lysis Buffer | Follow the manufacturer's instructions to dissolve the crystals in Lysis Buffer. |
| 2 | Incorrect sample preparation due to non-compliance with recommendations for the procedure for obtaining clinical samples (including violation of storage and transportation conditions) | Take new samples in accordance to official guidelines and repeat the analysis |
| 3 | Insufficient amount of biological material in the sample | Take new samples in accordance to official guidelines and repeat the analysis |

2. The presence of a positive reaction with a known negative sample during PCR or RT-PCR.

| № | Possible reason | Solution |
|---|---|---|
| 1 | Contamination at the stage of NA extraction | Decontaminate, use filter tips, chemical and ultraviolet disinfection of all work surfaces, use separate sets of dispensers, equipment, gowns and gloves for each area, conduct internal and external quality control of studies |