

# Homogenisation

*With Perfection*



### **Definition**

Homogenisation is the thorough mixing of two components of one system that are immiscible by their nature.

Common application in microbiology is resuspending of cell pellets and disruption of cell clots and cell tissue.

### **Applications**

- 1. Homogenisation of two indissoluble liquids, e.g. creating emulsions**
- 2. Mixing of solids into liquids, e.g. creating suspensions**
- 3. Separating bacteria or yeast cells from the culture medium by centrifugation or resuspending, e.g. washing with buffers**
- 4. Splitting bacteria or yeast cell clots, e.g. for chemical cell disruption**
- 5. Splitting united cell structures, sensitive material, e.g. cell culture, liver etc.**
- 6. Splitting united cell structures, tough material, e.g. muscle, bowel, skin, plant tissue**

Complete disruption into individual cells through homogenisation can only be guaranteed for sensitive material (cell culture, liver tissue, plant tissue etc.). Frequently, homogenisation serves as a preparation step for chemical (detergents), enzymatic or mechanical cell disruption.

Please contact us for mechanical cell disruption systems (French Press System, BioNeb System, Ultrasonic systems etc.).

Homogenisation highly increases the effect of cell disruption and reduces the residence time of chemicals or enzymes.

### **What do you need for homogenisation?**

#### ***schuett homger<sup>plus</sup>***

Powered drive-unit at high-torque, in which you may clamp the pestle.

The homogenising vessel is tightly clamped into the cooling vessel on the lifting table.

During homogenisation, the table may easily be lifted up and down with a lever. This assures powerful homogenisation for the up and down movement without any effort from the user.

#### **Pestle**

We offer a wide range of pestles made of teflon, glass-fibre reinforced teflon, glass, polypropylene or stainless steel in cylindrical or tapered shape.

#### **Homogenising vessel**

We offer glass vessels where the inner diameter has highest fitting accuracy. Vessels are available for capacities of 2-40 ml.

# Semi-automatic homogeniser



## ***schuett homger<sup>plus</sup>*** ***Semi-automatic homogeniser***

- ***for tough tissue that is difficult to homogenize***
- ***high-torque drive-unit, up to 3,000 rpm***
- ***vibration-free with robust 3-support-construction***
- ***convenient cooling of the samples with ice***
- ***including quick-grip clamp for EPPENDORF® test tubes***

*schuett homger<sup>plus</sup> consists of a speed-stabilized drive-unit and a cooling vessel with an universal quick-grip chuck. Suitable for all common homogenisers of different sizes.*

*Its strong performance in a high-speed zone guarantees perfect homogenisation, even when using very small homogenisers (EPPENDORF® -scale).*

*The high-torque drive-unit of the schuett homger<sup>plus</sup> makes it very suitable for use at low speeds. schuett homger<sup>plus</sup> combines excellent physical stability with comfortable handling and smooth running properties.*

### ***Versatile***

*Adjustment in height and the locking of the drive-unit are continuously variable, so that an adjustment to homogenising vessels/pestles of various manufacturers is easily possible.*

*The fast-action clamping chuck with hollow shaft permits rapid and easy replacement of the pestle and permits use of pestles with longer shafts.*

*schuett homger<sup>plus</sup> is also suitable for hand-held homogenisers or EPPENDORF® reaction vessels.*

*Furthermore, the use as a high-performance agitator is possible.*

# Semi-automatic homogeniser

## **Comfortable and safe**

The lever arm moves the table up and down together with the cooling vessel and the tightly clamped homogenising vessel.

The lifting mechanism assures safe and comfortable work, both with tough and sensitive homogenising tasks.

The cooling vessel offers additional working safety in the case of glass-breakage or when using pathogen materials.



## **Speed-stabilized**

*schuett homger<sup>plus</sup>* is speed-stabilized with an electronic rotational speed-control variable from 40 to 3,000 rpm. The speed is infinitely variable and remains constant, independent of load changes when homogenising. The standard integrated 4-digit LED-display makes reproducible homogenising possible.

## **Cooling Vessel**

The transparent cooling vessel allows permanent monitoring of the homogenisation and guarantees high working safety.

*schuett homger<sup>plus</sup>* is suitable for homogenising sensitive botanical material, animal tissue, anorganic material etc.

Handy cooling of the samples with ice, which can easily be filled into the cooling vessel after opening the screw cap. This prevents sensitive samples from heating during homogenisation.

## **Universal**

The universal clamping adapter of the cooling vessel allows for use of almost all homogenising vessels currently available on the market. Included in delivery are 6 inserts for vessels with various diameters.

Even EPPENDORF® reaction vessels can be used.

Homogenising vessels and inserts are fixed to the chuck and locked.

The unit can also be supplied modified for use in a sterile workbench when operating with infectious substances (optional).

## **Accessories**

*schuett homger<sup>plus</sup>* includes a universal quick-grip chuck to use pestles of different shaft diameters and lengths.

To change even quicker and safer, especially when using glass pestles with shaft diameters of 6, 8 or 10 mm, we recommend the use of a quick-grip clamp for glass pestles.

We offer a whole range of homogenising vessels and tapered respectively cylindrical pestles made of glass or teflon.

Please ask for our special pestles made of stainless steel or polypropylen to use with EPPENDORF®-test tubes or Falcon-tubes.

# Homogenisers

## Homogenizers

suitable for use with our schuett homger<sup>plus</sup> semi-automatic homogeniser or any other drive-unit with drill chuck.

The homogenising vessels and pestles of schuett-biotec GmbH are available in different models and sizes as well as with different specific features, i.e. the user may choose a homogenising vessel and pestle that perfectly meets his individual demands - depending on consistency and fibre length of the material to be treated.

All homogenising vessels and pestles are manufactured with utmost precision and care to guarantee highest fitting accuracy to reach a good homogenisation result.

In case of breakage, only the damaged part has to be replaced, the counterpiece may still be used.

## Please note for using glass pestles with powered drive-units

When using pestles and homogenising vessels made of glass, both items have to be handled with care as two cut glass surfaces encounter.

The rotational speed should be as slow as possible. Furthermore, the vertical power should only be used to the least possible extent.

When moving, only glass surfaces being covered by liquid should be in contact. Contact between two dry glass surfaces cause resonance vibrations, which may lead to breakage of the glass parts.

Please moisten pestle and homogenising vessel before homogenising. Carefully insert the pestle into the homogenising vessel at a low rotational speed.



Homogeniser with overflow flare with lip and teflon pestle, tapered



Homogeniser as centrifuge tube with teflon pestle, cylindrical



Homogeniser with overflow flare with lip and teflon pestle, cylindrical



Homogeniser with overflow flare with lip and glass pestle, tapered



Homogeniser with overflow flare, without lip and glass pestle, cylindrical



Homogeniser with overflow flare with lip and glass pestle, cylindrical



EPPI-pestle made of polypropylen and stainless steel with quick-grip clamp



### ***Tapered or cylindrical***

*Depending on the task, one can choose between homogenisers with teflon pestles or ground glass pestles of tapered or cylindrical shape.*

*The tapered homogeniser combines two zones for homogenisation. In the tapered zone the material will be pre-homogenised while the final fine-homogenisation takes place in the cylindrical zone.*

*If the start material already has a fine texture, a cylindrical homogeniser may suffice.*

*Homogeniser and pestle are of a precise shape and therefore separately exchangeable.*

### ***Tapered homogenising vessels***

*are most suitable for tough tissue that is difficult to homogenise (application 4 and 6).*

*The distance between pestle and homogenising vessel depends on the immersion depth of the pestle in the tapered part of the vessel. In the tapered part, the material is chopped by moving the pestle up and down before it is homogenised in the cylindrical part of the vessel.*

*Tapered homogenising vessels reach very good results - even for materials that could virtually not be homogenised in cylindrical vessels.*

### ***Cylindrical homogenising vessels***

*are most suitable for soft tissue as stated in applications 1-5.*

*The straight, cylindrical pestles have a high fitting accuracy to the inner diameter of the homogenising vessel. The tip of the pestle fits exactly the bottom of the homogenising vessel, which forces the homogenising material upwards. The up and down movement of the vessel - and therefore with the shearing action at the walls - causes the homogenisation process.*

*For application 3, we offer a special homogenising vessel, which may be placed directly into the centrifuge.*

*This vessel is suitable for centrifuge rotation of up to 4,000 rpm. Cylindrical homogenising vessels produce a very fine homogenisation.*



### **Pestels made of teflon**

With shaft made of stainless steel. Inert, elastic, with a smooth, wax-like moisture-rejecting surface. Resistant to high temperatures.

Pestles made of teflon are preferentially used for homogenisation of soft materials (application 1 to 4, possibly 5).

The teflon pestle tips accurately fit the inner dimensions of the homogenising vessel. All pestles and homogenising vessels of the same size may be exchanged and autoclaved.

Teflon is chemically inert and has a soft wax-like and moisture-rejecting surface. The advantages of teflon are low heat development, no contamination of the homogenate by glass abrasion, high stability, and trouble-free sterilisation.

In the case where teflon (flexibiliser) might disturb the analytic, please use glass pestles.

### **Glass-fibre reinforced teflon pestle**

For especially tough tissue. These pestles are practically unbreakable and cause considerably less contamination of the homogenate due to glass abrasion than glass pestles.

The flexibility of teflon limits the effectiveness of using teflon pestles with tough tissue (application 4, possibly 6).

The reinforced teflon pestles contain 25% of glass and are therefore 10 times tougher; however, they are resistant to chemicals and have a smooth surface.

They are most suitable for material that is rather difficult to homogenise, but still provide the advantages of pure teflon pestles.

### **Pestels made of glass**

With robust glass shaft. Ground-glass surface in cylindrical/tapered shape. Highly efficient with tough tissue.

Cut glass pestles and homogenising vessels are most suitable for tough material that may cause difficulties during homogenisation (application 6).

Naturally, application 1-5 may be done with glass pestles as well, it is however more comfortable to use teflon pestles due to the easy handling.

Pestle and homogenising vessel may be exchanged, so that in case of weariness or breakage only the affected part has to be replaced. A motor drive-unit and a quick-grip clamp for glass pestles are recommended to minimize lateral pressure on the glass shaft and to reach sufficient torque with few rotations per minute.

In the case where glass abrasion (quartz particles) may disturb the analytic, please use teflon pestles.

### **EPPENDORF®-scale 1.5 ml**

#### **EPPI-pestle made of polypropylene (pestle and shaft)**

Autoclavable. Facilitates sterile working with serial samples.

We offer special tapered pestles made of autoclavable polypropylene with a capacity of 500 µl for use in EPPENDORF®-test tubes.

The test tubes are safely held in the cooling vessel. Cooling the sample with ice allows for gentle treatment of the samples, e.g. for DNA/RNA-extraction.

Our quick-grip clamp guarantees the treatment of many samples in best time and allows for changing the pestle with running engine.

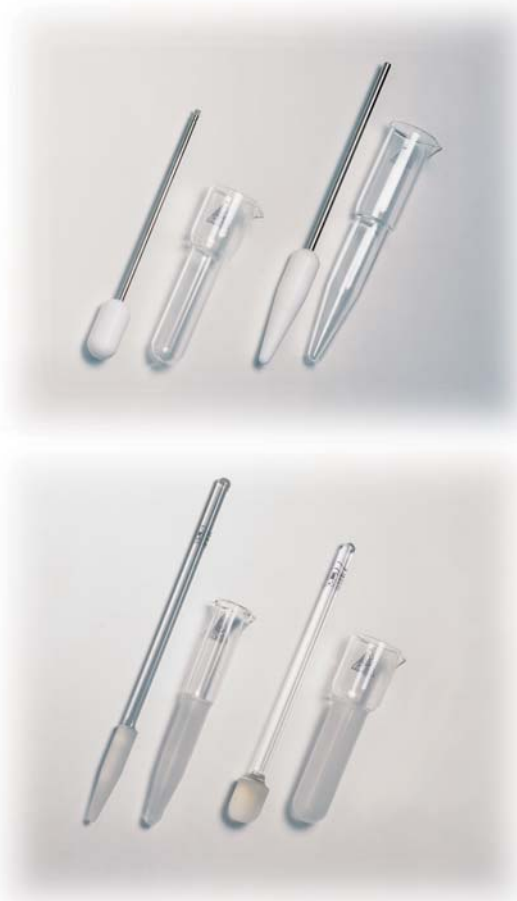
#### **EPPI-pestle made of stainless steel, cut from solid material.**

Autoclavable. They are made from one piece and easy to clean sterilize in order to avoid contamination with germs etc. Suitable for use with liquid nitrogen.

They may be exposed to high and low temperatures (autoclaving, liquid nitrogen).

Our pestles made of stainless steel are most suitable for homogenising small volumes (up to 500 µl) in tapered EPPENDORF®-test tubes being frozen in liquid nitrogen.

The advantages of the quick-grip clamp and the cooling vessel (see above) are adaptable to pestles made of stainless steel as well.



**Technical Data**

|                        |   |
|------------------------|---|
| Dimensions (w x h x d) | 320 x 750 x 300 mm                                  |
| Speed                  | 40-3,000 rpm  |
| Weight                 | approx. 15 kg                                       |
| Power                  | 230 V, 50-60 Hz, 330 W or<br>115 V, 50-60 Hz, 330 W |

**Ordering Information**

|                                      |                 |
|--------------------------------------|-----------------|
| <b>schuett homger<sup>plus</sup></b> | <b>Cat.-No.</b> |
| <b>3.201 011</b>                     |                 |

including cooling vessel, universal quick-grip chuck and universal clamping adapter

**Accessories**

|                                    |                  |
|------------------------------------|------------------|
| Quick-grip clamp for glass pestles | <b>3.201 111</b> |
|------------------------------------|------------------|

**Volume****Glass vessel****Pestle****Homogeniser with teflon pestle, tapered**

|       |                               |                  |                  |
|-------|-------------------------------|------------------|------------------|
| 2 ml  | with overflow flare, with lip | <b>3.201 022</b> | <b>3.202 022</b> |
| 15 ml | with overflow flare, with lip | <b>3.201 152</b> | <b>3.202 152</b> |
| 40 ml | with overflow flare, with lip | <b>3.201 402</b> | <b>3.202 402</b> |

**Homogeniser with teflon pestle, cylindrical**

|        |                               |                  |                  |
|--------|-------------------------------|------------------|------------------|
| 2 ml   | cylindrical                   | <b>3.203 022</b> | <b>3.204 022</b> |
| 5 ml * | cylindrical                   | <b>3.203 052</b> | <b>3.204 102</b> |
| 10 ml  | cylindrical                   | <b>3.203 102</b> | <b>3.204 102</b> |
| 15 ml  | with overflow flare, with lip | <b>3.203 152</b> | <b>3.204 102</b> |
| 20 ml  | cylindrical                   | <b>3.203 202</b> | <b>3.204 202</b> |
| 30 ml  | cylindrical                   | <b>3.203 302</b> | <b>3.204 302</b> |
| 40 ml  | with overflow flare, with lip | <b>3.203 402</b> | <b>3.204 302</b> |

**Homogeniser with teflon pestle, cylindrical**

**glass-fibre reinforced, highly efficient with tough tissue**

|        |                               |                  |                  |
|--------|-------------------------------|------------------|------------------|
| 5 ml * | cylindrical                   | <b>3.203 052</b> | <b>3.205 102</b> |
| 10 ml  | cylindrical                   | <b>3.203 102</b> | <b>3.205 102</b> |
| 15 ml  | with overflow flare, with lip | <b>3.203 152</b> | <b>3.205 102</b> |
| 30 ml  | cylindrical                   | <b>3.203 302</b> | <b>3.205 302</b> |
| 40 ml  | with overflow flare, with lip | <b>3.203 402</b> | <b>3.205 302</b> |

**Homogeniser with glass pestle, tapered**

|       |                               |                  |                  |
|-------|-------------------------------|------------------|------------------|
| 2 ml  | with overflow flare, with lip | <b>3.206 022</b> | <b>3.207 022</b> |
| 15 ml | with overflow flare, with lip | <b>3.206 152</b> | <b>3.207 152</b> |
| 40 ml | with overflow flare, with lip | <b>3.206 402</b> | <b>3.207 402</b> |

**Homogeniser with glass pestle, cylindrical**

|       |                                  |                  |                  |
|-------|----------------------------------|------------------|------------------|
| 8 ml  | with overflow flare, without lip | <b>3.208 082</b> | <b>3.209 082</b> |
| 15 ml | with overflow flare, without lip | <b>3.208 152</b> | <b>3.209 152</b> |
| 40 ml | with overflow flare, with lip    | <b>3.208 402</b> | <b>3.209 402</b> |

**EPPI-pestle**

**for homogenizing with 1.5 ml EPPENDORF®-test tubes**

Made of polypropylen (qty=10)

|   |                  |
|---|------------------|
| shaft-Ø 4.9 mm, total length 70 mm, tapered | <b>3.200 512</b> |
|---|------------------|

Made of stainless steel

|  |                  |
|--|------------------|
| shaft-Ø 4.9 mm, total length 100 mm, tapered | <b>3.200 712</b> |
|--|------------------|

|                  |                  |
|------------------|------------------|
| Quick-grip clamp | <b>3.200 612</b> |
|------------------|------------------|

\* to be used as centrifuge glass

Volume is the maximum capacity moving inside the tube. The volume of pestle is considered.