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# MixMate<sup>®</sup>

Operating manual

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## 1 Operating instructions




### 1.1 Using this manual

- ▶ Read this operating manual completely before using the device for the first time. Observe the instructions for use of the accessories where applicable.
- ▶ This operating manual is part of the product. Please keep it in a place that is easily accessible.
- ▶ Enclose this operating manual when transferring the device to third parties.
- ▶ The current version of the operating manual for all available languages can be found on our webpage [www.eppendorf.com/manuals](http://www.eppendorf.com/manuals).

### 1.2 Danger symbols and danger levels

#### 1.2.1 Danger symbols


The safety instructions in this manual have the following danger symbols and danger levels:

	<b>Electric shock</b>		<b>Hazard point</b>
	<b>Material damage</b>		

#### 1.2.2 Danger levels

<b>DANGER</b>	<i>Will</i> lead to severe injuries or death.
<b>WARNING</b>	<i>May</i> lead to severe injuries or death.
<b>CAUTION</b>	May lead to light to moderate injuries.
<b>NOTICE</b>	May lead to material damage.

### 1.3 Symbols used

<b>Depiction</b>	<b>Meaning</b>
1. 2.	Actions in the specified order
▶	Actions without a specified order
•	List
<i>Text</i>	Display or software texts
	Additional information

## **6 Operating instructions**

MixMate®

English (EN)

### **1.4 Abbreviations used**

#### **ANSI**

American National Standards Institute

#### **DNA**

Deoxyribonucleic acid (DNA)

#### **DWP**

Deepwell plate

#### **MTP**

Microplate

#### **PCR**

Polymerase Chain Reaction

#### **RNA**

Ribonucleic acid



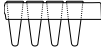


#### **rpm**

Revolutions per minute

#### **SLAS**

Society for Laboratory Automation and Screening

## 1.5 Glossary

<b>Deepwell plate</b>	Plate with 48, 96 or 384 wells with a larger volume than microplates. Suitable for the preparation, mixing, centrifuging, transporting and storing of solid and liquid samples.	
<b>Incubate</b>	Includes: cultivation of cell and bacterial cultures under controlled ambient conditions.	
<b>Micro test plate</b>	Plates with 24, 48, 96 or 384 wells for the preparation, mixing, centrifuging, transporting and storing of solid and liquid samples.	
<b>Mixing load</b>	All samples to be mixed and the tubes or plates in which the samples are located.	
<b>Pellet</b>	Compressed material. Is, for example, created via the centrifugation of a suspension.	
<b>Resuspending</b>	Dissolve the pellet by vortexing in a liquid. The material is distributed in the liquid. The result is a suspension.	
<b>Semi-skirted PCR plate</b>	PCR plate with surrounding half-edge.	
<b>Skirted PCR plate</b>	PCR plate with a surrounding edge.	
<b>Unskirted PCR plate</b>	PCR plate without a surrounding edge.	
<b>Vortexing</b>	Strong whirling or blending by manually pressing a tube onto the vortex mat.	
<b>Well</b>	Cavity. Microplate, PCR plate or Deepwell plate tube.	

## **2 Safety**

### **2.1 Intended use**

The Eppendorf MixMate is used to hold vessels and plates to mix samples. The Eppendorf MixMate is exclusively intended for indoor use.

All country-specific safety requirements for operating electrical equipment in laboratories must be observed.

Only use Eppendorf accessories or accessories recommended by Eppendorf.

The Eppendorf MixMate may only be operated by adequately trained and skilled personnel. The product can be used for training, routine and research laboratories in the areas of life sciences, industry or chemistry. This product is intended to be used for research purposes only. Eppendorf does not provide warranty for other applications. The product is not suitable for use in diagnostic or therapeutic applications.

### **2.2 User profile**

The device and accessories may only be operated by trained and skilled personnel.

Before using the device, read the operating manual carefully and familiarize yourself with the device's mode of operation.

### **2.3 Information on product liability**

In the following cases, the designated protection of the device may be affected. Liability for any resulting damage or personal injury is then transferred to the owner:

- The device is not used in accordance with the operating manual.
- The device is used outside of its intended use.
- The device is used with accessories or consumables that are not recommended by Eppendorf.
- The device is maintained or repaired by persons not authorized by Eppendorf AG.
- The user makes unauthorized changes to the device.



## 2.4 Warnings for intended use

Read the operating instructions and observe the following general safety information before using the MixMate.



### **WARNING! Electric shock due to damage to the device or mains/power cord.**

- ▶ Only switch on the device if the device and mains/power cord are undamaged.
- ▶ Only operate devices which have been installed or repaired properly.
- ▶ In case of danger, disconnect the device from the mains/power supply voltage. Disconnect the mains/power plug from the device or the earth/grounded socket. Use the isolating device intended for this purpose (e.g. the emergency switch in the laboratory).



### **WARNING! Lethal voltages inside the device.**

If you touch any parts which are under high voltage you may experience an electric shock. Electric shocks cause injuries to the heart and respiratory paralysis.

- ▶ Ensure that the housing is closed and undamaged.
  - ▶ Do not remove the housing.
  - ▶ Ensure that no liquids can penetrate the device.
- Only authorized service staff may open the device.



### **WARNING! Risk of a device catching fire as a result of liquid ingress.**

Liquid ingress can cause a fire due to a short circuit in the device.

- ▶ Do not allow any liquids to penetrate the inside of the housing.
- ▶ Only mix in sealed tubes and plates.
- ▶ If there was an ingress of liquid: switch off the device, pull the mains/power plug, and have the device cleaned by service technicians who have been authorized by Eppendorf.



### **WARNING! Injury from flying tubes and plates.**

If the maximum permitted total weight of the mixing load is exceeded, plates or tubes may become detached from the device.

- ▶ Always ensure that tubes, plates and tube holders are well-seated.
- ▶ Only use plates that conform to the Microplate standards ANSI/SLAS 1-2004 through ANSI/SLAS 4-2004.

**WARNING! Injury from sample material being thrown out.**

Sample material can be thrown out of open, improperly sealed or unstable tubes and plates.

- ▶ Only mix in closed tubes and closed plates.
- ▶ Observe the nationally prescribed safety environment when working with hazardous, toxic and pathogenic samples. Pay particular attention to personal protective equipment (gloves, clothing, goggles, etc.), extraction, and the biosafety level of the lab.

**WARNING! Injury from improper vortex action.**

Improper vortex action can destroy tubes or cause their content to be lost.

- ▶ Only vortex intact and sealed tubes.
- ▶ Never vortex tubes made of glass or other fragile material.

**WARNING! Danger due to incorrect voltage supply.**

- ▶ Only connect the device to voltage sources which correspond with the electrical requirements on the name plate.
- ▶ Only use earth/grounded sockets with a protective earth (PE) conductor.
- ▶ Only use the mains/power cord supplied.

**NOTICE! Damage to the display due to mechanical pressure.**

- ▶ Do not apply any mechanical pressure to the display.

**NOTICE! Damage due to strong vibrations.**

When mixing at high speeds, items located near the device may be moved by the vibrations of the work surface and, e.g., fall off the work table.

- ▶ Do not place easily movable items near the device or secure them adequately.

**NOTICE! Damage to electronic components from spilled liquids.**

- ▶ Make sure that the vortex mat and the cover caps are fitted properly. If the vortex mat is not fitted properly, contact your Eppendorf partner or the authorized Technical Service.
- ▶ If liquid has been spilled: Switch off the device, disconnect the mains/power plug and arrange for it to be cleaned by service personnel authorized by Eppendorf.



**NOTICE! Damage to electronic components due to condensation.**

Condensate may form in the device when it has been transported from a cool environment to a warmer environment.

- ▶ After installing the device, wait for at least 3 h. Only then connect the device to the mains/power line.



**NOTICE! Damage from the use of aggressive chemicals.**

- ▶ Do not use any aggressive chemicals on the device or its accessories, such as strong and weak bases, strong acids, acetone, formaldehyde, halogenated hydrocarbons or phenol.
  - ▶ If the device has been contaminated by aggressive chemicals, clean it immediately using a mild cleaning agent.
-

## 3 Product description

## 3.1 Product overview

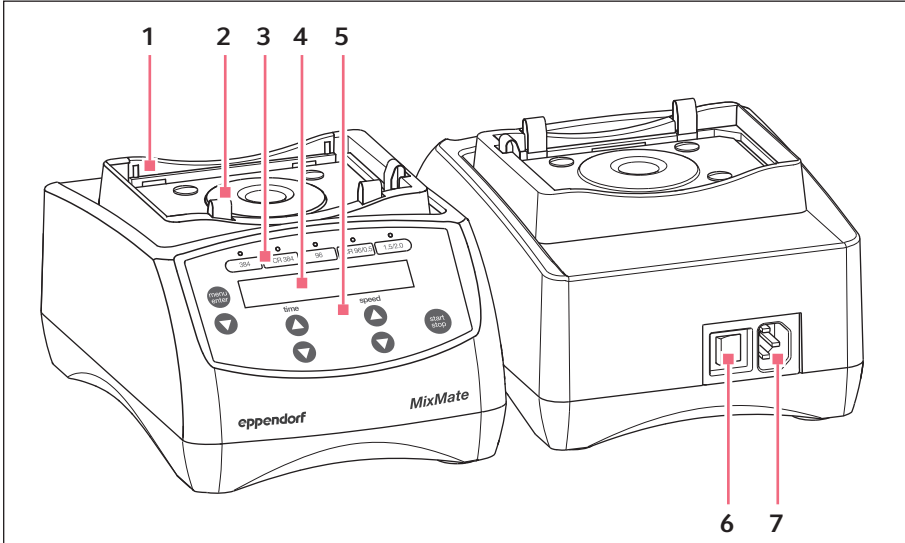


Fig. 3-1: Front and rear view

**1 Plate holder**

For holding skirted PCR plates, MTP and DWP as well as tube holders.

**2 Vortex mat**

For direct vortexing of various tubes.

**3 Program keys**

For selecting preset mixing parameters.

**4 Display**

Displays the mixing frequency and the mixing time.

**5 Operating controls**

Keys for operating the MixMate.

**6 Mains/power switch**

Switch for switching the device on and off.

Switch position **0**: The device is switched off.

Switch position **I**: The device is switched on.

**7 Mains/power cord socket**

Port for the supplied mains/power cord.

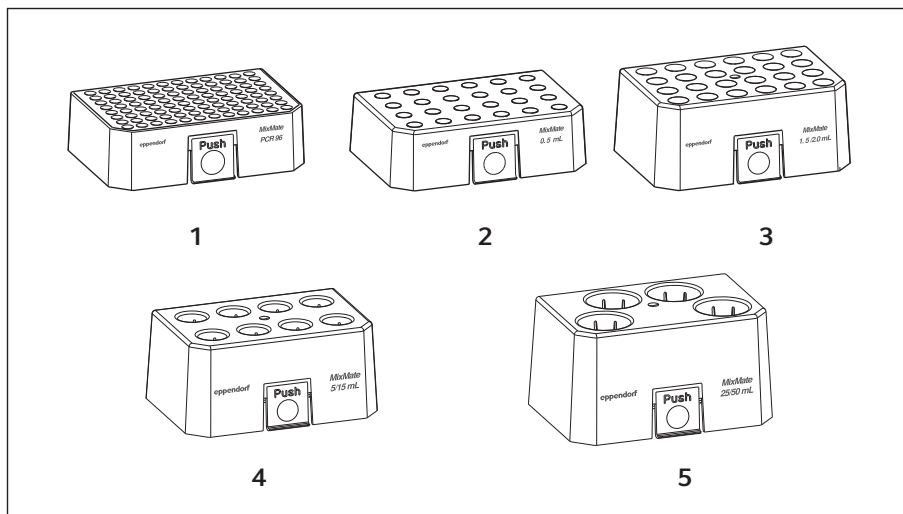


Fig. 3-2: Tube holders for the MixMate

- |   |   |
|---|---|
| <p><b>1 PCR 96 tube holder</b><br/>       For a PCR plate (96-well, semi-skirted or unskirted) or 96 micro test tubes (0.2 mL).</p> <p><b>2 0.5 mL tube holder</b><br/>       For 24 micro test tubes (0.5 mL).</p> <p><b>3 1.5/2.0 mL tube holder</b><br/>       For 24 micro test tubes (1.5 and 2.0 mL).</p> | <p><b>4 5/15 mL tube holder</b><br/>       For 8 micro test tubes (5 mL) or conical tubes (15 mL)</p> <p><b>5 25/50 mL tube holder</b><br/>       For 4 conical tubes (25 mL and 50 mL) or 4 micro test tubes (25 mL)</p> |
|---|---|

### 3.2 Delivery package

Quantity	Description
1	MixMate in the ordered version
1	Mains/power cord
1	Operating manual
1	Short instructions

**Product description**

MixMate®

English (EN)

**3.3 Features**

The MixMate allows aqueous solutions and suspensions to be **mixed and vortexed** effectively in a wide range of micro test tubes or plates. The MixMate supports the following tube formats at a maximum mixing frequency of up to 3000 rpm:

- 0.2 mL PCR tubes up to 25 mL micro test tubes
- MTP, DWP and PCR plates up to 384 wells
- Conical tubes with 5 mL, 15 mL, 25 mL, 50 mL


The **program keys** facilitate rapid access to selected mixing parameters.

Potential **applications** include:

- Controlled mixing of PCR, restriction or other enzyme reactions.
- Controlled incubation of absorption, blocking or reaction batches.
- Resuspension of DNA, RNA, protein or cell pellets in tubes and plates.
- Vortexing in micro test tubes and in 15 mL and 50 mL screw-top tubes.

## 4 Installation


### 4.1 Preparing installation

-  Keep the transport carton and the packing material for subsequent safe transport or storage.
- ▶ Check the completeness of the delivery using the information on the delivery package.
- ▶ Check all parts for any transport damage.

### 4.2 Selecting the location

Select the device location according to the following criteria:

- Mains/power connection in accordance with the name plate
- Minimum distance to other devices and walls: 10 cm
- Resonance free table with horizontal even work surface
- The design of table is suitable for operating the device.
- Surrounding area must be well ventilated.
- The location must be protected against direct sunlight.

-  The mains/power switch and the disconnecting device of the mains/power line must be easily accessible during operation (e.g. a residual current circuit breaker).

### 4.3 Installing the instrument

1. Place the MixMate on a suitable work surface, so that the ventilation gaps on the bottom of the device are not blocked.
2. Connect the device to the mains/power line via the mains/power cord socket using the supplied mains/power cord.
3. Switch on the device, using the mains/power switch.
4. Carry out a test run at maximum speed (3000 rpm) to ensure that the grip between the device and the surface is sufficient.  
The MixMate must not move from its position.

## 5 Operation

### 5.1 Operating controls

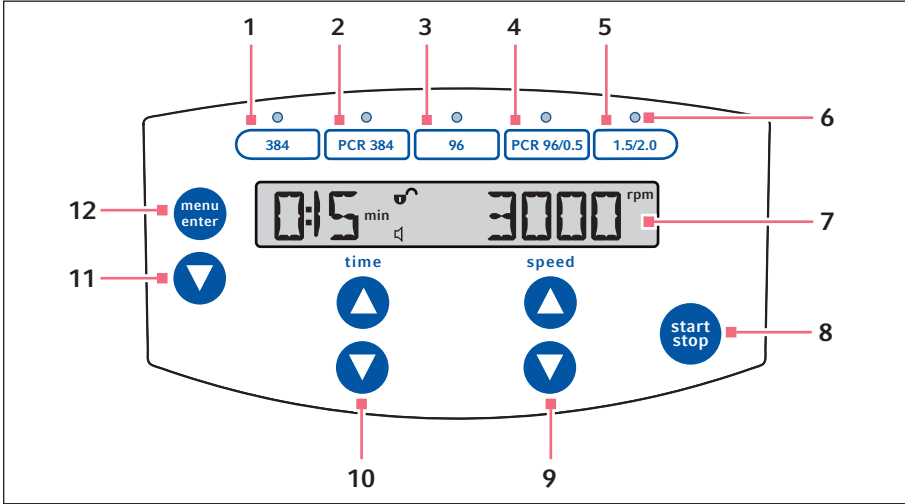


Fig. 5-1: Operating controls and display

- |   |  |
|---|--|
| 1 Program key for MTP (384-well)  | 7 Display                              |
| 2 Program key for PCR plates (384-well)   | 8 Start/stop mixing run                |
| 3 Program key for MTP (96-well)   | 9 Set the mixing frequency (speed)     |
| 4 Program key for PCR plates (96-well) and micro test tubes (0.2 mL and 0.5 mL) | 10 Set the mixing duration (time)      |
| 5 Program key for micro test tubes (1.5 mL and 2.0 mL)                          | 11 Navigating in the menu              |
| 6 Control LED to display the selected program key                               | 12 Call and select the menu parameters |



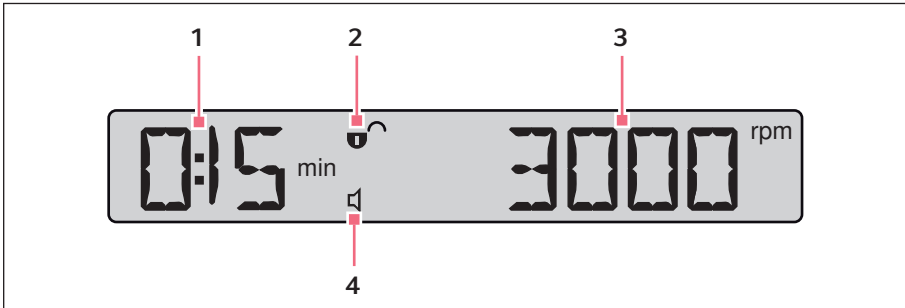


Fig. 5-2: Display

**1 Mixing time**

Setting:  
up to 19:45 min in 15 s increments  
20 min to 59 min: in 1 min increments  
1.0 h to 99.5 h: in 0.5 h increments  
'oo': unlimited mixing time

**3 Mixing frequency**

Setting:  
300 rpm to 3000 rpm: in 50 rpm increments

**2 Symbol for key lock**

**4 Symbol for signal tone setting**

**i** After switching on, the display shows the values of the last run.

## 5.2 Inserting plates and tubes



### **WARNING! Injury from flying tubes and plates.**

If the maximum permitted total weight of the mixing load is exceeded, plates or tubes may become detached from the device.

- ▶ Always ensure that tubes, plates and tube holders are well-seated.
- ▶ Only use plates that conform to the Microplate standards ANSI/SLAS 1-2004 through ANSI/ SLAS 4-2004.

Tab. 5-1: Selecting a suitable holder

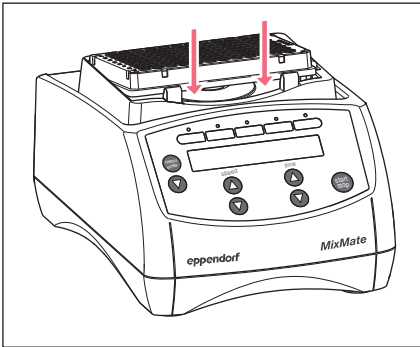
Plate/tube	Plate holder (1)	Tube holder (2)				
		PCR 96	0.5 mL	1.5/ 2.0 mL	5/15 mL	25/50 mL
PCR plate, skirted	+					
PCR plate, semi-skirted		+				
PCR plate, unskirted		+				
MTP	+					
DWP (2)	+					
0.2 mL PCR tubes		+				
0.5 mL PCR tubes			+			
0.5 mL micro test tubes			+			
1.5 mL micro test tubes				+		
2.0 mL micro test tubes				+		
25 mL micro test tubes						+
5 mL conical tubes(3)					+	
15 mL conical tubes(3)					+	
25 mL conical tubes(3)						+
50 mL conical tubes(3)						+

(1) To ensure that the plates are positioned securely in the plate holder, the plates must conform to the microplate standards ANSI/SLAS 1-2004 to ANSI/SLAS 4-2004.

(2) The maximum permissible mixing frequency for PCR 96 tube holders, 0.5 mL, 1.5/2.0 mL and DWP is 2000 rpm.

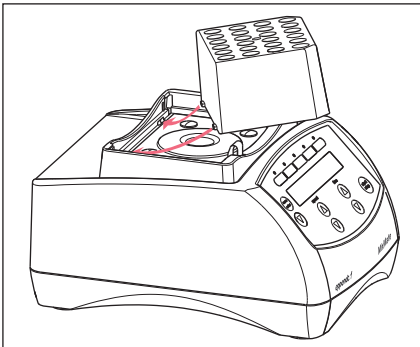
(3) The maximum permissible mixing frequency for 5/15 mL and 25/50 mL tube holders is 1000 rpm.

### 5.2.1 Inserting the plate in the plate holder

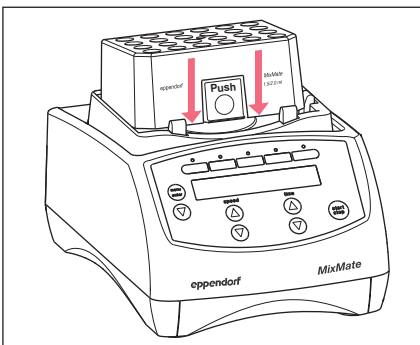


1. Place the plate at the rear of the plate holder.
2. Press the plate into the plate holder. Make sure it is firmly seated.

### 5.2.2 Inserting the tube holder in the plate holder



1. Select the appropriate tube holder (see table above).
2. Hold the tube holder up against the back edge of the plate holder so that the stop pins fit in the holes.



3. Engage the tube holder by pressing gently on the front.

### 5.2.3 Removing the tube holder from the plate holder

1. Remove the tube holder by lightly pressing the **Push** release button.

### 5.2.4 Inserting the plate in the PCR 96 tube holder

1. Insert the PCR 96 tube holder in the plate holder.
2. Press semi-skirted or unskirted PCR plates into the bores of the tube holder. Make sure they are seated evenly.

### 5.2.5 Inserting tubes in the tube holders

1. Select the appropriate tube holder (see table above).
2. Insert the tube holder in the plate holder.
3. Push the micro test tubes fully into the bores of the tube holder.

## 5.3 Mixing

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#### **WARNING! Injury from sample material being thrown out.**

Sample material can be thrown out of open, improperly sealed or unstable tubes and plates.

- ▶ Only mix in closed tubes and closed plates.
- ▶ Observe the nationally prescribed safety environment when working with hazardous, toxic and pathogenic samples. Pay particular attention to personal protective equipment (gloves, clothing, goggles, etc.), extraction, and the biosafety level of the lab.



#### **WARNING! Risk of a device catching fire as a result of liquid ingress.**

Liquid ingress can cause a fire due to a short circuit in the device.

- ▶ Do not allow any liquids to penetrate the inside of the housing.
- ▶ Only mix in sealed tubes and plates.
- ▶ If there was an ingress of liquid: switch off the device, pull the mains/power plug, and have the device cleaned by service technicians who have been authorized by Eppendorf.








The MixMate features an automatic overload protection. If you have set an excessively high speed for the mixing load or if you have not set the mixing load securely on the plate holder, you will hear a signal tone. The MixMate automatically reduces the mixing frequency to 1400 rpm. The display alternately shows the messages *TOO FAST* and *1400 rpm*.

Press **start/stop** to end the mixing process. To deactivate the error message, press **start/stop** a second time.

### 5.3.1 Mixing with preset parameters

With the program keys you can select the following preset parameters (mixing frequency and mixing time). They allow a controlled and effective mixing of samples without wetting the tube lid or plate cover. The program keys are not programmable.

Tab. 5-2: Program keys for preset optimized mixing parameters

Program key	Parameter	Tubes / plates	Filling level*
	15 s/2000 rpm	MTP and DWP (384-well)	10 to 60 %
	15 s/2600 rpm	PCR plates (384-well)	10 % to 50 %
	30 s/1000 rpm	MTP (96-well)	5 % to 60 %
	30 s/1650 rpm	PCR plates and DWP (96-well), PCR tubes (0.2 mL) and micro test tubes (0.5 mL)	5 % to 50 %
	1 min/1400 rpm	Micro test tubes (1.5 mL and 2.0 mL)	5 % to 80 %

\* Share of max. working volume. Observe manufacturer's instructions.



The parameters of the program keys do not cover all known or possible tube or plate geometries as well as sample properties.

For some applications, it may be possible to optimize these parameters. For example, the mixing frequency can be too low or the mixing time too short, whereby the samples are not mixed optimally. Or the mixing frequency is too high and causes cover wetting. In such cases, you can adapt the preset parameters to your requirements before starting the mixing process.

1. Select the appropriate parameters from the table.
2. Press the program key determined from the table.
3. Adapt the preset mixing time and mixing frequency with the arrow keys **time** and **speed**, if required.  
If the parameter setting is changed, the indicator light on the program key goes out.
4. Press the **start/stop** key to start the mixing process.  
A signal tone sounds at the end of the mixing process.  
Parameters that have been changed are not saved. After the mixing process has been completed, the original parameters can be recalled via the program keys.

### 5.3.2 Mixing with free parameters



After switching on the device, the parameters for the last run appear on the display.

1. Use the **time** arrow keys to set the mixing time.  
For continuous operation, select **oo** below 0:15 min or above 99.5 h.
2. Use the **speed** arrow keys to set the mixing frequency.
3. To start the mixing process, press the **start/stop** key.  
The remaining mixing time and the current mixing frequency are displayed. During continuous operation, the current mixing time appears alternating with **oo**, and after 99.5 h only **oo** appears.  
You can also change the parameters during a mixing process by pressing the **time** and **speed** arrow keys. To do so, the key lock must not be active. The mixing process is then continued with the changed parameters.  
The program keys are not available during the mixing process.  
A signal tone sounds at the end of the mixing process. The MixMate stops.
4. To end the mixing process prematurely, if necessary, press the **start/stop** key.

### 5.4 Vortexing

When vortexing different tubes (e.g. 1.5 mL micro test tubes or 50 mL screw cap tubes) press on the vortex mat of the MixMate to mix them individually.



---

**WARNING! Injury from improper vortex action.**

Improper vortex action can destroy tubes or cause their content to be lost.

- ▶ Only vortex intact and sealed tubes.
- ▶ Never vortex tubes made of glass or other fragile material.



---

**NOTICE! Damage to vortex mat caused by improper vortexing.**

- ▶ Only vortex tubes in the depression in the middle of the vortex mat.
-

### 5.4.1 Touch Vortex mode at 3500 rpm

With the Touch Vortex mode you vortex at a fixed frequency of 3500 rpm.

1. To start the Touch Vortex mode, press the tube into the recess in the vortex mat. **VORTX** mode and the elapsed time are shown on the display:
  - Up to 1 min in one-second increments.
  - Up to 19:59 h in one-minute increments.
  - Then the time display changes to **oo**.
2. To end the Touch Vortex mode, relieve the vortex mat. The MixMate runs out for approx. 2 s.

**i** **Ergonomic vortexing:** The run-out of the Touch Vortex mode prevents the immediate braking of the MixMate after relieving the vortex mat. This run-out facilitates both vortexing with 15 mL and 50 mL screw cap tubes as well as the vortexing of several tubes one after the other.

### 5.4.2 Vortexing with free parameters

You can also vortex with free parameters on the vortex mat of the MixMate. You can adjust the vortexing duration infinitely from 15 s, the vortexing frequency variably from 300 to 2000 rpm.

**i** In this Vortex mode, the message **TOO FAST** can be triggered at frequencies higher than 2000 rpm. The MixMate automatically reduces the frequency to 1400 rpm. The display alternately shows the messages **TOO FAST** and **1400 rpm**. To stop the vortexing process, press the **start/stop** key. To deactivate the error message, press the **start/stop** key a second time. As long as the MixMate is running, the Touch Vortex mode is inactive.

1. Use the **time** arrow keys to set the vortexing duration. For continuous operation, select **oo** below 0:15 min or above 99.5 h.
2. Use the **speed** arrow keys to set the vortexing frequency.
3. To start the vortexing process, press the **start/stop** key.
4. Hold the tube on the vortex mat. The remaining vortexing duration and the current vortexing frequency are displayed. During continuous operation, the current vortexing duration appears alternating with **oo**, after 99.5 h only **oo** appears. You can also change the parameters during the vortexing process by means of the **time** and **speed** arrow keys. To do so, the key lock must not be active. The vortexing process is then continued with the changed parameters. The Touch Vortex mode is not active during the vortexing process. A signal tone sounds at the end of the vortexing process. The MixMate stops.
5. To terminate the vortexing process prematurely, if necessary, press the **start/stop** key a second time.

## 5.5 Device menu

In the MixMate menu, you can activate the key lock (**LOCK**) and set the volume of the signal tone (**VOL**).

### 5.5.1 Menu structure

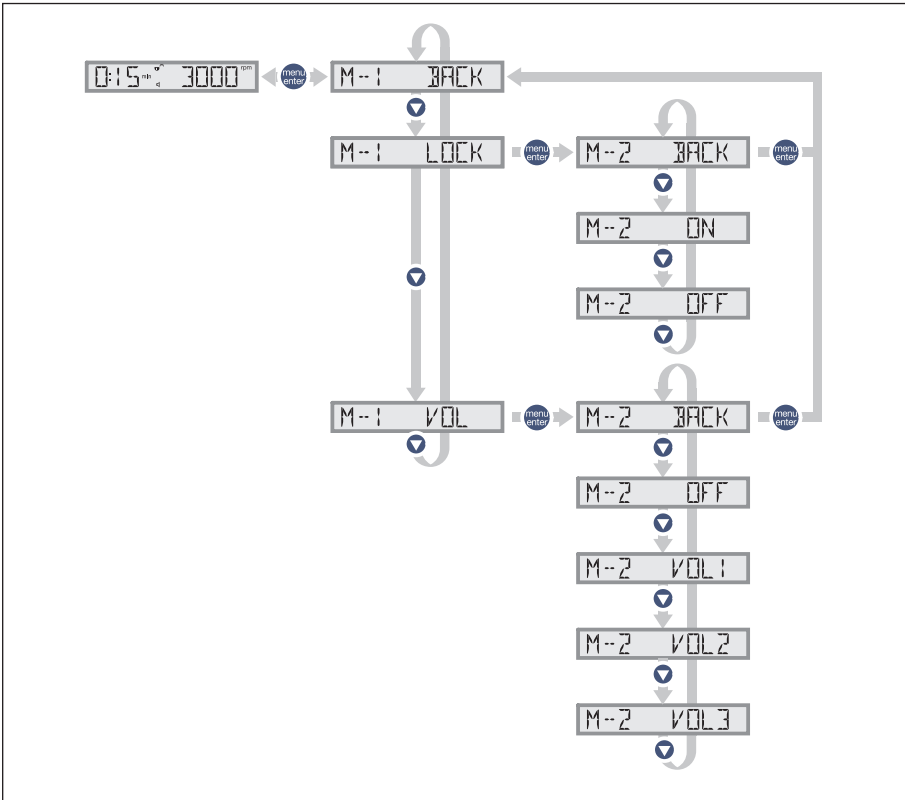


Fig. 5-3: Menu structure

### 5.5.2 Navigating in the menu

- ▶ With the **menu/enter** key, you can switch between the menu levels or confirm the changed parameters.
- ▶ Use the menu arrow key to select the parameters.
- ▶ When **M – 1 BACK** or **M – 2 BACK** is displayed, press the **menu/enter** key to exit the menu level without saving changes.





### 5.5.3 Key lock (LOCK) activation/deactivation

The key lock prevents set parameters being modified inadvertently during a mixing process.

1. Press the **menu/enter** key to call up the menu.
2. Press the menu arrow key once.
3. Press the **menu/enter** key to open the key lock menu.
4. Select sub-item **M – 2 ON** with the menu arrow key to activate the key lock, or **M – 2 OFF** to deactivate the key lock.
5. Press the **menu/enter** key to confirm the selected setting.  
 You will then exit menu level 2.  
 Press the **menu/enter** key again to exit the menu completely.

With the key lock activated, all keys apart from **menu/enter** are inactive during the mixing process. When the mixer is at rest, all the keys are released.

You can tell from the  symbol in the display that the key lock is active and from the  symbol that the key lock is deactivated.

### 5.5.4 Adjusting the signal tone-volume (VOL)

The MixMate announces that a mixing process is complete by means of a signal tone. You can set the volume of this signal tone in the device menu as follows:

1. Press the **menu/enter** key to call up the menu.
2. Press the menu arrow key twice.
3. Press the **menu/enter** key to open the menu for the signal tone volume.
4. Use the menu arrow key to select the desired setting from **OFF, VOL1** to **VOL3**. With **OFF** the signal tone is switched off, with **VOL3** the signal tone sounds at maximum volume.  
 The selected volume is played.
5. Press the **menu/enter** key to confirm the selected setting.  
 You will then exit menu level 2.  
 Press the **menu/enter** key again to exit the menu completely.
6. Press **M – 2 BACK** to leave this menu level.

## 6 Troubleshooting

If you cannot remedy an error with the recommended measures, please contact your local Eppendorf partner. The contact addresses can be found on the Internet at [www.eppendorf.com](http://www.eppendorf.com).

### 6.1 General errors

Problem	Cause	Solution
No display	Power supply is interrupted.	▶ Check the mains connection and the power supply to the lab.
Too fast	Mixing load is too heavy for the selected mixing frequency.	▶ Reduce the mixing frequency or the weight of the mixing load.
Too fast	Mixing load not properly positioned in the plate holder.	▶ Check that the mixing load is fixed in position.
Too fast	Continuous vortexing at frequencies > 2000 rpm.	▶ Reduce the continuous vortexing frequency to ≤ 2000 rpm.
ERR00 – ERR03/ ERR06 – ERR11	Electronics error	▶ Switch off the device and switch it on again after 5 s.
ERR04 - ERR05	Device overheats. The ventilation slots on the underside of the device are blocked.	<ol style="list-style-type: none"> <li>1. Switch off the device and leave to cool down for 10 minutes.</li> <li>2. Ensure that the ventilation slots on the underside of the device are clear.</li> <li>3. Switch the device back on again.</li> </ol>
ERR12	Incorrect power supply	▶ Make sure that the supply voltage and the power frequency are compatible with the information given on the device name plate. This is located on the underside of the device.
ERR13	Software error	▶ Switch off the device and switch it on again after 5 s.
ERR15 and ERR16	Hardware error	▶ Contact your Eppendorf partner.

## 7 Maintenance

### 7.1 Cleaning

#### 7.1.1 Cleaning the device and accessories

Clean the housing of the MixMate, the vortex mat, the plate holder and the tube holders regularly.



#### **DANGER! Electric shock due to the ingress of liquid.**

- ▶ Switch off the device and disconnect it from the mains/power supply before starting cleaning or disinfecting.
- ▶ Do not allow any liquids to penetrate the inside of the housing.
- ▶ Do not perform a spray clean/spray disinfection on the housing.
- ▶ Wait until the device is completely dry before reconnecting it to the mains/power supply.



#### **WARNING! Risk of a device catching fire as a result of liquid ingress.**

Liquid ingress can cause a fire due to a short circuit in the device.

- ▶ Do not allow any liquids to penetrate the inside of the housing.
- ▶ Only mix in sealed tubes and plates.
- ▶ If there was an ingress of liquid: switch off the device, pull the mains/power plug, and have the device cleaned by service technicians who have been authorized by Eppendorf.



#### **NOTICE! Damage from the use of aggressive chemicals.**

- ▶ Do not use any aggressive chemicals on the device or its accessories, such as strong and weak bases, strong acids, acetone, formaldehyde, halogenated hydrocarbons or phenol.
- ▶ If the device has been contaminated by aggressive chemicals, clean it immediately using a mild cleaning agent.



#### **NOTICE! Corrosion due to aggressive cleaning agents and disinfectants.**

- ▶ Do not use any corrosive cleaning agents, aggressive solvents or abrasive polishes.
- ▶ Do not incubate the accessories in aggressive cleaning agents or disinfectants for longer periods.

**NOTICE! Damage to electronic components from spilled liquids.**

- ▶ Make sure that the vortex mat and the cover caps are fitted properly. If the vortex mat is not fitted properly, contact your Eppendorf partner or the authorized Technical Service.
  - ▶ If liquid has been spilled: Switch off the device, disconnect the mains/power plug and arrange for it to be cleaned by service personnel authorized by Eppendorf.
- 

**Required equipment**

- Mild, soap-based household cleaning agent
1. Switch off the MixMate and isolate it from the mains/power supply.
  2. Clean the housing, plate holder, vortex mat and tube holder.  
The housing may only be wiped with a damp cloth. Do not perform a spray clean/spray disinfection on the housing.
  3. Dry all cleaned parts.
  4. Perform a function test.

**7.1.2 Performing a function test**

1. Use the mains/power cord to connect the MixMate to the mains/power supply.
2. Switch on the device, using the mains/power switch.
3. Check the Touch Vortex function using a suitable tube.

## 7.2 Disinfection/decontamination

---



### **DANGER! Electric shock due to the ingress of liquid.**

- ▶ Switch off the device and disconnect it from the mains/power line before starting cleaning or disinfection.
- ▶ Do not allow any liquids to penetrate the inside of the housing.
- ▶ Do not perform a spray clean/spray disinfection on the housing.
- ▶ Only reconnect the device to the mains/power line when it is completely dry, both inside and outside.



### **WARNING! Risk of a device catching fire as a result of liquid ingress.**

Liquid ingress can cause a fire due to a short circuit in the device.

- ▶ Do not allow any liquids to penetrate the inside of the housing.
- ▶ Only mix in sealed tubes and plates.
- ▶ If there was an ingress of liquid: switch off the device, pull the mains/power plug, and have the device cleaned by service technicians who have been authorized by Eppendorf.



### **NOTICE! Damage from UV and other high-energy radiation.**

- ▶ Do not use UV, beta, gamma, or any other high-energy radiation for disinfection.
- ▶ Avoid storage in areas with strong UV radiation.

---

### **Required equipment**

- Alcohol (ethanol, isopropanol) or disinfectants containing alcohol
- Mild, soap-based household cleaning agent

Proceed as follows:

1. Choose the disinfection method which corresponds to the legal regulations and guidelines in place for your range of application.
2. Switch off the device and disconnect it from the mains/power line.
3. Wipe down all parts of the device and accessories, including the connecting cable, with the disinfectant.
4. Clean the device with a mild soap-based household cleaning agent.

### 7.3 Decontamination before shipment

If you are shipping the device to the authorized Technical Service for repairs or to your authorized dealer for disposal please note the following:

---



**WARNING! Risk to health from contaminated device.**

1. Observe the information in the decontamination certificate. It is available as a PDF document on our webpage ([www.eppendorf.com/decontamination](http://www.eppendorf.com/decontamination)).
  2. Decontaminate all the parts you are going to dispatch.
  3. Include the fully completed decontamination certificate in the shipment.
-

## 8 Transport, storage and disposal

### 8.1 Transport

► Only transport the device in the original packaging.

	Air temperature	Max. rel. humidity	Air pressure
General transportation	-20 to 60 °C	10 to 95 %	30 to 106 kPa
Air freight	-20 to 55 °C	10 to 95 %	30 to 106 kPa

### 8.2 Storage

	Air temperature	Max. rel. humidity	Air pressure
in transport packaging	-20 to 55 °C	10 to 95 %	70 to 106 kPa
without transport packaging	-5 to 45 °C	10 to 95 %	70 to 106 kPa

### 8.3 Disposal

If the product needs to be disposed of, the relevant legal regulations must be observed.

#### Information on the disposal of electrical and electronic devices in the European Community:

Within the European Community, the disposal of electrical devices is regulated by national regulations based on EU Directive 2012/19/EU pertaining to waste electrical and electronic equipment (WEEE).

According to these regulations, any devices supplied after August 13, 2005, in the business-to-business sphere, to which this product is assigned, may no longer be disposed of in municipal or domestic waste. To document this, they have been marked with the following marking:



Because disposal regulations may differ from one country to another within the EU, please contact your supplier if necessary.

**Technical data**

MixMate®

English (EN)

**9 Technical data****9.1 Power supply**

Mains power connection:	220 to 240 V $\pm 10$ %, 50 to 60 Hz 110 to 120 V $\pm 10$ %, 50 to 60 Hz
Power consumption:	40 W
Overvoltage category:	II

**9.2 Ambient conditions**

Environment	Use only indoors
Ambient temperature	2 °C – 40 °C
Relative humidity	10 % – 75 %
Atmospheric pressure	Use up to an altitude of 2000 m above MSL.
Degree of contamination	2

**9.3 Weight/dimensions**

Dimensions	Width: 170 mm Depth: 230 mm Height: 130 mm
Weight	4.15 kg
Noise level	< 50 dB(A)

**9.4 Application parameters**

Max. load	300 g
Mixing frequencies under load up to 80 g under load greater than 80 g for PCR 96 tube holder, 0.5 mL, 1.5/ 2.0 mL and DWP for tube holder 5/15 mL, 25/50 mL and DWP	300 to 3000 rpm, in 50 rpm increments 300 to max. 2000 rpm, in 50 rpm increments up to max. 2000 rpm up to max. 1000 rpm
Adjustable mixing time	Up to 19:45 min in 15 s increments, from 20 min to 59 min in 1 min increments, from 1.0 h to 99.5 h in 0.5 h increments and unlimited mixing time.
Touch Vortex frequency	3500 rpm
Mixing and vortex radius	1.5 mm (3 mm mixing stroke)



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# Declaration of Conformity

The product named below fulfills the requirements of directives and standards listed. In the case of unauthorized modifications to the product or an unintended use this declaration becomes invalid.

**Product name:**

MixMate 5353

**Product type:**

Mixer for micro test tubes and plates

**Relevant directives / standards:**

2014/35/EU: EN 61010-1, EN 61010-2-051,  
UL 61010-1, CSA C22.2 No. 61010-1  
2014/30/EU: EN 55011, EN 61326-1  
2011/65/EU: EN 50581

Date: June 15, 2016



Management Board



Portfolio Management

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ISO 9001  
Certified

ISO  
13485  
Certified

ISO  
14001  
Certified

# Eppendorf Certificate

## Declaration of Conformity

Product: MixMate®  
 Order No. International: 5353 000.014  
 Order No. North America: 022674200

The device was tested in accordance with EN ISO 5349-1:2001 “Mechanical vibration – Measurement and assessment of human exposure to hand-transmitted vibration – Part 1”

### Hand- arm vibration assessment of MixMate® in accordance with EN ISO 5349-1:2001

Tests were performed on the MixMate operated in the “touch vortex” operation mode (3,500 rpm) with 15 mL and 50 mL conical tubes. The total vibration value was measured, the daily vibration exposure and the exposure points calculated from it.

The exposure action value **EAV of 2.5 m/s<sup>2</sup> A(8)** is equivalent to 100 exposure points and is the level at and above which hand-arm-vibration management procedures must be initiated where employees are regularly exposed to this level of vibration exposure.

The exposure limit value **ELV of 5 m/s<sup>2</sup> A(8)** is equivalent to 400 exposure points and must not be exceeded on any work day. If it is, immediate measures must be taken to control vibration levels or reduce exposure times to limit daily vibration exposure to below the ELV.

Usage pattern: Each test consisted of a representative usage pattern equivalent to 5 successive touch vortex operations of 30 seconds with 5 second intervals in a total of 2 minutes 30 seconds “on” and 20 seconds “off”. Tubes were filled with 2/3 of water.	Tube	Total vibration value	Daily exposure value	1 HOUR exposure points	Time - single tool use: For not exceeding	
		m/s <sup>2</sup>	m/s <sup>2</sup>		EAV	ELV
					2.5 m/s <sup>2</sup> minutes	5 m/s <sup>2</sup> minutes
	15 mL	5.2	1.8	54	111	444
	50 mL	9.4	3.3	177	34	136

# Eppendorf Certificate

## Exposure Action Value (EAV)

The table indicates that the operator using 15 mL conical tubes in touch vortex mode (3,500 rpm) with reported usage would reach the EAV in 111 minutes and using 50 mL conical tubes in 34 minutes. Based on a usage pattern of 30 seconds vortex/5 seconds gap for changing the tube, this means that approximately 190 × 15 mL or 58 × 50 mL conical tubes could produce exposures that reach the EAV. With a usage pattern of 15 seconds vortex/5 seconds gap, 333 × 15 mL tubes or 102 × 50 mL tubes may be vortexed without exceeding the EAV. With a usage pattern of 45 seconds vortex/5 seconds gap 133 × 15 mL tubes or 40 × 50 mL tubes may be vortexed.

## Exposure Limit Value (ELV)

The table indicates that the operator using 15 mL conical tubes in touch vortex mode (3,500 rpm) with reported usage would reach the ELV in 444 minutes and using 50 mL conical tubes in 136 minutes. Based on a usage pattern of 30 seconds vortex/5 seconds gap, this means that approximately 761 × 15 mL conical tubes or 233 × 50 mL conical tubes could produce exposures that reach the ELV. Immediate action must thus be taken to limit exposures to below the ELV. With a usage pattern of 15 seconds vortex/5 seconds gap, 1332 × 15 mL tubes or 408 × 50 mL tubes may be vortexed until the ELV is reached. With a usage pattern of 45 seconds vortex/5 seconds gap 532 × 15 mL tubes or 163 × 50 mL tubes may be vortexed.

Vortex time (5 seconds gap)	Number of tubes to reach EAV/for not exceeding ELV			
	EAV		ELV	
	15 mL	50 mL	15 mL	50 mL
15 seconds	333	102	1332	408
30 seconds	190	58	761	233
45 seconds	133	40	532	163

Date: November 4, 2014

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Dr. S. Scheeff  
Global Product Manager  
Sample Preparation Instruments

Dr. B. Schreiber  
Vice President  
Quality Management & Regulatory Affairs

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Measurement of sound power level according to  
DIN EN ISO 3744:1995-11 and DIN EN ISO 11204:1996-7

## Allround mixer MixMate

Eppendorf AG, 22331 Hamburg, Germany

### 1. Machine:

- |     |                       |                        |
|-----|-----------------------|------------------------|
| 1.1 | Type:                 | Allround mixer MixMate |
| 1.2 | Serial Number:        | 5353 05003*            |
| 1.3 | Year of construction: | 2008                   |

### 2. Specifications:

See documents of the manufacturer

### 3. Measurement system:

- |     |                               |              |
|-----|-------------------------------|--------------|
| 3.1 | Calibrated sound level meter: | Norsonic 118 |
|-----|-------------------------------|--------------|

### 4. Measurement surface:

- |     |                       |                                     |
|-----|-----------------------|-------------------------------------|
| 4.1 | Measurement surface:  | hemisphere with 10 measuring points |
| 4.2 | Measurement distance: | 1 m                                 |

### 5. Measurement conditions:


- |     |                                     |                                    |
|-----|-------------------------------------|------------------------------------|
| 5.1 | Environment:                        | Free field over a reflecting plane |
| 5.2 | Environmental correction $K_{2A}$ : | 0.9 dB(A)                          |
| 5.3 | accuracy class                      | 2                                  |
| 5.4 | Operating conditions:               | 1400 rpm                           |

- |    |  |            |
|----|--|------------|
| 6. | <u>Measurement surface sound pressure level:</u> | 31.2 dB(A) |
|    | <u>Sound power level:</u>                        | 39.0 dB(A) |

## TÜV Nord Umweltschutz GmbH & Co. KG

Große Bahnstraße 31, 22525 Hamburg

Nr. 109SST127 Date of measurement: 25.04.2009



Dipl. - Ing. C. Michalke

\*) Sample measurement for this device only.

Measurement of sound power level according to  
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See documents of the manufacturer

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|-----|-------------------------------|--------------|
| 3.1 | Calibrated sound level meter: | Norsonic 118 |
|-----|-------------------------------|--------------|

### 4. Measurement surface:

- |     |                       |                                     |
|-----|-----------------------|-------------------------------------|
| 4.1 | Measurement surface:  | hemisphere with 10 measuring points |
| 4.2 | Measurement distance: | 1 m                                 |

### 5. Measurement conditions:

- |     |                                     |                                    |
|-----|-------------------------------------|------------------------------------|
| 5.1 | Environment:                        | Free field over a reflecting plane |
| 5.2 | Environmental correction $K_{2A}$ : | 0.9 dB(A)                          |
| 5.5 | accuracy class                      | 2                                  |
| 5.6 | Operating conditions:               | 1650 rpm                           |

- |    |  |            |
|----|--|------------|
| 6. | <u>Measurement surface sound pressure level:</u> | 33.1 dB(A) |
|    | <u>Sound power level:</u>                        | 41.0 dB(A) |

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| 1.2 | Serial Number:        | 5353 05003*            |
| 1.3 | Year of construction: | 2008                   |

### 2. Specifications:

See documents of the manufacturer

### 3. Measurement system:

- |     |                               |              |
|-----|-------------------------------|--------------|
| 3.1 | Calibrated sound level meter: | Norsonic 118 |
|-----|-------------------------------|--------------|

### 4. Measurement surface:

- |     |                       |                                     |
|-----|-----------------------|-------------------------------------|
| 4.1 | Measurement surface:  | hemisphere with 10 measuring points |
| 4.2 | Measurement distance: | 1 m                                 |

### 5. Measurement conditions:

- |     |                                     |                                    |
|-----|-------------------------------------|------------------------------------|
| 5.1 | Environment:                        | Free field over a reflecting plane |
| 5.2 | Environmental correction $K_{2A}$ : | 0.9 dB(A)                          |
| 5.7 | accuracy class                      | 2                                  |
| 5.8 | Operating conditions:               | 3000 rpm                           |

- |    |  |            |
|----|--|------------|
| 6. | <u>Measurement surface sound pressure level:</u> | 46.1 dB(A) |
|    | <u>Sound power level:</u>                        | 54.0 dB(A) |

### TÜV Nord Umweltschutz GmbH & Co. KG

Große Bahnstraße 31, 22525 Hamburg

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Dipl. - Ing. C. Michalke

\*) Sample measurement for this device only.







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