

# BASICS PAPER STIRRING & HEATING

# MAGNETIC VS OVERHEAD STIRRERS

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# WHAT KIND OF STIRRING **IS BEST FOR YOUR LAB?**

Stirring is a critical part of many chemical processes. Stirring promotes the homogenization of miscible liquids, solid particles, and other reagents that are used within chemistry processes. Heating a solution ensures even heat distribution and consistent heating throughout the entire solution. It causes atoms and molecules to collide, giving a desired outcome. In other words, it causes them to react with each other to create a product. Magnetic and overhead stirrers are used in the lab only to complete stirring tasks. When choosing between a magnetic and an overhead stirrer, let's consider some key factors.



## Volume

The size of the volume samples you plan on stirring will play a significant role in what kind of stirrer to use. If your lab is processing smaller volume samples, a magnetic stirrer will be the way to go. Most magnetic stirrers are most effective with 20 or fewer liters volume samples.

Samples that are larger than 20 liters will require a more robust instrument. Depending on the model, overhead lab stirrers can mix anywhere from 50 to 100+ liters.



### Speed

As measured by rotations-per-minute (RPM), speed is another crucial consideration when choosing your stirrer.

Once again, overhead stirrers will provide you with a broader range of applications that can be mixed. Depending on the model, overhead stirrers can range from 10 to 2,000 rpm.

If using a magnetic stirrer, the rpm can change depending on the magnetic stir bar being used. Some stir bars can become disengaged from the rotating magnet at higher speeds, causing the stir bar to move around and allow you not to achieve the desired mix.

# Viscosity

When it comes to the viscosity of your samples, overhead stirrers are the superior of the two. While magnetic stirrers are sufficient for water-like samples, overhead stirrers will be able to conquer higher viscosity samples such as lotions, gels, organic compounds, and bio-diesel fuels.



Water 0 mPas Olive Oil 84 mPas

Honey 10,000 mPas

Viscosity

# Heating Requirements

If your samples must be heated while stirred, magnetic stirrers are available with a heating function, giving you an all-in-one tool.

Heating with overhead stirrers will require more added equipment. The two common solutions for a source of heat are heating mantles or a hotplate. Heating mantles are ideal when working with round bottom flasks and come in various sizes and configurations.

# Vessel Type

Magnetic stirrers can be used with open or closed vessels. Flat bottom flasks will give you the best results, with controlled rotation of the stir bar and the best contact with the magnetic agitator.

Overhead stirrers can work with both flat bottom flasks and closed reaction systems. Closed reaction systems will allow you to operate under pressure or vacuum conditions with the proper seals installed around the mixing shaft.





Toothpaste 100.000 mPas



**Peanut Butter** 250,000 mPas





# Applications

The choice will ultimately come down to the applications you are performing. For example, magnetic stirrers will fit your needs if working with mainly low viscosity substances. On the other hand, if you work with any high viscosity samples or require a faster rpm, then an overhead stirrer will be the best choice for you.



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### INTERNATIONAL

Heidolph Scientific Products GmbH

Walpersdorfer St. 12 | 91126 Schwabach, Germany Phone: +49 9122 9920-67 | sales@heidolph.de

#### NORTH AMERICA

Heidolph North America

1235 N. Mittel Blvd, Suite B | Wood Dale, IL 60191 Phone: (224) 264-9600 | hello@heidolph.com

#### **CHINA**

Heidolph Instruments Shanghai Ltd.

Room 805, Building 1 | Lane 908, Xiuwen Road Minhange District | 201100 Shanghai Phone: +86 21 6093 9799 | sales@heidolph-instruments.cn

### SOUTH KOREA

Heidolph Korea Ltd.

#1309, 3, Digital-ro 26-gil Guro-gu, Seoul Phone: +80 70 8064 7152 | sales@heidolph.kr

#### www.heidolph.com









