# miniVE

## Operating Instructions

### Original instructions

# Table of Contents

# 1 Introduction

## About this chapter

This chapter contains important user information, descriptions of safety notices, regulatory information, and intended use of the miniVE system.

## In this chapter

# 1.1 About this manual

## Purpose of this manual

The *Operating Instructions* provide you with the information needed to install, operate and maintain the product in a safe way.

## Scope of this manual

The *Operating Instructions* cover the miniVE instrument. The illustration below shows the miniVE instrument.


## Illustrations

The images and annotations in this document are for illustrative purposes only. The configuration of individual products may vary, and therefore illustrations may not reflect the actual system delivered.

# 1.2 Important user information

## Read this before operating the product

**All users must read the entire *Operating Instructions* before installing, operating or maintaining the product.**

Always keep the *Operating Instructions* at hand when operating the product.

Do not operate the product in any other way than described in the user documentation. If you do, you may be exposed to hazards that can lead to personal injury and you may cause damage to the equipment.

## Intended use of the product

miniVE is intended for protein and nucleic acid electrophoresis under commonly used denaturing and non-denaturing conditions. miniVE can be combined with an optional blotting module. miniVE Blot Module is primarily intended for blotting of proteins and nucleic acids at laboratory-scale. The system can be used for a variety of research purposes to fulfill the needs of the users in academia and in life sciences industry.

miniVE shall not be used in any clinical procedures, or for diagnostic purposes.

## Prerequisites

In order to operate the miniVE in the way it is intended:

- The user must have a general understanding of electrophoresis and blotting techniques.
- The user must read and understand the Safety Instructions chapter in the *Operating Instructions*.
- miniVE must be installed in accordance with the instructions in the *Operating Instructions*.

## Safety notices

This user documentation contains safety notices (WARNING, CAUTION, and NOTICE) concerning the safe use of the product. See definitions below.

**WARNING**

**WARNING** indicates a hazardous situation which, if not avoided, could result in death or serious injury. It is important not to proceed until all stated conditions are met and clearly understood.

**CAUTION**

**CAUTION** indicates a hazardous situation which, if not avoided, could result in minor or moderate injury. It is important not to proceed until all stated conditions are met and clearly understood.

**NOTICE**

**NOTICE** indicates instructions that must be followed to avoid damage to the product or other equipment.

## Notes and tips

***Note:*** *A note is used to indicate information that is important for trouble-free and optimal use of the product.*

***Tip:*** *A tip contains useful information that can improve or optimize your procedures.*

# 1.3 Regulatory information

## Introduction

This section lists the regulations and standards that apply to the miniVE instrument

## Manufacturing information

The table below summarizes the required manufacturing information.

| Requirement | Information |
|---|---|
| Name and address of manufacturer | GE Healthcare Bio-Sciences AB,<br>Björkgatan 30, SE 751 84 Uppsala, Sweden |

## In this section

# 1.3.1 EU directives

## Introduction

This section describes the EU Directives that apply to miniVE.

## Conformity with EU Directives

This product fulfills the European Directives listed below. See the EU Declaration of Conformity for the directives and regulations that apply for the CE marking.

If not included with the product, a copy of the EU Declaration of Conformity is available on request.

| Directive | Title |
|---|---|
| 2014/35/EU | Low Voltage Directive (LVD) |
| 2011/65/EU | Restriction of Hazardous Substances (RoHS) Directive |

## CE marking

The CE marking and the corresponding EU Declaration of Conformity is valid for the instrument when it is:

- used according to the Operating Instructions or user manuals, and
- used in the same state as it was delivered from GE, except for alterations described in the Operating Instructions or user manuals.

# 1.3.2 Eurasian Customs Union

## Introduction

This section contains additional regulatory information to comply with the Eurasian Customs Union technical regulations.

## Manufacturer and importer information

The table below summarizes the manufacturer and importer information required by the Eurasian Customs Union.

| Requirement | Information |
|---|---|
| Name and address of manufacturer | See *Manufacturing information* |
| Telephone number of manufacturer | Telephone: + 46 771 400 600 |
| Importer and/or company for obtaining information about importer | GE Healthcare LLC<br>GE Healthcare Life Sciences<br>Presnenskaya nab., 10C, 12th floor<br>RU-123 317 Moscow, Russian Federation<br>Telephone 1: + 7 495 411 9714<br>Fax nr: + 7 495 739 6932<br>Email: LSrus@ge.com |

# 1.3.3 Regulations for USA and Canada

## Introduction

This section describes the regulations that apply to miniVE in the USA and Canada.

## NRTL certification


This symbol indicates that the product has been certified by Intertek, which is a US Occupational Safety and Health Administration Nationally Recognized Testing Laboratory (NRTL).

# 1.3.4 Other regulations and standards

## Introduction

This section describes the standards that apply to the miniVE instrument.

## Environmental conformity

This product conforms to the following environmental requirements.

| Requirement | Title |
|---|---|
| 2012/19/EU | Waste Electrical and Electronic Equipment (WEEE) Directive |
| China RoHS | Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products. |

## Standards, applied to this product

Standard requirements fulfilled by this product are summarized in the table below.

| Standard | Description |
|---|---|
| IEC/EN 61010-1, UL 61010-1, CAN/CSA-C22.2 No. 61010-1 | Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements. |
| EN 50581 | Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances |

# 2 Safety instructions

## About this chapter

This chapter describes safety precautions, labels and symbols that are attached to the equipment. In addition, the chapter describes emergency and recovery procedures, and provides recycling information.

## Important

**WARNING**

**Before installing, operating or maintaining the product, all users must read and understand the entire contents of this chapter to become aware of the hazards involved.**

## In this chapter

This chapter contains the following sections:

# 2.1 Safety precautions

## Introduction

miniVE is powered by an external power supply and handles materials that are considered hazardous material. Before installing, operating or maintaining the system, you must be aware of the hazards described in this manual.

**Follow the instructions provided to avoid injury to the operator or other personnel, to the product, or to other equipment in the area.**

The safety precautions in this section are grouped into the following categories:

- General precautions
- Personal protection
- Using flammable liquids
- Installing and moving the product
- Power supply
- System operation
- Maintenance

Always follow the instructions below to avoid injury when using the miniVE.

## General precautions

**WARNING**

**Before installing, operating or maintaining the product, all users must read and understand the entire contents of this chapter to become aware of the hazards involved.**

**WARNING**

Only properly trained personnel may operate and maintain the product.

**WARNING**

Do not operate the miniVE in any other way than described in the miniVE Operating Instructions.

**WARNING**

Do not damage the power supply cord by bending, twisting, heating or allowing them to become pinned under the equipment. Using damaged power cords could result in fire or electric shock.

If the power supply cords are damaged, contact your local GE representative for replacements.

**WARNING**

**Use only approved parts**. Only spare parts and accessories that are approved or supplied by GE may be used for maintaining or servicing the product.

**WARNING**

The safety lid must be in place before connecting the power leads to a power supply.

**WARNING**

The high voltage power supply must always be disconnected when the safety lid of the electrophoresis unit is taken off. The high voltage power supply must never be switched on unless the safety lid is on the electrophoresis unit.

**WARNING**

Never exceed the operating limits stated in this document and on the system label. Operation of the product outside these limits can damage equipment and cause personal injury or death.

**WARNING**

Any liquid on the equipment must be dried off before connecting the power supply.

**CAUTION**

Handle the glass components with care! Wear appropriate personal protective equipment (PPE).

**CAUTION**

Never introduce anti-freeze or any organic solvent into any part of the instrument. Organic solvents will cause irreparable damage to the instrument.

**CAUTION**

When lifting and moving the instrument be careful not to drop it. This may cause injury.

## Personal protection

**WARNING**

Always use appropriate Personal Protective Equipment (PPE) during operation and maintenance of this product.

**WARNING**

**Hazardous substances and biological agents**. When using hazardous chemical and biological agents, take all suitable protective measures, such as wearing protective clothing, glasses and gloves resistant to the substances used. Follow local and/or national regulations for safe operation and maintenance of this product.

**WARNING**

**Spread of biological agents**. The operator must take all necessary actions to avoid spreading hazardous biological agents. The facility must comply with the national code of practice for biosafety.

## Using flammable liquids

**WARNING**

A fume hood or similar ventilation system shall be installed when flammable or noxious substances are used.

## Installing and moving the product

**CAUTION**

Turn off the power switch and remove connecting cables before moving the equipment.

**CAUTION**

When lifting and moving the instrument be careful not to drop it. This may cause injury.

**CAUTION**

Make sure that the system is placed on a stable, level bench with adequate space for ventilation.

**CAUTION**

The electrophoresis unit is heavy, especially when filled with buffer. Handle the unit with care to avoid personal injury.

## Power supply

**WARNING**

**Power cord**. Only use power cords with approved plugs delivered or approved by GE.

**WARNING**

Make sure that there is access to the instrument power supply cord at all times.

**WARNING**

**Disconnect power**. Always disconnect power from the instrument before replacing any component on the instrument, unless stated otherwise in the user documentation.

## Operation

**CAUTION**

Do not operate with buffer temperature above 75°C.

**WARNING**

Acrylamide is a neurotoxin. Always wear gloves and observe all laboratory safety procedures.

## Maintenance

**WARNING**

**Decontaminate before maintenance.** To avoid personnel being exposed to potentially hazardous substances, make sure that the miniVE is properly decontaminated and sanitized before maintenance or service.

**WARNING**

**Disconnect power.** Always disconnect power from the instrument before performing any maintenance task.

**WARNING**

**Decommissioning**. Decontaminate the equipment before decommissioning to make sure that hazardous residues are removed.

# 2.2 Labels

## Introduction

This section describes the system label and other safety or regulatory labels that are attached to the product.

## Description of symbols on the system label

The table below describes the various symbols that may be found on the system label.

| Label | Meaning |
|---|---|
|  | **Warning!** Read the user documentation before using the system. Do not open any covers or replace parts unless specifically stated in the user documentation. |
|  | This symbol indicates that the waste of electrical and electronic equipment must not be disposed as unsorted municipal waste and must be collected separately. Please contact an authorized representative of the manufacturer for information concerning the decommissioning of equipment. |
|  | This symbol indicates that the product *does not* contain toxic or hazardous materials in excess of the limits established by the Chinese standard *GB/T 26572 Requirements of concentration limits for certain hazardous substances in electrical and electronic products*, and can be recycled after being discarded, and should not be casually discarded. |
|  | The system complies with applicable European directives. |
|  | Eurasian Conformity mark: the single conformity mark indicates that the product is approved for circulation on the markets of the member states of the Eurasian Customs Union. |

| Label | Meaning |
|---|---|
|  | This symbol indicates that the product has been certified by Intertek, which is a US Occupational Safety and Health Administration Nationally Recognized Testing Laboratory (NRTL). |
| **Serial no.:** | Serial number of the product |
| **Manufactured:** | Year (YYYY) and month (MM) of manufacture |

## Safety labels

The table below describes the various symbols that may be found on the product.

| Symbol/text | Description |
|---|---|
|  | **Warning!** Read the user documentation before using the system. Do not open any covers or replace parts unless specifically stated in the user documentation. |
|  | **Warning! High Voltage**. Always make sure that the system is disconnected from electric power before removing the lid. |

# 2.3 Emergency procedures

## Introduction

This section describes how to shut down the product in an emergency situation, and the procedure for restarting the product.

The section also describes the result in the event of power failure.

## Precautions

**WARNING**

Make sure that there is access to the instrument power supply cord at all times.

## Emergency shutdown

In an emergency situation, shut down the power supply in accordance with its emergency procedure.

## Power failure

In case of power failure to the product, the run is interrupted immediately.

## Restart after emergency shutdown or power failure

To restart the run after an emergency shutdown or power failure, follow these steps:

| Step | Action |
|---|---|
| 1 | Make sure all connections are in place. |
| 2 | Start the power supply as described in the power supply's User Manual. |

# 2.4 Recycling information

## Introduction

This section contains information about the decommissioning of the product.

## Decontamination

The product must be decontaminated before decommissioning. All local regulations must be followed with regard to scrapping of the equipment.

## Disposal of the product

When taking the product out of service, the different materials must be separated and recycled according to national and local environmental regulations.

## Disposal of electrical components

Waste electrical and electronic equipment must not be disposed of as unsorted municipal waste and must be collected separately. Please contact an authorized representative of the manufacturer for information concerning the decommissioning of the equipment.

# 2.5 Declaration of Hazardous Substances (DoHS)

**根据SJ/T11364-2014《电子电气产品有害物质限制使用标识要求》特提供如下有关污染控制方面的信息。**

The following product pollution control information is provided according to SJ/T11364-2014 Marking for Restriction of Hazardous Substances caused by electrical and electronic products.

## 电子信息产品污染控制标志说明
## Explanation of Pollution Control Label

**该标志表明本产品不含有超过中国标准GB/T 26572《电子信息产品中有毒有害物质的限量要求》中限量的有毒有害物质,报废后可以进行回收处理,不能随意丢弃。**

This symbol indicates that this electrical and electronic product does not contain any hazardous substances above the maximum concentration value established by the Chinese standard GB/T 26572 , and can be recycled after being discarded, and should not be casually discarded.

## 有害物质的名称及含量
## Name and Concentration of Hazardous Substances

**产品中有害物质的名称及含量**
Table of Hazardous Substances' Name and Concentration

| 部件名称 Component name | 有害物质 Hazardous substance | | | | | |
|---|---|---|---|---|---|---|
| | 铅 (Pb) | 汞 (Hg) | 镉 (Cd) | 六价铬 (Cr(VI)) | 多溴联苯 (PBB) | 多溴二苯醚 (PBDE) |
| 80641877 | 0 | 0 | 0 | 0 | 0 | 0 |
| 80641896 | 0 | 0 | 0 | 0 | 0 | 0 |

**本表格依据SJ/T 11364的规定编制。**

This table is prepared according to SJ/T 11364.

0: **表示该有害物质在该部件所有均质材料中的含量均在GB/T 26572规定的限量要求以下。**

X: **表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572规定的限量要求。**

- **此表所列数据为发布时所能获得的最佳信息.**

0: Indicates that this hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in GB/T 26572.

X: Indicates that this hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in GB/T 26572.

- Data listed in the table represents best information available at the time of publication.

# 3 System description

## About this chapter

This chapter gives an overview of the miniVE instrument, and a brief description of its function.

## In this chapter

# 3.1 Instrument overview

## Introduction to miniVE

The miniVE is a vertical electrophoresis electrotransfer instrument.

This section gives an overview of the miniVE, and the optional miniVE Blot Module.

## Illustration of the instrument

The illustration below shows the miniVE instrument.


miniVE is powered using a separate power supply.

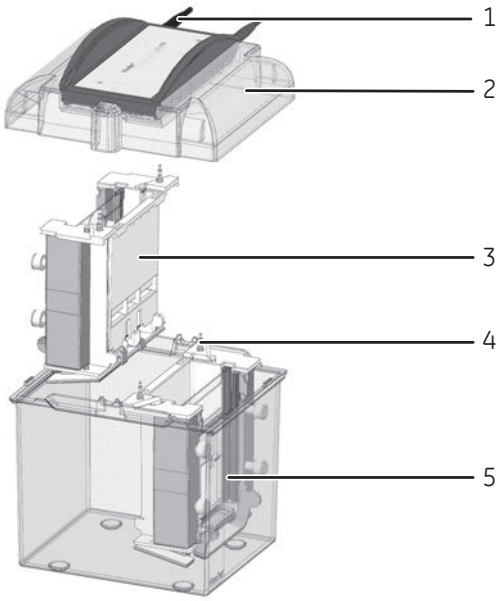
# 3.2 Detailed description

## Introduction

This section gives an overview of miniVE, and miniVE Blot Module.

## Illustration of miniVE

The illustration below shows the locations and gives brief descriptions of the miniVE instrument.

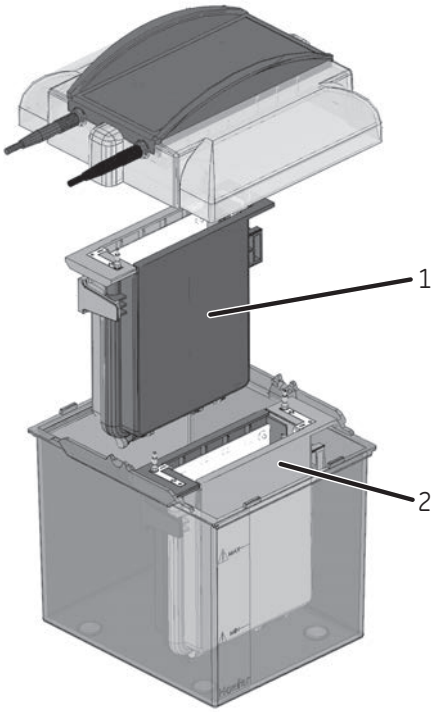



| Part | Function |
|---|---|
| 1 | Color-coded leads |
| 2 | Safety lid |
| 3 | Electrophoresis module |
| 4 | Banana plug connectors |
| 5 | Tank |

miniVE requires a power supply with a minimum rating of 50 mA and 250 V.

## Illustration of miniVE Blot Module

The illustration below shows the locations of the optional miniVE Blot Module.




| Part | Function |
|---|---|
| 1 | Black cathode side of blotting module |
| 2 | Red anode side of blotting module |

# 4 Installation

## Introduction

This chapter provides required information to enable users and service personnel to unpack miniVE.

## Safety precautions

**CAUTION**

When lifting and moving the instrument be careful not to drop it. This may cause injury.

**CAUTION**

Make sure that the system is placed on a stable, level bench with adequate space for ventilation.

## Unpacking procedure

Unwrap all packages carefully.

Inspect all visible parts for damage or missing pieces. If any damage is observed, record this on the receiving documents and inform your GE representative. Make sure to keep all packing material for damage claims or to use should it become necessary to return the unit.

# 5 Operation

## About this chapter

This chapter gives instructions on how to safely operate the product.

## Safety precautions

**WARNING**

Never exceed the operating limits stated in this document and on the system label. Operation of the product outside these limits can damage equipment and cause personal injury or death.

**WARNING**

The safety lid must be in place before connecting the power leads to a power supply.

**WARNING**

The high voltage power supply must always be disconnected when the safety lid of the electrophoresis unit is taken off. The high voltage power supply must never be switched on unless the safety lid is on the electrophoresis unit.

**WARNING**

Any liquid on the equipment must be dried off before connecting the power supply.

**CAUTION**

Never introduce anti-freeze or any organic solvent into any part of the instrument. Organic solvents will cause irreparable damage to the instrument.

**CAUTION**

Do not operate with buffer temperature above 75°C.

**CAUTION**

Handle the glass components with care! Wear appropriate personal protective equipment (PPE).

**CAUTION**

When lifting and moving the instrument be careful not to drop it. This may cause injury.

**NOTICE**

After initial monitoring, do not leave the unit unattended for more than 30 min before checking the progress of the bands and the buffer level.

## In this chapter

# 5.1 Electrophoresis module

## About this section

This section gives instructions on how to safely operate the electrophoresis module. For instructions on using the blot module, see *Section 5.2 Electrotransfer module, on page 48*.

## In this section

# 5.1.1 Prepare the electrophoresis module

## Introduction

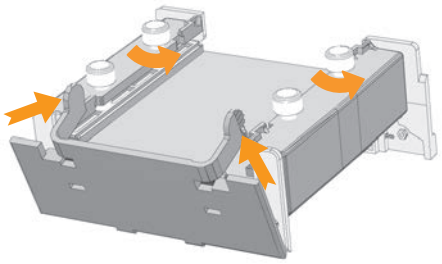
This section describes how to prepare the electrophoresis module.

The electrophoresis module accepts both self-cast and pre-cast gels 8 cm wide, from 8 to 10.5 cm long, and 0.75 to 1.5 mm thick. For instructions on using the module with pre-cast gels, see *Section 5.1.2 Pre-cast gels, on page 41*.

## Preparations

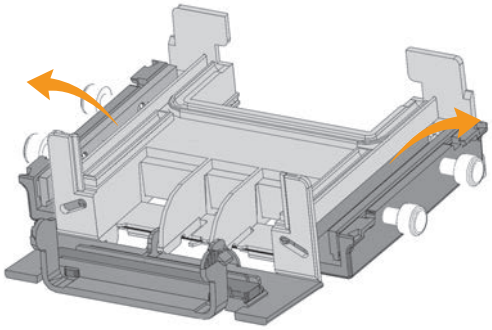
Follow the instructions below to open the electrophoresis module.

| Step | Action |
|---|---|
| 1 | Release the sealing plate by applying gentle inward pressure to both tabs as indicated by the arrows. |



| | |
|---|---|
| 2 | Holding the tabs, move the plate into the fully open position. |
| 3 | Loosen all four screws 4 to 5 turns in counterclockwise direction, as shown in the illustration in step 1. Do not attempt to remove the screws from the clamps. |

| Step | Action |
|---|---|
| 4 | Swing the clamps outward to open the module. |

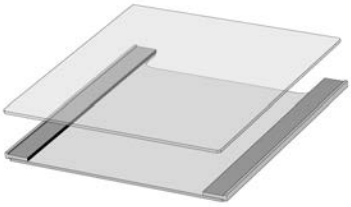


| | |
|---|---|
| 5 | Lay the module flat on a bench. |

## Prepare self-cast gel sandwich

Follow the instructions below to prepare the self-cast gel sandwich. One single gel can be cast on the module.

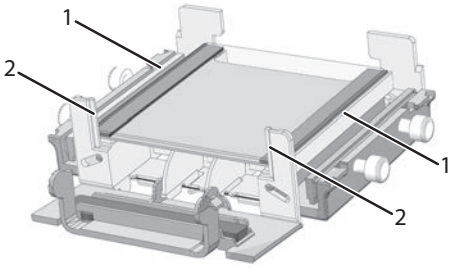
| Step | Action |
|---|---|
| 1 | Prepare the module, as described in *Preparations, on page 34* |
| 2 | Choose one notched plate, one rectangular glass plate, and two spacers. Use only unchipped plates to prevent leaking. |
| 3 | Assemble the gel sandwich with the notch at the top of the sandwich and the spacer ridges align along the glass plate edges on the sides of the sandwich. |



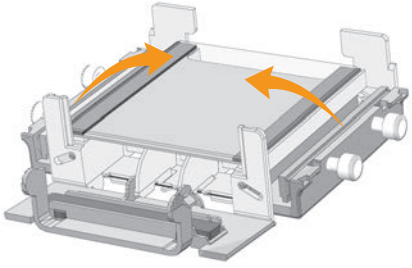
## Place and seal gel sandwich in module

Follow the instructions below to place and seal the gel sandwich in the module.

| Step | Action |
|---|---|
| 1 | Take care to "square" the three sealing sides of the sandwich. Hold the sandwich and gently tap the bottom against a flat surface.<br><br>***Note:***<br>*Make sure to take extra care to align all components when assembling the sandwich, to ensure a good seal.* |
| 2 | Lay the sandwich on the module, with the notched-plate-side down. Fit the gel sandwich within the guides on both sides (1) and against the guide feet at the bottom (2). |

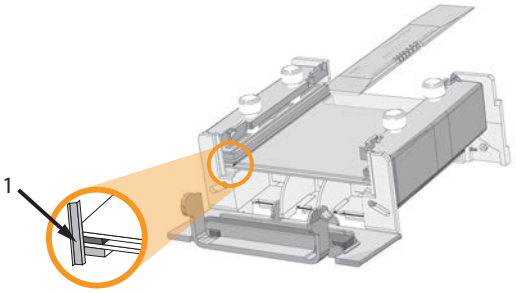



| | |
|---|---|
| 3 | While gently holding the sandwich against the module, swing one clamp into position over the spacer, taking care not to bump the sandwich out of alignment. |

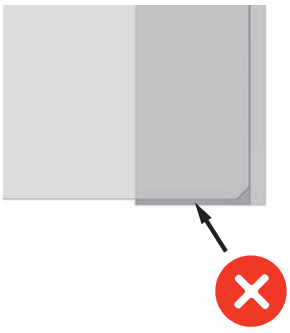


| | |
|---|---|
| 4 | Turn each screw (alternating to keep the pressure even) until the clamps are loosely secured and will allow the spacers to be adjusted, if necessary. |

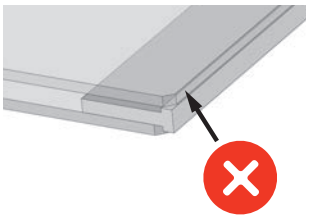
| Step | Action |
|---|---|
| 5 | Repeat step 3 and 4 for the clamp on the other side. |
| 6 | If the spacers and glass plates are not perfectly aligned against the stops, use the stiff end of the Wonder Wedge to press against the edges of the spacer and glass plates and position them flush against the guide foot (1). |




| | |
|---|---|
| 7 | Complete the clamping by tightening each screw firmly, hand tight.<br><br>***Note:***<br>*Do not overtighten, as the plates may crack.* |
| 8 | Check the spacer alignment. Misalignment can cause leaks. |

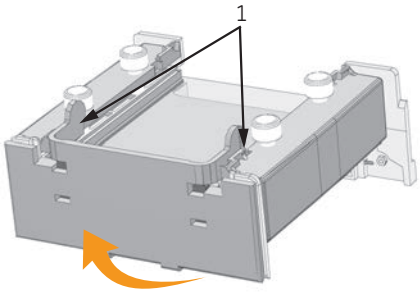


The spacer must not protrude out of the sandwich or be recessed into it.



The glass plate must not be resting on the spacer "T".

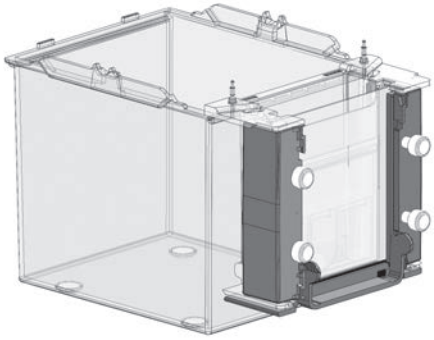
| Step | Action |
|---|---|
| 9 | Lock the sealing plate into the closed position by engaging each tab in its topmost notch (1). |




| | |
|---|---|
| 10 | Hang the module from the narrow side of the tank or place it on the bench top to cast the gel. |

***Note:***

*When hanging the module on the tank, either fill the tank or hang the second module on the other side as a counterbalance.*



## Pour resolving gel

Follow the instructions below to pour the resolving gel.

**WARNING**

Acrylamide is a neurotoxin. Always wear gloves and observe all laboratory safety procedures.

| Step | Action |
|---|---|
| 1 | Prepare the monomer solution. |
| 2 | Pipet the solution into the sandwich slowly so that it flows along a spacer, taking care not to trap any air pockets. |
| 3 | |

| If... | Then... |
|---|---|
| No stacking gel | 1 Fill the solution to the desired level.<br>2 Insert a comb (at a slight angle to prevent trapping air) into the sandwich, allowing the comb sides to rest on the spacers. |
| Stacking gel (1cm) | 1 Fill to 3 cm below the top of the rectangular glass plate.<br>2 Overlay each gel with a thin layer of water-saturated n-butanol, water, or diluted gel buffer to prevent exposing the monomer solution to oxygen. Use a glass syringe fitted with a 22-gauge needle to apply 100 µL of the overlay solution slowly to one side of the sandwich, near the spacer. Allow the solution to flow across the surface unaided. |

## After polymerization

Follow the instructions below after the resolving gel has polymerized.

**WARNING**

Acrylamide is a neurotoxin. Always wear gloves and observe all laboratory safety procedures.

| Step | Action |
|---|---|
| 1 | Allow a minimum of one hour for the gel to polymerize. |
| 2 | If a comb is in place, remove it by carefully pulling on the comb while gently rocking it back and forth to break the vacuum. Rinse the wells with electrophoresis buffer to remove any unpolymerized acrylamide. |
| 3 | If an overlay was applied, rinse the sandwich several times with double-distilled water to remove it. Invert the module to drain. |
| 4 | To ensure seamless contact between the resolving and stacking gels, remove residual liquid by blotting one corner of the gel with a lint-free tissue. |

## Pour stacking gel

Follow the instructions below to pour the stacking gel.

**WARNING**

Acrylamide is a neurotoxin. Always wear gloves and observe all laboratory safety procedures.

| Step | Action |
|---|---|
| 1 | Prepare the stacking gel monomer solution. |
| 2 | De-gas the stacking gel monomer solution, add catalyst and initiator. |
| 3 | Use a pipette to pour the solution into one corner of the plate, taking care not to trap any bubbles. |
| 4 | Insert a comb (at a slight angle to prevent trapping air) into the sandwich, allowing the comb sides to rest on the spacers. |
| 5 | Allow a minimum of one hour for the gel to polymerize. |

# 5.1.2 Pre-cast gels

## Introduction

This section describes how to use pre-cast gels with the electrophoresis module. For instructions on how to use self-cast gels, see *Section 5.1.1 Prepare the electrophoresis module, on page 34*.

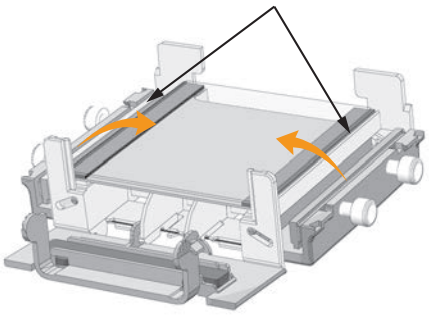
## Place pre-cast gel

Follow the instructions below to place a pre-cast gel sandwich in an electrophoresis module. One single gel can be used per module.

**WARNING**

Acrylamide is a neurotoxin. Always wear gloves and observe all laboratory safety procedures.

| Step | Action |
|---|---|
| 1 | Prepare the electrophoresis module as described in *Preparations, on page 34*. |
| 2 | Follow the manufacturer's instructions to prepare the gel for electrophoresis. This may involve removing tape or breaking off the sealing edge from the bottom of the cassette. |
| 3 | Remove the comb and rinse the wells with electrophoresis buffer to remove any unpolymerized acrylamide. |
| 4 | Position the cassette on the module. Orient the cassette so that the notched side is against the gasket, and the wells are at the top of the module. Center the cassette within the guide rail at both sides of the module (1). |



| Step | Action |
|---|---|
| 5 | Swing each clamp into position over the sides of the cassette. |
| 6 | Tighten each screw, alternating to apply even pressure until the cassette is secure.<br><br>***Note:***<br>*The gasket around the upper buffer chamber should be fully compressed to provide a seal, but do not overtighten the screws.* |
| 7 | Check that both gel surfaces will be in contact with the buffer. |
| 8 | Check that the bottom of the gel is exposed to buffer.<br><br>***Note:***<br>*Some pre-cast gels require you to remove tape or break off the sealing edge from the bottom of the cassette.* |
| 9 | Move the sealing plate into the “half open” position to prepare for electrophoresis. Apply gentle inward pressure to both tabs and lock them into the lower notch. See the illustration in step 1 of section *Prepare final assembly, on page 43*. |

# 5.1.3 Final electrophoresis assembly

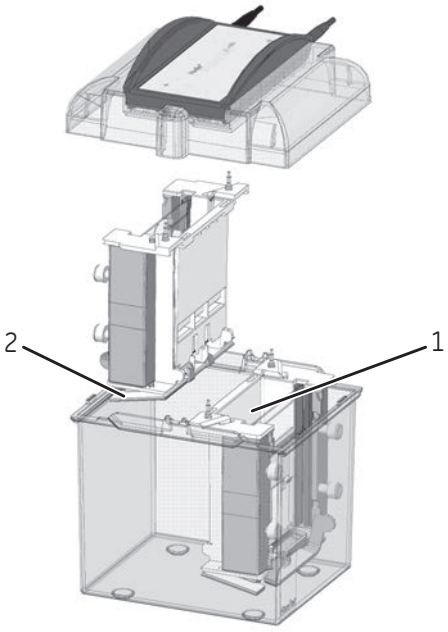
## Introduction

This section describes how to prepare the final electrophoresis assembly.

## Prepare final assembly

Follow the instructions below to prepare final assembly.

| Step | Action |
|---|---|
| 1 | Make sure the sealing plate is in the “half-open” position (2). |




| | |
|---|---|
| 2 | Lower each module into the tank (1), seating it in the locating slots.<br>The module seats properly in only one orientation, with the banana plugs toward the center of the tank and the gel facing outward. |

| Step | Action |
|---|---|
| 3 | Add 1.2 to 1.6 L buffer to the tank when only one module is in place or 1.1 to 1.4 L when two modules are in place.<br><br>***Note:***<br>*The minimum and maximum levels are marked. Verify that the lower electrode, which is approximately 2 cm from the bottom of the module, is completely submerged. To prevent buffer from entering the upper buffer chamber, verify that the buffer level is not above the maximum level.* |
| 4 | Add the appropriate amount of electrophoresis buffer to the upper buffer chamber.<br><br>Fill the upper buffer chamber to a level 3 to 5 mm above the notched plate. This requires approximately 100 mL per module. |
| 5 | Prepare the sample: Increase liquid sample density with 10% glycerol or sucrose. Add a tracking dye, such as bromophenol blue. |
| 6 | Apply the sample into the wells using a micropipet or fine-tipped microsyringe.<br><br>The table below shows the volume of sample required for different numbers of wells and comb thicknesses. |

## Well capacities

Volume of sample (µL) per 1 mm well depth.

| | Comb thickness | | |
|---|---|---|---|
| Number of wells | 0.75 (mm) | 1.0 (mm) | 1.5 (mm) |
| 5 | 9.5 | 12.7 | 19.1 |
| 9 | - | 5.8 | - |
| 10 | 3.6 | 4.8 | 7.2 |
| 12 | - | 4.75 | - |
| 15 | 2.2 | 2.9 | 4.4 |
| 18 | - | 2.9 | - |

## Electrical connections

Follow the instructions below to prepare the electrical connections.

| Step | Action |
|---|---|
| 1 | Position the safety lid over the unit and seat the lid so the banana plugs engage the jacks in the lid. The lid is symmetrical and fits in either orientation. |
| 2 | Plug the color-coded leads into the jacks of an approved power supply (red to red, black to black). The minimum power supply rating is 250 V, 50 mA, constant current or constant voltage. |

# 5.1.4 Electrophoresis run

## Introduction

This section describes how to run gels in miniVE.

**NOTICE**

After initial monitoring, do not leave the unit unattended for more than 30 min before checking the progress of the bands and the buffer level.

## Run a gel

For optimal resolution, start electrophoresis immediately after sample loading.

Gels may be run at either constant current or constant voltage. For Laemmli SDS separations, the recommended voltage range is 100 to 250 V and should not exceed 300 V. If running gels at constant current, the current should be 10 to 20 mA per gel, depending on gel thickness (10 mA for 0.75 mm, 15 mA for 1.5 mm).

Check progress after 5 min, and again after half an hour, monitoring the position of the tracking dye. The run is complete when the tracking dye reaches the bottom of the gel.

# 5.1.5 After electrophoresis

## Introduction

This section describes how the procedures after an electrophoresis run.

## After a run

Follow the instructions below after an electrophoresis run.

**CAUTION**

Handle the glass components with care! Wear appropriate personal protective equipment (PPE).

| Step | Action |
|---|---|
| 1 | Turn off the power supply and disconnect the leads. |
| 2 | Remove the safety lid and lift out the module(s). |
| 3 | Release each gel sandwich or cassette from the module.<br>1 Move the sealing plate to the fully open position by pressing inward on both tabs and guiding the plate to open out.<br>2 Loosen all four screws 4 to 5 turns counterclockwise.<br>3 Swing the clamps outward. |
| 4 | Remove the gel from the sandwich or cassette.<br>1 Gently loosen and then slide away both spacers.<br>2 Slip an extra spacer or the Wonder Wedge into the bottom edge to prevent breaking the “ears” of the notched plates.<br>3 Separate the plates.<br>If using pre-cast gels, follow the manufacturer’s instructions. |
| 5 | Carefully lift the gel from the plate and lay it into a tray containing stain, fixative, or transfer buffer. |
| 6 | Clean the unit as described in *Chapter 6 Maintenance, on page 57*. |

# 5.2 Electrotransfer module

## About this section

This section gives instructions on how to operate the electrotransfer module in a safe way. For instructions on using the electrophoresis module, see *Section 5.1 Electrophoresis module, on page 33*.

## In this section

# 5.2.1 Prepare the electrotransfer module

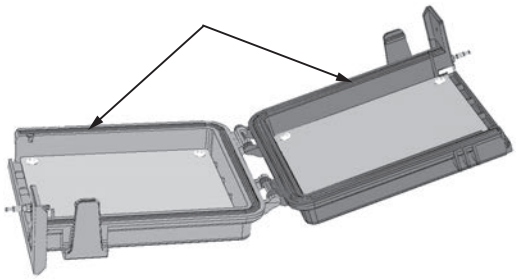
## Introduction

This section describes how to prepare the electrotransfer module.

## Prepare the electrotransfer module

Follow the instructions below to open the electrotransfer module.

| Step | Action |
|---|---|
| 1 | Prior to use, wash the tank and blot module with a dilute solution of non-abrasive laboratory detergent. Thoroughly rinse with water and distilled water. |
| 2 | Take two strands of gaskets. |
| 3 | Open the module by releasing both tabs. |
| 4 | Lay a gasket along the entire groove around three sides of each cup half. The arrows in the illustration below indicate the location of the grooves. |



| | |
|---|---|
| 5 | Avoid stretching or twisting the gasket; the length should just fit. Gently press into place. |

## Passive cooling

Follow the instructions to use passive cooling.

| Step | Action |
|---|---|
| 1 | Chill approximately 2 L of deionized water to 4°C. |

| Step | Action |
|---|---|
| 2 | Fill the tank with chilled water (this serves as passive cooling during electro-transfer). |

## Prepare transfer stack components

Follow the instructions below to prepare the components of the transfer stack.

***Note:*** *Always wear gloves when handling membranes to avoid leaving fingerprints.*

| Step | Action |
|---|---|
| 1 | For each gel, cut the membrane and two pieces of filter paper the same size as the gel, but no larger than 8.5 × 10.5 cm.<br>***Note:***<br>*The gel determines the size of the membrane and filter paper.* |
| 2 | Equilibrate the gel in transfer buffer for 10 min.<br>***Tip:***<br>*Equilibration allows the gel to swell or shrink before it contacts the transfer membrane and removes excess buffer salts and detergents from the gel. Longer equilibration may result in diffuse bands.* |
| 3 | Pre-wet nitrocellulose or nylon membranes in distilled water, taking care not to trap air bubbles. Dip one end of the membrane into the buffer and slowly submerge it, allowing it to wet by capillary action.<br>Pre-wet PVDF or other hydrophobic membranes in methanol. |
| 4 | After pre-wetting the membrane, soak it in transfer buffer for 2 to 5 min. |
| 5 | Wet the filter paper in transfer buffer. |

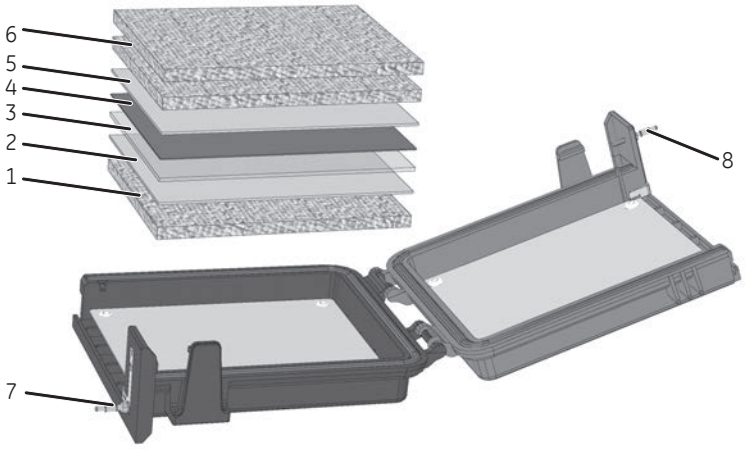
## Prepare transfer stack

Follow the instructions below to prepare the transfer stack.

Transfer the sample as soon as possible after electrophoresis to minimize sample diffusion within the gel. Electrophoretic transfer can be performed on up to four mini gels at one time, if two gels are placed in each of two modules.

***Note:*** *Always wear gloves when handling membranes to avoid leaving fingerprints.*

| Step | Action |
|---|---|
| 1 | Assemble the transfer stack so that molecules will migrate to the membrane.<br>For negatively charged macromolecules (e.g. proteins run in an SDS gel and nucleic acids) assemble the transfer stack on the black side (7). Proteins will transfer towards the red side (8). |




| Part | Function |
|---|---|
| 1 | Packing sponge |
| 2 | Wet filter paper |
| 3 | Equilibrated gel |
| 4 | Membrane |
| 5 | Wet filter paper |
| 6 | Two packing sponges |
| 7 | Black side of the electrotransfer module |
| 8 | Red side of the electrotransfer module |

| | |
|---|---|
| 2 | Center a packing sponge (1) on the black cathode side. |
| 3 | Place one piece of wet filter paper (2) on the sponge. |
| 4 | Position the equilibrated gel (3) on the filter paper. Wet the gel surface with a few drops of transfer buffer. |

| Step | Action |
|---|---|
| 5 | Place the membrane (4) on the gel. Do not reposition the membrane once it contacts the gel. Use a glass rod to roll out any air bubbles. |
| 6 | Place one piece of wet filter paper (5) on the membrane. |
| 7 | Place two packing sponges (6) on the filter paper. A second transfer stack, if added, is placed between these two sponges. Repeat steps 2 to 7. |
| 8 | Check the position of the transfer stack. The transfer stack should be centered on the electrode plate. No layer should be pinched when the module is closed. |
| 9 | Fold the empty half of the cup over the stack and press the halves together to snap the module closed. The transfer stack should be held firmly in place when the cup is closed.<br>Replace old and compressed sponges, if needed, to fill the cup. |

# 5.2.2 Final electrotransfer assembly

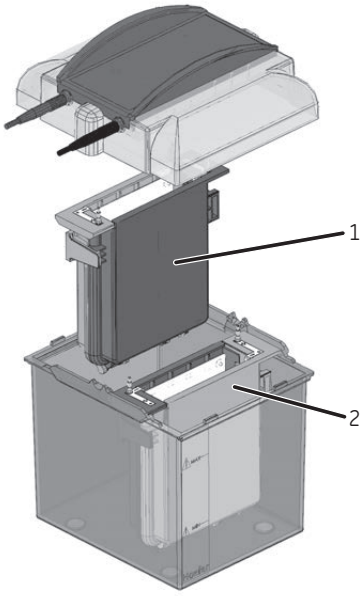
## Introduction

This section describes how to prepare the final electrotransfer assembly.

## Prepare final assembly

Follow the instructions below to prepare final assembly.

| Step | Action |
|---|---|
| 1 | Slowly pour 300 to 350 mL of transfer buffer into the top of the module, to allow air to be displaced by the buffer as it fills the cup. Tap the blotting cup lightly to dislodge any air bubbles in the packing sponges. |
| 2 | Position the module(s) in the tank with the banana plugs and black side (1) toward the center, the red side facing outward (2). |



| Step | Action |
|---|---|
| 3 | Fill the tank with deionized water (1.7 L is required when using one module and 1.2 L when using two modules). Chill deionized water to approximately 4°C before filling to the tank.<br><br>***Note:***<br>*To avoid rapid evaporation, the buffer temperature should not exceed 75°C. Passive cooling is recommended if the transfer will be longer than one hour, if biological activity must be retained, or if transferring nucleic acids.* |
| 4 | Place the safety lid on the tank. The lid is symmetrical and fits in either orientation. |
| 5 | Plug the color-coded leads into the jacks of an approved power supply: red to red, black to black. |

# 5.2.3 Electrotransfer run

## Introduction

This section describes how to run and electrotransfer using the miniVE Blot Module.

## Run an electrotransfer

Electrophoretic transfer conditions for blotting proteins in Towbin buffer: 25 V for 1 to 2 hours, 300 to 400 mA.

# 5.2.4 After electrotransfer

## Introduction

This section describes how the procedures after an electrotransfer run.

## After a run

Follow the instructions below after an electrotransfer run.

***Note:*** *Always wear gloves when handling membranes to avoid leaving fingerprints.*

| Step | Action |
|---|---|
| 1 | Turn off the power supply and disconnect the leads. |
| 2 | Remove the safety lid. |
| 3 | Lift out the module(s) and drain it by inverting it over a sink. Avoid wetting the banana plugs with buffer. |
| 4 | Open the module. Remove the gels and membranes. Save the packing sponges. Discard the blotting paper. |
| 5 | Label each membrane and indicate the sample side. |
| 6 | Remove the membrane from the stack with a blunt forceps. |
| 7 | Process the membrane according to your protocol or allow the membrane to air dry prior to storage. |
| 8 | Clean the unit as described in *Chapter 6 Maintenance, on page 57*. |

# 6 Maintenance

## Introduction

This chapter provides information to enable users and service personnel to clean and maintain the product.

## Safety precautions

**WARNING**

Turn all power supply controls off and disconnect the power leads before removing the safety lid.

**WARNING**

Any liquid on the equipment must be dried off before connecting the power supply.

**CAUTION**

Never expose any part of the instrument to alcohols or organic solvents. (Except for water-saturated butanol for gel casting.) Alcohols or organic solvents will cause irreparable damage to the unit!

**CAUTION**

Handle the glass components with care! Wear appropriate personal protective equipment (PPE).

**CAUTION**

When lifting and moving the instrument be careful not to drop it. This may cause injury.

**NOTICE**

**Cleaning**. Keep the exterior of the instrument dry and clean. Wipe regularly with a soft damp tissue and, if necessary, a mild cleaning agent. Let the instrument dry completely before use.

## General cleaning procedure

When cleaning the miniVE make sure to:

- not autoclave or heat any part above 75°C.
- not immerse the safety lid in any liquid.
- not expose miniVE to organic solvents, abrasives, strong cleaning solutions, or strong acids or bases to clean the chambers.
- not soak the laminated gasket.

Immediately after each use, rinse the upper and lower buffer chambers with water and then rinse thoroughly with distilled water. Handle the upper buffer chamber with care to prevent damaging the banana plug. Wipe the lid with a damp cloth. If necessary, briefly rinse the underside of the lid with water. Allow to air-dry.

Clean the glass plates and spacers with a dilute solution of a laboratory cleanser, then rinse thoroughly with tap and distilled water. Glass plates can also be treated with (but not stored in) acidic cleaning solutions. Wipe plates with isopropanol to remove any Gel Seal residue.

## Cleaning before planned maintenance/service

To ensure the protection and safety of service personnel, all equipment and work areas must be clean and free of any hazardous contaminants before a Service Engineer starts maintenance work.

Please complete the checklist in the *On Site Service Health and Safety Declaration Form* or the *Health and Safety Declaration Form for Product Return or Servicing*, depending on whether the instrument is going to be serviced on site or returned for service, respectively.

Copy the form you need from *Section 8.3 Health and Safety Declaration Forms, on page 73*.

# 7 Troubleshooting

## About this chapter

This chapter provides information to assist users and service personnel to identify and correct problems that may occur when operating the product.

If the suggested actions in this guide do not solve the problem, or if the problem is not covered by this guide, contact your GE representative for advice.

## Safety precautions

**WARNING**

Turn all power supply controls off and disconnect the power leads before removing the safety lid.

**WARNING**

Any liquid on the equipment must be dried off before connecting the power supply.

**CAUTION**

Handle the glass components with care! Wear appropriate personal protective equipment (PPE).

**CAUTION**

When lifting and moving the instrument be careful not to drop it. This may cause injury.

## In this chapter

# 7.1 Electrophoresis troubleshooting

## During the run

| Problem | Possible cause | Remedy |
|---|---|---|
| Unusually slow (or fast) run | Sample or reagent preparation | If the required pH of a solution is overshot, do not back-titrate. Discard and prepare fresh buffer. |
| | | Check recipes, gel concentrations, and buffer dilution. For instance, do not use Tris-HCl instead of Tris for Laemmli tank buffer. |
| | | Decrease the salt concentration of samples. |
| | Reagent quality | Dispose of older acrylamide solutions and use only stock of the highest quality. |
| | | Use only freshly deionized urea. |
| | Voltage or current settings | To increase or decrease the migration rate, adjust the voltage or current by 25% to 50%. |

## Sample

| Problem | Possible cause | Remedy |
|---|---|---|
| Dye front curves up (smiles) at edges | Uneven heat distribution | Fill the tank to the level appropriate for the run. |
| | Excessive heat | Prechill the buffer. |
| | | Decrease the current or voltage setting. |
| | | Run the gel in the cold room. |
| Protein streaks vertically | Particles in sample | Centrifuge or filter sample before loading to remove particles. |
| | | Dialyze or desalt the sample. |

| Problem | Possible cause | Remedy |
|---|---|---|
| Bands are skewed or distorted | Incomplete gel preparation and polymerization | De-gas the stacking-gel solution and avoid trapping air bubbles under the comb teeth. |
| | Irregular interface between stacking and running gels | Overlay the running gel with water-saturated butanol before polymerization begins, to avoid forming an uneven gel surface. |
| | Sample preparation | Dialyze or desalt the sample. |
| | | Centrifuge or filter sample before loading to remove particles. |
| Stained sample collects near the buffer front | Gel concentration | Molecules are not sufficiently restricted by the resolving gel pore size: increase the acrylamide percentage of the gel. |
| Stained sample collects near the top of the gel when the buffer front has reached the bottom | Gel concentration | The gel pore size is too small: decrease the acrylamide percentage of the resolving (or stacking) gel. |
| | Precipitation | The protein has precipitated. Heat the sample at a lower temperature (70°C or less) for 1 to 2 min. |
| Stained sample collects at both top and bottom of the gel | Gel concentration | The molecular weight range of the sample requires an acrylamide concentration gradient to resolve the full range of protein sizes. |

| Problem | Possible cause | Remedy |
|---|---|---|
| Poor band resolution | Running conditions | Conduct the separation at a lower current or voltage setting to reduce Joule heating. |
| | Reagent quality | Use only the highest-quality reagents. |
| | | Only use freshly deionized urea. |
| | Poor stacking | Use only gels that were recently prepared. |
| | | Check pH values of the resolving- and stacking-gel solutions. Do not back-titrate buffers. |
| | Sample preparation | Store sample on ice before it is denatured. |
| | | Dialyze or desalt the sample. |
| | | Heat samples in SDS sample buffer for no more than 1 to 2 min at 100°C to improve dissociation of subunits. Store on ice after heating. |
| | | Adjust the sample volume or concentration. |
| | | Add more mercaptoethanol or dithiothreitol; check sample treatment. |
| | | Add protease inhibitors if necessary to prevent proteolytic degradation of sample. |
| | | Store samples to be frozen in aliquots to avoid repeated freeze-thawing. Store at -40°C to -80°C. |

| Problem | Possible cause | Remedy |
|---|---|---|
| Tracking dye doesn't sharpen into a concentrated zone in the stacking gel | Poor stacking | Pour a taller stacking gel.<br>***Note:***<br>*For best results, allow a stacking-gel height of 2.5 times the height of the sample in the well.* |
| | Reagent quality | Dispose of outdated acrylamide solutions and use only the highest grade of acrylamide. |
| | Sample preparation | When preparing samples, avoid using solutions with high salt concentrations. |

# 7.2 Electrotransfer troubleshooting

## Incomplete transfer

| Problem | Remedy |
|---|---|
| Blank areas on the membrane | Remove all trapped air pockets in the transfer stack assembly:<br>Assemble the stack while it is submerged in transfer buffer, gently press on each sponge as it is added to the stack, and roll a glass pipette or test tube over the membrane and gel to eliminate all air bubbles. |
| | Use buffer with a lower ionic strength. |
| | Check electrode continuity. During the transfer, a continuous stream of gas is released along the entire length of the electrodes. If bubbles do not form along the entire length of the electrode, replace the electrode. |

| Problem | Remedy |
|---|---|
| Molecules do not migrate out of gel | Increase the field strength. |
| | Increase transfer period. Try doubling it. |
| | Do not use staining or fixing agents on the gel before transfer. |
| | Use a thinner gel. |
| | Reduce the gel acrylamide concentration. |
| | Check that the buffer pH is close to the intended pH. Most buffers should not be titrated; make fresh buffer. |
| | For proteins, use 3.5 mM SDS (0.1%) in the transfer buffer. |
| | Avoid including methanol in the transfer buffer or reduce the amount to the absolute minimum. |
| | Increase the length of time Southern blots are depurinated. |
| | For native gels, increase the net charge on the protein by changing to a transfer buffer with a different pH. Lower pH (<6–7) increases the positive charge on proteins; higher pH (>6–7) increases the negative charge on proteins. |

## Diffuse band patterns

| Problem | Solution |
|---|---|
| Diffuse band patterns | Transfer immediately after electrophoretic separation. If equilibrating before the transfer, shorten or eliminate the equilibration time or move the gel to the cold room during equilibration. |
| | If transfer buffer contains methanol (≥ 10%), equilibrate the gel in transfer buffer for 30 min to allow it to shrink before assembling the stack.<br>***Note:***<br>*Because methanol causes the gel to shrink slightly, large molecules may migrate more slowly.* |
| | Make sure that the gel is held firmly against the membrane and that it does not shift once contact is made. |
| | Check that the preferred binding surface of the membrane (if any) contacts the gel. |

## Inefficient binding to membrane

| Problem | Remedy |
|---|---|
| Chemical parameters | Fix or crosslink the molecule onto the membrane according to the requirements of the nucleic acid, protein, or membrane type. |
| | Prepare protein transfer buffer **without** SDS. |
| | Verify the optimal amount of methanol required for the membrane type and check the buffer solution. Add 10% to 20% methanol to the transfer buffer to enhance binding to nitrocellulose. |

| Problem | Remedy |
|---|---|
| Membrane parameters | Wear gloves when handling membranes. |
| | Store membranes at ambient temperature out of direct sunlight to keep the membranes activated. |
| | Use a membrane with a smaller pore size (0.10 to 0.20 µm) if proteins pass through the membrane, or use a different membrane type. |
| | Place a membrane both over and under the gel if you suspect one protein is moving in the opposite direction from the majority of the proteins. Check both membranes for protein(s). |
| | Check if too much sample is available for the binding surface area by applying two membranes instead of one. If “blow through” occurs, reduce the sample load. |

# 8 Reference information

## About this chapter

This chapter lists the technical specifications of the miniVE. The chapter also includes ordering information and the Health and Safety Declaration form for service.

## In this chapter

# 8.1 Specification

## miniVE

| Characteristic | Description |
|---|---|
| Maximum buffer temperature | 75°C |
| Environmental operating conditions | Indoor use: 4°C to 40°C<br>Humidity up to 80% relative humidity<br>Altitude up to 2000 m |
| Installation category | II |
| Pollution degree | 2 |
| Dimensions (W × H × D) | 19.2 × 18.8 × 17.2 cm |
| Weight (tank, lid, and two gel modules) | 1.2 kg |

## Electrophoresis module

| Characteristic | Description |
|---|---|
| Gel size (W × H) | 10 × 8 or 10.5 cm |
| Number of gels | 2 gel sandwiches |
| Maximum power | 25 W per gel |
| Maximum voltage | 600 V |
| Maximum tank volume | 1.6 L with one module in place<br>1.4 L with two modules in place |

## Electrotransfer module

| Characteristic | Description |
|---|---|
| Number of gels | 2 blotting modules |
| Maximum power | 15 W per blotting module |
| Maximum current | 400 mA |

| Characteristic | Description |
|---|---|
| Buffer required | 350 mL per module |
| Maximum tank volume (for passive cooling) | 1.7 L with one module in place<br>1.2 L with two modules in place |

# 8.2 Ordering information

For product codes and information about how to order, please see www.gelifesciences.com

# 8.3 Health and Safety Declaration Forms

## On site service

### On Site Service Health & Safety Declaration Form

| Service Ticket #: | |
|---|---|

To make the mutual protection and safety of GE service personnel and our customers, all equipment and work areas must be clean and free of any hazardous contaminants before a Service Engineer starts a repair. To avoid delays in the servicing of your equipment, please complete this checklist and present it to the Service Engineer upon arrival. Equipment and/or work areas not sufficiently cleaned, accessible and safe for an engineer may lead to delays in servicing the equipment and could be subject to additional charges.

| Yes | No | Please review the actions below and answer "Yes" or "No". Provide explanation for any "No" answers in box below. |
|---|---|---|
| ○ | ○ | **Instrument has been cleaned of hazardous substances**. Please rinse tubing or piping, wipe down scanner surfaces, or otherwise ensure removal of any dangerous residue. Ensure the area around the instrument is clean. If radioactivity has been used, please perform a wipe test or other suitable survey. |
| ○ | ○ | Adequate space and clearance is provided to allow safe access for instrument service, repair or installation. In some cases this may require customer to move equipment from normal operating location prior to GE arrival. |
| ○ | ○ | **Consumables, such as columns or gels, have been removed or isolated from the instrument and from any area that may impede access to the instrument.** |
| ○ | ○ | **All buffer / waste vessels are labeled. Excess containers have been removed from the area to provide access.** |
| Provide explanation for any "No" answers here: | | |

| Equipment type / Product No: | | Serial No: | |
|---|---|---|---|

I hereby confirm that the equipment specified above has been cleaned to remove any hazardous substances and that the area has been made safe and accessible.

| Name: | | Company or institution: | |
|---|---|---|---|
| Position or job title: | | Date (YYYY/MM/DD): | |
| Signed: | | | |



DOC1149542/28-9800-26 AC 05/2014

# Product return or servicing

## Health & Safety Declaration Form for Product Return or Servicing

| | | | |
|---|---|---|---|
| **Return authorization number:** | | *and/or* **Service Ticket/Request:** | |

To make sure the mutual protection and safety of GE personnel, our customers, transportation personnel and our environment, all equipment must be clean and free of any hazardous contaminants before shipping to GE. To avoid delays in the processing of your equipment, please complete this checklist and include it with your return.

1. Please note that items will NOT be accepted for servicing or return without this form
2. Equipment which is not sufficiently cleaned prior to return to GE may lead to delays in servicing the equipment and could be subject to additional charges
3. Visible contamination will be assumed hazardous and additional cleaning and decontamination charges will be applied

| Yes | No | Please specify if the equipment has been in contact with any of the following: | |
|---|---|---|---|
| | | Radioactivity (please specify) | |
| | | Infectious or hazardous biological substances (please specify) | |
| | | Other Hazardous Chemicals (please specify) | |

**Equipment must be decontaminated prior to service / return. Please provide a telephone number where GE can contact you for additional information concerning the system / equipment.**

| | | |
|---|---|---|
| **Telephone No:** | | |
| **Liquid and/or gas in equipment is:** | | **Water** |
| | | **Ethanol** |
| | | **None, empty** |
| | | **Argon, Helium, Nitrogen** |
| | | **Liquid Nitrogen** |
| | **Other, please specify** | |

| | | | |
|---|---|---|---|
| **Equipment type / Product No:** | | **Serial No:** | |

**I hereby confirm that the equipment specified above has been cleaned to remove any hazardous substances and that the area has been made safe and accessible.**

| | | | |
|---|---|---|---|
| **Name:** | | **Company or institution:** | |
| **Position or job title:** | | **Date (YYYY/MM/DD)** | |
| **Signed:** | | | |

**To receive a return authorization number or service number, please call local technical support or customer service.**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For local office contact information, visit
www.gelifesciences.com/contact

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