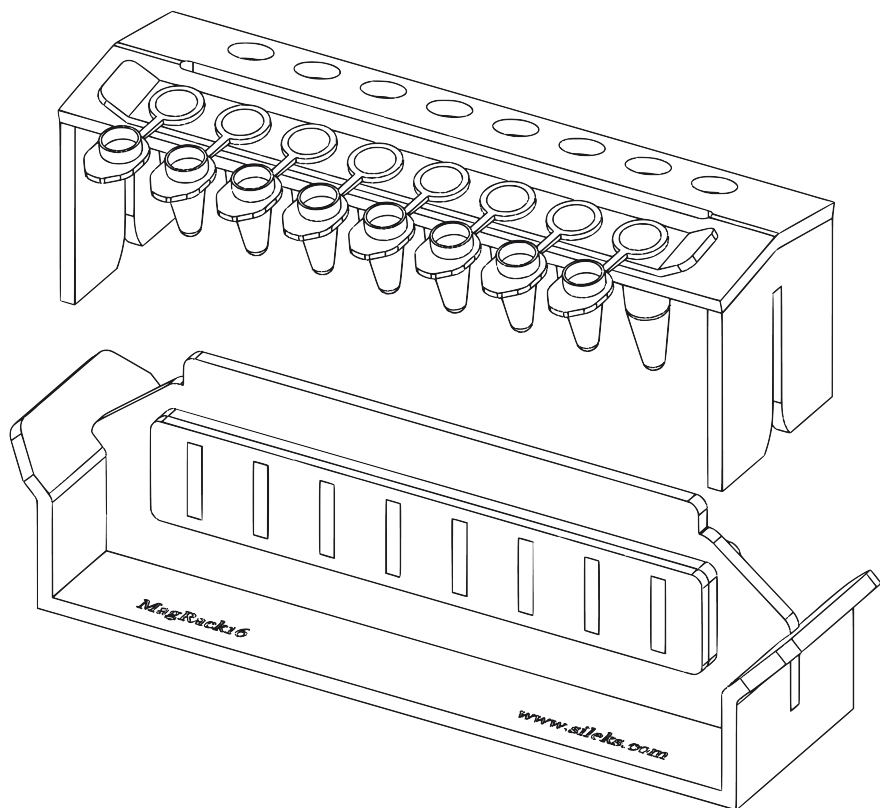


# Magnetic rack Sileks MagRack16



## User manual

Sileks GmbH, 2014



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## 1.1. Purpose

Magnetic rack Sileks MagRack16 is designed to help to optimize laboratory tasks regarding operations with magnetic and paramagnetic micro- and nanoparticles ("magnetic particles") in standard 1.5 ml tubes.

The rack can be used to accelerate and simplify isolation procedures of DNA / RNA / proteins and other macromolecules from various biological materials using laboratory methods, based on magnetic particles. Using such methods allows to significantly increase the speed of isolation procedure compared to methods, based on nonmagnetic sorbents. One of the keypoints of the total procedure optimization is the elimination of centrifugation stages from standard isolation protocols. A centrifuge, that is regularly required for pelleting a sorbent, is replaced by the desktop magnetic rack. The magnetic rack provides fast separation of particles from a liquid phase. The particles are safely collected on a tube wall without centrifugation. Another advantage of such an approach is high reliability of particles collection. While the particles remain in the magnetic field of the rack, they do not return to the liquid phase. Particles of nonmagnetic sorbents, in contrary, often separate from a pellet and are aspirated into the pipette. It causes loss of isolated substance and may inhibit further reactions.

## 1.2. Description

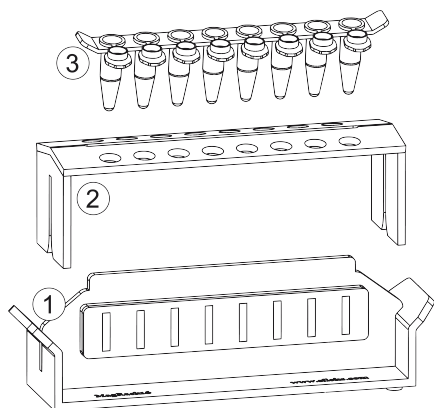


Fig.1. MagRack16 components.  
1 - Magnetic base  
2 - Nonmagnetic rack for tubes  
3 - Tubes in a strip

The magnetic rack consists of some elements and can be assembled/disassembled. The rack's base (1) has a magnetic collector for separating magnetic particles. The magnetic collector (2) contains strong rare-earth magnets. The nonmagnetic rack for tubes (3) is placed on top of the base. The top rack can be easily set on the magnetic base and moved away. When it is set, the tubes are positioned precisely near the magnets and the particles are separated very fast. The magnetic collector is segmented and consists of relatively small magnets. Its advantages over a whole magnetic bar are smaller weight and higher safety.

Magnetic field of small magnets have higher attenuation with distance, while near the surface it is almost as strong as near a big magnet.

Tubes can be placed in special strips (4). The strips are usefull for easy transfer of tubes between compatible devices (other racks, thermal blocks, tube depots etc).

## 1.3. The principle of operation

The magnetic rack allows to collect magnetic particles in two rows of tubes. Each row may contain up to eight standard 1.5 ml tubes. The magnetic collector contains rare-earth neodymium magnets that are the strongest permanent magnets used at the present time in technics. These magnets provide very high collection speed and big retention force. It guarantees reliable and fast separation of particles and helps to avoid their leak from a formed pellet.

The magnetic collector is located in such a position that provides separation of particles in a zone of tube, that is the most rational and allows for comfortable aspiration of the supernatant. The collector must remain under the tubes during liquid phase removal. If the top rack is moved away from the collector, the particles will not hold on the tube wall and will be aspirated along with a liquid. When resuspending particles, the top rack must be removed from the magnetic base, because the strong magnetic field of the collector may prevent thorough resuspension.

It is recommended to use special tube strips to make your work more comfortable and efficient. When using the strips, you can at once transfer a whole row of tubes (up to 8 pcs.) to any other compatible module (other magnetic racks, tube depots, thermal blocks etc.). Such approach makes the rack an important element in modular complexes, intended for isolation of biological macromolecules (DNA, RNA, proteins).

## 1.4. Main components and additional accessories

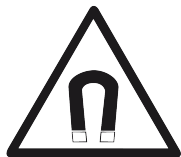
The standard set of MagRack16 magnetic rack includes:

|  |          |
|--|----------|
| Base of the rack with magnetic collector | - 1 pcs. |
| Rack for tubes                           | - 1 pcs. |
| User manual                              | - 1 pcs. |

Sold separately as accessories:

- Tube strips TubeStrip81 (with grips)
- Tube strips TubeStrip82 (without grips)
- Tube depots and docks for tube strips

## 2.1. General safety rules



Strong neodymium magnets are used in the rack. Their magnetic field may damage sensitive and precision electronic and mechanic devices if they are put close to the rack.

The magnetic collector represents an array of separate small magnetic bars. Such design provides higher attenuation of the magnetic field with distance from the working zone, while in the zone the field is almost as strong

as near a whole big magnetic bar. Nevertheless it is strongly recommended to follow rules listed below.

Do not place the rack near electronic and magnetic media storage, watches, precision balances and other magnetic-sensitive devices. Especial carefullnes is required when disassembling the rack. While in an assembled rack the walls prevent dangerous proximity with metallic objects, when the magnetic collector is exposed, it can attract various metallic things, turning them into projectiles, or be attracted itself to massive metallic objects (steel boxes and tables). You should be always very carefull when exposing the magnetic collector. Neglegence to this warning may result in unrecoverable damage to the rack itself, surrounding sensitive devices and even in user's injuries caused by attracted metallic objects.

The rack is made of strong acrylic plastic. It can hold all necessary working loads. But it may be damaged in case of a hard strike or after falling down from working surface. The rack must be protected from applying strong mechanical force.

The plastic used in the rack has relative chemical resistance. But strong organic solvents (chloroform, tetrafloromethylene etc.) and aggressive liquids (like acids and alcali) may cause the plastic to become dull. Avoid spilling aggressive liquids on the rack.

## 2.2. Transportation and operation safety rules

Avoid hard shocks and falls of the magnetic rack during its transporation and in daily work.

Follow precautions, described above, when transporting and using the magnetic rack. Do not store the rack near electronic and preccission mechanical devices. Always keep the rack and tube strips clean. Wash them only with warm water and soap in case they become dirty. Using dirty equipment significantly increases the risk of sampes cross-contamination during the isolation procedure. Do not wash the rack and its accessories with aggressive washing liquids and abrasive materials.

## 3.2. Working with the magnetic rack

Place tubes in wells of the rack. It is recommended to place them with their lids outside (see Fig. 2a). Tubes can be placed in special strips of TubeStrip8x series if it is required. Using such strips will make it easier to transfer tubes between compatible devices if you plan to use ones.

To separate particles, place the top (nonmagnetic) part of the rack on the magnetic base (Fig. 2b). Separation of particles begins immediately and proceeds very fast due to the strong magnetic field generated by the collector. The top part must remain on the magnetic base during the whole process of removal of liquid phase. Otherwise some amount of magnetic particles may be aspirated from the tube. The most efficient way to remove liquid is to use an automated aspirator. But in a common laboratory practice it is often done with a regular pipette.

The rack with tubes must be moved away from the magnetic base when new solutions are added to the tubes or when the pellet of magnetic particles in the tubes is resuspended. Otherwise the pellet will not be mixed thoroughly enough. The particles can be resuspended by manual pipetting. But it is much more efficient to use handheld laboratory mixer for achieving thorough resuspension.

If you use another devices, that has a compatible distance between tubes (18 mm between centers), you can use special strips for tubes, that allow for easy transfer of tubes between such devices. It significantly optimizes and simplifies the work. Using MagRack16 alone, you can process 16 tubes in one isolation cycle. Using some assisting equipment (strips holders for example), you can increase your productivity.

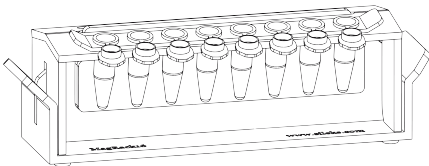


Fig. 2a. Separation of magnetic particles. The top rack with tubes is placed on the magnetic base to collect particles. When particles are collected, the liquid contents of the tubes can be removed.

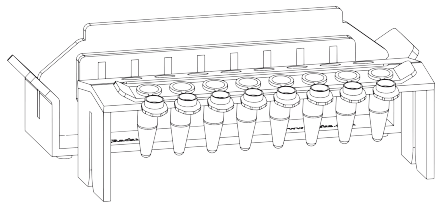


Fig. 2b. Resuspending magnetic particles. Rack with tubes moved away from the magnetic collector, making it possible to resuspend particles.

## 4. Troubleshooting

### **Difficulties during resuspension of magnetic particles**

- The rack with tubes is on the magnetic base.

The top rack with tubes must be moved away from the base of the rack with a magnetic collector when resuspending particles. Otherwise particles will be separated back from the suspension very fast.

### **The pellet of magnetic particles is captured when removing liquid phase**

- The top rack with tubes is not placed on the magnetic base.

The rack with tubes must remain on the magnetic base during the whole procedure of removing a supernatant. Physical properties of a particles pellet, produced by magnetic field, differ from a sorbent pellet, formed by centrifugation. The pellet of magnetic particles usually cannot remain on the tube wall if an external magnetic field is removed. The liquid phase must be removed in a magnetic field only.









# Magnetic rack Sileks MagRack16

Sileks GmbH

phone: +49 7632-82-31964

fax: +49 7632-82-31996

e-mail: [info@sileks.de](mailto:info@sileks.de)

web: [www.sileks.de](http://www.sileks.de)

Read more about our product on our web-site. There you can find additional media information, video tutorials and new ideas for optimizing your work using our laboratory equipment.



<http://www.sileks.eu/shortlink/MagRack16>