

# E-Gel™ Imager Gel Documentation System

## USER GUIDE

For visualization and documentation of gels

**Catalog Numbers** 4466611 and 4466612

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For descriptions of symbols on product labels or product documents, go to [thermofisher.com/symbols-definition](https://www.thermofisher.com/symbols-definition).

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# Product information

## Product description

The E-Gel™ Imager Gel Documentation System is a benchtop gel imaging system that supports both fluorescent and colorimetric (visible dye) visualization applications. The system consists of a high-resolution camera for capturing images, and a choice of interchangeable bases to provide transillumination.

- The E-Gel™ Imager UV Light Base is used to visualize ethidium bromide stained gels (including E-Gel™ precast agarose gels).
- The E-Gel™ Imager Blue Light Base is used to visualize gels stained with SYBR™ dyes (e.g., SYBR™ Safe), including E-Gel™ precast agarose gels with SYBR Safe and E-Gel EX precast agarose gels..

The system is controlled by the GelCapture Software application (for PC running Windows™ XP, Windows™ 7, or Windows™ 10 32-bit or 64-bit operating systems) and allows adjustment of exposure, sensitivity, and brightness. Captured images are exported to GelQuant Express Software for data analysis.

## Features

- Small footprint to conserve benchtop space.
- Base units with blue-light transillumination avoid the risks associated with UV transillumination.
- Sensors permit illumination only when the E-Gel™ Imager Camera Hood is properly positioned over the E-Gel™ Imager Light Base unit.
- Extended detection feature enables viewing precise images of high and low band intensity by expanding the dynamic range of the image.
- Compatible with a wide range of fluorescent and visible dyes (e.g. Qdot™, SYBR™ Safe, ethidium bromide).
- Compatible with different gel formats including precast gels (e.g. E-Gel™ Agarose Gels, NuPAGE™ Novex™ Bis-Tris Gels) and pour-it-yourself gels (agarose, or polyacrylamide).
- Rapid acquisition of high resolution images.
- Real-time sample imaging allowing detailed sample viewing.
- Eliminates the need for film or processing chemicals.
- Direct camera to PC image transfer prevents loss of resolution common to systems employing frame-grabber cards to capture data from video signals.

## Product contents

### Upon receiving the device

Examine the unit carefully for any damage incurred during transit. Any damage claims must be filed with the carrier. The warranty does not cover in-transit damage.

### Types of E-Gel™ imager products

The E-Gel™ Imager Gel Documentation System consists of an E-Gel™ Imager Camera Hood Kit, and one of three E-Gel™ Imager Light Base Kits depending upon the product that was purchased.

Product	Catalog No.
E-Gel™ Imager with E-Gel™ Imager UV Light Base	4466611
E-Gel™ Imager with E-Gel™ Imager Blue Light Base	4466612

### Components

The contents of the E-Gel™ Imager Gel Documentation System are listed in the following table.

Component	Cat. No. 4466611	Cat. No. 4466612
<b>E-Gel™ Imager Camera Hood Kit</b>		
Camera Hood	✓	✓
Camera Hood USB 2.0 cable	✓	✓
E-Gel™ Imager Light Diffuser	✓	✓
E-Gel™ Imager Universal Filter	✓	✓
GelCapture Imaging Software and GelQuant Express Quantitation Software	✓	✓
GelQuant Express Software Activation Dongle	✓	✓
Quick Reference Card	✓	✓
<b>E-Gel™ Imager UV Light Base Kit</b>		
E-Gel™ Imager UV Light Base	✓	—
Universal 12 V Power Cord	✓	—

(continued)

Component	Cat. No. 4466611	Cat. No. 4466612
<b>E-Gel™ Imager Blue Light Base Kit</b>		
E-Gel™ Imager Blue Light Base	—	✓
Universal 12 V Power Cord	—	✓

## Accessory products

Accessory products that can be purchased for use with the E-Gel™ Imager system are listed in the following section:

### E-Gel™ imager band excision kit

Components	Cat. No.	Quantity
E-Gel™ Imager Band Excision Kit	4466605	1

### E-Gel™ imager universal filter

Components	Cat. No.	Quantity
E-Gel™ Imager Universal Filter	4466606	1

### E-Gel™ imager Qdot™ 625 filter

Components	Cat. No.	Quantity
E-Gel™ Imager Qdot™ 625 Filter	4466607	1

### E-Gel™ imager UV/SYBR™ filter

Components	Cat. No.	Quantity
E-Gel™ Imager UV/SYBR™ Filter	4466608	1

### GelQuant express software activation dongle

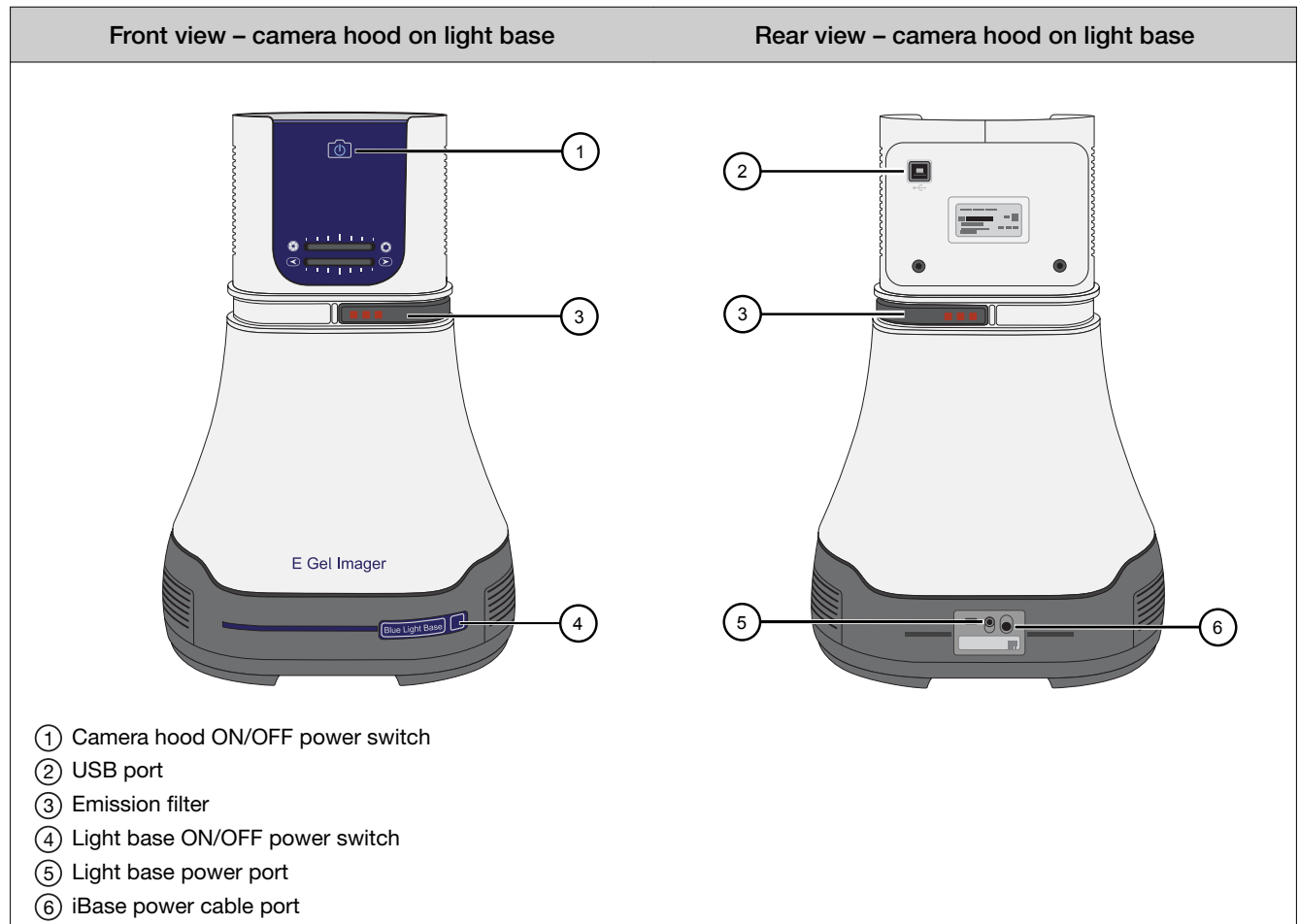
Components	Cat. No.	Quantity
GelQuant Express Software Activation Dongle	4466610	1



## Description of parts

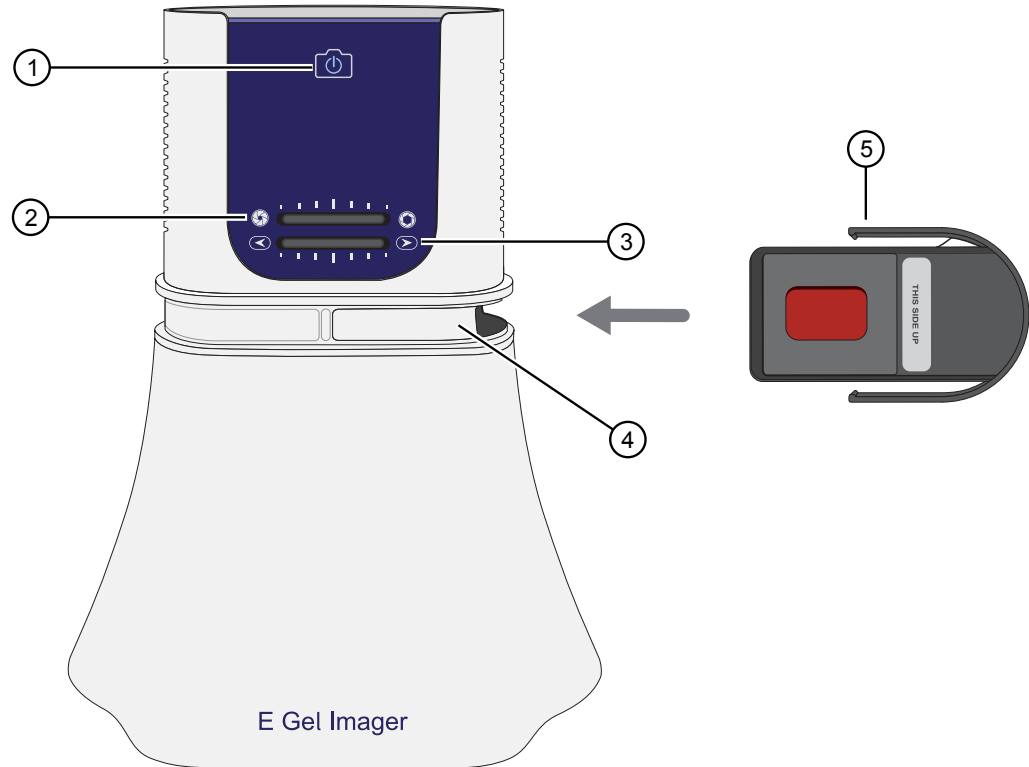
### E-Gel™ Imager System

The E-Gel™ Imager is a compact gel imaging tool standing 43.7 cm in height. It consists of the E-Gel™ Imager Camera Hood (35.6 cm in height), which fits on top of a Base unit (11.9 cm in height). The base unit provides transillumination for visualization of the gel.



## E-Gel™ Imager Camera Hood

The camera hood contains the camera and emission filter. It must be connected to a computer installed with the GelCapture Software in order to operate. Image settings can be adjusted using the software, or manually using the dials on the camera hood.



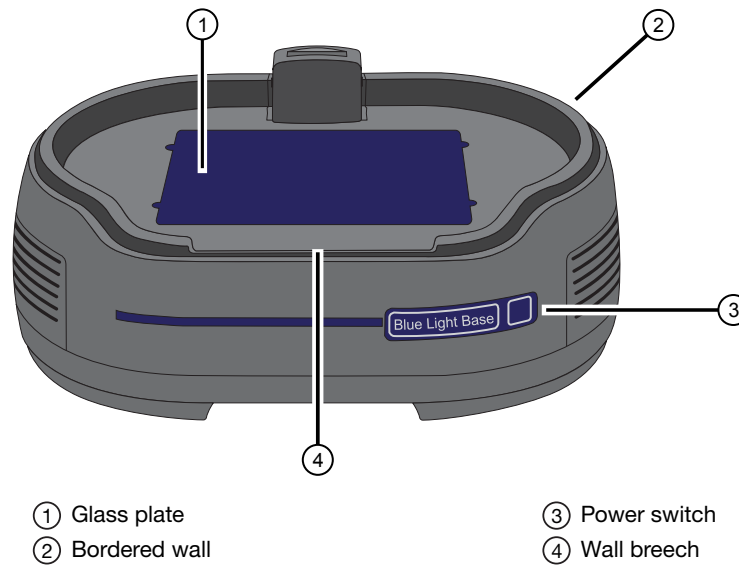
- ① ON/OFF power switch
- ② Manual iris dial
- ③ Manual focus dial
- ④ Filter tray
- ⑤ Emission filter

## E-Gel™ Imager Base Unit

Two types of E-Gel™ Imager Base are available for visualizing different types of gel stain, and for different applications. There is a bordered wall to prevent liquid spills, and a wall breach for easy removal of gels from the surface of the light base. The dimensions of each E-Gel™ Imager Base are 30.5 cm (length) × 21 cm (width).

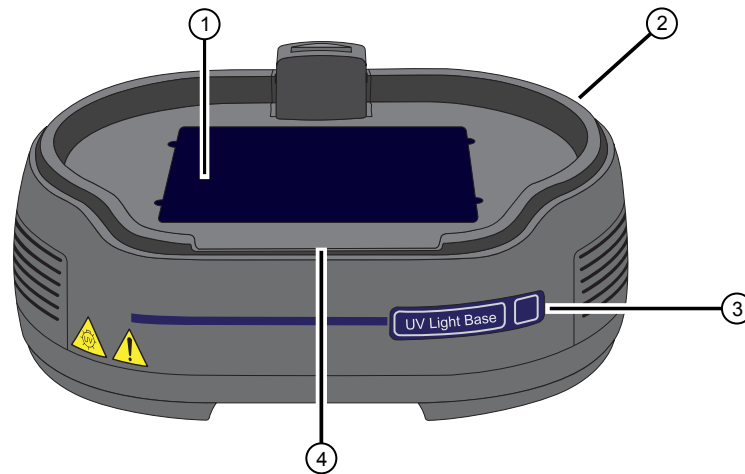
### E-Gel™ Imager Blue Light Base

The E-Gel™ Imager Blue Light Base is used to visualize gels stained with SYBR™ dyes. This light base can be used to visualize E-Gel™ pre-cast agarose gels. An automatic shut-off switch turns off the transilluminator after 20 minutes.



## E-Gel™ Imager UV Light Base

The E-Gel™ Imager UV Light Base is used to visualize ethidium bromide stained gels. This light base can be used to visualize E-Gel™ precast agarose gels. An automatic shut-off switch turns off the transilluminator after 10 minutes.



- ① Glass plate
- ② Bordered wall

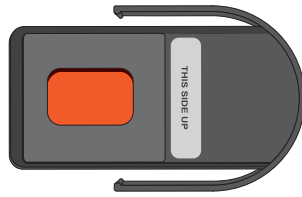
- ③ Power switch
- ④ Wall breach

## Colored emission filters

Three colored emission filters are available with the E-Gel™ Imager System to provide better definition when viewing specific sample types. Place the type of filter appropriate for the type of stain being used into the filter tray when visualizing a gel through the camera.

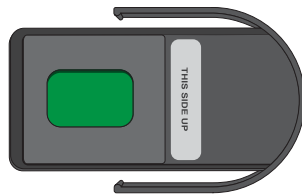
### E-Gel™ Imager Universal Filter

The E-Gel™ Imager Universal Filter is an orange filter for general use. Applications include ethidium bromide stained gels that are used with UV transillumination, or SYBR™ dyes with blue-light transillumination.



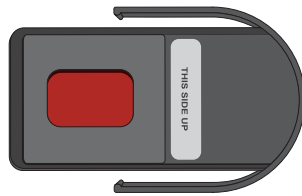
### E-Gel™ Imager UV/SYBR™ Filter

E-Gel™ Imager UV/SYBR™ Filter is a green filter for visualizing SYBR™ dyes with UV transillumination.



### E-Gel™ Imager Qdot™ 625 Filter

E-Gel™ Imager Qdot™ 625 Filter is a red filter for visualizing quantum dots with emission spectra of ~625 nm.



## Minimum PC requirements

In order to install and operate both the E-Gel™ Imager and GelCapture Software, your PC must meet the following minimum requirements:

- Intel™ Core™ 2 Duo processor, 1.8 GHz.
- Minimum 1 GB RAM of memory (2 GB recommended).
- Windows™ 7 Professional (English version), OR 32-bit or 64-bit Windows™ 10 operating systems.
- Minimum monitor resolution of 1024 × 768 pixels.
- A free USB 2.0 port (Not compatible with USB 1.0 or 1.1).

## Installing the E-Gel™ imager gel documentation system

The installation procedure for the E-Gel™ Imager Gel Documentation System can be completed in four steps as outlined below:

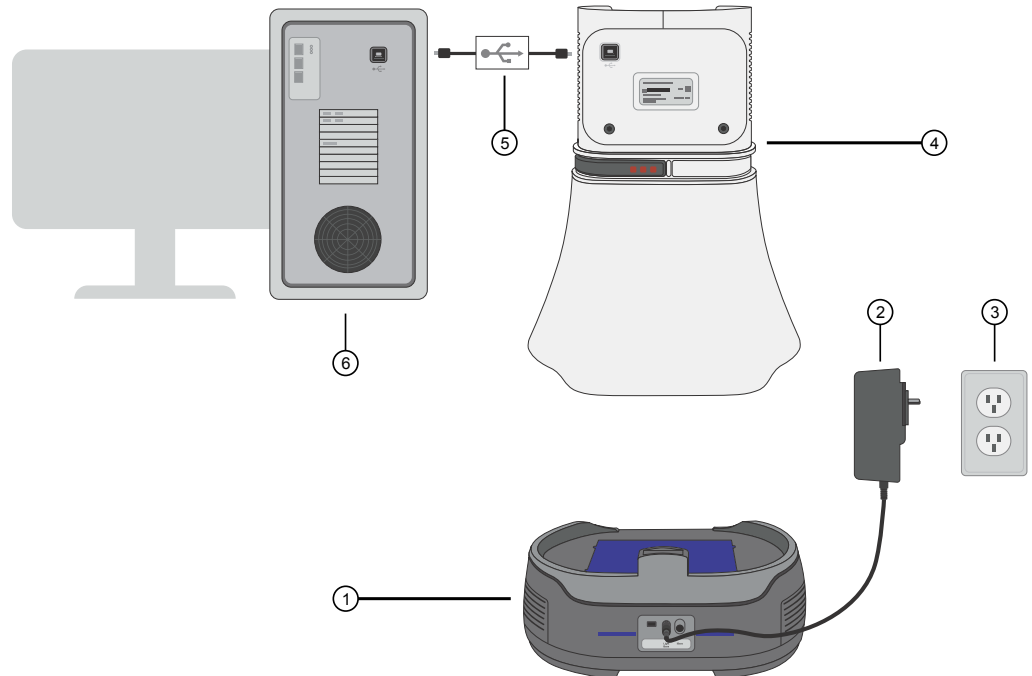
<b>Install hardware</b>	
E-Gel™ Imager Light Base	See page 14
<b>Install GelCapture Software</b>	
Windows™ 7 Professional	See page 34
Windows™ 10 Professional	Install GelCapture from the CD
<b>Install GelQuant Express Software</b>	
GelQuant Express Software	See GelQuant Express Manual

## Install hardware

Install the hardware for the E-Gel™ Imager Camera Hood and E-Gel™ Imager Light Base as described in the following section.

## Install the E-Gel™ Imager Camera Hood and Light Base

1. Place the E-Gel™ Imager Light Base on a flat surface.
2. Plug the Universal 12 V power cord into the light base power port, and connect the wall plug to an electrical socket.
3. Plug the USB 2.0 cable into the camera USB port of the camera hood and connect the other end into the USB 2.0 port of your computer.



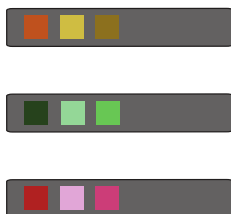
- ① E-Gel™ Imager Light Base
- ② Universal 12 V power cord
- ③ Electrical socket
- ④ E-Gel™ Imager Camera Hood
- ⑤ USB 2.0 cable
- ⑥ Computer

## Using the E-Gel™ Imager gel documentation system

After the software and hardware for the E-Gel™ Imager system is set up, the system is ready for use. Read the following chapter for detailed explanations on how to operate the system. For your convenience, the system is provided with a Quick Reference Guide that includes the operating instructions.

### Set up the E-Gel™ Imager

1. Ensure that the type of filter in the filter tray is appropriate for the type of stain being used in your gel sample. If the filter does not provide the best image possible, it may be necessary to test imaging with another type of filter (see “Colored emission filters” on page 13 for more information).



2. Remove the E-Gel™ Imager Camera Hood from the E-Gel™ Imager Base.
3. Place the gel in the center of the E-Gel™ Imager Base.



4. Place the E-Gel™ Imager Camera Hood on top of the E-Gel™ Imager Base.



5. Turn the camera on (⏻).
6. Turn the E-Gel™ Imager Base on (💡).
7. When the camera and transilluminator are turned on, the image of the gel is displayed on the **Live mode** screen in real time.

## Launch the GelCapture Software

1. Launch the GelCapture Software from your PC desktop.



2. Select the type of E-Gel™ Imager Light Base being used to provide transillumination from the **Home** screen (see page 21). Click **Select** to indicate the hardware configuration being used.

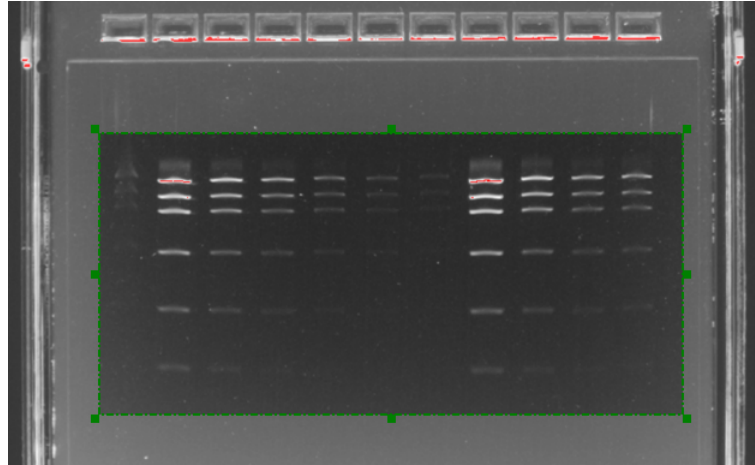
## Adjust image settings

1. Adjust the manual focus and iris dials on the camera hood to match the image of **Iris and focus settings** on the **Live mode** screen (see page 22).  
The recommended settings is automatically determined based on the type of E-Gel™ Imager Base and hardware configuration selected.
2. Perform fine adjustment of the image to attain an image that is clear, sharp, and bright using either the minus or plus buttons, or sliding the gauges for each setting (see page 22).
  - Exposure time can be set from 0.14–1.0 seconds. Increased exposure allows weaker signals that are not visible at a lower exposure time to be visible.
  - Sensitivity adjusts the degree of signal detection. The maximum exposure time is automatically updated in conjunction with the sensitivity setting.
  - Brightness adjusts the peak luminescence levels of the image.
3. If bands of both high and low intensity exist in the gel, perform extended detection (see “Perform extended detection” on page 27).

## Define region for image capture

In the **Live mode** screen you can save, copy, or view histograms in the selected area.

1. Select **Area of interest** () to define the region of the gel that you wish to image.
2. A green rectangular frame pops up around the image. Drag the edges of the green rectangle with your cursor to select your area of interest (AOI).



## Capture and save image

1. Right click in the green AOI frame to display a menu with the AOI options.  
**Note:** The options in the menu differ depending on whether you are looking at a real-time image, or working on a previously saved image.
2. *(Optional)* Click **Copy** to copy the image to the clipboard to paste elsewhere.
3. *(Optional)* Click **Crop** to crop the image to show only the AOI.  
Click **Un crop** to restore the image.
4. Click **Save** to capture the image of your gel in TIFF format.
5. To save an image in BMP or JPEG format, click **Export** and select BMP or JPEG.
6. Browse to the location where you want the image to be saved, and enter a name for the image, then click **Save**.

## Maintenance

To keep the E-Gel™ Imager in good working order, observe the following guidelines:

- The glass plate of the E-Gel™ Imager Light Base must be cleaned every time a sample is removed. Use a soft non-abrasive, lint-free cloth.
- To clean the E-Gel™ Imager and Light Base surface, use a cloth dampened with water.
- Do not operate while wearing gloves with talcum.
- Calibrate the camera once a year, as described in the Camera Calibration section.

**Note:** Turn the power OFF before any maintenance is performed on this equipment.

# 3

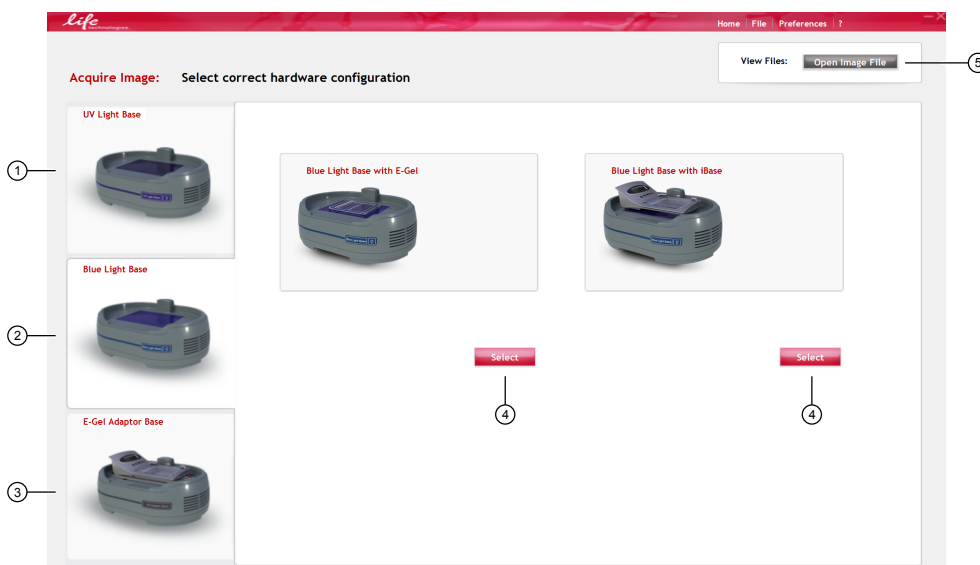
## GelCapture software

### GelCapture software

The GelCapture software application seamlessly integrates with the E-Gel™ Imager hardware, giving you complete control of configuration, capturing and saving sample images on your PC for analysis. The friendly GUI lets you perform common actions with a single click of a button or icon.

### Home screen

The **Home** screen appears upon launching the GelCapture software.



- ① Select UV Light Base.
- ② Select Blue Light Base.
- ③ Select Adaptor Base.
- ④ Select hardware configuration to access the **Live mode** screen.
- ⑤ Open image file to access the **Edit mode** screen.







## Live mode screen



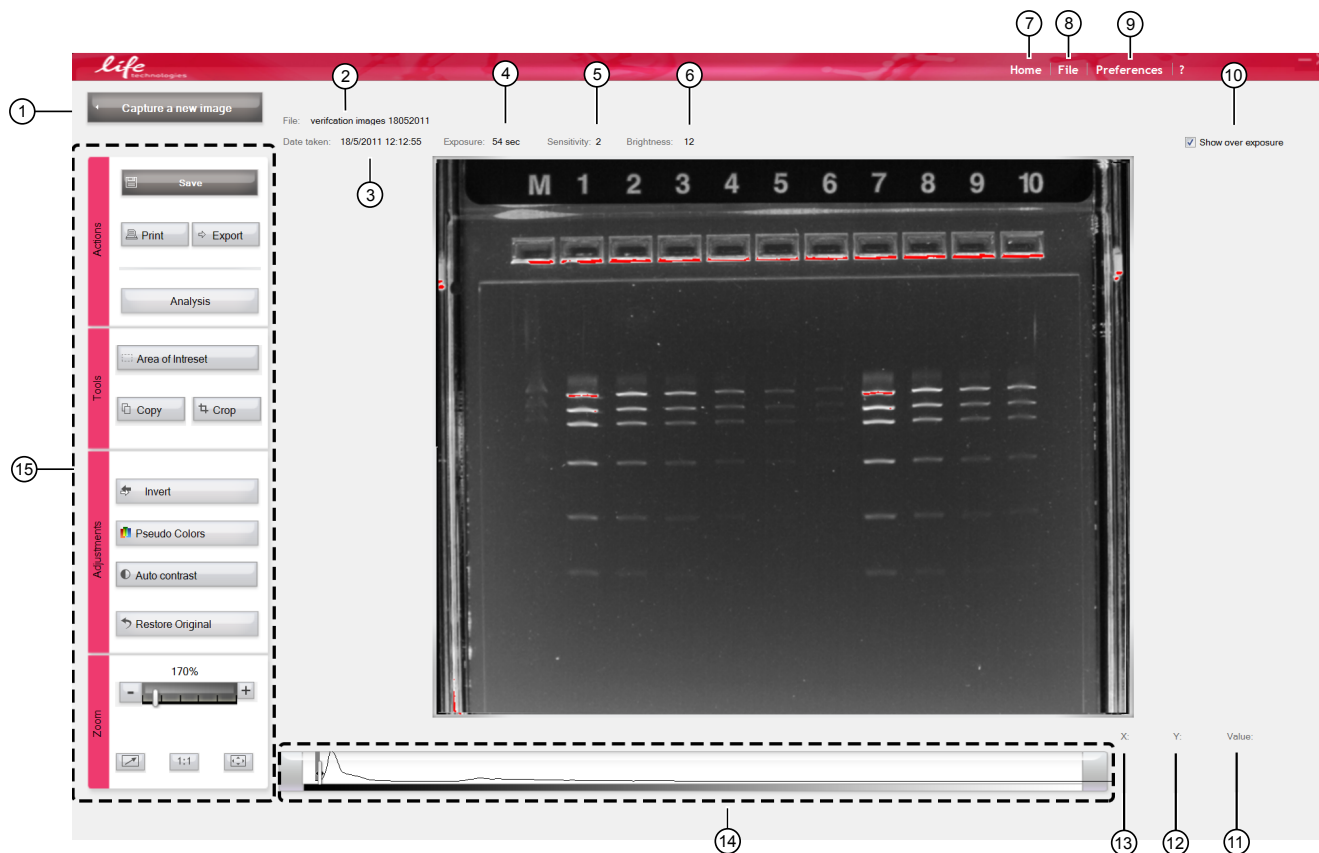
- ① **Iris and focus settings:** Image of recommended settings for the iris and focus.
- ② **Exposure time:** The +/- slide gauge is used to adjust the amount of time the camera sensor collects signal to create an image.
- ③ **Sensitivity:** The +/- slide gauge is used to adjust signal detection sensitivity.
- ④ **Extended detection:** Opens a tab with tools to adjust dynamic range. See “Perform extended detection” on page 27.
- ⑤ **Brightness:** The +/- slide gauge is used to adjust image brightness.
- ⑥ **Area of interest:** Allows tools to be used in selected regions of the image, in **Live mode** or for a saved image.
- ⑦ **Overexposure:** See “Correct overexposure” on page 28.
- ⑧ **Change:** Used to return to **Home screen** to change hardware configuration.
- ⑨ **Control panel:** See “Description of live mode control panel tools” on page 23.
- ⑩ **Preferences:** Open **Preferences** menu (see page 26).
- ⑪ **File:** Open **File** menu (see page 26).
- ⑫ **Home:** Return to **Home** screen.

## Description of live mode control panel tools

Short descriptions of tools that are available in the **Live mode** screen are listed in the following table.

Icon	Function
 Save	Saves an image.
 Print	Prints an image.
 Export	Exports an image as BMP or JPEG file.
 Analysis...	Shortcut to the analysis software.
 Edit Image	Go to <b>Edit mode</b> (available in both single capture mode and multiple image acquisition mode).
 Multi images Acquisition	Captures multiple images over a set period of time at designated intervals.

## Edit mode screen



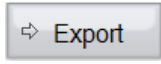
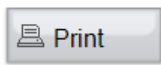
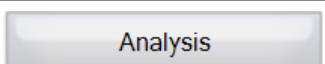
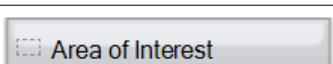
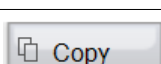
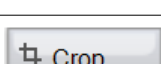
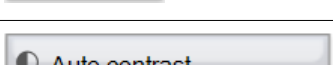
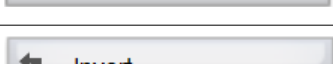
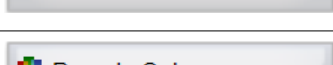

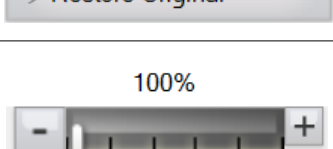





- ① **Capture a new image:** Return to **Live mode** screen.
- ② **File:** The file name of a saved image.
- ③ **Date taken:** The date an image was captured.
- ④ **Exposure:** The exposure time used to capture the image.
- ⑤ **Sensitivity:** The sensitivity used to capture the image.
- ⑥ **Brightness:** The brightness used to capture the image.
- ⑦ **Home:** Return to **Home** screen.
- ⑧ **File:** Open **File** menu (see page 26).
- ⑨ **Preferences:** Open **Preferences** menu (see page 26).
- ⑩ **Show over exposure:** See “Correct overexposure” on page 28.
- ⑪ **Value:** The gray scale value of the pixel being examined.
- ⑫ **Y:** The position of the pixel being examined on the y-axis.
- ⑬ **X:** The position of the pixel being examined on the x-axis.
- ⑭ **Histogram:** See “About the histogram” on page 27.
- ⑮ **Control panel:** See “Description of edit mode control panel tools” on page 25.



## Description of edit mode control panel tools

Short descriptions of tools that are available in the **Edit mode** screen are listed in the following table.

Icon	Function
	Opens the <b>Live mode</b> screen to allow capture of a new image.
	Saves an image.
	Exports an image as BMP or JPEG file.
	Prints an image.
	Shortcut to the analysis software.
	Selects a specific area to work within the image.
	Copies the image to the clipboard to paste elsewhere (available in <b>Edit mode</b> only).
	Crops an image (available in both <b>Live mode</b> and <b>Edit mode</b> ).
	This increases the contrast of the image, and can be used to reveal low concentration bands in the gel image.
	Creates an inverted color version of the image. The function changes the image color from black to white and vice versa
	Shows the image in using a color spectrum.
	Restores original image back to original grey scale values. It is the opposite of <b>Auto contrast</b> and does not affect <b>Invert</b> and <b>Pseudo color</b> tools.
	Zooms into/out of the image.
	Fits the image to the window.
	Shows the full image on screen.
	Full screen view. Click the <b>ESC</b> button to exit full screen view.

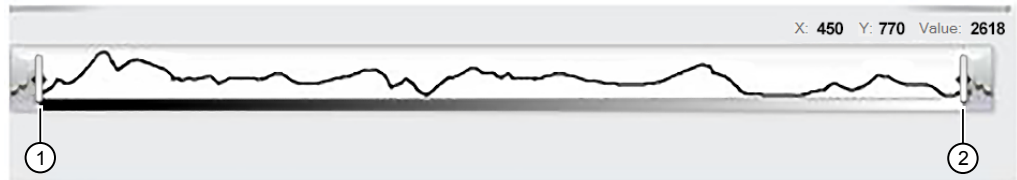
## Description of menu based tools

The **Main Menu** bar can be used to access various tools for file management and image adjustment.

Tool	Function
<b>File menu</b>	
Open tiff file	Opens a saved .tif file from your computer.
Save image	Saves an image (available in <b>Edit Mode</b> only).
Export image	Exports an image as BMP or JPEG file.
Print	Prints an image.
Print preview	Displays a preview of the image to be printed.
Page setup	Select page settings for printing.
Copy	Copies the image to the clipboard to paste elsewhere (available in <b>Edit Mode</b> only).
Exit	Exit software.
<b>Preferences menu</b>	
Area of interest	Selects a specific area to work within the image.
Full screen	Full screen view. Click the <b>ESC</b> button to exit full screen view.
Pseudo color	Shows the image in using a color spectrum.
Invert	Creates an inverted color version of the image. The function changes the image color from black to white and vice versa.
Over exposure	See “Correct overexposure” on page 28.
Contrast stretch	Adjusts the image to optimize contrast according to the histogram.
Optical enhancement	Optimizes the image.

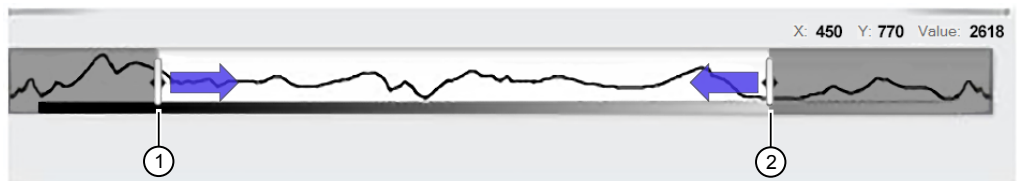
## About the histogram

The histogram provides the user with a graphical version of the image data to help determine the optimal image capture conditions. When an image is detected, the histogram is displayed at the bottom of the screen.



- ① Left cursor
- ② Right cursor

The y-axis of the histogram displays the number of pixels at a given gray level. The x-axis displays the type of the gray levels. You can reduce the time that is taken to view the band by stretching the signal. This can be achieved by dragging the cursor at the left and right margins of the histogram, and moving them towards the center.



- ① Left cursor
- ② Right cursor

## Perform extended detection

This tool is used to increase dynamic range for optimal capture of images in gels that contain bands of both high and low intensity.

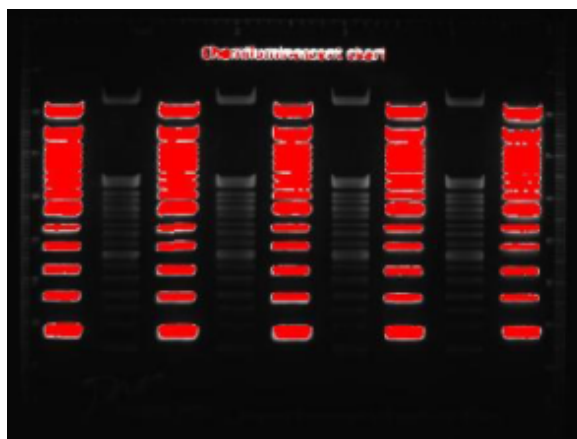
1. View the gel in the **Live mode** screen.
2. Click the **Extended detection** tab.
3. Adjust sensitivity using the +/- slide gauge to optimize the image.
4. Adjust brightness using the +/- slide gauge to optimize the image.

## Correct overexposure

Overexposure occurs when the camera receives too much light. Overexposure can be visualized as white, or bright areas that are difficult to analyze, and that can lead to inaccurate analysis results.

1. Select the **Show over exposure** checkbox.
2. To correct over exposure, go to the **Live mode** screen, then perform any action that reduces the overall amount of light reaching the camera (for example, reducing exposure time, sensitivity, and/or brightness).

The **GelCapture overexposure** tool automatically displays overexposed, saturated areas in red in a given image.



3. After overexposure has been corrected, click **Save**.

## Apply auto-contrast

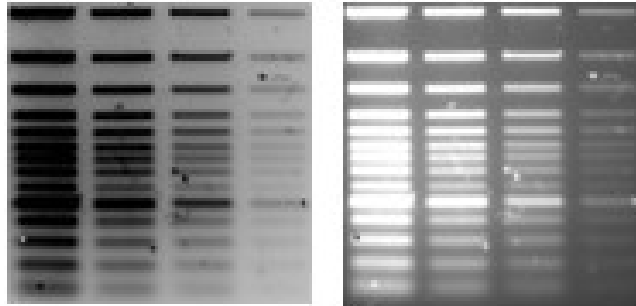
This function increases the contrast of the image and helps to reveal low concentration bands in the gel image.

1. Click **Auto contrast** (☉) in the control panel.
2. Click **Restore original** (↔) to return the image to its original grayscale parameters.

## Invert an image

Inverting an image is particularly useful for discriminating between close bands. This function inverts the color scale of the image (i.e., light areas appear dark and dark areas appear light, much like for a film negative).

1. Click **Invert** (↔) on the control panel.  
An inverted version of the image is displayed.

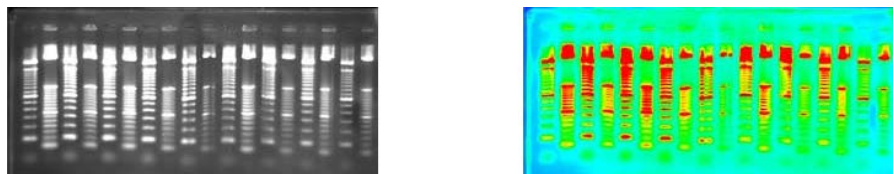


2. Click **Invert** (↔) again to revert the image to its original state.

## Apply pseudo colors

**Pseudo color** applies a false color palette to the image by applying a color spectrum, designating "hot" and "cold" regions of the image. Colors are based on gray scale intensity, where red corresponds to the maximum (hot) and blue corresponds to the minimum (cold) gray scale levels.

1. Click **Pseudo colors** (🌈) on the control panel.  
An image of the gel with false color is displayed.



2. Click **Pseudo Ccolors** (🌈) again to revert the image to its original state.



# Troubleshooting

Observation	Possible cause	Recommended action
Camera is not detected	Camera not turned on, or software launched before camera turned on.	Turn on the Light Base and Camera Hood prior to launching the GelCapture software.
	Cables not properly connected.	Ensure the USB 2.0 cable is properly connected to both the Camera Hood and the PC.
	Camera drivers not installed successfully.	Uninstall GelCapture software, then reinstall the software and camera drivers.
No image on screen	Light Base not turned on or in sleep mode.	Turn on the Light Base, or lift and replace the Camera Hood to activate the Light Base.
	Insufficient exposure time.	Increase the exposure time.
	The iris is not open.	Turn the Manual Iris Dial to increase the aperture.
E-Gel™ Imager does not turn on after pressing either camera hood or E-Gel™ Imager Base ON/OFF button	Loose power supply cable	Ensure that the camera hood power supply and light base power supply connections are secure and properly connected to an electrical outlet.
	Loose internal power supply button cables	Contact technical support.
The camera is not recognized	Camera not switched on	Ensure the camera is switched on.
	Software was turned on prior to setting up the device.	Make sure the light base and imager hood are set up and switched on before launching the software
	Cables not connected properly	Ensure that the camera USB 2.0 and power supply cables are connected properly.
	Camera drivers did not install successfully	Uninstall GelCapture. Then reinstall GelCapture and the camera drivers.
No image on screen	E-Gel™ Imager Light Base not turned on	Ensure the E-Gel™ Imager Light Base is turned on.
	Possible time delay each time images are changed	Wait a few seconds for images to be displayed.
A black image is seen onscreen	Light hood is on sleep mode	Lift the hood and launch again to wake up the light base.
	Short exposure time	Increase the exposure time.
	The iris is closed	Turn the Manual Iris Dial to increase the aperture.
Images out of focus	Incorrect focus settings	Adjust the focus settings using the Manual Focus™ Dial.



Observation	Possible cause	Recommended action
Improper illumination intensity	Button is receiving incorrect voltage	Contact technical support.
	Low incoming illumination source voltage	Contact technical support.
Duration of E-Gel™ Safe Imager™ transillumination too short	E-Gel™ Safe Imager™ transilluminator switched on with short press (30 second transillumination)	Press the button on the E-Gel™ Safe Imager™ for 2 seconds. The transilluminator turns on for 5 minutes before automatic shutoff.



# Product specifications

## E-Gel™ Imager Camera Hood

Condition	Description
Case dimensions	35.6 cm (height) × 30.5 cm (length) × 21 cm (width)
Electrical Requirements	100–240 V, 50/60Hz, 0.6A
Temperature	Ambient ± 5°C to 40°C
Adaptor Specifications	Use only the UL Listed adaptor supplied with the E-Gel™ Imager Camera Hood (100–240 VAC, 50/60 Hz, 0.6 A)

## E-Gel™ Imager Light Base (UV or Blue-Light)

Condition	Description
Viewing surface dimensions	42 mm × 83 mm
Case dimensions	11.9 cm (height) × 30.5 cm (length) × 21 cm (width)
Electrical Requirements	100–240VAC 50/60Hz 0.6A
Temperature	Ambient ± 5°C to 40°C
Adaptor Specifications	Use only the UL Listed adaptor supplied with the E-Gel™ Imager Light Base (90–264 VAC, 47/63 Hz, 0.9 A)





# Software installation

## Getting started

### Minimum PC requirements

In order to install and operate both the E-Gel™ Imager and GelCapture software, your PC must meet the following minimum requirements:

- Intel™ Core™ 2 Duo processor, 1.8 GHz.
- Minimum 1 GB RAM of memory (2 GB recommended).
- 32 bit Windows™ XP Pro (English version, SP 3) OR Windows™ 7 Professional (English version) operating system, or Windows 10.
- Minimum monitor resolution of 1024 × 768 pixels.
- A free USB 2.0 port (Not compatible with USB 1.0 or 1.1).

### Software installation guidelines

To install the GelCapture software and camera drivers, follow these guidelines:

- Log in as user with Administrator privileges (for installation only). Verify that you are logged in as an Administrator before starting installation. If you do not have Administrator privileges, contact your IT department for help.
- Change PC power setting to “Never Hibernate”.
- Make sure that the PC is **not** connected to the E-Gel™ Imager when installing the GelCapture software.
- Install GelCapture software **before** turning on the E-Gel™ Imager and installing camera drivers.

You do not have to have an active internet connection while performing software installation.

## Install GelCapture Software

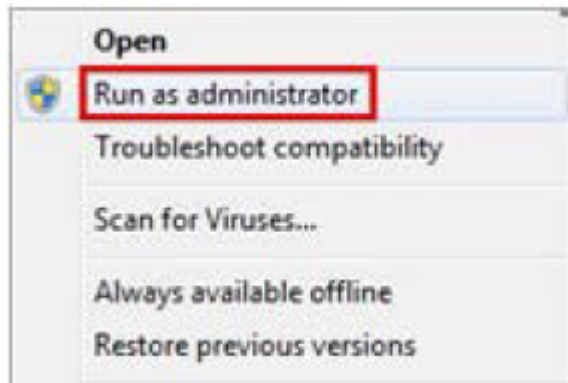
### Windows™ XP professional

1. Insert the installation CD into the disk drive, and follow the instructions provided by the installation wizard.
2. When the self-installation has completed, click on **Finish** to exit setup.



## Windows™ 7 professional

1. Open the CD with internet explorer, right-click the GelCapture.exe installation file, and select **Run as administrator**.



2. Select **Allow, I trust this program. I know where it's from or I've used it before** to allow the program to run.
3. Follow the instructions provided by the installation wizard.
4. Once installation is complete, click Finish to exit Setup.

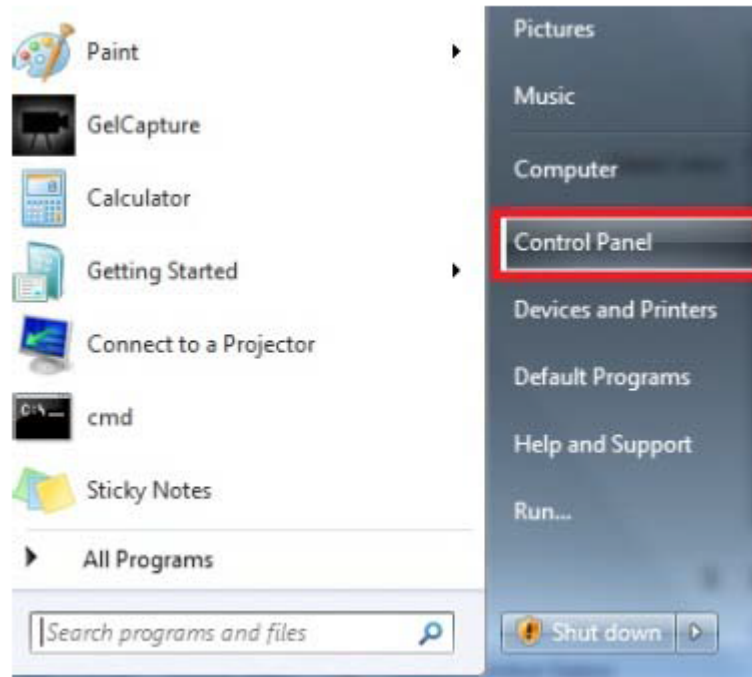


## Installing the camera driver (Windows™ 7 pro)

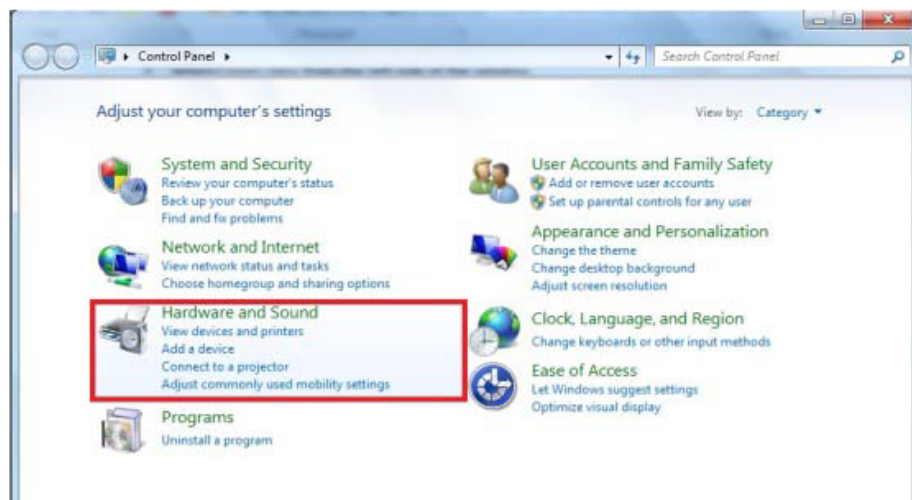
### Installing the camera driver (Windows™ 7 professional)

Before installing the camera driver for Windows™ 7 Professional, make sure that the GelCapture software for Windows™ 7 Professional is installed on the computer (“Windows™ 7 professional” on page 34).

1. Go to Windows™ Control Panel by clicking Start >> Settings >> Control Panel.

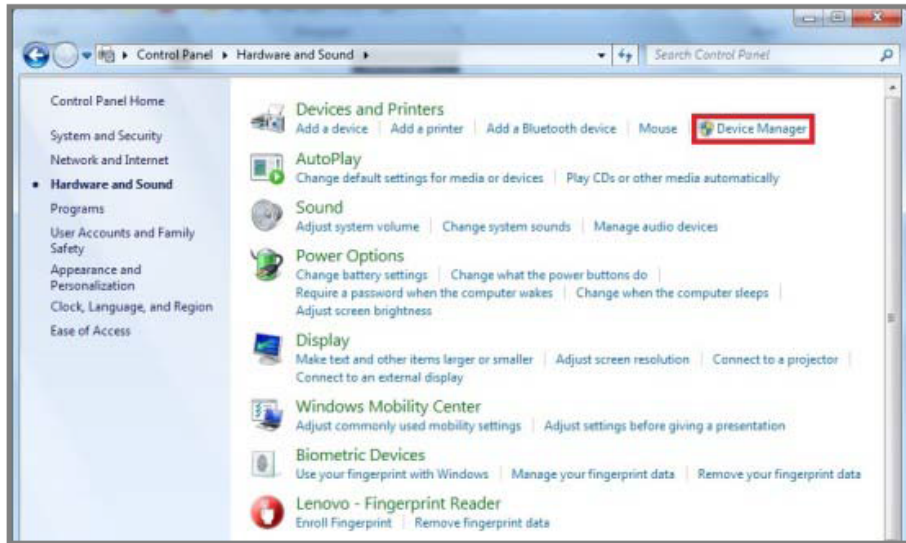


2. Open the Hardware and Sound settings.

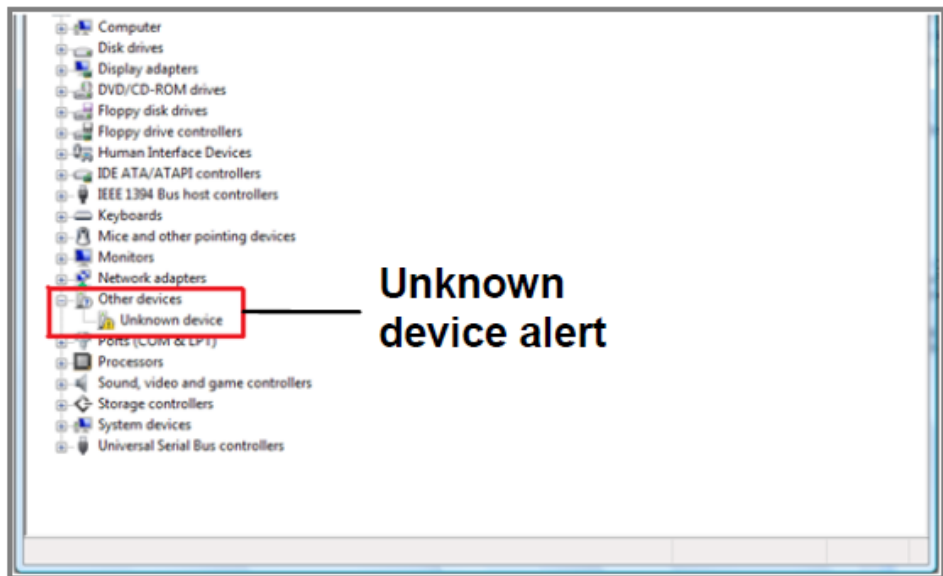




3. From the Devices and Printers settings, open the Device Manger.

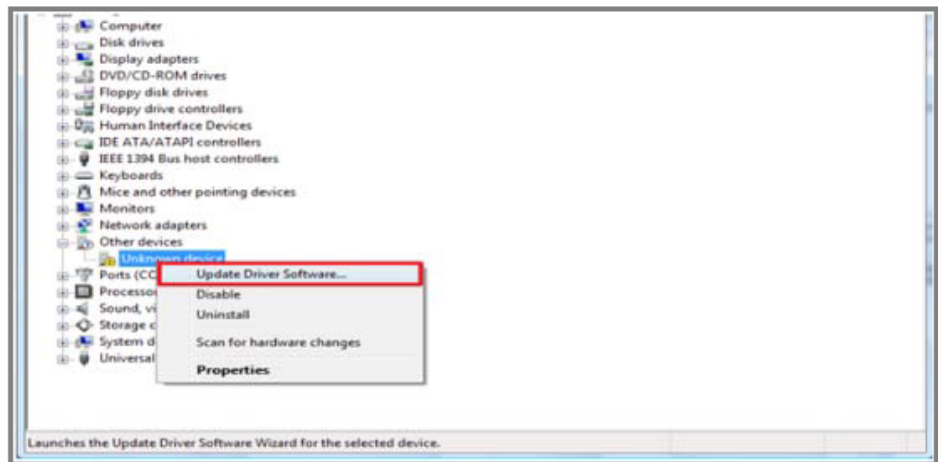


4. Connect the USB 2.0 cable from the PC to the E-Gel™ Imager, and turn the E-Gel™ Imager camera on. The Device Manager should recognize the new device connection and alert you.

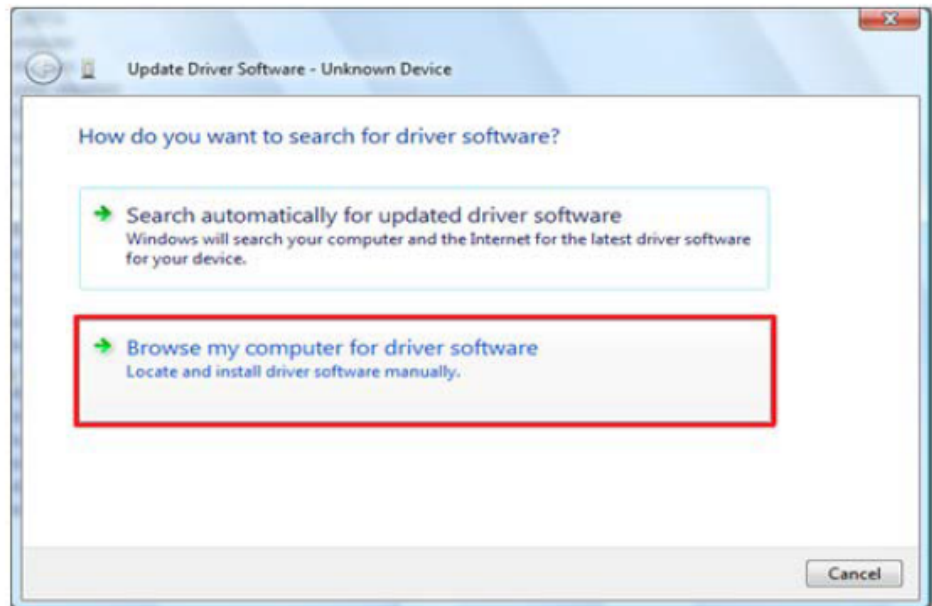




5. Under Other devices, right-click Unknown device and select Update Driver Software.

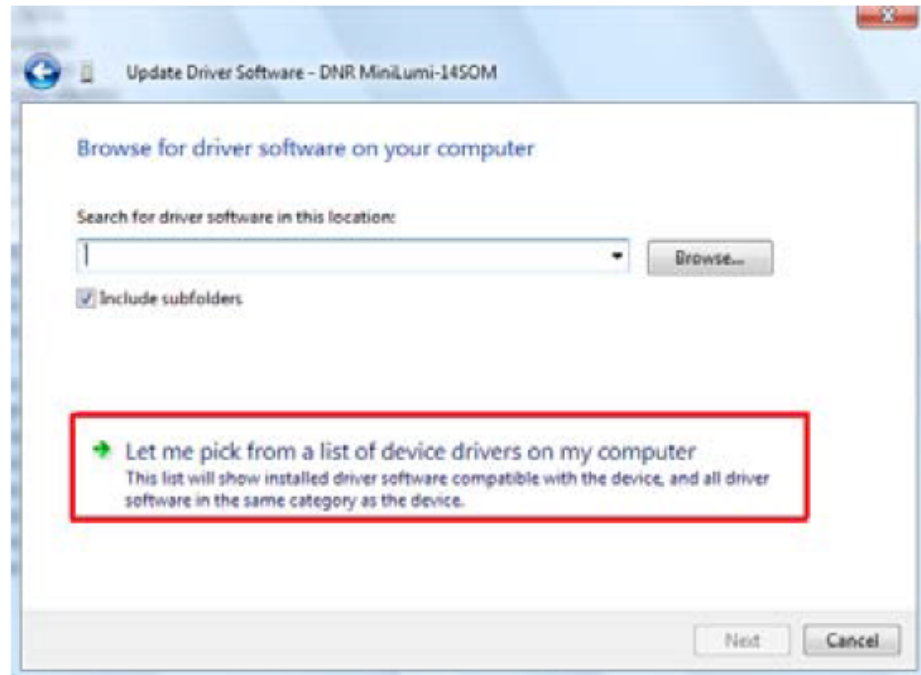


6. In the Update Driver Software window, select “Browse my computer for driver software”.

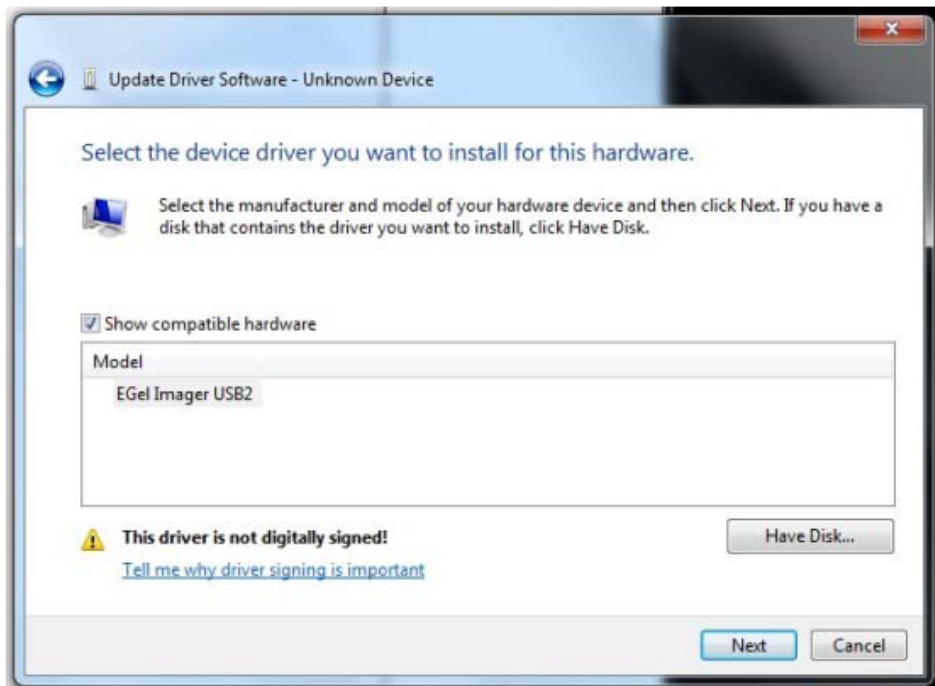




7. Select “Let me pick from a list of device drivers on my computer”.

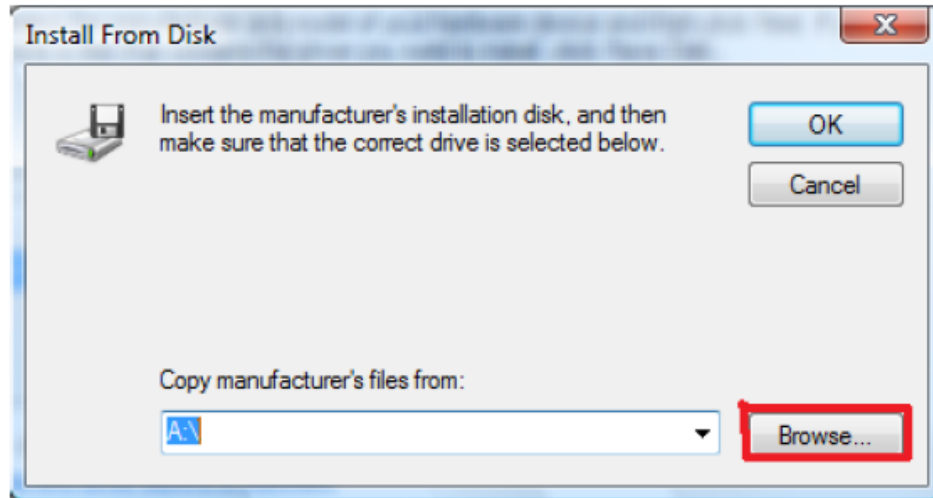


8. Choose E-Gel™ Imager USB2 and click, **Have Disk**.

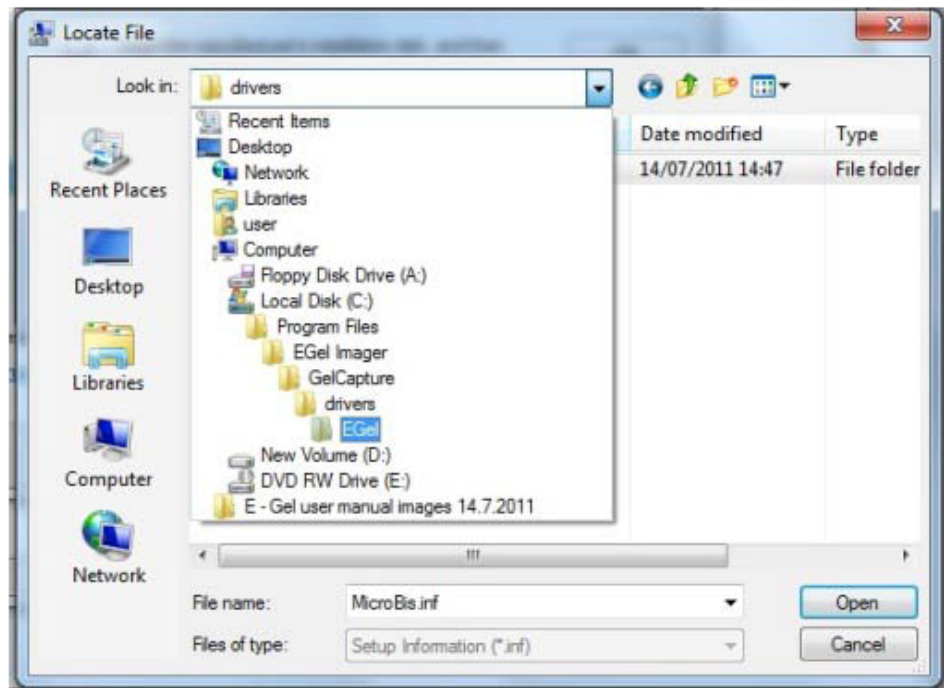




9. In the Install From Disk window, click **Browse**.

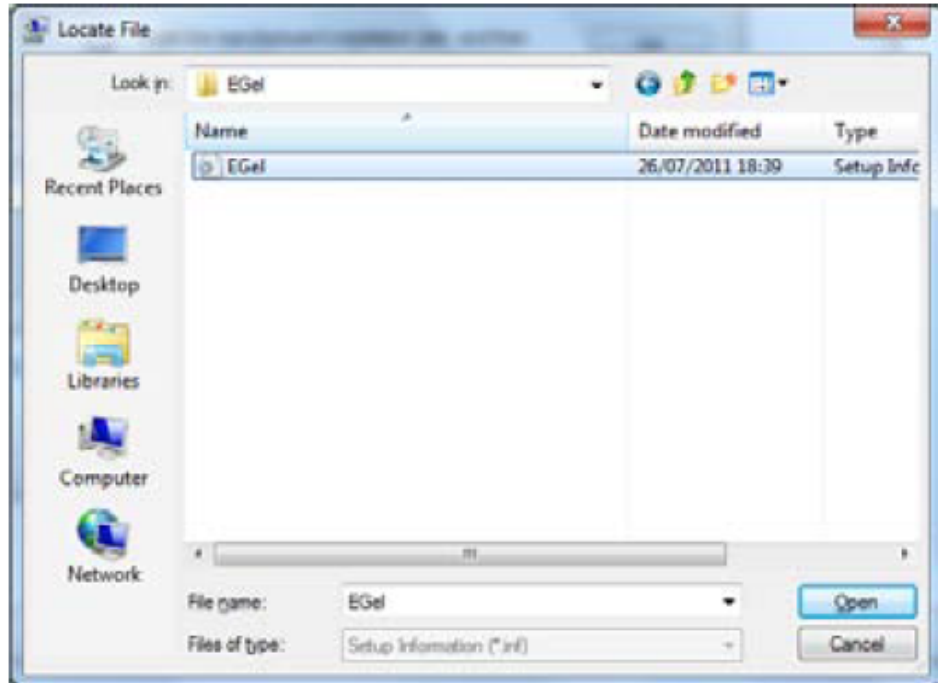


10. Browse to the following location: My computer >> Local Disc (C:) >> Program Files >> EGel Imager >> GelCapture >> drivers >> EGel, and click **Open**.

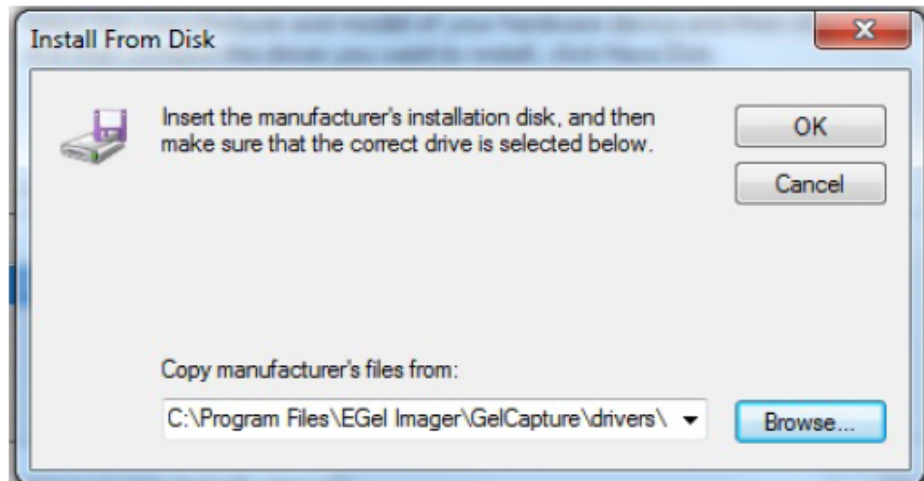




11. Choose EGel Imager from the E-Gel™ Imager folder, and click **Open**.



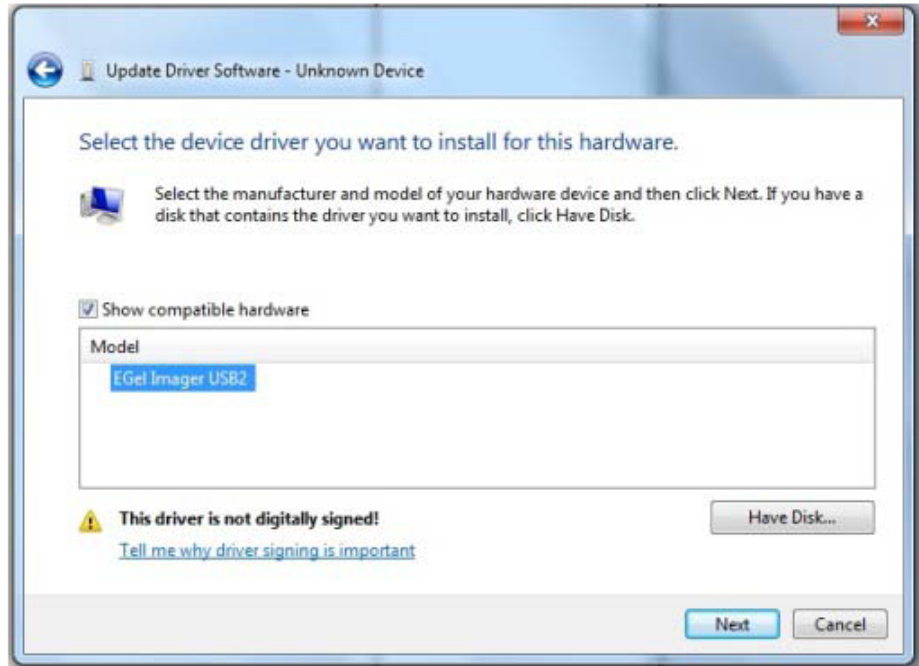
12. Click **OK**.







13. Choose EGel Imager USB2, and click Next.



14. After successfully completing the driver update, the successful update window will be displayed. Click Close.



15. Close the Device Manager and Control Panel windows. The E-Gel™ Imager camera driver is now installed and ready for use.



# The E-Gel™ Imager Band Excision Kit

## Using the E-Gel™ Imager Band Excision Kit

Use the E-Gel™ Imager Band Excision Kit (Cat. No. 4466605) to excise bands from your gel.

- When cutting bands from the E-Gel™ Imager Blue Light Base, use the appropriate safety equipment. Wear the Safe Imager™ Viewing Glasses to protect your eyes from intense blue-light exposure. Wear gloves when handling gels.

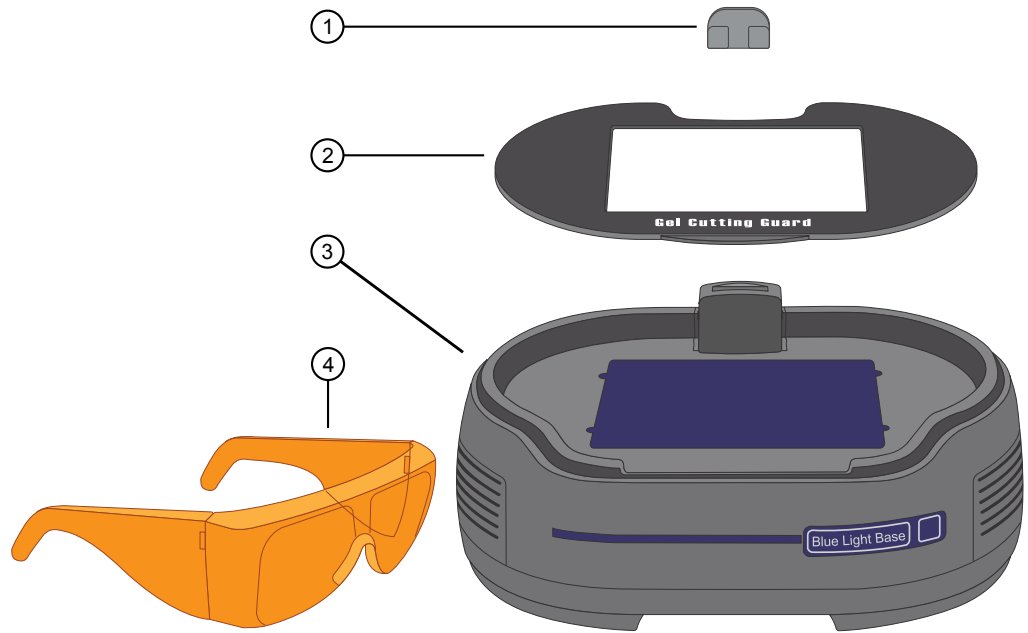


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**WARNING!** The Safe Imager™ Viewing Glasses do not protect from UV light. Do not use the Safe Imager™ Viewing Glasses with the UV light base. When using UV light, wear appropriate eyewear that will protect eyes from UV light.

---

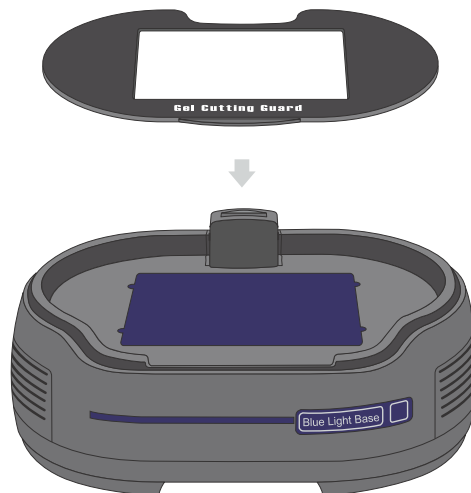
- When cutting bands from the E-Gel™ Imager UV Light Base, use the appropriate safety equipment to protect yourself from UV exposure. Wear gloves when handling gels.



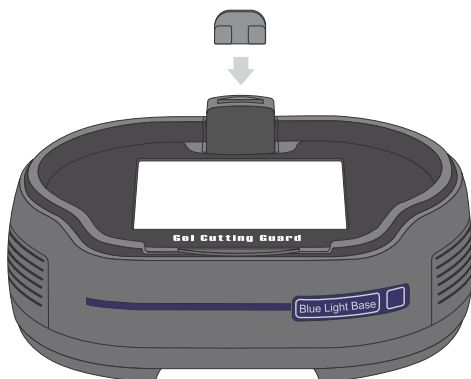
- ① Activation switch: A magnetic switch that allows transillumination to be powered on without having the E-Gel™ Imager Camera Hood in place.
- ② Gel Cutting Guard: Protects the surface of the E-Gel™ Imager Light Base from scratches when cutting gel bands.
- ③ E-Gel™ Imager Light Base (Not included with E-Gel™ Imager Band Excision Kit)
- ④ Safe Imager™ Viewing Glasses: Protects the eyes from intense blue-light, and allow bands to be viewed (available separately as Cat. No. S37103).

## Excise a band from the gel

1. Turn the E-Gel™ Imager camera OFF, then remove the E-Gel™ Imager Camera Hood and anything on the surface of the E-Gel™ Imager Light Base.
2. Place the Cutting Gel Guard on the surface of the E-Gel™ Imager Light Base.



3. Place the magnetic activation switch on top of the sensor, and power on the E-Gel™ Imager Light Base.



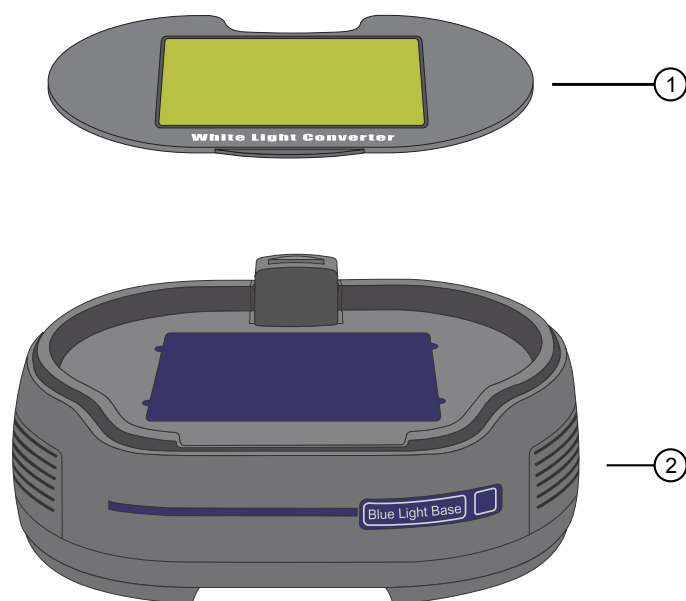
4. Use a clean knife or scalpel to cut bands from the gel.
5. After cutting the bands, remove the magnet, then transfer the excised bands from the plate to the light base.
6. Place the camera hood back on top of the light base.
7. Press the camera ON/OFF button to view the gel bands.



# The White Light Converter

## Using the White Light Converter

The E-Gel™ Imager System is designed to detect gels that are stained with both fluorescent and visible dyes, but requires use of the White Light Converter to detect gels that are stained with visible dyes.



- ① White Light Converter
- ② E-Gel™ Imager Light Base (Not included with E-Gel™ Imager Band Excision Kit)

## View a gel with the white light converter

1. Remove the E-Gel™ Imager Camera Hood.
2. Place the White Light Converter on the E-Gel™ Imager Light Base.
3. Place your gel on top of the White Light Converter.
4. Place the E-Gel™ Imager Camera Hood back on top of the Light Base.



5. Continue to work as you would without the White Light Converter.

**Note:** To work with a new sample, turn the unit OFF, remove the Tower, remove the sample from the Light Base, and clean the Light Base with water and ethanol. Then place the new sample on the Light Base.



# Related products

## Accessory products

Unless otherwise indicated, all materials are available through **thermofisher.com**. "MLS" indicates that the material is available from **fisherscientific.com** or another major laboratory supplier.

Item	Amount	Source
<b>E-Gel™ Imager Gel Documentation System</b>		
E-Gel™ Imager UV Light Base	1 unit	Cat. No. 4466602
E-Gel™ Imager Imager Blue Light Base	1 unit	Cat. No. 4466603
E-Gel™ Band Excision Kit	1 kit	Cat. No. 4466605
E-Gel™ Imager Universal Filter	1 filter	Cat. No. 4466606
E-Gel™ Imager Qdot™ 625 Filter	1 filter	Cat. No. 4466607
E-Gel™ Imager Qdot™ UV/SYBR™ Filter	1 filter	Cat. No. 4466608
GelQuant Express Software Activation Dongle	1 each	Cat. No. 4466610
<b>E-Gel™ Devices</b>		
E-Gel™ Safe Imager™ Real-Time Transilluminator	1 unit	Cat. No. G6500
<b>E-Gel™ Power Snap Electrophoresis System</b>		
E-Gel™ Power Snap Electrophoresis Device	1 unit	G8100
E-Gel™ Power Snap Electrophoresis System	1 unit	G8300
E-Gel™ Power Snap Camera	1 unit	G8200
E-Gel™ Power Snap Electrophoresis System Starter Kit, EX 1%	1 kit	G8341ST
E-Gel™ Power Snap Electrophoresis System Starter Kit, SYBR Safe 1.2%	1 kit	G8351ST



## E-Gel™ agarose gels and DNA ladders

E-Gel™ Agarose Gels are bufferless pre-cast agarose gels with a variety of different agarose percentages and well formats designed for fast, convenient electrophoresis of DNA samples.

To find DNA ladders available for sizing DNA, visit [thermofisher.com/e-gel](http://thermofisher.com/e-gel) or for more details on these products, contact **Technical Support** (page 66).

Table 1 E-Gel™ Agarose Gels

Item	Amount	Source
E-Gel™ EX Gel, 1%	10 Pak	G501801
E-Gel™ EX Gel, 2%	10 Pak	G401002
Bolt™ EX Gel, 4%	10 Pak	G401004
E-Gel™ 1.2% with SYBR™ Safe™	18 Pak	G521801
E-Gel™ EX 2% Agarose Gels	20 gels	Cat. No. G402002
E-Gel™ EX 4% Agarose Gels	10 gels	Cat. No. G401004

## Staining and detection










Unless otherwise indicated, all materials are available through [thermofisher.com](http://thermofisher.com). "MLS" indicates that the material is available from [fisherscientific.com](http://fisherscientific.com) or another major laboratory supplier.

Item	Amount	Source
SYBR™ Green I Nucleic Acid Gel Stain	500 µL	Cat. No. S7563
Qdot™ 625 Streptavidin Conjugate	100 µL	Cat. No. A10196
Qdot™ 625 Antibody Conjugation Kit	1 kit	Cat. No. A10197





# Explanation of symbols

Symbol	Description
	The E-Gel™ Imager System complies with the Underwriters Laboratories Inc. regulation and the European Community Safety requirements. Operation of the E-Gel™ Imager System is subject to the conditions described in this manual. The protection provided by the equipment may be impaired if the equipment is used in a manner not specified by Invitrogen™.
	The E-Gel™ Imager System complies with the MET Laboratories, Inc. regulation safety requirements.
	The E-Gel™ Imager with E-Gel™ Imager UV Light Base is classified as a device that produces ultraviolet illumination, as indicated by the symbol.
	The Caution symbol denotes a risk of safety hazard. Refer to accompanying documentation.
	This symbol indicates that the device operates on alternative current.
	This symbol indicates that the device is protected by double reinforced insulation.
	The WEEE (Waste Electrical and Electronic Equipment) symbol indicates that this product should not be disposed of in unsorted municipal waste. Follow local municipal waste ordinances for proper disposal provisions to reduce the environmental impact of WEEE. Visit <a href="http://www.invitrogen.com/weee">www.invitrogen.com/weee</a> for collection and recycling options.
	This product has been tested to the requirements of CAN/CSA – C22.2 No. 61010 – 1, second edition, including Amendment 1, or a later version of the same standard incorporating the same level of testing requirements.
	The C-Tick symbol denotes that the device is compliant with the electromagnetic compatibility (EMC) of the Australian Communications Authority (ACA).

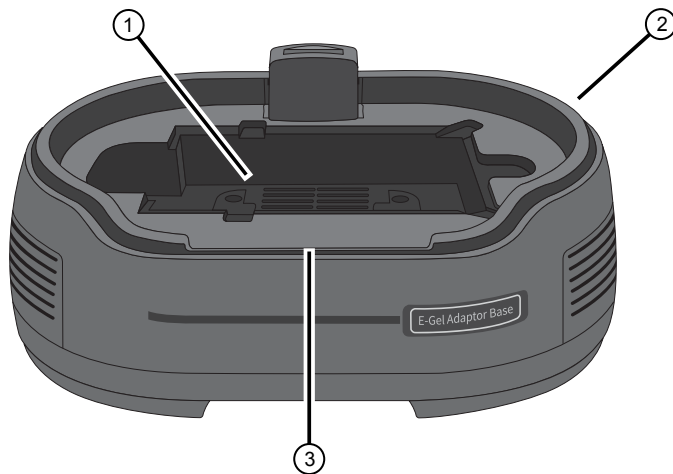


# Products no longer supported

## The E-Gel™ Imager iBase™ Light Diffuser

### E-Gel™ Imager Adaptor Base

The E-Gel™ Imager Adaptor Base is used with the E-Gel™ Safe Imager™ Transilluminator to visualize gels stained with SYBR™ dyes. The E-Gel™ Imager Adaptor Base can also be used with the E-Gel™ iBase™ Device to visualize E-Gel™ pre-cast agarose gels.



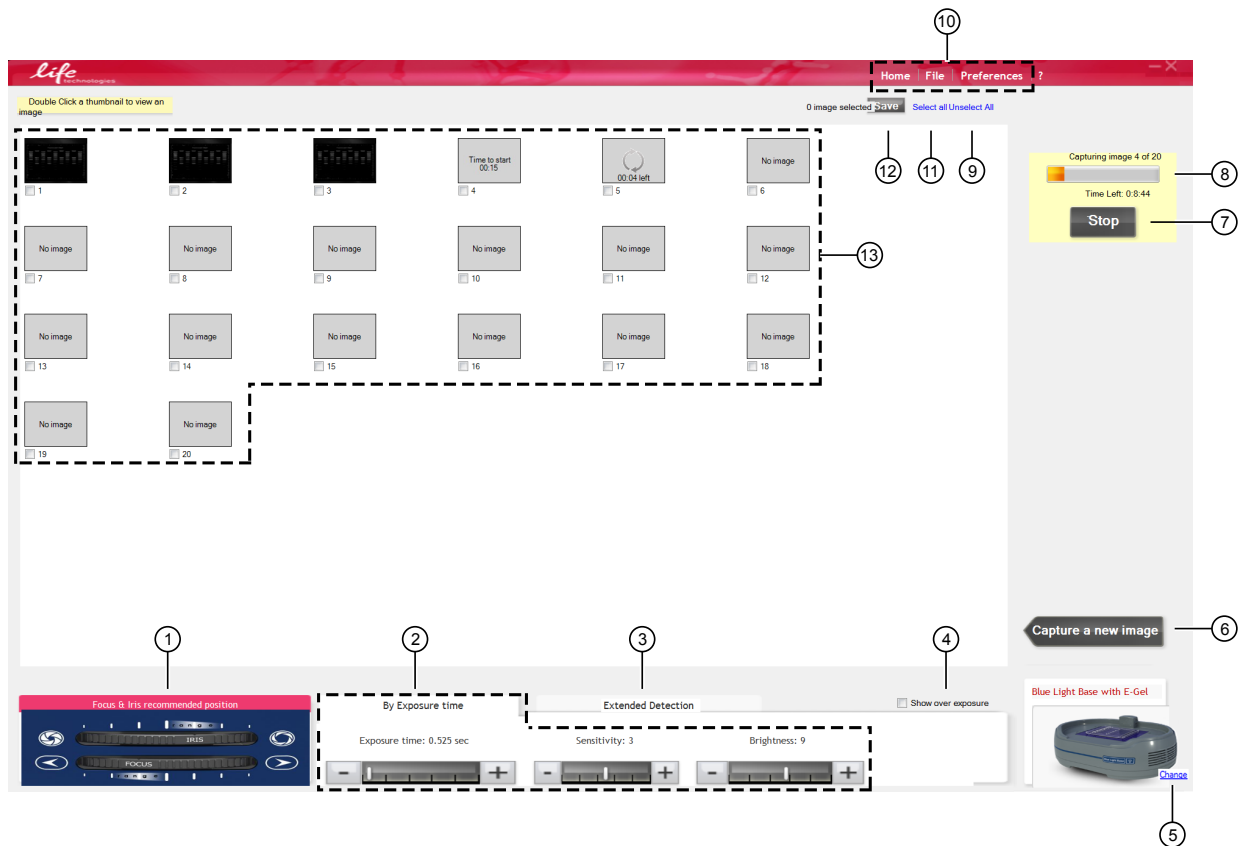
- ① Well
- ② Bordered wall
- ③ Wall breach



## About multiple image acquisition

**Multiple image acquisition** is an advanced image capture function to acquire a series of images over time (for example, for bands migrating during gel electrophoresis).

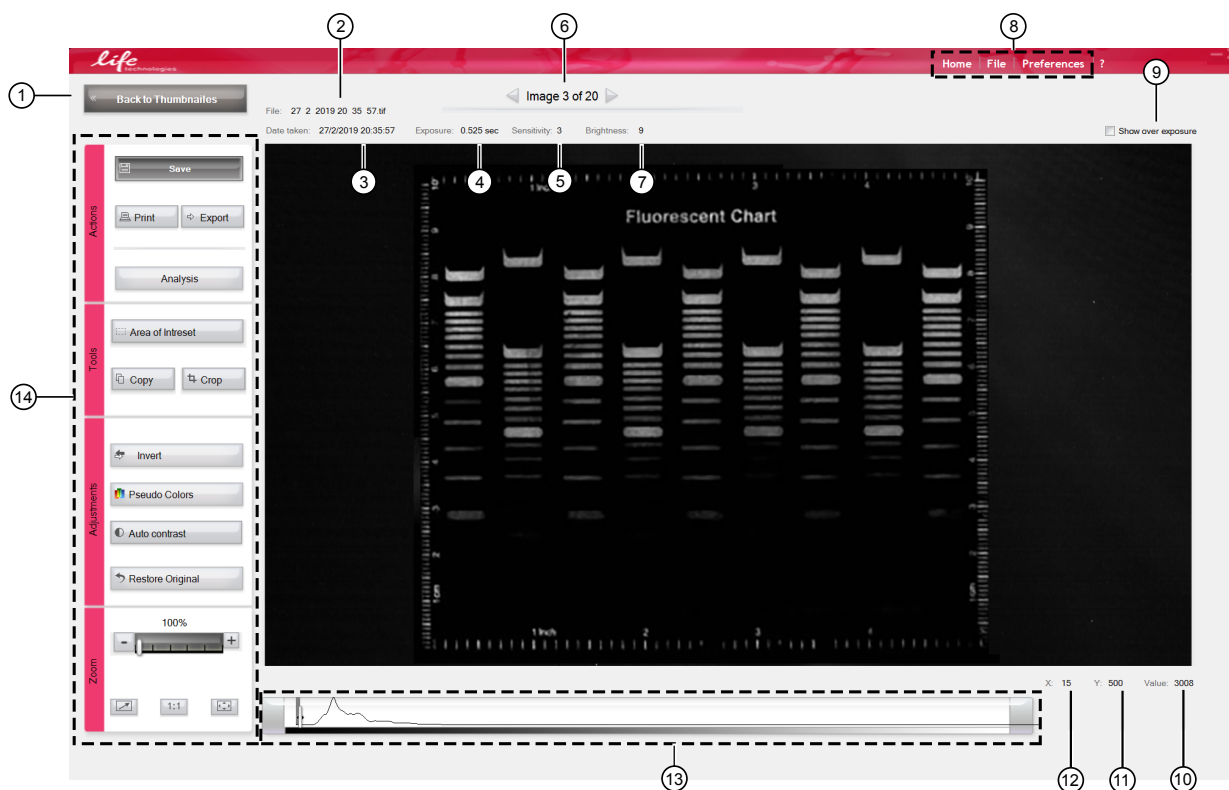
## Multiple image acquisition live mode screen



- ① **Iris and focus settings:** Image of recommended settings for the iris and focus.
- ② **Capture settings:** See descriptions on page 22.
- ③ **Extended detection:** Opens a tab with tools to adjust dynamic range. See “Perform extended detection” on page 27.
- ④ **Overexposure:** See “Correct overexposure” on page 28.
- ⑤ **Change:** Used to return to **Home screen** to change hardware configuration.
- ⑥ **Capture a new image:** Used to return to **Live mode** screen. Available only when image capture is stopped.
- ⑦ **Stop:** Used to stop image acquisition. Available only during image capture.
- ⑧ **Progress bar:** Amount of time remaining for multiple image capture.
- ⑨ **Unselect all:** To unselect all images.
- ⑩ **Main menu tools:** See descriptions on page 26.
- ⑪ **Select all:** To select all images.
- ⑫ **Save:** To save images.
- ⑬ **Thumbnail images:** Double click thumbnail to access **Multiple image acquisition edit mode** screen (see 52).



## Multiple image acquisition edit screen



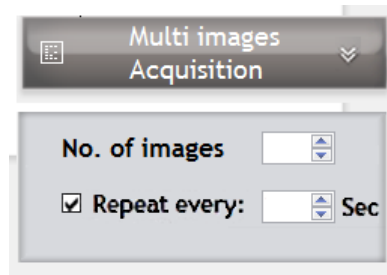
- ① **Back to thumbnail:** Return to **Live mode** screen.
- ② **File:** The file name of a saved image.
- ③ **Date taken:** The date an image was captured.
- ④ **Exposure:** The exposure time used to capture the image.
- ⑤ **Sensitivity:** The sensitivity used to capture the image.
- ⑥ **Navigation arrows:** Allows navigation between images that are captured in sequence.
- ⑦ **Brightness:** The brightness used to capture the image.
- ⑧ **Main menu tools:** See descriptions on page 26.
- ⑨ **Overexposure:** See “Correct overexposure” on page 28.
- ⑩ **Value:** The gray scale value of the pixel being examined.
- ⑪ **Y:** The position of the pixel being examined on the y-axis.
- ⑫ **X:** The position of the pixel being examined on the x-axis.
- ⑬ **Histogram:** See “About the histogram” on page 27.
- ⑭ **Control panel:** See “Description of edit mode control panel tools” on page 25.



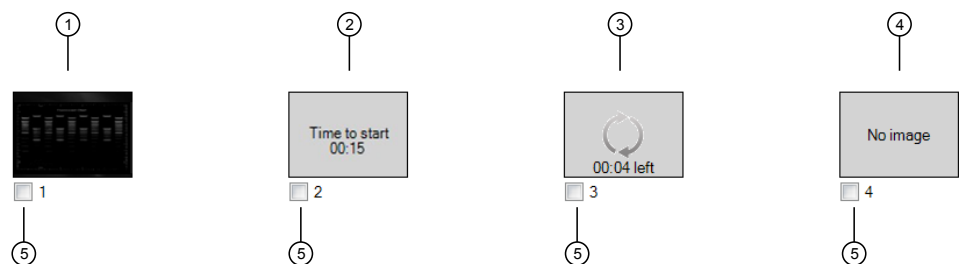
## Perform multiple image acquisition

Use **Multiple Image Acquisition** to capture images of band migration during gel electrophoresis.

1. Click the **Multiple Image Acquisition** button.



2. Set the number of images to be captured (2–20).
3. (Optional) Set the amount of time between each image capture event. Mark this checkbox, then set the desired time delay, or leave it unmarked.
4. Adjust image settings.  
**Note:** If settings are altered during the image capture process, all subsequent images will be captured with the new settings.
5. Click **Start** to start the image series capturing process.
6. A new screen appears that displays the progress of the image capture in a series of thumbnail images. Double-clicking on any thumbnail image brings you to the **Multiple image acquisition edit mode** screen for that image (see page 52).



- |                                   |                             |
|-----------------------------------|-----------------------------|
| ① Image already captured.         | ④ Image to be captured.     |
| ② Image currently being captured. | ⑤ Image selection checkbox. |
| ③ Image currently being captured. |                             |

7. Select the images that you want to save.
8. Click **Save** to save selected images.



**Appendix H** Products no longer supported  
*The E-Gel™ Imager iBase™ Light Diffuser*

9. Click **Stop** to cancel image capture.
10. When the acquisition process is completed, or acquisition is aborted, the **Capture a new image** button appears on the screen.



## Additional multiple image acquisition functions

The Background function for **Multi Images Acquisition** process creates images that are made of a combination of previous and new information.

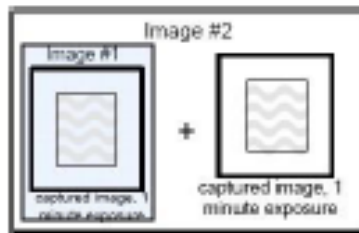
The background for a second image is based on information from both the first and second images, although the second image was captured with the same exposure time as the first image in the series.

### Software Integration



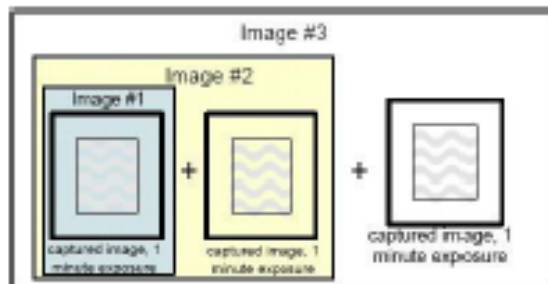
**Image #1**  
**1 minute**  
**exposure time**

**The image is captured for one minute**



**Image #2**  
**2 minute**  
**exposure time**

**The last image (image #1) is captured for one minute and combined with image #1 to create image #2**



**Image #3**  
**3 minute**  
**exposure time**

**The last image (composite image #2) is capture for one minute and combined with image #2 to create image #3**

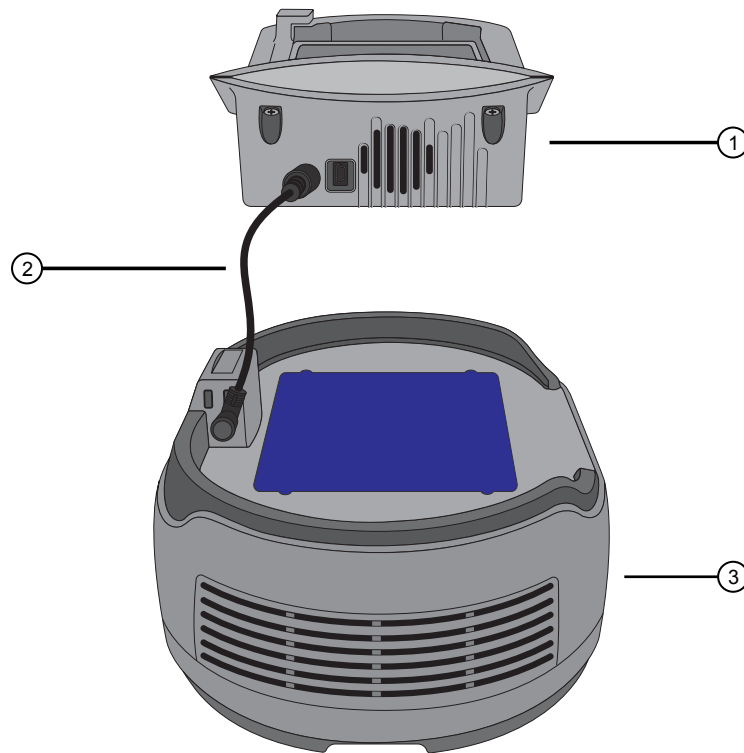


## Using the E-Gel™ imager light base with E-Gel™ iBase™ device

### Hardware configuration

The E-Gel™ Imager Blue Light Base or E-Gel™ Imager UV Light Base can be used to provide transillumination for the E-Gel™ iBase™ Device.

For best results, affix the E-Gel™ Imager iBase™ Light Diffuser to the underside of the E-Gel™ iBase™ Device when using the E-Gel™ iBase™ Device with the E-Gel™ Imager System (see “Attach the E-Gel™ Imager iBase™ Light Diffuser” on page 61).



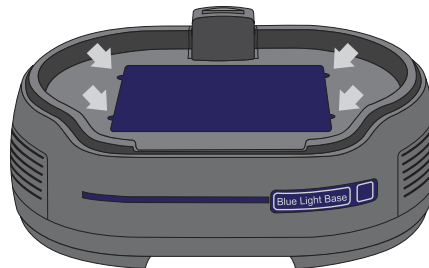
- ① E-Gel™ iBase™
- ② DC connector cable
- ③ E-Gel™ Imager Light Base





## Connect the E-Gel™ iBase™ Device with the E-Gel™ Imager Light Base

1. Place the E-Gel™ iBase™ Device on E-Gel™ Imager Light Base. The pegs under the E-Gel™ iBase™ Device should be positioned to fit in the niches on the E-Gel™ Imager Light Base.



2. Connect the DC connector cable between the E-Gel™ iBase™ Device and the E-Gel™ Imager Light Base.
3. Connect the Universal 12 V power port at the rear of the E-Gel™ Imager Light Base.
4. The E-Gel™ iBase™ Device is now ready for use with the E-Gel™ Imager.



## Using the E-Gel™ Imager Adaptor Base

### Install hardware

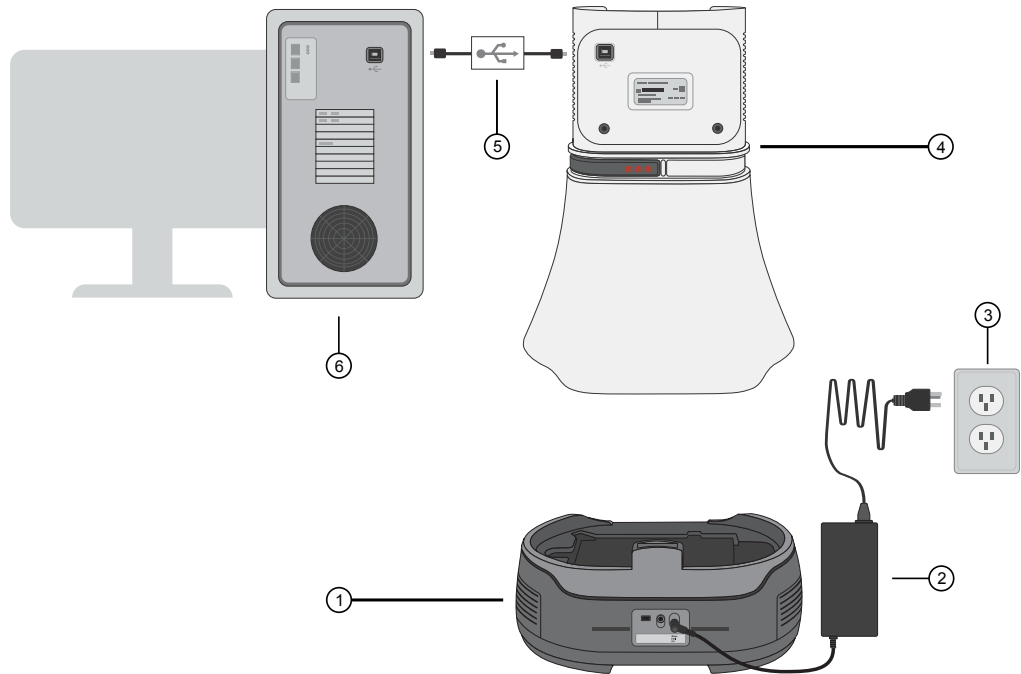
Install the hardware for the E-Gel™ Imager Camera Hood and E-Gel™ Imager Adaptor Base as described in the following section.

To install the E-Gel™ Imager Light Base, see “Install hardware” on page 14.



## Install the E-Gel™ Imager Camera Hood and Adaptor Base

1. Place the E-Gel™ Imager Adaptor Base on a flat surface.
2. Plug the 48-V power supply into the 48 V power port, and connect the wall plug to an electrical socket.
3. Plug the USB 2.0 cable into the camera USB port of the camera hood and connect the other end into the USB 2.0 port of your computer.

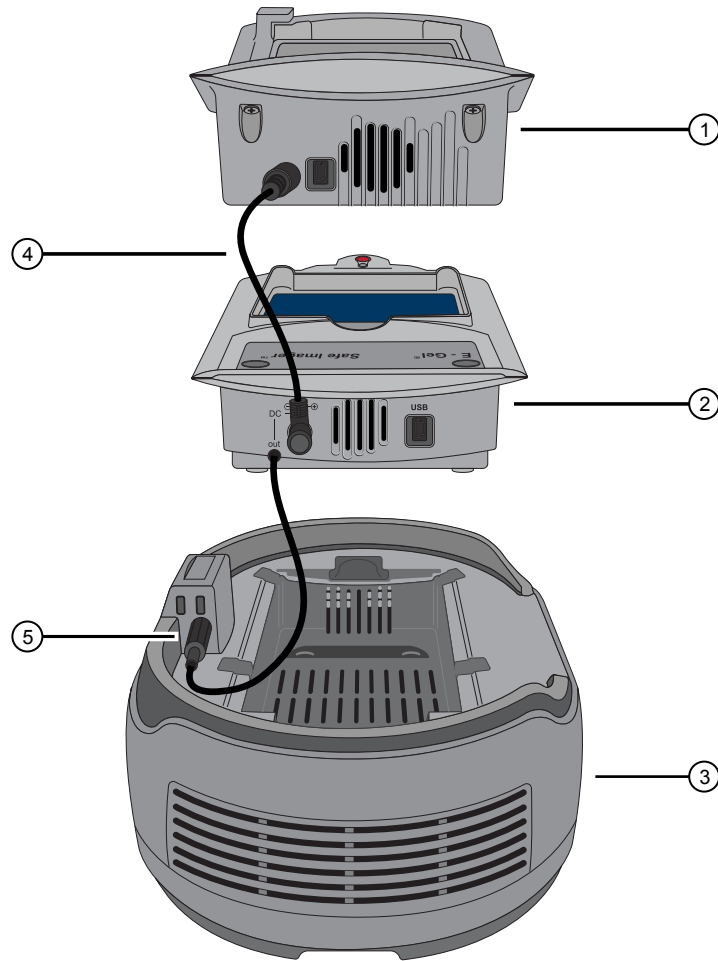


- |   |                             |
|---|-----------------------------|
| ① E-Gel™ Imager Adaptor Base  | ③ Electrical socket         |
| ② 48-V power supply (from the E-Gel™ iBase™ Device or the E-Gel™ Safe Imager™ Transilluminator) | ④ E-Gel™ Imager Camera Hood |
|   | ⑤ USB 2.0 cable             |
|   | ⑥ Computer                  |



## Hardware configuration

The E-Gel™ Imager Adaptor Base is used with the E-Gel™ Safe Imager™ Transilluminator to visualize gels stained with SYBR™ dyes. In this configuration, the E-Gel™ Safe Imager™ Transilluminator can also be used with the E-Gel™ iBase™ Device to visualize E-Gel™ pre-cast agarose gels.



- ① E-Gel™ iBase™
- ② E-Gel™ Safe Imager™
- ③ E-Gel™ Imager Adaptor Base
- ④ DC connector cable
- ⑤ E-Gel™ Safe Imager™ power cable

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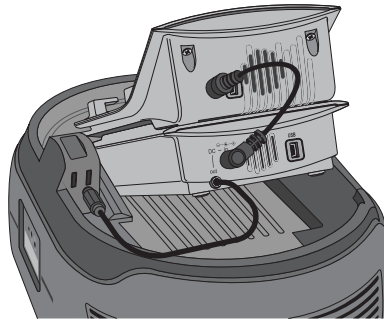
**IMPORTANT!** When using the E-Gel™ Safe Imager™ to provide transillumination for imaging, ensure to push the red button on the E-Gel™ Safe Imager™ for 2 seconds to extend the duration of transillumination to 5 minutes.

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### Connect the E-Gel™ iBase™ /Safe Imager™ Transilluminator with the Adaptor Base

1. Connect the DC connector cable to the E-Gel™ Safe Imager™ and the E-Gel™ iBase™ Device.
2. Connect the E-Gel™ Safe Imager™ power cable into the E-Gel™ Imager Adaptor Base.
3. Place the E-Gel™ Safe Imager™ into the well of the E-Gel™ Imager Adaptor Base.



4. Connect the iBase™ /Safe Imager™ power supply cable to the 48-V power port at the rear of the E-Gel™ Imager Adaptor Base.
5. The E-Gel™ iBase™ Device is now ready for use with the E-Gel™ Imager System.
6. Press the ON/OFF power button to power on the E-Gel™ Safe Imager™.



① E-Gel™ Safe Imager™ ON button

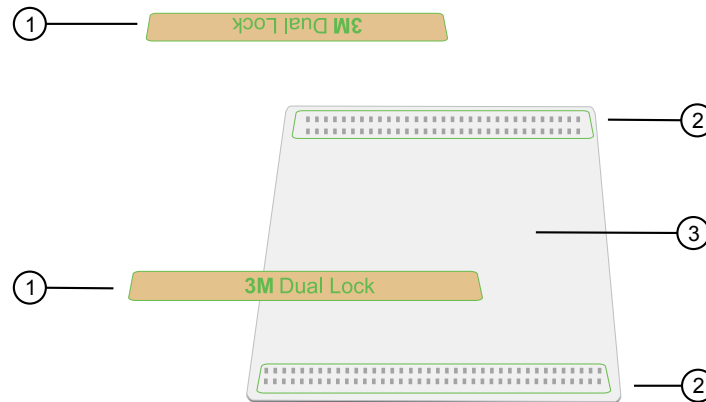


## The E-Gel™ Imager iBase™ Light Diffuser

### Using the E-Gel™ Imager iBase™ Light Diffuser

The E-Gel™ Imager iBase™ Light Diffuser (Cat. No. 4473062) is designed to improve images that are obtained from the E-Gel™ iBase™ Device when placed on the E-Gel™ Imager Blue Light Base or E-Gel™ Safe Imager™ Transilluminator.

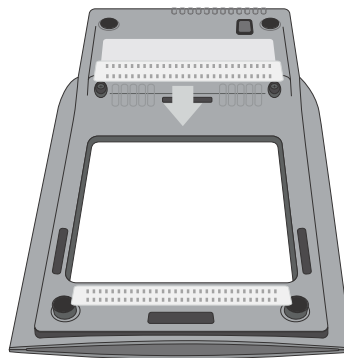
The diffuser has a thin protective film on one side, and 2 strips of adhesive-backed velcro on the other side.



- ① Velcro strip for E-Gel™ iBase™ Device
- ② Velcro strip on E-Gel™ Imager iBase™ Light Diffuser
- ③ E-Gel™ Imager iBase™ Light Diffuser

### Attach the E-Gel™ Imager iBase™ Light Diffuser

1. Remove the velcro strips from the diffuser, then peel off the brown adhesive backing.
2. Attach the velcro strips to the back of the E-Gel™ iBase™ Device, then press firmly to set the strips in place.



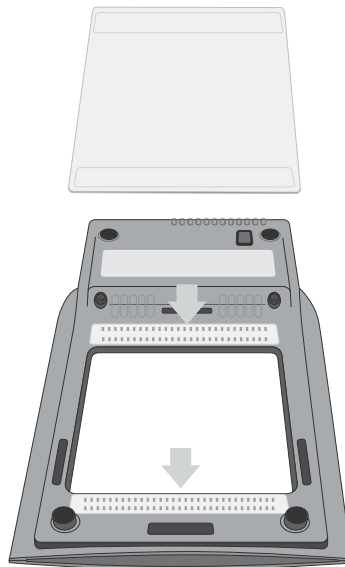
**Note:** Do not remove the velcro strips once they are attached to the E-Gel™ iBase™ Device.



3. Remove the protective film from the surface of the diffuser.



4. Place the diffuser on the E-Gel™ iBase™ Device so that the velcro strips on the diffuser come in contact with the velcro strips on the E-Gel™ iBase™ Device.



5. The E-Gel™ iBase™ Device is now ready to be used with the E-Gel™ Imager.



6. To remove the diffuser from the E-Gel™ iBase™ Device, gently separate the velcro strips.



# Safety



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**WARNING! GENERAL SAFETY.** Using this product in a manner not specified in the user documentation may result in personal injury or damage to the instrument or device. Ensure that anyone using this product has received instructions in general safety practices for laboratories and the safety information provided in this document.

- Before using an instrument or device, read and understand the safety information provided in the user documentation provided by the manufacturer of the instrument or device.
  - Before handling chemicals, read and understand all applicable Safety Data Sheets (SDSs) and use appropriate personal protective equipment (gloves, gowns, eye protection, and so on). To obtain SDSs, see the “Documentation and Support” section in this document.
- 

## Safety features

- An internal sensor prevents accidental electrocution when the tower is lifted off the base by automatic circuit cut-out.
- This system has automatic shut-down when not in use for more than 20 minutes.

## Safety requirements

- Verify that all devices are turned off before making any connections.
- Do not block the ventilation openings of any parts of the E-Gel™ Imager unit or of its sub-assemblies.
- Place the E-Gel™ Imager unit at least 30 cm (12 inches) away from the walls and ceiling.
- Do not store below  $-10^{\circ}\text{C}$ . The recommended operating conditions for the E-Gel™ Imager are  $25^{\circ}\text{C}$  ( $78^{\circ}\text{F}$ )  $\pm 5^{\circ}\text{C}$ , 55% relative humidity, up to 2000 m altitude. Storage conditions:  $10^{\circ}\text{C}$  to  $40^{\circ}\text{C}$ ; 50–80% humidity; up to 2000 m altitude.
- Do not store the system in direct sunlight or in the direct flow of the air conditioner.
- Do not clean the system with harmful solvents. Only use a soft cloth dampened with water.
- Intended for indoor use only.



- Do not open the unit. Due to the danger of exposure to high voltage, only trained service technicians should open the unit.
- Do not place the system near any motorized, vibrating, or magnetic equipment.
- Unit protection can be impaired if used in a manner not specified by the manufacturer.
- Dispose of all plastic bags and wrapping according to local environmental regulations and keep them away from children.

## Chemical safety



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**WARNING! GENERAL CHEMICAL HANDLING.** To minimize hazards, ensure laboratory personnel read and practice the general safety guidelines for chemical usage, storage, and waste provided below. Consult the relevant SDS for specific precautions and instructions:

- Read and understand the Safety Data Sheets (SDSs) provided by the chemical manufacturer before you store, handle, or work with any chemicals or hazardous materials. To obtain SDSs, see the “Documentation and Support” section in this document.
  - Minimize contact with chemicals. Wear appropriate personal protective equipment when handling chemicals (for example, safety glasses, gloves, or protective clothing).
  - Minimize the inhalation of chemicals. Do not leave chemical containers open. Use only with adequate ventilation (for example, fume hood).
  - Check regularly for chemical leaks or spills. If a leak or spill occurs, follow the manufacturer's cleanup procedures as recommended in the SDS.
  - Handle chemical wastes in a fume hood.
  - Ensure use of primary and secondary waste containers. (A primary waste container holds the immediate waste. A secondary container contains spills or leaks from the primary container. Both containers must be compatible with the waste material and meet federal, state, and local requirements for container storage.)
  - After emptying a waste container, seal it with the cap provided.
  - Characterize (by analysis if necessary) the waste generated by the particular applications, reagents, and substrates used in your laboratory.
  - Ensure that the waste is stored, transferred, transported, and disposed of according to all local, state/provincial, and/or national regulations.
  - **IMPORTANT!** Radioactive or biohazardous materials may require special handling, and disposal limitations may apply.
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## Biological hazard safety



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**WARNING! BIOHAZARD.** Biological samples such as tissues, body fluids, infectious agents, and blood of humans and other animals have the potential to transmit infectious diseases. Conduct all work in properly equipped facilities with the appropriate safety equipment (for example, physical containment devices). Safety equipment can also include items for personal protection, such as gloves, coats, gowns, shoe covers, boots, respirators, face shields, safety glasses, or goggles. Individuals should be trained according to applicable regulatory and company/institution requirements before working with potentially biohazardous materials. Follow all applicable local, state/provincial, and/or national regulations. The following references provide general guidelines when handling biological samples in laboratory environment.

- U.S. Department of Health and Human Services, *Biosafety in Microbiological and Biomedical Laboratories (BMBL)*, 5th Edition, HHS Publication No. (CDC) 21-1112, Revised December 2009; found at:  
<https://www.cdc.gov/labs/pdf/CDC-BiosafetymicrobiologicalBiomedicalLaboratories-2009-P.pdf>
  - World Health Organization, *Laboratory Biosafety Manual*, 3rd Edition, WHO/CDS/CSR/LYO/2004.11; found at:  
[www.who.int/csr/resources/publications/biosafety/Biosafety7.pdf](http://www.who.int/csr/resources/publications/biosafety/Biosafety7.pdf)
-

# Documentation and support

## Customer and technical support

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- Product documentation
  - User guides, manuals, and protocols
  - Certificates of Analysis
  - Safety Data Sheets (SDSs; also known as MSDSs)

**Note:** For SDSs for reagents and chemicals from other manufacturers, contact the manufacturer.

## Limited product warranty

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