ABI PRISM® 310 Genetic Analyzer

Site Preparation Guide

Applied Biosystems

For Research Use Only. Not for use in diagnostic procedures.

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Preface

How to Use This Guide

Purpose of This Guide

The *ABI PRISM® 310 Genetic Analyzer Site Preparation Guide* provides the information you need to fully prepare your site for the arrival and installation of the ABI PRISM® 310 Genetic Analyzer.

Audience

This guide is intended for the personnel who schedule, manage, and perform the tasks required to prepare your site for installation of the 310 Genetic Analyzer.

User Attention Words

Two user attention words appear in Applied Biosystems user documentation. Each word implies a particular level of observation or action as described below:

Note: Provides information that may be of interest or help but is not critical to the use of the product.

IMPORTANT! Provides information that is necessary for proper instrument operation, accurate chemistry kit use, or safe use of a chemical.

The following are examples of the user attention words:

Note: The size of the column affects the run time.

Note: The Calibrate function is also available in the Control Console.

IMPORTANT! To verify your client connection to the database, you need a valid user ID and password.

IMPORTANT! You must create a separate Sample Entry Spreadsheet for each 96-well plate.

Safety Alert Words

Safety alert words also appear in user documentation. For more information, see "Safety Alert Words" on page viii.

Text Conventions

This guide uses the following conventions:

- **Bold** indicates user action. For example:

  Type **0**, then press **Enter** for each of the remaining fields.
- *Italic* text indicates new or important words and is also used for emphasis. For example:

  Before analyzing, *always* prepare fresh matrix.
- A right arrow bracket (>) separates successive commands you select from a drop-down or shortcut menu. For example:

  Select **File > Open > Spot Set**.

  Right-click the sample row, then select **View Filter > View All Runs**.

How to Obtain More Information

Related Documentation

The related document *ABI Prism® 310 Genetic Analyzer User Guide* is shipped with the system. The guide provides brief, step-by-step procedures for DNA sequencing or DNA fragment analysis. It is designed to help you quickly learn to use the ABI PRISM® 310 Genetic Analyzer.

Note: For additional documentation, see "How to Obtain Support" on page vi.

Send Us Your Comments

Applied Biosystems welcomes your comments and suggestions for improving its user documents. You can e-mail your comments to:

techpubs@appliedbiosystems.com

How to Obtain Support

For the latest services and support information for all locations, go to **http://www.appliedbiosystems.com**, then click the link for **Support**.

At the Support page, you can:

- Obtain worldwide telephone and fax numbers to contact Applied Biosystems Technical Support and Sales facilities
- Search through frequently asked questions (FAQs)
- Submit a question directly to Technical Support
- Order Applied Biosystems user documents, MSDSs, certificates of analysis, and other related documents
- Download PDF documents
- Obtain information about customer training
- Download software updates and patches

Safety and EMC Compliance Information

This section includes the following topics:

Safety Conventions Used in This Document

Safety Alert Words

Four safety alert words appear in Applied Biosystems user documentation at points in the document where you need to be aware of relevant hazards. Each alert word–**IMPORTANT, CAUTION, WARNING, DANGER**–implies a particular level of observation or action, as defined below:

Definitions

IMPORTANT! – Indicates information that is necessary for proper instrument operation, accurate chemistry kit use, or safe use of a chemical.

– Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

– Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.

– Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations.

Except for IMPORTANTs, each safety alert word in an Applied Biosystems document appears with an open triangle figure that contains a hazard symbol. *These hazard symbols are identical to the hazard icons that are affixed to Applied Biosystems instruments* (see "Safety Symbols" on page ix).

Examples

The following examples show the use of safety alert words:

IMPORTANT! You must create a separate a Sample Entry Spreadsheet for each 96-well plate.

The lamp is extremely hot. Do not touch the lamp until it has cooled to room temperature.

CHEMICAL HAZARD. Formamide. Exposure causes eye, skin, and respiratory tract irritation. It is a possible developmental and birth defect hazard. Read the MSDS, and follow the handling instructions. Wear appropriate protective eyewear, clothing, and gloves.

ELECTRICAL HAZARD. Failure to ground the instrument properly can lead to an electrical shock. Ground the instrument according to the provided instructions.

Symbols on Instruments

Electrical Symbols on Instruments

The following table describes the electrical symbols that may be displayed on Applied Biosystems instruments.

Symbol	Description
	Indicates the **On** position of the main power switch.
	Indicates the **Off** position of the main power switch.
	Indicates a standby switch by which the instrument is switched on to the **Standby** condition. Hazardous voltage may be present if this switch is on standby.
	Indicates the **On/Off** position of a push-push main power switch.
	Indicates a terminal that may be connected to the signal ground reference of another instrument. This is not a protected ground terminal.
	Indicates a protective grounding terminal that must be connected to earth ground before any other electrical connections are made to the instrument.
	Indicates a terminal that can receive or supply alternating current or voltage.
	Indicates a terminal that can receive or supply alternating or direct current or voltage.

Safety Symbols

The following table describes the safety *s*ymbols that may be displayed on Applied Biosystems instruments. Each symbol may appear by itself or with text that explains the relevant hazard (see "Safety Labels on Instruments" on page x). These safety symbols may also appear next to DANGERS, WARNINGS, and CAUTIONS that occur in the text of this and other product-support documents.

Symbol	Description
	Indicates that you should consult the manual for further information and to proceed with appropriate caution.
	Indicates the presence of an electrical shock hazard and to proceed with appropriate caution.

Symbol	Description
	Indicates the presence of a hot surface or other high-temperature hazard and to proceed with appropriate caution.
	Indicates the presence of a laser inside the instrument and to proceed with appropriate caution.
	Indicates the presence of moving parts and to proceed with appropriate caution.

Safety Labels on Instruments

The following CAUTION, WARNING, and DANGER statements may be displayed on Applied Biosystems instruments in combination with the safety symbols described in the preceding section.

English	Francais
CAUTION Hazardous chemicals. Read the Material Safety Data Sheets (MSDSs) before handling.	**ATTENTION** Produits chimiques dangeureux. Lire les fiches techniques de sûreté de matériels avant la manipulation des produits.
CAUTION Hazardous waste.	**ATTENTION** Déchets dangereux.
CAUTION Hazardous waste. Refer to MSDS(s) and local regulations for handling and disposal.	**ATTENTION** Déchets dangereux. Lire les fiches techniques de sûreté de matériels et la régulation locale associées à la manipulation et l'élimination des déchets.
WARNING Hot lamp.	**AVERTISSEMENT** Lampe brûlante.
WARNING Hot. Replace lamp with an Applied Biosystems lamp.	**AVERTISSEMENT** Composants brûlants. Remplacer la lampe par une lampe Applied Biosystems.
CAUTION Hot surface.	**ATTENTION** Surface brûlante.
DANGER High voltage.	**DANGER** Haute tension.
WARNING To reduce the chance of electrical shock, do not remove covers that require tool access. No user-serviceable parts are inside. Refer servicing to Applied Biosystems qualified service personnel.	**AVERTISSEMENT** Pour éviter les risques d'électrocution, ne pas retirer les capots dont l'ouverture nécessite l'utilisation d'outils. L'instrument ne contient aucune pièce réparable par l'utilisateur. Toute intervention doit être effectuée par le personnel de service qualifié de Applied Biosystems.

English	Francais
DANGER Class 3B laser radiation present when open and interlock defeated. Avoid direct exposure to laser beam.	**DANGER** Class 3B rayonnement laser en cas d'ouverture et d'une neutralisation des dispositifs de sécurité. Eviter toute exposition directe avec le faisceau.
DANGER Class 3B laser radiation when open. Avoid direct exposure to laser beam.	**DANGER** Class 3B rayonnement laser en cas d'ouverture. Eviter toute exposition directe avec le faisceau.
DANGER Class 3B laser radiation present when open and interlock defeated. Do not stare directly into the beam	**DANGER** de Class 3B rayonnement laser en cas d'ouverture et d'une neutralisation des dispositifs de securite. Eviter toute exposition directe avec le faisceau.
DANGER Class 3B laser radiation present when open. Do not stare directly into the beam.	**DANGER** de Class 3B rayonnement laser en cas d'ouverture. Eviter toute exposition directe avec le faisceau.
CAUTION Moving parts.	**ATTENTION** Parties mobiles.

General Instrument Safety

WARNING **PHYSICAL INJURY HAZARD.** Use this product only as specified in this document. Using this instrument in a manner not specified by Applied Biosystems may result in personal injury or damage to the instrument.

Moving and Lifting the Instrument

CAUTION **PHYSICAL INJURY HAZARD.** The instrument is to be moved and positioned only by the personnel or vendor specified in the applicable site preparation guide. If you decide to lift or move the instrument after it has been installed, do not attempt to lift or move the instrument without the assistance of others, the use of appropriate moving equipment, and proper lifting techniques. Improper lifting can cause painful and permanent back injury. Depending on the weight, moving or lifting an instrument may require two or more persons.

Moving and Lifting Stand-Alone Computers and Monitors

WARNING Do not attempt to lift or move the computer or the monitor without the assistance of others. Depending on the weight of the computer and/or the monitor, moving them may require two or more people.

Things to consider before lifting the computer and/or the monitor:

- Make sure that you have a secure, comfortable grip on the computer or the monitor when lifting.
- Make sure that the path from where the object is to where it is being moved is clear of obstructions.
- Do not lift an object and twist your torso at the same time.
- Keep your spine in a good neutral position while lifting with your legs.
- Participants should coordinate lift and move intentions with each other before lifting and carrying.
- Instead of lifting the object from the packing box, carefully tilt the box on its side and hold it stationary while someone slides the contents out of the box.

Operating the Instrument

Ensure that anyone who operates the instrument has:

- Received instructions in both general safety practices for laboratories and specific safety practices for the instrument.
- Read and understood all applicable Material Safety Data Sheets (MSDSs). See “About MSDSs” on page xiii.

Chemical Safety

Chemical Hazard Warning

WARNING **CHEMICAL HAZARD.** Before handling any chemicals, refer to the Material Safety Data Sheet (MSDS) provided by the manufacturer, and observe all relevant precautions.

WARNING **CHEMICAL HAZARD.** All chemicals in the instrument, including liquid in the lines, are potentially hazardous. Always determine what chemicals have been used in the instrument before changing reagents or instrument components. Wear appropriate eyewear, protective clothing, and gloves when working on the instrument.

About MSDSs

Chemical manufacturers supply current Material Safety Data Sheets (MSDSs) with shipments of hazardous chemicals to *new* customers. They also provide MSDSs with the first shipment of a hazardous chemical to a customer after an MSDS has been updated. MSDSs provide the safety information you need to store, handle, transport, and dispose of the chemicals safely.

Each time you receive a new MSDS packaged with a hazardous chemical, be sure to replace the appropriate MSDS in your files.

Obtaining MSDSs

You can obtain from Applied Biosystems the MSDS for any chemical supplied by Applied Biosystems. This service is free and available 24 hours a day.

To obtain MSDSs:

1. Go to **https://docs.appliedbiosystems.com/msdssearch.html**
2. In the **Search** field, type in the chemical name, part number, or other information that appears in the MSDS of interest.
3. Select the language of your choice, then click **Search**.
4. Find the document of interest, right-click the document title, then select any of the following:
   - **Open** – To view the document
   - **Print Target** – To print the document
   - **Save Target As** – To download a PDF version of the document to a destination that you choose

Chemical Safety Guidelines

To minimize the hazards of chemicals:

- Read and understand the Material Safety Data Sheets (MSDS) provided by the chemical manufacturer before you store, handle, or work with any chemicals or hazardous materials. (See “About MSDSs” on page xiii.)
- Minimize contact with chemicals. Wear appropriate personal protective equipment when handling chemicals (for example, safety glasses, gloves, or protective clothing). For additional safety guidelines, consult the MSDS.
- Minimize the inhalation of chemicals. Do not leave chemical containers open. Use only with adequate ventilation (for example, fume hood). For additional safety guidelines, consult the MSDS.
- Check regularly for chemical leaks or spills. If a leak or spill occurs, follow the manufacturer’s cleanup procedures as recommended on the MSDS.
- Comply with all local, state/provincial, or national laws and regulations related to chemical storage, handling, and disposal.

Chemical Waste Safety

Chemical Waste Hazard

HAZARDOUS WASTE. Refer to Material Safety Data Sheets and local regulations for handling and disposal.

CHEMICAL WASTE HAZARD. Wastes produced by Applied Biosystems instruments are potentially hazardous and can cause injury, illness, or death.

Chemical Waste Safety Guidelines

To minimize the hazards of chemical waste:

- Read and understand the Material Safety Data Sheets (MSDSs) provided by the manufacturers of the chemicals in the waste container before you store, handle, or dispose of chemical waste.
- Provide 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.)
- Minimize contact with chemicals. Wear appropriate personal protective equipment when handling chemicals (for example, safety glasses, gloves, or protective clothing). For additional safety guidelines, consult the MSDS.
- Minimize the inhalation of chemicals. Do not leave chemical containers open. Use only with adequate ventilation (for example, fume hood). For additional safety guidelines, consult the MSDS.
- Handle chemical wastes in a fume hood.
- After emptying a waste container, seal it with the cap provided.
- Dispose of the contents of the waste tray and waste bottle in accordance with good laboratory practices and local, state/provincial, or national environmental and health regulations.

Waste Disposal

If potentially hazardous waste is generated when you operate the instrument, you must:

- Characterize (by analysis if necessary) the waste generated by the particular applications, reagents, and substrates used in your laboratory.
- Ensure the health and safety of all personnel in your laboratory.
- Ensure that the instrument 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.

Electrical Safety

ELECTRICAL SHOCK HAZARD. Severe electrical shock can result from operating the ABI PRISM® 310 Genetic Analyzer without its instrument panels in place. Do not remove instrument panels. High-voltage contacts are exposed when instrument panels are removed from the instrument.

Power

ELECTRICAL HAZARD. Grounding circuit continuity is vital for the safe operation of equipment. Never operate equipment with the grounding conductor disconnected.

ELECTRICAL HAZARD. Use properly configured and approved line cords for the voltage supply in your facility.

ELECTRICAL HAZARD. Plug the system into a properly grounded receptacle with adequate current capacity.

Overvoltage Rating

The ABI PRISM® 310 Genetic Analyzer system has an installation (overvoltage) category of II, and is classified as portable equipment.

Physical Hazard Safety

Moving Parts

PHYSICAL INJURY HAZARD. Moving parts can crush and cut. Keep hands clear of moving parts while operating the instrument. Disconnect power before servicing the instrument.

Biological Hazard Safety

General Biohazard

BIOHAZARD. Biological samples such as tissues, body fluids, and blood of humans and other animals have the potential to transmit infectious diseases. Follow all applicable local, state/provincial, and/or national regulations. Wear appropriate protective eyewear, clothing, and gloves. Read and follow the guidelines in these publications:

- U.S. Department of Health and Human Services guidelines published in *Biosafety in Microbiological and Biomedical Laboratories* (stock no. 017-040-00547-4; **http://bmbl.od.nih.gov**)
- Occupational Safety and Health Standards, Bloodborne Pathogens (29 CFR§1910.1030; **http://www.access.gpo.gov/nara/cfr/ waisidx_01/ 29cfr1910a_01.html**).

Additional information about biohazard guidelines is available at: **http://www.cdc.gov**

Laser Safety

Laser Classification

The ABI PRISM® 310 Genetic Analyzer uses an argon ion gas laser that emits up to 30 mW of electromagnetic radiation. Under normal operating conditions, the instrument laser is categorized as a Class 1 laser. When safety interlocks are disabled during certain servicing procedures, the laser can cause permanent eye damage, and, therefore, is classified under those conditions as a Class 3B laser.

The 310 Genetic Analyzer has been designed to comply with Title 21, U.S. Government DHEW/BRH Performance Standards, Chapter 1, Sub-chapter J, Section 1040, as applicable.

Laser Safety Requirements

To ensure safe laser operation:

- The system must be installed and maintained by an Applied Biosystems Technical Representative.
- All instrument panels must be in place on the instrument while the instrument is operating. When all panels are installed, there is no detectable radiation present. If any panel is removed when the laser is operating (during service with safety interlocks disabled), you may be exposed to laser emissions in excess of the Class 3B rating.
- Do not remove safety labels or disable safety interlocks.

Additional Laser Safety Information

Refer to the user documentation provided with the laser for additional information on government and industry safety regulations.

LASER HAZARD. Lasers can burn the retina causing permanent blind spots. Never look directly into the laser beam. Remove jewelry and other items that can reflect the beam into your eyes. Do not remove the instrument top or front panels. Wear proper eye protection and post a laser warning sign at the entrance to the laboratory if the top or front panels are removed for service.

LASER BURN HAZARD. An overheated laser can cause severe burns if it comes in contact with the skin. DO NOT operate the laser when it cannot be cooled by its cooling fan. Always wear appropriate laser safety goggles.

Workstation Safety

Correct ergonomic configuration of your workstation can reduce or prevent effects such as fatigue, pain, and strain. Minimize or eliminate these effects by configuring your workstation to promote neutral or relaxed working positions.

MUSCULOSKELETAL AND REPETITIVE MOTION HAZARD. These hazards are caused by potential risk factors that include but are not limited to repetitive motion, awkward posture, forceful exertion, holding static unhealthy positions, contact pressure, and other workstation environmental factors.

To minimize musculoskeletal and repetitive motion risks:

- Use equipment that comfortably supports you in neutral working positions and allows adequate accessibility to the keyboard, monitor, and mouse.
- Position the keyboard, mouse, and monitor to promote relaxed body and head postures.

Safety and Electromagnetic Compatibility (EMC) Standards

This section provides information on:

- U.S. and Canadian Safety Standards
- Canadian EMC Standard
- European Safety and EMC Standards
- Australian EMC Standards

U.S. and Canadian Safety Standards

This instrument has been tested to and complies with standard UL 3101-1, "Safety Requirements for Electrical Equipment for Laboratory Use, Part 1: General Requirements."

This instrument has been tested to and complies with standard CSA 1010.1, "Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use, Part 1: General Requirements."

Canadian EMC Standard

This instrument has been tested to and complies with ICES-001, Issue 3: Industrial, Scientific, and Medical Radio Frequency Generators.

European Safety and EMC Standards

Safety

This instrument meets European requirements for safety (Low Voltage Directive 73/23/EEC). This instrument has been tested to and complies with standards EN 61010-1:2001, "Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use, Part 1: General Requirements" and EN 61010-2-010, "Particular Requirements for Laboratory Equipment for the Heating of Materials."

EMC

This instrument meets European requirements for emission and immunity (EMC Directive 89/336/EEC). This instrument has been tested to and complies with standard EN 61326 (Group 1, Class B), "Electrical Equipment for Measurement, Control and Laboratory Use – EMC Requirements."

Australian EMC Standards

This instrument has been tested to and complies with standard AS/NZS 2064, "Limits and Methods Measurement of Electromagnetic Disturbance Characteristics of Industrial, Scientific, and Medical (ISM) Radio-frequency Equipment."

Site Preparation Tasks 1

This chapter includes the following topics:

Overview

Before an Applied Biosystems service representative arrives to install the system, prepare your site for the installation according to the instructions in this chapter. Checklists are provided in Chapter 2, "Checklists."

IMPORTANT! If site preparation tasks are not complete when the Applied Biosystems service representative arrives, the scheduled installation may be postponed.

Site Preparation Schedule

To minimize the time between the shipment arrival and system installation:

1. Complete the site preparation tasks (Chapter 1).
2. Fill out the corresponding checklists (Chapter 2).
3. Schedule installation before the system shipment arrives.
4. Verify with an Applied Biosystems service representative who will contact you by telephone that:
   - All checklists are complete.
   - The purchase order is complete.
   - You have considered all components and options in preparing the site.

Site Preparation Process

The general site preparation tasks and a suggested sequence for completing the tasks are summarized in Figure 1-1. The sequence can vary, but always:

- Review this guide first.
- Unpack and store separately shipped chemistry kit(s) as soon as you receive it.

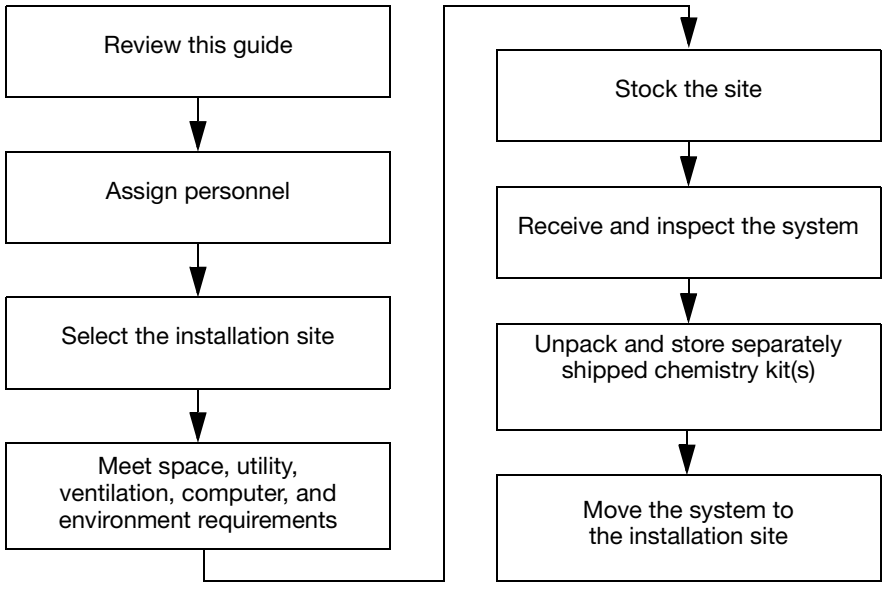

Figure 1-1 Site preparation tasks and their suggested sequence

Assigning Personnel

Laboratory Safety Representative

Applied Biosystems requests that a representative from your laboratory be in the vicinity and available to the Applied Biosystems service representative at all times while the service representative is at your facility. The laboratory safety representative should be familiar with laboratory safety procedures and know the location of all the safety equipment.

Tasks and Personnel

Table 1-1 summarizes specific site-preparation tasks and suggests the personnel to accomplish the tasks. Use the table to help schedule and manage the site-preparation process.

Table 1-1 Suggested personnel tasks

Personnel	Tasks
Site Preparation/ Installation Coordinator	• Reviews the site preparation guide for safety information and system requirements. • Coordinates personnel and tasks. • Orders required materials. • Chooses the site. • Reviews checklists with applicable personnel, then with the Applied Biosystems service representative to verify that the site is properly prepared. • Receives and inspects the system. • Stores one of the following kits: – Sequencing Chemistry Installation Kit (P/N 401820) – Fragment Analysis Chemistry Installation Kit (P/N 4339808) – Sequencing/Fragment Analysis Chemistry Installation Kit (P/N 4390404) – HID Chemistry Installation Kit (P/N 4331843) • Schedules the installation and informs personnel of the installation date. • Ensures that the site is clear of unnecessary material on the installation day. • Is available to assist the service representative throughout installation.
Laboratory Safety Representative	• Reviews the site preparation guide for safety information. • Ensures that the required safety practices and equipment are in place. • Is available to assist with unpacking and setup.
Laboratory Personnel/ Primary Users	• Review safety information. • Ensure that all customer-provided materials for installation are present at the site. • Primary users (responsible for training other users) are available during the installation for about eight hours of training.

Table 1-1 Suggested personnel tasks *(continued)*

Personnel	Tasks
Facilities Personnel	• Ensure that installation requirements are met for: – Space at the installation site – Building clearances – Temperature and humidity – Ventilation and waste collection – Electrical supply – Computer – Safety and installation materials • If possible, move the crated system to the site before the installation date. • Are available to assist service representative and laboratory personnel throughout installation. • If applicable, at least one person is available to help the Applied Biosystems service representative move and position the system.

Selecting the Site

When deciding where to install the instrument, refer to the following sections for site requirements:

- "Space Requirements" on page 1-4
- "Environmental Requirements" on page 1-8
- "Electrical Requirements" on page 1-8
- "Safety and Materials" on page 1-10

IMPORTANT! The site cannot be designated BioSafety Level 3 (BSL-3) or BioSafety Level 4 (BSL-4). Applied Biosystems does not install, service, or repair Applied Biosystems instruments in areas designated BSL-3 or BSL-4.

Space Requirements

System Components

The ABI Prism® 310 Genetic Analyzer includes the:

- ABI Prism® 310 Genetic Analyzer
- Computer, monitor, keyboard, mouse, and mouse pad

Figure 1-2 ABI Prism® 310 Genetic Analyzer

Inlet and Outlet Connections

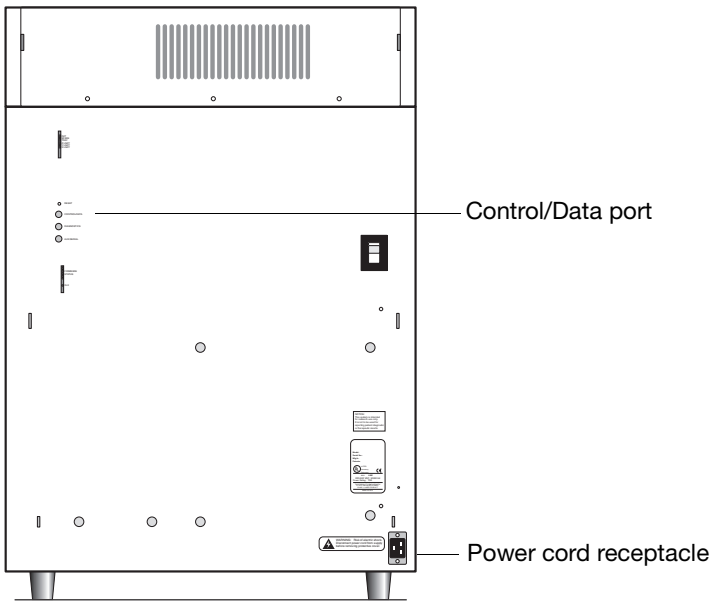

Figure 1-3 ABI Prism® 310 Genetic Analyzer back view

Layout Requirements

Figure 1-4 shows a typical layout and some basic layout considerations for the genetic analyzer. For details on the 310 Genetic Analyzer space requirements, see Figure 1-5 on page 1-7.

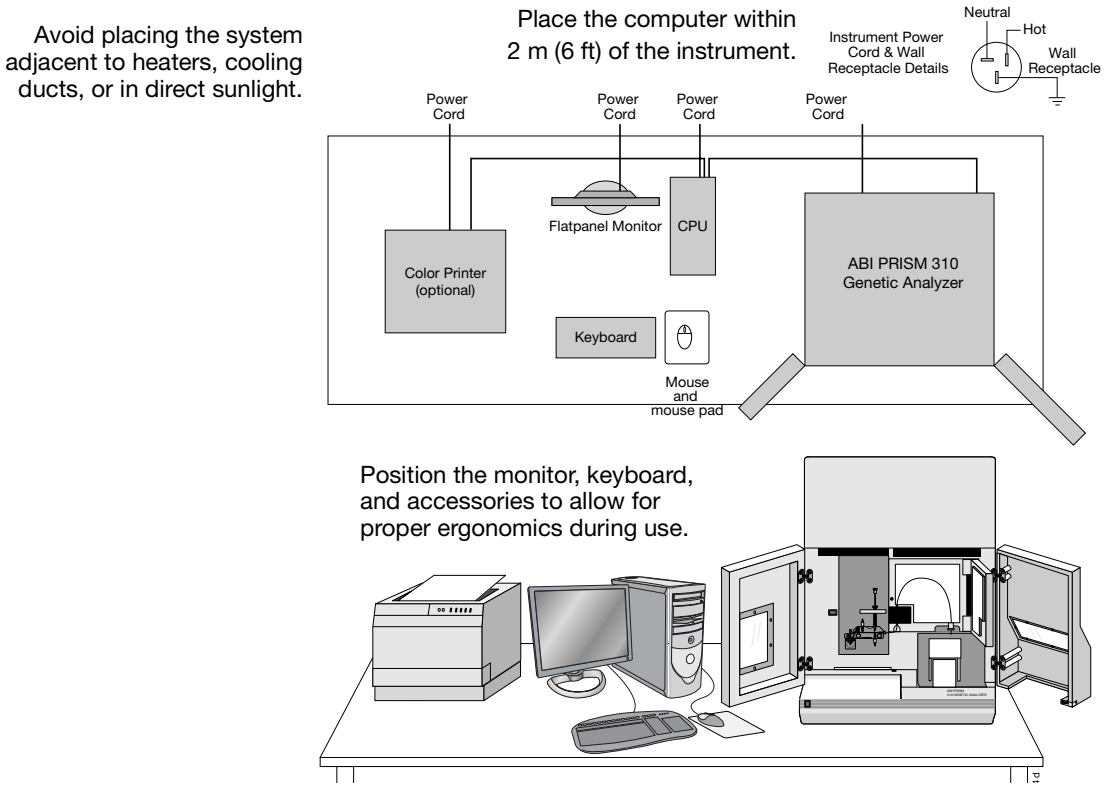

Figure 1-4 Layout requirements (not to scale)

Dimensions and Weights

The table below indicates dimensions and weights of the system components. Ensure that the installation site (floor space and/or bench space) can accommodate the dimensions and support the weights.

Component	Width	Depth	Height	Weight
310 instrument, crated	89 cm (35 in.)	82 cm (32 in.)	145 cm (57 in.)	151 kg (332 lbs)
310 instrument, uncrated	61 cm (24 in.)	55.9 cm (22 in.)	86.4 cm (34 in.)	90 kg (198 lbs)
Computer and accessories: • Computer • Monitor • Keyboard	49 cm (19 in.)	69 cm (27 in.)	61 cm (24 in.)	30 kg (65 lbs)

Required Clearances

Required clearances for the ABI PRISM® 310 Genetic Analyzer are summarized below and illustrated in Figure 1-5.

- **Clearance on all sides** – At least 30.5 cm (12 in.) of clearance for service access, and cable routing. Allow space for the Applied Biosystems service representative to move the instrument for easy access to the back and sides.
- **Vertical clearance** – At least 5 cm (2 in.) of unobstructed vertical clearance above the top of the genetic analyzer to allow the top to be lifted during service.
- **Rear clearance** – At least 15.3 cm (6 in.) of clearance at the rear of the instrument for adequate ventilation.

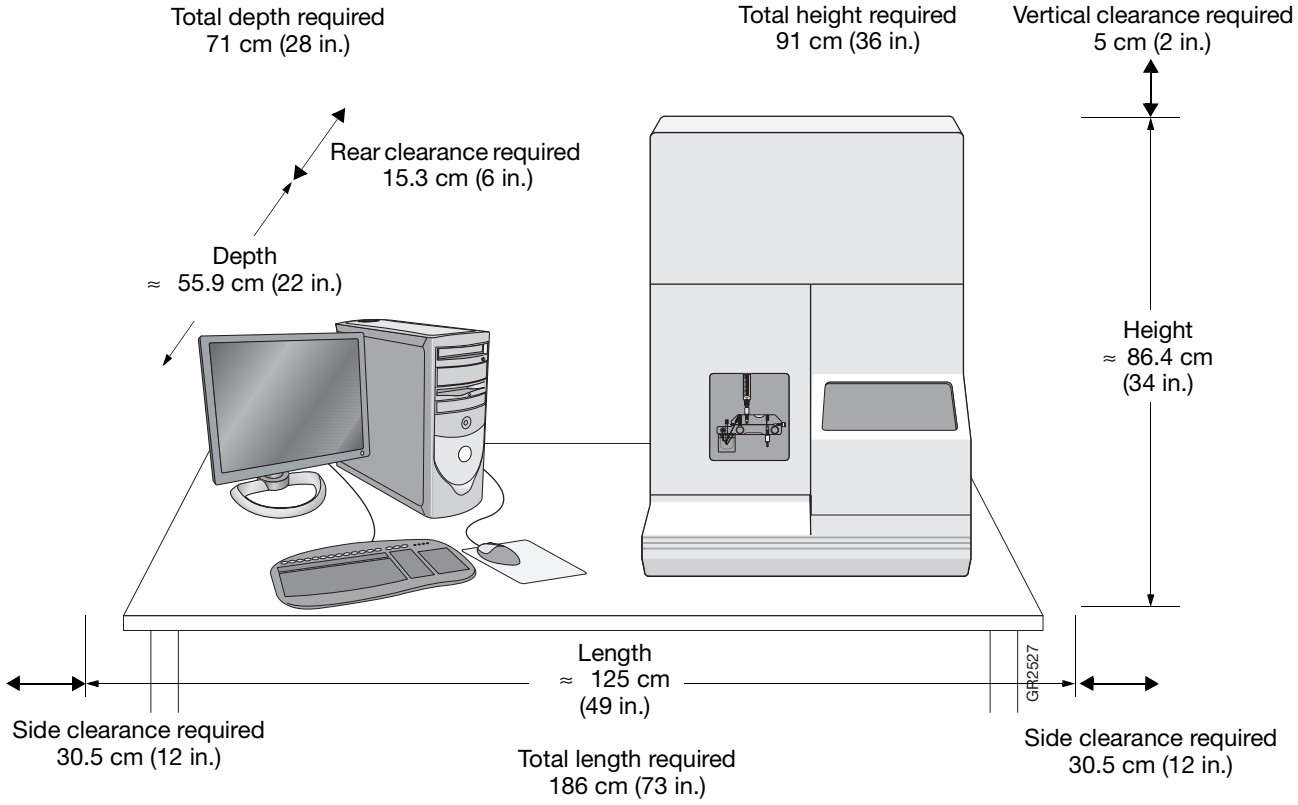

Figure 1-5 Space requirements (not to scale)

Environmental Requirements

Altitude

This ABI PRISM® 310 Genetic Analyzeris for indoor use only and for altitudes not exceeding 2000 m (6500 ft) above sea level.

Temperature and Humidity Requirements

Ensure that the installation site is maintained under the following conditions:

Condition	Acceptable Range
Temperature	15 to 30 °C (59 to 86 °F)
Humidity	Up to 80% relative humidity, noncondensing

Avoid placing the system adjacent to heaters, cooling ducts, or in direct sunlight. Fluctuations between day and night temperatures can cause system instability.

Pollution

The ABI PRISM® 310 Genetic Analyzer has a Pollution Degree rating of II. It may be installed in an environment that has nonconductive pollutants only, such as dust particles or wood chips. Typical environments with a Pollution Degree II rating are laboratories and sales and commercial areas.

Heat Production

The thermal output of the instrument is 5000 BTU/h (approximately 1500 W). Consult your facilities department regarding ventilation requirements for this level of heat output.

Electrical Requirements

Power

IMPORTANT! You must be able to disconnect the main power supply to the instrument immediately if necessary.

The following table specifies the electrical operating range for the instrument in various parts of the world:

Location	Voltage (Vac)	Frequency	Plug Type
Japan	100 ±10%	50/60 Hz ±1%	JIS 8303
USA/Canada	120 ±10%	50/60 Hz ±1%	NEMA 5-15
Europe (pre-1992)	220 ±10%	50/60 Hz ±1%	CEE 7/4
EC	240 ±10%	50/60 Hz ±1%	CEE 7/4
UK	240 +6%/–10%	50/60 Hz ±1%	BS 1363
Australia	240 +6%/–10%	50/60 Hz ±1%	AS 3112

Power Line

The electrical receptacle must have a dedicated 2.4 kVA single phase power line and ground or a 2.4 kVA power line with a line conditioner or uninterruptible power supply (UPS).

Electrical Outlets

This instrument requires a Nema 5-15 receptacle in the U.S. The electrical receptacle must be located within 3 m (10 ft) of the instrument rear panel. Do not use extension cords.

Cords

In the USA, Canada, and Japan, the instrument is supplied with a detachable cord equipped with a standard three-prong plug.

In Europe and Australia, the instrument is supplied with an detachable electrical cord equipped with a standard EC plug.

The computer can be plugged into any standard electrical receptacle after it has been configured for the proper voltage.

Grounding

Certain types of electrical noise are greatly exaggerated by poor or improper electrical ground connections. To prevent these problems, it is important to have a dedicated line and ground between the instrument and building main electrical service.

Power Line Regulator

In areas where the supplied power is subject to voltage fluctuations exceeding ±10% of the nominal value (above), a power line regulator may be required. High or low voltages can have adverse effects on the electronic components of the instrument.

Voltage Spikes

Short-duration, high-voltage spikes often cause random failures in microprocessor-controlled instrumentation. These spikes can be caused by other devices using the same power source (refrigerators, air conditioners, and centrifuges) or by outside influences such as lightning. A dedicated line and ground between the instrument and building main electrical service prevents such problems.

If your environment contains devices that are electrically noisy or you are in an area with frequent electrical storms, a line conditioner with a recommended capacity of 2.4 kVA will enhance the reliability of your system.

Power Outages

The instrument has been designed to pause during short periods of power outage (loss). To continue operation you must resume the run from the software, provided that the line voltage did not become excessively noisy before the outage. If you want increased protection during a power outage, install an uninterruptible power supply (UPS) with a capacity of 2.4 kVA.

Electric Shock Warning

ELECTRICAL SHOCK HAZARD. Severe electrical shock, which could cause physical injury or death, can result from working on an instrument when the high-voltage power supply is operating. To avoid electrical shock, disconnect the power supply to the instrument, unplug the power cord, and wait at least 1 minute before working on the instrument.

Computer Requirements

Antivirus Software Requirements

No antivirus software is provided because customer preferences and network requirements vary. Therefore, you need to install antivirus software of your choice to protect the computer against viruses.

CAUTION Do not install on the computer additional software other than antivirus software. Changes to the configured software could void the instrument warranty and cause the system to be nonoperational.

LAN Connection

Applied Biosystems will not support or connect a network card or install network connections. You must make arrangements with your own network administration to to have this done during or immediately after installation of the ABI PRISM® 310 Genetic Analyzer.

Printer Requirements

The ABI PRISM® 310 Genetic Analyzer can use a network or dedicated printer. The printer and any necessary print drivers must be available before the scheduled installation.

Safety and Materials

Safety Practices

IMPORTANT! The site must not be designated BioSafety Level 3 (BSL-3) or BioSafety Level 4 (BSL-4). Applied Biosystems does not install, service, or repair Applied Biosystems instruments in areas designated BSL-3 or BSL-4.

IMPORTANT! A safety representative from your facility must ensure that:

- Personnel establish and follow all applicable safety practices and policies to protect laboratory personnel from potential hazards.
- All applicable safety devices and equipment are available at all times.

Required Safety Equipment

Your laboratory has specific safety practices and policies designed to protect laboratory personnel from potential hazards that are present. Applied Biosystems expects that you will follow all applicable safety-related procedures at all times.

The following safety protection and equipment must be available at the installation site:

- Protection from any sources of hazardous chemicals, radiation (for example, lasers, radioisotopes, radioactive wastes, and contaminated equipment), and potentially infectious biological material that may be present in the area where the Applied Biosystems service representative will work.
- Appropriate fire extinguisher:
  - You are responsible for providing an appropriate fire extinguisher for use on or near Applied Biosystems equipment.
  - The types and sizes of fire extinguishers shall be suitable for use on electrical and chemical fires as specified in current codes, regulations, and/or standards, and with approval of the Fire Marshall or other authority having jurisdiction.

  - The installation of appropriate fire extinguishers shall be in addition to other fire-protection systems and not as a substitute or alternative to them.
- Eyewash.
- Safety shower.
- Eye and hand protection.
- Adequate ventilation, including vent line/fume hood, if applicable.
- Biohazard waste container, if applicable.
- First-aid equipment.
- Spill cleanup equipment.
- Applicable MSDSs.

Materials for Installation

Provide the following materials for the installation:

- Safety glasses, lab coats, chemical-resistant, disposable gloves (powder-free)
- Glassware washing solution
- Lint-free tissues
- Water, Milli-Q® grade
- Three sizes of micropipettors and tips
  - 1- to 10-µL
  - 10- to 100-µL
  - 100- to 1,000-µL
- Mini vortexer, centrifuge, and 0.5-mL and 1.5-mL sample tubes
- Cap tubes, 15-mL
- Heating block or water bath to 95 ° C
- Ice bucket, wet ice
- Graduated cylinders, 10-mL, 25-mL, 50-mL, 100-mL
- Additional computer supplies (paper, disks, and so on)
- Printer (optional)

Materials for Routine Operation

Additional supplies and consumables are necessary for routine operation of the 310 instrument. Before the system is installed, contact the Applied Biosystems sales representative to order these additional supplies.

Receiving and Inspecting the System

Shipped Contents

The ABI PRISM® 310 Genetic Analyzer shipment includes the:

- 310 instrument in a crate
- A box with:
  - User Guide (P/N 4317588)
  - Installation Guide (P/N 4317586)
  - 310 Packing Kit (P/N 4326808)
  - Accessories (if ordered)
  - One or both of the following autosampler kits:
  - 48-Lane Sample Tray (P/N 402867)
  - 96-Lane Sample Tray (P/N 402868)
- Computer monitor
- CPU desktop, computer keyboard, mouse, and mouse pad
- One of the following chemistry kits:
  - Sequencing Chemistry Installation Kit (P/N 401820)
  - Fragment Analysis Chemistry Installation Kit (P/N 4339808)
  - Sequencing/Fragment Analysis Chemistry Installation Kit (P/N 4390404)
  - HID Chemistry Installation Kit (P/N 4331843)

IMPORTANT! Except for the Sequencing Chemistry Installation Kit, Fragment Analysis Chemistry Installation Kit, Sequencing/Fragment Analysis Chemistry Installation Kit, or the HID Chemistry Installation Kit, do not unpack ABI Prism® 310 Genetic Analyzer shipping containers, to protect you from liability if any damage occurred during shipping.

Shipping List

Verify that the items shown on the shipping list are the same items that you ordered.

Inspecting Shipping Containers for Damage

Carefully inspect the shipping containers and report any damage to the Applied Biosystems service representative. Record any damage or mishandling on the shipping documents. Also, contact Applied Biosystems if the tip or shock indicators on the crates show evidence that the shipment was mishandled during transit.

Unpacking and Storing the Chemistry Kit(s)

You must unpack one of the following kits (whichever one you ordered for your application):

- Sequencing Chemistry Installation Kit
- Fragment Analysis Chemistry Installation Kit
- Sequencing/Fragment Analysis Chemistry Installation Kit
- HID Chemistry Installation Kit

Store according to the storage conditions specified on page 1-13 to page 1-15.

WARNING **CHEMICAL HAZARD.** Some chemicals used with Applied Biosystems instruments are potentially hazardous and can cause injury, illness, or death. Read and understand the Material Safety Data Sheets (MSDSs) provided by the chemical manufacturer before you store, handle, work with, or dispose of any chemicals or hazardous materials.

Autosampler Tray Kits

Your site ordered one or both of the autosampler kits indicated in Tables 1-2 and 1-3.

Note: These kits are shipped in a separate box at the same time as the packing kit.

Table 1-2 ABI PRISM 310 Genetic Analyzer 48-Sample Tray Kit

Part Number	Item	Quantity
401957	Genetic Analyzer Sample Tubes	1 PK/500
401956	Genetic Analyzer Septa, 0.5-mL	
5572	Tray, Sample 310	2

Table 1-3 ABI PRISM 310 Genetic Analyzer 96-Sample Tray Kit

Part Number	Item	Quantity
402866	Genetic Analyzer Retainer Clip	1
4305547	Genetic Analyzer Septa Strips	
N8010580	MicroAmp® 8-Strip Reaction Tube	
4312063	Splash-free support base	
4305051	96-well tray/retainer adaptor	
403081	MicroAmp® 96-well tray	

Additional Installation Kits

Your site ordered and will receive separately the Sequencing Chemistry Installation Kit, the Fragment Analysis Chemistry Installation Kit, Sequencing/Fragment Analysis Chemistry Installation kit, or the HID Chemistry Installation Kit.

Table 1-4 Sequencing Chemistry Installation Kit (P/N 401820)

Part Number	Item	Storage Temp.
4311320	Hi-Di™ Formamide, 25 mL	4 °C
402837	Performance Optimized Polymer 6 (POP-6™)	4 to 10 °C
402840	Capillaries, 61 cm × 50 µm	Ambient
4336935	BigDye® v3.1 Terminator Sequencing Standard	–20 °C
4336948	BigDye® v3.1 Matrix Standards Kit	4 °C

Table 1-4 Sequencing Chemistry Installation Kit (P/N 401820)

Part Number	Item	Storage Temp.
4336915	BigDye® v3.1 Read Reaction Kit (24 reaction)	–20 °C
4336791	BigDye® v1.1 Terminator Sequencing Standard	–20 °C
4336805	BigDye® v1.1 Matrix Standards Kit	4 °C
4336772	BigDye® 1.1 Read Reaction Kit (24 reaction)	–20 °C
402824	ABI PRISM® 310 Genetic Analyzer Buffer w/EDTA	4 °C
402839	310 Capillaries, 47 cm × 50 µm	Ambient
401928	ABI PRISM® 310 Sensitivity Standard	Ambient
4336697	Small buffer tube	Ambient

Table 1-5 Fragment Analysis Chemistry Installation Kit (P/N 4339808)

Part Number	Item	Storage Temp.
4311320	Hi-Di Formamide, 25 mL	4 °C
4318159	DS-33 Matrix Standards	
4330397	DS-33 GeneScan Installation Standard	
4322682	GeneScan™ 500 (LIZ®-dye) Size Standard	
402838	POP-4™ polymer	
402824	ABI PRISM 310 Genetic Analyzer Buffer w/EDTA	
402839	310 Capillaries, 47 cm × 50 µm	Ambient
401928	ABI PRISM® 310 Sensitivity Standard	

Table 1-6 Sequencing/Fragment Analysis Chemistry Installation Kit (P/N 4390404)

Part Number	Item	Storage Temp.
4336935	BigDye® v3.1 Terminator Sequencing Standard	–20 °C
4336948	BigDye® v3.1 Matrix Standards Kit	4 °C
4336915	BigDye® v3.1 Read Reaction Kit (24 reaction)	–20 °C
4336791	BigDye® v1.1 Terminator Sequencing Standard	–20 °C
4336805	BigDye® v1.1 Matrix Standards Kit	4 °C
4336772	BigDye® 1.1 Read Reaction Kit (24 reaction)	–20 °C
4318159	DS-33 Matrix Standards	4 °C
4330397	DS-33 GeneScan Installation Standard	4 °C
4322682	GeneScan™ 500 (LIZ®-dye) Size Standard	4 °C
4311320	Hi-Di Formamide, 25 mL	4 °C
402840	(Sequencing) Capillary, 61 cm × 50 µm	Ambient
402839	310 Capillaries, 47 cm × 50 µm	Ambient
402824	ABI PRISM 310 Genetic Analyzer Buffer w/EDTA	4 °C
401928	ABI PRISM 310 Sensitivity Standard	Ambient

Table 1-6 Sequencing/Fragment Analysis Chemistry Installation Kit (P/N 4390404)

Part Number	Item	Storage Temp.
402838	Performance Optimized Polymer 4 (POP-4)	4 °C
402837	Performance Optimized Polymer 6 (POP-6™)	4 °C

Table 1-7 HID Chemistry Installation Kit (P/N 4331843)

Part Number	Item	Storage Temp.
402839	Capillary, 310 GeneScan 47 cm × 50 µ i.d.	Ambient
4311320	Hi-Di Formamide, 25 mL	4 °C
4312131	DS-32 Matrix Standard	4 °C
401734	Kit, ABI PRISM® GeneScan™ 500 ROX™ Size Standard	4 °C
402838	Performance Optimized Polymer 4 (POP-4™)	4 °C
4303835	Kit, HID GeneScan Allelic Ladder	4 °C
402824	ABI PRISM 310 Genetic Analyzer Buffer w/EDTA	4 °C
401928	ABI PRISM 310 Sensitivity Standard	Ambient

Moving the Crated Instrument to the Laboratory

Moving Schedule

Before the date of installation:

- Clear the installation site of all unnecessary materials.
- If possible, move the crated 310 instrument from the receiving area to the installation site.
- If possible, move the other shipping containers from the shipping area to the installation site.

Required Building Clearances

The largest container (crate) included with the ABI PRISM® 310 Genetic Analyzer shipment contains the 310 instrument. To move the crate to the installation site, verify that the building clearances allow passage of the following crate dimensions:

Crate Dimension	Minimum Building Clearance
Height	145 cm (57 in.)
Length	89 cm (35 in.)
Depth	82 cm (32 in.)

Instrument Weight

The 310 instrument weighs approximately 90 kg (198 lbs). The crated instrument weighs approximately 151 kg (332 lbs).

Moving and Lifting the Instrument

CAUTION **PHYSICAL INJURY HAZARD.** The instrument is to be moved and positioned only by the Applied Biosystems service representative. If you decide to lift or move the instrument after it has been installed, do not attempt to lift or move the instrument without the assistance of others, the use of appropriate moving equipment, and proper lifting techniques. Improper lifting can cause painful and permanent back injury. Depending on the weight, moving or lifting an instrument may require two or more persons.

CAUTION Do not tip the ABI PRISM® 310 Genetic Analyzer on end. Tipping damages the 310 instrument hardware and electronics.

During Installation

After the system is uncrated with assistance from a person at your site, installation and testing of the ABI PRISM® 310 Genetic Analyzer by the Applied Biosystems service representative takes about 14 hours including training.

CAUTION While the 310 instrument is being installed, avoid exposure to hazards that may be associated with the installation process.

Operator Training

During and/or after installation, the Applied Biosystems service representative reviews data and provides some basic operator training. For additional training and reference information, see the user documents provided with the instrument.

Checklists 2

This chapter includes the following topics:

Overview

Before using the checklists, read all previous sections in this guide.

Use the checklists in this chapter to ensure that you have made all preparations for installing the system. An Applied Biosystems service representative will contact you to verify that all checklists are complete before setting up the installation date.

In the following checklists, date each item after verifying its completion.

Personnel Checklist

For more information, see "Assigning Personnel" on page 1-3.

Date Verified	Designated Personnel
	Site Preparation/Installation coordinator
	Laboratory safety representative
	Laboratory personnel: • To ensure that customer-supplied materials are on hand • Primary users to be trained during installation and to subsequently train other users
	Facilities personnel: • To provide environmental, electrical, and computer site-preparation requirements • One person to help the service representative move and position the instrument, if applicable

Space and Layout Checklist

For more information, see “Space Requirements” on page 1-4.

Date Verified	Requirement
	Location is away from: • Heating or cooling ducts. • Direct sunlight.
	Space for the computer desk is within 2 m (6 ft) of the ABI PRISM® 310 Genetic Analyzer.
	Computer workspace allows for proper ergonomics during use.
	Location accommodates the dimensions and weights specified in “Dimensions and Weights” on page 1-6.
	Location meets the requirements specified in “Required Clearances” on page 1-7.

Environmental Checklist

For more information, see “Environmental Requirements” on page 1-8.

Date Verified	Requirement
	The altitude does not exceed 2000 m (6500 ft) above sea level.
	The conditions specified in “Temperature and Humidity Requirements” on page 1-8 have been met.
	Pollution Degree II – Only nonconductive pollutants, if any, are present.

Ventilation and Waste Collection Checklist

For more information, see “Heat Production” on page 1-8.

Date Verified	Requirement
	Facilities personnel have certified that the normal room ventilation system can maintain room temperature if the maximum thermal output of the system is vented directly into the room air.
	Proper handling and disposal method(s) for hazardous chemical waste (If appropriate) have been established.

Electrical Checklist

For more information, see “Electrical Requirements” on page 1-8.

Date Verified	Requirement
	The main power supply to the instrument can be immediately disconnected.
	Appropriate grounded power receptacles are available (see “Electrical Requirements” on page 1-8).
	A dedicated 2.4 kVA power line and ground are available for the system. A line conditioner or UPS on the power line is recommended.
	Three standard power outlets (four with a printer) are within 3 m (10 ft) of the instrument location, preferable, near the back of the instrument.

Computer Checklist

For more information, see “Computer Requirements” on page 1-10.

Date Verified	Requirement
	Antivirus Software
	Appropriate antivirus software is available for loading on the system computer.
	Printer
	A network printer or a dedicated printer and necessary print drivers are available.

Safety Checklist

For more information, see “Safety Practices” on page 1-10.

Date Verified	Requirement
	The site is not designated BioSafety level 3 (BSL-3) or BioSafety level 4 (BSL-4).
	Safety practices and policies to protect laboratory personnel from potential hazards are in place and are followed.
	Protection from any sources of hazardous chemicals, radiation (for example, lasers, radioisotopes, radioactive wastes, and contaminated equipment), and potentially infectious biological material is in place.
	Appropriate fire extinguisher
	Eye and hand protection
	Eyewash
	Safety shower
	Vent lines/fume hood, if applicable
	Biohazard waste container, if applicable
	First-aid equipment
	Spill cleanup equipment
	MSDSs readily available

Materials Checklist

For more information, see “Safety and Materials” on page 1-10.

Date Verified	Requirement
	Materials for General Installation
	Safety glasses and lab coats
	Chemical-resistant disposable gloves (powder free)
	Glassware washing solution
	Lint-free tissues
	Water, Milli-Q grade
	Three sizes of micropipettors and tips: • 1- to 10-µL • 10- to 100-µL • 100- to 1000-µL
	A mini vortexer, centrifuge, and 0.5-mL and 1.5-mL sample tubes
	Cap tubes, 15 mL
	Heating block or water bath to 95 °C
	Ice bucket, wet ice
	Graduated cylinders, 10-mL, 25-mL, 50-mL, 100-mL
	Additional computer supplies (paper, disks, and so on)
	Printer (optional)
	Materials for Routine Operation
	Materials for routine operation after the installation is complete are available or have been ordered (see “Materials for Routine Operation” on page 1-11).

System Receipt and Inspection Checklist

For more information, see "Receiving and Inspecting the System" on page 1-12.

Date Verified	Action
	Verified that the instrument serial number and system on the packing list are those that were ordered. Otherwise, reported to the Applied Biosystems service representative discrepancies in the packing list.
	Opened and stored components as specified in the kit operating instructions of one of the following: • Sequencing Chemistry Installation Kit • Fragment Analysis Chemistry Installation Kit • Sequencing/Fragment Analysis Chemistry Installation Kit • HID Chemistry Installation Kit
	Received the system and inspected the shipping containers for mishandling or damage. **IMPORTANT!** Do not open any shipping containers except for the separately shipped chemistry installation kits as listed above.
	Reported to the Applied Biosystems service representative: • Any damage to the shipping containers • Tip indicators or shock indicators that show evidence of mishandling during transit

Moving the Crated Instrument Checklist

For more information, see "Moving the Crated Instrument to the Laboratory" on page 1-15

Date Verified	Requirement
	The measured building clearances can accommodate the ABI PRISM® 310 Genetic Analyzer crate dimensions (see "Required Building Clearances" on page 1-15). If the crate dimensions exceed building clearances, contact the Applied Biosystems service representative. Do not unpack the crate without authorization.
	Move the crated genetic analyzer and and any of the shipped containers, to the laboratory before the date of the scheduled installation. **WARNING** **PHYSICAL INJURY HAZARD**. Do not attempt to lift or move any boxed or crated items unless you have received related training. Incorrect lifting can cause painful and sometimes permanent back injury. Use proper lifting techniques when lifting or moving items. No attempt should be made to lift the instrument.
	Cleared the installation site of all unnecessary materials.

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Worldwide Sales and Support

Applied Biosystems vast distribution and service network, composed of highly trained support and applications personnel, reaches 150 countries on six continents. For sales office locations and technical support, please call our local office or refer to our Web site at **www.appliedbiosystems.com**.

Applera is committed to providing the world's leading technology and information for life scientists. Applera Corporation consists of the Applied Biosystems and Celera Genomics businesses.

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