cytiva

SE 600 Ruby

Operating Instructions

Original instructions

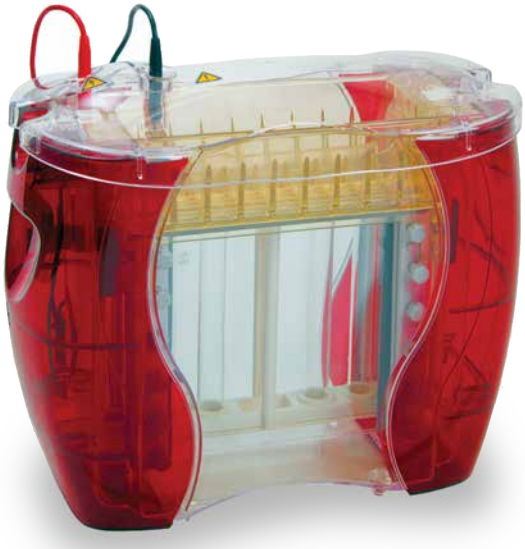

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Table of Contents

1 Introduction

About this chapter

This chapter contains important user information, descriptions of safety notices, regulatory information, and intended use of the SE 600 Ruby.

In this chapter

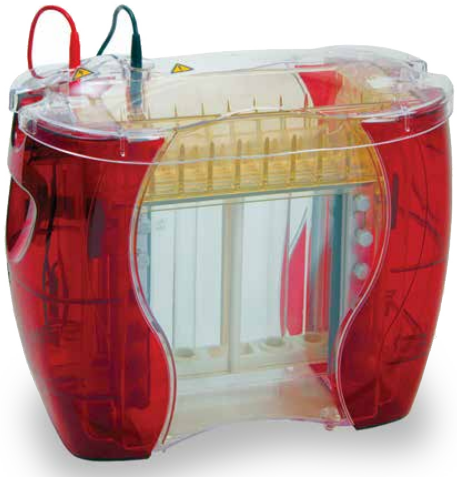
1.1 About this manual

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* covers SE 600 Ruby. The illustration below shows the SE 600 Ruby instrument.



Typographical conventions

Software items are identified in the text by ***bold italic*** text.

Hardware items are identified in the text by **bold** text.

In electronic format, references in *italics* are clickable hyperlinks.

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

The SE 600 Ruby vertical slab gel electrophoresis unit is intended for protein and nucleic acid electrophoresis under commonly used denaturing and non-denaturing conditions. Applications include protein separations, nucleic acid fractionation, and the second-dimension separation of 2-D electrophoresis.

SE 600 Ruby is intended for research use only, and shall not be used in any clinical procedures, or for diagnostic purposes.

Prerequisites

In order to operate SE 600 Ruby in the way it is intended:

- The user must have a general understanding of electrophoresis techniques.
- The user must read and understand the Safety Instructions chapter in the Operating Instructions.
- SE 600 Ruby must be installed in accordance with the site requirements and instructions in the Operating Instructions.

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.*

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.

In this chapter

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.

2.1 Safety precautions

Introduction

SE 600 Ruby 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 SE 600 Ruby.

Definitions

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.

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 SE 600 Ruby in any other way than described in the SE 600 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 Cytiva representative for replacements.

WARNING

Use only approved parts. Only spare parts and accessories that are approved or supplied by Cytiva 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

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

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

Do not operate with buffer temperature above 45°C. All plastic parts are rated for 45°C continuous duty.

CAUTION

Circulate only water or 50/50 water/ethylene glycol through the heat exchanger. Never use anti-freeze or any organic solvent in the heat exchanger.

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.

CAUTION

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

CAUTION

Do not operate with buffer temperature above 45°C. All plastic parts are rated for 45°C continuous duty.

CAUTION

Circulate coolant through the heat exchanger to minimize heating. Overheating will cause irreparable damage to the unit! Do not connect the heat exchanger to a water tap or any coolant source where the water pressure is unregulated.

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!

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

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

Power supply

WARNING

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

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

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 SE 600 Ruby 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.
Serial no.:	Serial number of the product
Manufac-tured:	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 of the SE 600 Ruby in an emergency situation, and the procedure for restarting the SE 600 Ruby.

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

The following table describes the consequences of a power failure.

Power failure to...	will result in...
SE 600 Ruby instrument	• The run is interrupted immediately

Restart after emergency shutdown or power failure

To restart the run after an emergency situation, follow the steps below:

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

3 System description

About this chapter

This chapter gives an overview of the SE 600 Ruby, and a brief description of its function.

Illustration of the instrument

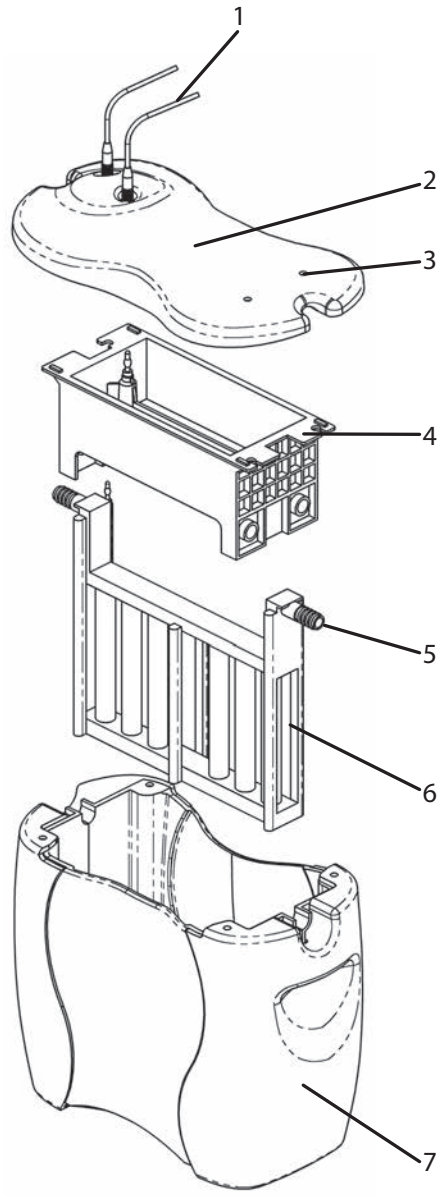
The illustration below shows the SE 600 Ruby instrument.

Part	Description
1	SE 600 Ruby instrument.
2	Dual Gel Caster.

SE 600 Ruby is powered using a separate power supply. To make self-cast gels a gel caster is required. In addition, an optional heat exchanger allows buffer temperature control in the lower chamber.

SE 600 Ruby overview

This illustration shows the location of the main parts of the SE 600 Ruby instrument.



Part	Function
1	Color-coded power cable with banana plug (2×)

Part	Function
2	Safety lid
3	Interlock pins
4	Upper buffer chamber with upper electrode (cathode)
5	Heat exchanger connector ports (13 mm outer diameter)
6	Heat exchanger with lower electrode (anode)
7	Lower buffer chamber

Also included with the SE 600 Ruby instrument, but not shown in the illustration:

- Gel Seal compound (7.1 g)
- Spacer-Mate alignment template
- Glass plates (6×)
- Wonder Wedge plate separation tool
- Buffer dam
- 1.5 mm thick spacers (4×)
- 15-well combs (2×)

Modules

To operate the SE 600 Ruby, the following components are required but not included:

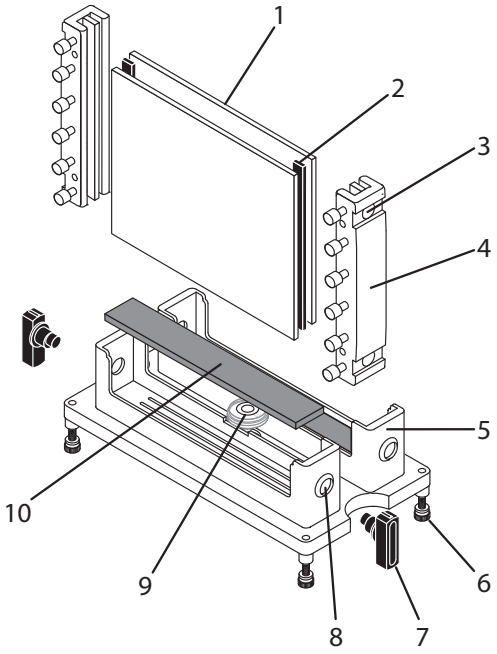
- Power supply with minimum rating of 500 V, 100 mA (constant A or V)
- Magnetic stirrer
- Magnet stirring bar

The following components are not included, but can be used with the SE 600 Ruby:

- Gel caster for making self-cast gels
- Gradient Maker for making self-cast gradient gels
- Heat exchanger (optional) for buffer temperature control in the lower chamber

Gel caster overview

This illustration shows the location of the main parts of Dual Gel Caster.



Part	Function
1	Glass plate
2	Spacer
3	Cam hole in the clamp (2 ×)
4	Clamp
5	Casting cradle
6	Leveling feet
7	Cam (install ridge-end up)
8	Cam hole in the casting cradle (4 ×)
9	Spirit level
10	Gasket (foam side down)

4 Installation

About this chapter

This chapter provides required information to enable users and service personnel to unpack the SE 600 Ruby instrument.

Safety precautions

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.

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 Cytiva 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 operate the product in a safe way.

In this chapter

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

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

WARNING

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

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

Circulate only water or 50/50 water/ethylene glycol through the heat exchanger. Never use anti-freeze or any organic solvent in the heat exchanger.

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 45°C. All plastic parts are rated for 45°C continuous duty.

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.

CAUTION

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

CAUTION

Circulate coolant through the heat exchanger to minimize heating. Overheating will cause irreparable damage to the unit! Do not connect the heat exchanger to a water tap or any coolant source where the water pressure is unregulated.

NOTICE

After initial monitoring, do not leave the unit unattended for more than 1 h before checking the progress of the bands and the buffer level.

5.1 Construct the gel sandwich

Introduction

The SE 600 Ruby instrument can be used to run both precast gels and self-cast gels. One to four gels (18 × 16 cm) can be run with SE 600 Ruby.

The mode of gel casting depends on the number of gels run.

1. First, prepare the gel caster before constructing the gel sandwiches. Refer to the instructions in *Prepare the gel caster, on page 23*.
2.
   - If up to two gels are run at a time, construct single gel sandwiches. Refer to the instructions in *Construct a single gel sandwich, on page 24*.
   - If three or four gels are run at a time, construct double gel "club sandwiches". Refer to *Construct a double gel, club sandwich, on page 26*.

This section describes how to prepare a single gel sandwich, a double gel (club sandwich), and how to insert it into the gel caster. For complete instructions, refer to the manual of your gel caster.

Prepare the gel caster

Follow the instructions below to prepare the gel caster before constructing a gel sandwich.

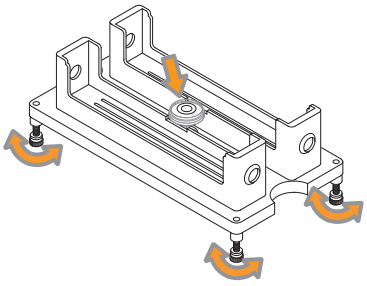
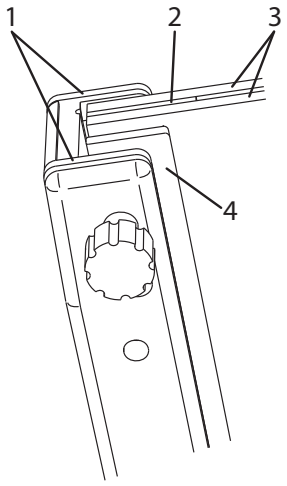
Step	Action
1	Place the spirit level into the caster center and adjust the leveling feet. 
2	Loosen all clamp screws and make space for the sandwich by sliding the pressure plates toward the screws.

Illustration of a gel sandwich

The illustration below shows the location of the components in a gel sandwich.



Part	Function
1	Clamp ridges
2	Spacer
3	Glass plates
4	Pressure plate

Construct a single gel sandwich

To run up to two gels at a time, follow the instructions below to construct single gel sandwiches.

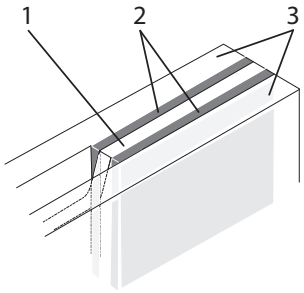
Note: *For best results, make sure to take extra care to align all components when assembling the sandwiches.*

Step	Action
1	Choose two perfectly clean, unchipped glass plates and two spacers for each gel sandwich.
2	Lay one glass plate on a flat surface, lay the Spacer-Mate alignment template onto the plate (wide side at the top of the plate), place a spacer along each edge, and lay the second glass plate on top.
3	Slide one clamp at a time along the sandwich sides. Finger-tighten one screw on each clamp.

Step	Action
4	Set the sandwich upright on a flat surface, and loosen the screws to align the stack. ***Note:*** *Make sure to take extra care to align all components when assembling the sandwich, to ensure a good seal.* ***Tip:*** *Use the casting cradle to hold the sandwich during alignment. Remove the laminated gasket from the cradle and instead of setting the sandwich upright on a flat surface, set it into the casting cradle.*
5	Finger-tighten all screws.
6	Remove the Spacer-Mate.
7	Inspect the bottom of the sandwich to make sure that the edges are aligned flush to ensure a complete seal. Adjust if necessary. ***Tip:*** *Optional: Apply a light film of Gel Seal compound only on the bottom corner surfaces created by the spacers and plates if the sandwiches tend to leak.*

Illustration of a double gel, club sandwich

The illustration below shows the location of the components in a double gel club sandwich.



Part	Function
1	Notched center plate
2	Spacers
3	Glass plates

Construct a double gel, club sandwich

To run up to four gels a time, follow the instructions belowto construct the gel club sandwich.

Requirement: A 16 cm long, notched center-divider plate to pair two gel sandwiches.

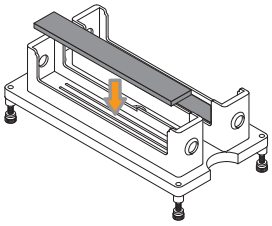
Note: *For best results, make sure to take extra care to align all components when assembling the sandwiches.*

Step	Action
1	Choose two perfectly clean, unchipped glass plates, a notched center driver plate (16 cm long) and two spacers for each gel club sandwich.
2	Lay one glass plate on a flat surface, lay the Spacer-Mate alignment template onto the plate (wide side at the top of the plate), place a spacer along each edge, and lay the notched center driver plate on top.
3	Place another Spacer-Mate alignment template onto the notched center driver plate, and place a spacer along each edge. Lay the other glass plate on top.
4	Slide one clamp at a time along the sandwich sides. Finger-tighten one screw on each clamp.
5	Set the sandwich upright on a flat surface, and loosen the screws to align the stack. ***Note:*** *Make sure to align all components when assembling the sandwich, to ensure a good seal.* ***Tip:*** *Use the casting cradle to hold the sandwich during alignment. Remove the laminated gasket from the cradle and, instead of setting the sandwich upright on a flat surface, set it into the casting cradle.*
6	Finger-tighten all screws.
7	Remove the Spacer-Mate templates.
8	Inspect the bottom of the sandwich to make sure that the edges are aligned flush to ensure a complete seal. Adjust if necessary. ***Tip:*** *Optional: Apply a light film of Gel Seal compound only on the bottom corner surfaces created by the spacers and plates if the sandwiches tend to leak.*

Insert the gel sandwich into the gel caster

Follow the instructions below to insert the gel sandwich into the gel caster.

Note: *Do not use silicone grease or petroleum jelly to seal the sandwich. These substances are difficult to remove and ultimately cause artifacts.*

Step	Action
1	Place the laminated gasket into the casting cradle with the foam side down. 
2	Place the clamp assembly in the casting cradle, with the screws facing outwards.
3	Insert a cam into the hole on each side of the casting tray with the ridge (short end) pointing up.
4	Seal the gel sandwich against the casting gasket by turning both cams as far as needed, usually 90° to 150°, up to 180°. The seal is complete once the glass edge appears darker and nearly transparent against the gasket. Do not turn past this point. ***Note:*** *When turning the cams, it is easier to keep the caster balanced if you turn both toward the center of the caster.* *Result:* The cam action presses the plates down into the gasket to seal the bottom of the sandwich.

5.2 Prepare poly-acrylamide gels

Prepare continuous gel

Follow the instructions below to prepare a continuous gel.

WARNING

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

Step	Action
1	Prepare the required amount of monomer acrylamide solution.
2	De-gas and add the initiator and catalyst just prior to pouring the gel.
3	Pipette the solution into one corner of the sandwich, taking care not to introduce any air bubbles. Fill to just below the top of the upper plate edge. If bubbles are trapped, remove with a pipette or syringe.
4	If working with club sandwich gels, make sure to pipette the solution into both sandwiches. Fill each sandwich to the same level below the notched edge.
5	Introduce a comb, at a slight angle, into each sandwich, while taking care not to trap air bubbles under the teeth.
6	Allow the gel to polymerize for a minimum of 1 h.

Prepare the resolving gel for discontinuous gels

Follow the instructions below to prepare the resolving gel for discontinuous gels.

WARNING

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

Step	Action
1	Prepare the required amount of resolving gel solution.
2	De-gas and add the initiator and catalyst just prior to pouring the resolving gel.

Step	Action
3	Pipette the solution into one corner of the sandwich, taking care not to introduce any air bubbles. Fill the solution to 3 to 4 cm below the top of the glass plate. This height allows 1 cm of stacking gel below the wells.
4	If working with club sandwich gels, make sure to pipette the solution into both sandwiches. Fill each sandwich to the same level below the notched edge.
5	Overlay the gel with a thin layer of water-saturated butanol, water, or diluted gel buffer to prevent gel exposure to oxygen. Slowly deliver the overlay solution from a glass syringe fitted with a 22-gauge needle. Apply the solution near the spacer at one side of the sandwich and allow it to flow across the surface unaided.
6	Allow the gel to polymerize for a minimum of 1 h.

Prepare the stacking gel for discontinuous gels

Follow the instructions below to prepare the stacking gel for a discontinuous gel.

WARNING

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

Step	Action
1	After the resolving gel is set, prepare the stacking gel solution.
2	Remove the overlay by rinsing the top of the gel several times with distilled water. Invert the caster to drain. To ensure a seamless contact between the resolving and stacking gels, remove residual liquid by blotting one corner with a lab wipe.
3	Degas and add the initiator and catalyst just prior to pouring the stacking gel.
4	Pour the stacking gel onto the resolving gel with a disposable or Pasteur pipette to a level about 2 mm from the top of the plate.
5	Introduce a comb (at a slight angle) into the sandwich, taking care not to trap air under the teeth. Allow a minimum of 1 h for the gel to polymerize.

Prepare the stacking gel for discontinuous 2D electrophoresis gels

Follow the instructions below to prepare the stacking gel for a discontinuous 2D electrophoresis gel.

WARNING

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

Step	Action
1	After the resolving gel is set, prepare the agarose seal solution by dissolving it in running buffer.
2	Remove the overlay by rinsing the top of the gel several times with distilled water. Invert the caster to drain. To ensure a seamless contact between the resolving and stacking gels, remove residual liquid by blotting one corner with a lab wipe.
3	Place the immobilized pH gradient (IPG) strip or tube gel on top of the resolving gel. ***Note:*** *Take care to avoid trapping any air bubbles between the first- and second-dimension gels.*
4	Pour the agarose seal onto the resolving gel with a disposable or Pasteur pipette.

5.3 Prepare gradient poly-acrylamide gels

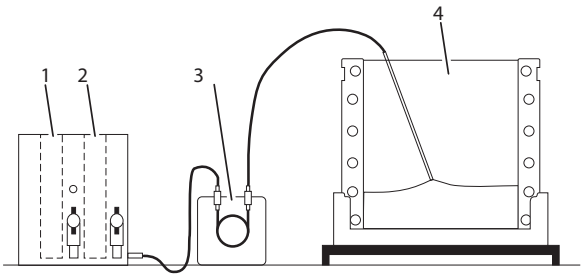
Introduction

Both linear and exponential gradient gels can be poured in Dual Gel caster.

Gradient gels are poured from the top of the caster with a cannula if using the provided Dual Gel Caster or from the bottom if using a multiple gel caster. A stacking gel is then poured over the gradient gel.

This section describes how to prepare a linear gradient gel while using Dual Gel Caster. Refer to the *Multiple Gel Caster manual* for instructions regarding gradient gels.

Illustration of pouring a gradient gel



Note: *Gradient gels poured in the multiple gel caster are introduced through the bottom.*

Part	Function
1	Reservoir chamber
2	Mixing chamber
3	Pump
4	Gel Caster

Prepare the setup

Follow the instructions below to prepare the setup for pouring a gradient gel.

Step	Action
1	Assemble sandwich(es) into Dual Gel Caster as described in *Section 5.1 Construct the gel sandwich, on page 23*.
2	Run a length of clear vinyl tubing through a peristaltic pump.

Step	Action
3	Attach one end of the tubing to the gradient maker outlet port and the other end to a 20 cm cannula. ***Note:*** *The outer diameter of the cannula must be less than the thickness of the spacer.*
4	Place the cannula so that it rests at the bottom of the sandwich, midway between the spacers.

Prepare the solutions

Follow the instructions below to prepare the solutions for a gradient gel.

WARNING

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

Step	Action
1	Calculate the volume of monomer solution needed. Divide the total volume in half and prepare this volume of both the higher- and lower-percentage acrylamide solutions. ***Tip:*** *Adjust the higher-percentage acrylamide solution to 15% (w/v) sucrose or 25% (v/v) glycerol to improve layering.*
2	Pour the lower-percentage acrylamide solution into the reservoir chamber.
3	Open the stoplock between the chambers long enough to displace the air and then close.
4	Pour the higher-percentage acrylamide solution into the mixing chamber and place a stirring bar in this chamber.
5	For exponential gradient gels, make sure to position a plunger or sealing plug above the liquid in the mixing chamber to hold the volume constant.
6	Place the gradient maker onto a magnetic stirrer and begin stirring at a rate that mixes well but does not introduce bubbles into the solution.

Pouring a linear gradient gel

Follow the instructions below for pouring a linear gradient gel.

WARNING

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

Step	Action
1	While the solution is stirring, begin pumping from the mixing chamber and open the stoplock to the reservoir chamber. Raise the cannula as liquid enters the sandwich, keeping the tip at the gel surface.
2	Prepare more gels as required. Start with the preparatory steps described in *Prepare the setup, on page 31*.
3	Overlay each gel with a thin layer of water-saturated butanol, water, or diluted gel buffer to prevent gel exposure to oxygen. Slowly deliver the overlay solution from a glass syringe fitted with a 22-gauge needle. Apply the solution near the spacer at one side of the sandwich and allow it to flow across the surface unaided.
4	Allow the gels to polymerize for a minimum of 1 h.
5	After polymerization, pour off the overlay and rinse the gel surface several times with distilled water.
6	Prepare the stacking-gel monomer solution.
7	Pour the stacking gel.
8	Introduce a comb (at a slight angle) into the sandwich, taking care not to trap air under the teeth.
9	Allow a minimum of 1 h for the stacking gel to polymerize.

Pouring an exponential gradient gel

Follow the instructions below for pouring an exponential gradient gel.

WARNING

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

Step	Action
1	Make sure that a plunger or sealing plug is placed above the liquid in the mixing chamber to hold the volume constant.

Step	Action
2	While the solution is stirring, begin pumping from the mixing chamber and open the stoplock to the reservoir chamber. Raise the cannula as liquid enters the sandwich, keeping the tip at the gel surface.
3	Prepare more gels as required. Start with the preparatory steps described in *Prepare the setup, on page 31*.
4	Overlay each gel with a thin layer of water-saturated butanol, water, or diluted gel buffer to prevent gel exposure to oxygen. Slowly deliver the overlay solution from a glass syringe fitted with a 22-gauge needle. Apply the solution near the spacer at one side of the sandwich and allow it to flow across the surface unaided.
5	Allow the gels to polymerize for a minimum of 1 h.
6	After polymerization, pour off the overlay and rinse the gel surface several times with distilled water.
7	Prepare the stacking-gel monomer solution.
8	Pour the stacking gel.
9	Introduce a comb (at a slight angle) into the sandwich, taking care not to trap air under the teeth.
10	Allow a minimum of 1 h for the stacking gel to polymerize.

5.4 Sample preparation and loading

Introduction

The sample can be loaded either while the sandwich is in the caster or after the upper buffer chamber is attached. When loading samples while using divider plates, the samples must be loaded without the upper buffer chamber in place.

The amount of sample loaded depends on the thickness of the gel, the sensitivity of the detection method used, and the amount of sample expected in each band. In a continuous buffer system, the protein sample should be relatively concentrated, because no stacking gel is used. In a discontinuous buffer system, the zone into which each molecular species migrates is sharpened by the stacking gel, so the sample need not be as concentrated.

This section describes how to prepare and load the sample.

Sample preparation

Follow the instructions below for preparing the samples.

Step	Action
1	Increase liquid density of the sample with 10% glycerol or sucrose.
2	Add a tracking dye to the sample.
3	For SDS protein gels, use 2× treatment buffer to denature both liquid and dry samples in a test tube. • To liquid protein solutions, add an equal volume of 2× buffer. • To dry protein samples, add equal volumes of 2× sample buffer and high-purity water to achieve the desired concentration.
4	Denature the sample by: • Heating the tube in boiling water for 90 s, then allow to cool to room temperature. Treated samples can be stored at -40 to -80°C for future runs. • Or, heating membrane proteins to 60°C for 20 min. Store unused sample at 4°C.

Sample loading

Follow the instructions below for loading the samples onto the gel.

Step	Action
1	Remove the comb by gently rocking it side to side and then lifting it straight up to avoid damaging the well walls.

Step	Action
2	Carefully rinse each well with distilled water to remove unpolymerized acrylamide and then drain by inverting the gel sandwich (or caster).
3	Fill each well with electrophoresis buffer.
4	Determine the volume of sample that can be loaded. Refer to *Sample volume guidelines on page 36*.
5	Apply the sample into the wells using a fine-tipped microsyringe or gel-loading pipette tip.

Sample volume guidelines

The table describes the volume sample per mm of well depth, for standard size combs.

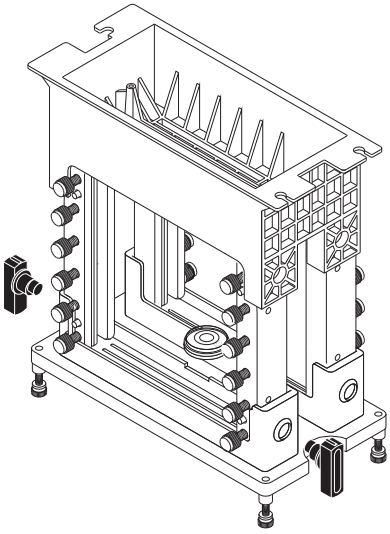
Number of wells (well depth)	Comb thickness		
	0.75 mm	1.0 mm	1.5 mm
10 (25 mm)	6.2 µL	8.3 µL	12.4 µL
15 (25 mm)	4.3 µL	5.7 µL	8.6 µL
20 (25 mm)	3.1 µL	4.1 µL	6.2 µL
28 (15 mm)	2.1 µL	2.7 µL	4.1 µL
1/1 (reference well / preperative well)	4 µL/90 µL	6 µL/121 µL	9 µL/183 µL
1/2 (reference well / preperative wells)	4 µL/85 µL	6 µL/112 µL	9 µL/171 µL

5.5 Final assembly

Introduction

This section describes how to assemble and connect the SE 600 Ruby to a power supply before starting a run.

Illustration of upper buffer chamber assembly



Assembling upper buffer chamber

Follow the instructions below to assemble the upper buffer chamber of SE 600 Ruby.

Step	Action
1	Rinse the buffer chamber with water and distilled water thoroughly before each use. ***Note:*** *Before using the first time, disassemble the unit and wash with a dilute solution of a laboratory detergent and rinse thoroughly first with water and then with distilled water.*
2	Clean away any gel adhering to the exterior of the gel sandwiches.

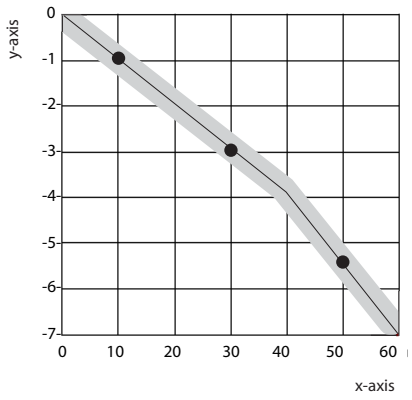
Step	Action
3	If running only one gel, Make sure to block the second upper buffer chamber slot by installing the acrylic buffer dam included with the unit. Fit clamps onto the dam, taking care to align the clamp ends and dam edges. Install the "dummy" gel, screws facing out, in the second cradle in Dual Gel Caster.
4	Turn the upper buffer chamber upside down and place a slotted gasket into both sandwich holder recesses. Both the slot in the gasket and the slot in the recess must align. Both slotted gaskets must be used even if running only one gel sandwich. Grooves along each slot help keep the gasket in place.
5	Release the sandwiches from the caster by removing all bottom cams (if present).
6	Lower the upper buffer chamber onto the gel sandwiches in the casting stand.
7	Install the cams, ridge pointing down, into the buffer chamber cam holes.
8	Clamp the sandwich in place by simultaneously turning one cam clockwise and the other counterclockwise a full 180°. ***Note:*** *Do not force the cams. If you encounter unusual resistance, disassemble and inspect clamp and glass alignment along the top of the sandwich. Align and reinstall.*
9	Use a pipette to carefully fill each slot above the sample wells with buffer to minimize disturbing the samples. Then pour 100 mL of buffer into the chamber, directing the buffer stream toward the side wall. Check that no buffer leaks around the gasket.

Assembling lower buffer chamber

Follow the instructions below to assemble the lower buffer chamber of SE 600 Ruby and connect the heat exchanger.

Step	Action
1	Rinse the lower buffer chamber with water and distilled water thoroughly before each use. ***Note:*** *Before using the first time, disassemble the unit and wash with a dilute solution of a laboratory detergent and rinse thoroughly first with water and then with distilled water.*
2	Place a magnetic spin bar into the lower buffer chamber and place the unit on a magnetic stirrer.

Step	Action
3	Fill the lower chamber with up to 4 L of buffer.
4	Lower the heat exchanger into the lower chamber, fitting the ports into the notches in the rim. ***Note:*** *The heat exchanger must be in place for all runs because the lower electrode is integrated into the heat exchanger.*
5	If no cooling is required, skip to step 7.
6	Connect the heat exchanger to a thermostatic circulator. Slide hose clamps (four total) onto each end of two lengths of 10 to 12 mm inner diameter (3/8 to 1/2") vinyl or silicone tubing. Attach one end of each length of tubing to a heat exchanger port. Attach the free ends of each length of tubing to the circulator bath ports, one to the inlet and the other to the outlet. Secure the connections with the hose clamps. ***Note:*** *If the cooling option is used frequently, it is convenient to attach QuickFit connectors to the tubing. The valves in these fittings prevent coolant spillage.*
7	Use the chart below to estimate a starting point for the circulator bath temperature setting. Adjust as necessary for variables such as ambient temperature, changes in power output, and circulator bath efficiency. If accurate temperature control is critical, measure the temperature and adjust as necessary. *Optional*: Pre-chill the buffer.



Step	Action

Table axes	Description
x-axis	Power supply setting (W)
y-axis	Bath setting correction (°C)

Final assembly SE 600 Ruby

Follow the instructions below to finalize the assembly of SE 600 Ruby.

Step	Action

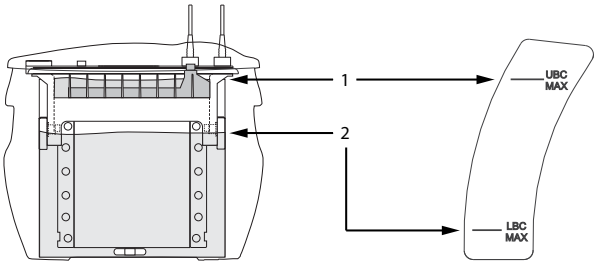
1 Fit the upper buffer chamber assembly into the lower buffer chamber.

Tip:

Use a steady hand to avoid disturbing the samples. Grasp the assembly in the casting stand by the upper buffer chamber and carefully lower it into the lower chamber.

2 Inspect the installation and check the buffer levels.

Upper buffer chamber (UBC)	The electrode along the upper chamber ridge must be submerged about 1 cm. This level requires 450 to 600 mL of buffer. This is just enough to cover the upper chamber ribs, but not high enough to contact the banana plug. Do not fill above **UBC MAX** fill line.
Lower buffer chamber (LBC)	Fill to **LBC MAX** fill line.



Part	Function
1	Upper chamber buffer maximum fill line

Step	Action

Part	Function
2	Lower chamber buffer maximum fill line

3	Place the safety lid on the unit by engaging the safety interlock pins before lowering the electrode connections on to the banana plugs.

Connect power supply

Follow the instructions below to connect the SE 600 Ruby to an approved power supply.

WARNING

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

WARNING

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

Step	Action
1	Plug the red cable into the red output jack of the power supply.
2	Plug the black cable into the black output jack of the power supply.

Note: *The red cable, which is connected to the bottom electrode, is the anode (+), and the black cable, connected to the top electrode, is the cathode (–).*

For complete instructions refer to the manual of the power supply.

5.6 Running the sample

Introduction

Gels may be run at either constant current or constant voltage settings.

A constant current mode is traditionally used with a discontinuous buffer system so that the rate of electrophoretic migration remains unchanged throughout the run. Under these conditions voltage increases as the run proceeds. A lower current setting is recommended for higher resolution. The optimal current level must be determined empirically; the main factors that must be balanced include the gel concentration and migration speed, and the resulting Joule heating and band distortion.

Refer to the *Gel running guidelines for a Laemmli buffer system, on page 42* for starting-point guidelines and adjustments for gel thickness, number of gels, and migration rate.

This section describes how current, voltage and time affect the run of Laemmli SDS gels. Guidelines for gels ran in the Laemmli buffer system and run monitoring are also described in this section.

Current

Current acts on the total cross-section area of all the gels because the gels are connected in parallel in the electrical circuit. Thus the current setting for one gel must be multiplied by the number of gels of the same cross-section run simultaneously. For a 1.5 mm thick Laemmli SDS gel, we suggest a starting current setting of 25 mA. For two 1.5 mm gels use a 50 mA current setting.

Note: *Cooling may be required to control Joule heating.*

Voltage

The starting voltage for a 1.5 mm thick Laemmli SDS gel connected to a power supply set to 25 mA is usually 80 to 90 V. The final voltage is typically 250 to 400 V, depending on the length of the gel. See *Gel running guidelines for a Laemmli buffer system, on page 42*.

Time

A run is usually complete when the tracking dye reaches the bottom of the gel. For a 16 cm long and 1.5 mm thick Laemmli SDS gel, a run at 25 mA/gel without cooling usually requires 5 h.

Gel running guidelines for a Laemmli buffer system

Parameter	Value
Gel thickness*	1.5 mm

Parameter	Value
Current per gel[†]	25 mA (constant current)
Starting voltage[‡]	80 to 90 V
Final voltage	220 to 250 V

[*]Thicker or thinner gels require proportionally more or less current. For example, a 0.75 mm gel, which is half as thick as a 1.5 mm gel, requires half as much current, i.e. 12.5 mA.

[†]The current must be multiplied by the number of gels. For instance, if two club sandwiches are installed, the four gels require four times as much current. The current can be increased for faster runs if active cooling is used and it can be decreased for slower overnight runs.

[‡]At 25 mA per gel.

Record run

Keep a record of the current or voltage setting, number and thickness of gels, buffer system, and the starting and final current or voltage readings for each run so that results can be compared. Inconsistent results for the same system and settings indicate potential problems such as leaking current, incorrect buffer concentrations, high salt concentrations, or inconsistent chemical quality.

Check band progress after 5 min, and again after 1 h, keeping an eye on the migration rate of the tracking dye. The run is complete when the tracking dye reaches the bottom of the gel. Watch the buffer level and, if necessary, replenish it as required to keep the top electrode submerged. A small volume of buffer may leak past a nicked plate or gasket, or buffer may pass through the gel.

NOTICE

After initial monitoring, do not leave the unit unattended for more than 1 h before checking the progress of the bands and the buffer level.

5.7 After the run

Introduction

This section describes how to remove a gel from the assembly after a run.

CAUTION

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

Remove upper buffer chamber

Follow the instructions below to remove the upper buffer chamber.

Step	Action
1	Once the tracking dye reaches the bottom of the gel, turn the power supply off.
2	Disconnect the color-coded cables from the power supply.
3	Remove the safety lid, using the finger leverage between the lid and the top of the heat exchanger. ***Note:*** *Lift straight up to avoid bending the banana plugs.*
4	If coolant is circulating, stop the flow and disconnect the fittings or tubing.
5	Pull out the upper buffer chamber assembly, and install the assembly in Dual Gel Caster.
6	Pour the buffer into a sink.

Remove gel after run

Follow the instructions below to remove the gel from the gel sandwich.

Step	Action
1	Make sure that the upper buffer chamber assembly is installed in the Dual Gel Caster.
2	Release the sandwiches by turning and removing the cams.
3	Unscrew and remove the clamps from the sandwiches.
4	Gently loosen and then slide away both spacers.

Step	Action
5	Use the Wonder Wedge Gel Plate Separation tool to separate the plates.
6	Carefully lift the glass plate with the gel attached. ***Note:*** *Handle the gel with care to avoid damaging it.*
7	Invert the plate and position the gel low over the staining tray.
8	Pry one corner of the gel away from the glass and allow it to drop into the tray, or, if the gel is thick enough to handle, lift it and place it into the tray.
9	To avoid splashing, add staining or fixative solution to the tray after the gel is transferred.
10	Clean the unit and gel plates as described in *Section 6.1 Cleaning procedures, on page 48*.

6 Maintenance

About this chapter

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

In this chapter

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

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.

CAUTION

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

6.1 Cleaning procedures

General procedure

When cleaning the SE 600 Ruby make sure to:

- not autoclave or heat any part above 45°C.
- not expose SE 600 Ruby 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. Clean gaskets with mild detergent and rinse with distilled 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.

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.

6.2 Replacing a heat exchanger glass tube

Follow the instructions to replace a broken heat exchanger glass tube.

CAUTION

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

Step	Action
1	Remove the tube by simultaneously twisting and sliding it down as far as possible, until the top end is free of the upper grommet. Carefully guide the tube so that it will clear the assembly, then lift the tube out of the lower grommet.
2	Lightly grease the outside of both ends of the new tube with silicone grease. Twist and slide one end of the tube into the lower grommet. Then slip the other end into the top grommet, gently pushing it with a slight twist until it stops.
3	Check that the grommet is not pinched.

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 Cytiva representative for advice.

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

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

Do not operate with buffer temperature above 45°C. All plastic parts are rated for 45°C continuous duty.

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.

CAUTION

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

Gel casting and assembly problems

Error description	Possible cause	Corrective action
Gel sandwich leaks while casting	Dirty or damaged components	Plates, spacers, and the gasket must be completely clean. Wash if necessary.
		Replace chipped plates (especially if chipped near the spacers).
		Check the caster gasket for cuts or cracks and replace if necessary.
	Mis-aligned parts	Check plate and spacer alignment and realign if necessary.
	Over-clamping	Turn cam only as far as necessary to create a seal (usually 90° to 150°, but up to 180°).
		On each spacer apply a light film of Gel Seal compound to the bottom outside corner only. Do not use silicone grease.
Sample wells damaged or irregular	Air bubbles	Remove air bubbles before inserting combs. Slide comb into solution at an angle. If comb must be removed, add more monomer solution before reinserting the comb.
	Incomplete or delayed polymerization	Allow acrylamide gels to set for a minimum of 1 h.

Error description	Possible cause	Corrective action
	Debris in wells	Rinse out unpolymerized gel with sample buffer.
	Comb removal	Remove the comb at a slight angle and very slowly to prevent damaging the gel.

Incomplete polymerization problems

Error description	Possible cause	Corrective action
Incomplete gel polymerization	Chemicals	Use only recent stocks of the highest-quality reagents.
		If the dry ammonium persulfate (APS) does not crackle when added to water, replace with fresh stock.
		Increase Tetramethylethylenediamine (TEMED) or APS concentration, or both.
	pH	Solutions with extreme pH values (especially acidic) may not polymerize.
	Oxygen	Remove oxygen from the gel environment: De-gas the monomer solution 5 to 10 min before pouring and then overlay the gel surface with water-saturated n-butanol.
	Temperature	Adjust the gel solution temperature to a minimum of 20°C, especially for gels with low acrylamide percentages.

Problems during the run

Error description	Possible cause	Corrective action
Upper buffer chamber leaks	Mis-aligned parts	Check that the glass plates, spacers, and clamps are aligned and fit snugly into the upper chamber gasket.
		Check that both gaskets are centered and that the positioning ridges fit inside the grooves.
	Dirty or damaged components	Check that the gasket is not damaged or pinched. Replace if necessary. Check that the upper buffer chamber is not warped from prior exposure to excessive heat.
Power supply detects current leak	Electrical path to outside ground/ earth	Add more silicone grease to seal heat exchanger grommets.
		Check for leaks or cracks in the heat exchanger. Replace worn grommets.
Unusually slow (or fast) run	Current leakage around gel	Check for leaks; all plates and spacers must be aligned and free of grease and cracks.
		If used, secure the buffer dam.
	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.

Error description	Possible cause	Corrective action
	Voltage or current settings	To increase or decrease the migration rate, adjust the voltage or current by 25% to 50%.

Sample problems

Error description	Possible cause	Corrective action
Dye front curves up (smiles) at edges	Uneven heat distribution	Fill the lower buffer chamber to the level appropriate for the run. See *Section 5.5 Final assembly, on page 37*.
		Use magnetic stirrer and stirring bar to keep buffer well mixed.
	Excessive heat	Circulate external coolant.
		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.
	Overloading	Load less sample.
	Degradation	Add protease inhibitor.
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.
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.

Error description	Possible cause	Corrective action
	Degradation	Proteins may be degraded by endogenous proteases: use protease inhibitors during the isolation step.
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.
Poor band resolution	Running conditions	Begin electrophoresis as soon as the sample is loaded to prevent low molecular weight species from diffusing.
		Conduct the separation at a lower current or voltage setting to reduce Joule heating.
	Reagent quality	Use only the highest-quality reagents.
	Poor stacking	Use only gels that were recently prepared.
		Add a stacking gel or increase height of the stacking gel. Prepare the resolving gel surface by first rinsing it with stacking gel monomer before pouring the stacking gel to ensure continuity between the gels.
		Check pH values of the resolving- and stacking-gel solutions. Do not back-titrate buffers.

Error description	Possible cause	Corrective action
	Incomplete gel polymerization	Allow gel to polymerize fully.
	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 (DTT); check sample treatment.
		Add protease inhibitors if necessary to prevent proteolytic degradation of sample.
		Increase glycerol or sucrose to increase sample density.
		Store samples to be frozen in aliquots to avoid repeated freeze-thawing. Store at -40°C to -80°C.
Tracking dye doesn't sharpen into a concentrated zone in the stacking gel	Poor stacking	Pour a taller stacking gel. ***Note:*** *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.

8 Reference information

About this chapter

This chapter lists the technical specifications of the SE 600 Ruby. The chapter also includes ordering information and the Health and Safety Declaration form for service.

In this chapter

8.1 Specifications

Characteristic	Description
Gel plate size (W × H)	18 × 16 cm
Gel size (W × H)	14 or 16 × 16 cm
Number of gels	2 gel sandwiches, or 2 club sandwiches (4 gels)
Maximum power	50 W
Maximum voltage	1000 V
Maximum current	500 mA
Maximum buffer temperature	45°C
Buffer required	Approximately 4.5 L, depending on the number of gels in place
Environmental operating conditions	Indoor use: 4°C to 40°C Humidity up to 80% relative humidity Altitude up to 2000 m
Installation category	II
Pollution degree	2
Dimensions (W × H × D)	32 × 29 × 14 cm
Weight	8 kg

8.2 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. Contact an authorized representative of the manufacturer for information concerning the decommissioning of the equipment.

8.3 Regulatory information

Introduction

This section lists the regulations and standards that apply to the product.

In this section

8.3.1 Contact information

Contact information for support

To find local contact information for support and sending troubleshooting reports, visit *cytiva.com/contact*.

Manufacturing information

The table below summarizes the required manufacturing information.

Requirement	Information
Name and address of manufacturer	Cytiva Sweden AB Björkgatan 30 SE 751 84 Uppsala Sweden
Telephone number of manufacturer	+ 46 771 400 600

8.3.2 European Union and European Economic Area

Introduction

This section describes regulatory information for the European Union and European Economic Area that applies to the equipment.

Conformity with EU Directives

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.

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, except for alterations described in the *Operating Instructions* or user manuals.

8.3.3 Eurasian Economic Union Евразийский экономический союз

This section describes the information that applies to the product in the Eurasian Economic Union (the Russian Federation, the Republic of Armenia, the Republic of Belarus, the Republic of Kazakhstan, and the Kyrgyz Republic).

Introduction

This section provides information in accordance with the requirements of the Technical Regulations of the Customs Union and (or) the Eurasian Economic Union.

Введение

В данном разделе приведена информация согласно требованиям Технических регламентов Таможенного союза и (или) Евразийского экономического союза.

Manufacturer and importer information

The following table provides summary information about the manufacturer and importer, in accordance with the requirements of the Technical Regulations of the Customs Union and (or) the Eurasian Economic Union.

Requirement	Information
Name, address and telephone number of manufacturer	See *Manufacturing information*
Importer and/or company for obtaining information about importer	Cytiva RUS LLC 109004, Moscow internal city area Tagansky municipal district Stanislavsky str., 21, building 3, premises I, office 57 Russian Federation Telephone: +7 499 609 15 50 E-mail: *rucis@cytiva.com*

Информация о производителе и импортере

В следующей таблице приводится сводная информация о производителе и импортере, согласно требованиям Технических регламентов Таможенного союза и (или) Евразийского экономического союза.

Требование	Информация
Наименование, адрес и номер телефона производителя	См. *Информацию об изготовлении*
Импортер и/или лицо для получения информации об импортере	ООО "Цитива РУС" 109004, город Москва вн.тер.г. муниципальный округ Таганский улица Станиславского, дом 21, строение 3, помещение I, комната 57 Российская Федерация Телефон: +7 499 609 15 50 Адрес электронной почты: *rucis@cytiva.com*

Description of symbol on the system label
Описание обозначения на этикетке системы

This Eurasian compliance mark indicates that the product is approved for use on the markets of the Member States of the Customs Union of the Eurasian Economic Union

Данный знак о Евразийском соответствии указывает, что изделие одобрено для использования на рынках государств-членов Таможенного союза Евразийского экономического союза

8.3.4 Declaration of Hazardous Substances (DoHS)

This section describes the information that applies to the product in China.

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)
80647957	0	0	0	0	0	0

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.

8.4 Ordering information

For product codes and information about how to order, please see *cytiva.com*.

8.5 Health and Safety Declaration Form

On site service

cytiva

On Site Service Health & Safety Declaration Form

Service Ticket #:	

To make the mutual protection and safety of Cytiva 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, 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	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**. Rinse tubing or piping, wipe down scanner surfaces, or otherwise make sure removal of any dangerous residue. Make sure the area around the instrument is clean. If radioactivity has been used, 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 Cytiva 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:			

Product return or servicing

cytiva

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

1. 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 Cytiva 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	Specify if the equipment has been in contact with any of the following:	
◯	◯	Radioactivity (specify)	
◯	◯	Infectious or hazardous biological substances (specify)	
◯	◯	Other Hazardous Chemicals (specify)	

Equipment must be decontaminated prior to service / return. Provide a telephone number where Cytiva 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, 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:			

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

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