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Applied Biosystems SOLiD™ 4 System

Site Preparation Guide

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Contents

Preface

Overview

The Applied Biosystems SOLiD™ 4 System, based on sequencing by oligonucleotide ligation and detection, is the next-generation system for ultra high-throughput DNA analysis. The system consists of the SOLiD™ 4 Analyzer and sample-preparation equipment.

SOLiD™ 4 Analyzer

The SOLiD™ 4 Analyzer includes the SOLiD™ 4 Instrument, the SOLiD™ 4 Computer System, and the SOLiD™ Software Suite.

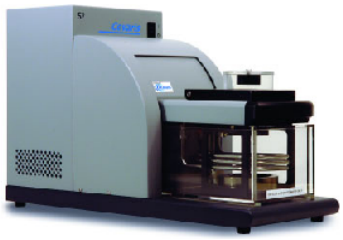
Figure 1 SOLiD™ 4 Analyzer.

Sample-preparation equipment

The sample-preparation equipment includes:

- Covaris™ S2 System from Covaris: To shear DNA in fragment library preparation, and to declump beads in bead and slide preparation

Covaris™ S2 System from Covaris Inc.



Covaris™ S-series Machine

Latitude™ Laptop from Dell® Inc.

VWR® Compact Chiller, Model 117-612

Figure 2 Covaris™ S2 System.

- HydroShear® DNA Shearing Device from Genomic Solutions: To shear DNA in mate-paired library preparation

HydroShear® DNA Shearing Device from Genomic Solutions®

Figure 3 HydroShear® DNA Shearing Device from Genomic Solutions.

- ULTRA-TURRAX® Tube Drive from IKA (optional): To produce water-in-oil emulsions

ULTRA-TURRAX® Tube Drive from IKA®

Figure 4 ULTRA-TURRAX® Tube Drive from IKA.

About this guide

The following table contains chapter names and a brief description of their contents.

Table 1 Chapter names and content description

Chapter name	Content description
Safety	Information about various safety issues related to SOLiD™ 4 System.
Chapter 1, SOLiD™ 4 System Room Configuration	Information about SOLiD™ 4 System components, various processing rooms, and rooms configurations.
Chapter 2, SOLiD™ 4 System Materials	Equipment and consumables required for SOLiD™ 4 System.
Chapter 3, SOLiD™ 4 Analyzer Site Preparation	Information about tasks involved in receiving and setting up the SOLiD™ 4 Analyzer.
Chapter 4, SOLiD™ 4 Analyzer Checklists	A series of checklists corresponding to the items discussed in Chapter 3.
Chapter 5, Sample-Preparation Equipment Site Preparation	Information about tasks involved in receiving and setting up the sample-preparation equipment.
Chapter 6, Sample-Preparation Equipment Checklists	A series of checklists corresponding to the items discussed in Chapter 5.

How to use this guide

Purpose of this guide

The *Applied Biosystems SOLiD™ 4 System Site Preparation Guide* provides the information you need to fully prepare your site for the arrival and installation of the Applied Biosystems SOLiD™ 4 System.

Audience

This guide is intended for the personnel who will schedule, manage, and perform the tasks required to prepare your site for installation of the SOLiD™ 4 System.

Text conventions

This guide uses the following conventions:

- **Bold** text 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 symbol (▸) 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**.

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.

Examples of the user attention words appear below:

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.

Safety alert words

Safety alert words also appear in user documentation. For more information, see "Safety conventions used in this document" on page 14.

How to obtain more information

Related documentation

The following documents are related to the SOLiD™ System:

Table 2 Related documentation

Document	Part number	Description
Applied Biosystems SOLiD™ 4 System Library Preparation Guide	4445673	Describes how to prepare libraries.
Applied Biosystems SOLiD™ 4 System Library Preparation Quick Reference Card	4445674	Provides brief, step-by-step procedures for preparing libraries.
Applied Biosystems SOLiD™ 4 System Templated Bead Preparation Guide	4448378	Describes how to prepare templated beads by emulsion PCR (ePCR), required before sequencing on the SOLiD™ 4 System.
Applied Biosystems SOLiD™ 4 System Templated Bead Preparation Quick Reference Card	4448329	Provides brief, step-by-step procedures for preparing templated beads by emulsion PCR (ePCR), required before sequencing on the SOLiD™ 4 System.
Applied Biosystems SOLiD™ 4 System Instrument Operation Guide	4448379	Describes how to load and run the SOLiD™ 4 System for sequencing.
Applied Biosystems SOLiD™ 4 System Instrument Operation Quick Reference Card	4448380	Provides brief, step-by-step procedures for loading and running the SOLiD™ 4 System.
Applied Biosystems SOLiD™ 4 System SETS Software User Guide	4448411	Provides an alternate platform to monitor runs, modify settings and reanalyze previous runs that are performed on the SOLiD System.
Applied Biosystems SOLiD™ 4 System ICS Software Help	—	Describes the software and provides procedures for common tasks (see the Instrument Control Software).

Table 2 Related documentation *(continued)*

BioScope™ Software for Scientists Guide	4448431	Provides a bioinformatics analysis framework for flexible application analysis (data-generated mapping, SNPs, count reads) from sequencing runs.
Working with SOLiDBioScope.com™ Quick Reference Card	4452359	Provides an online suite of software tools for Next Generation Sequencing (NGS) analysis. SOLiDBioScope.com™ leverages the scalable resources of cloud computing to perform compute-intensive NGS data processing.
Applied Biosystems SOLiD™ 4 System Software Integrated Workflow Quick Reference Guide	4448432	Describes the relationship between the softwares comprising the SOLiD 4 platform and provides quick step procedures on operating each software to perform data analysis.
Applied Biosystems SOLiD™ 4 System Product Selection Guide	4452360	Provides a quick guide to the sequencing kits you need to perform fragment, paired end, mate-pair, multiplex fragment, and multiplex paired end sequencing.
Applied Biosystems SOLiD™ System SOLiD™ 3 Plus to SOLiD™ 4 System User Documentation Changes	4451929	Provides a brief summary of changes made between the SOLiD™ 3 Plus System documentation and the SOLiD™ 4 System documentation.
Applied Biosystems SOLiD™ 4 Upgrade Checklist	4449773	Provides a checklist to ensure that all necessary preparations are made before upgrading to the SOLiD™ 4 System and provides a list of orderable consumables.
Applied Biosystems SOLiD™ 4 System Library Preparation Guide	4445673	Describes how to prepare libraries.
Applied Biosystems SOLiD™ 4 System Library Preparation Quick Reference Card	4445674	Provides brief, step-by-step procedures for preparing libraries.

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

IMPORTANT! The e-mail address above is only for submitting comments and suggestions relating to documentation. To order documents, download PDF files, or for help with a technical question, go to **www.appliedbiosystems.com**, then click the link for **Support**. (See "How to obtain support" below).

How to obtain support

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

At the Support page, you can:

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

In addition, the Support page provides access to worldwide telephone and fax numbers to contact Applied Biosystems Technical Support and Sales facilities.

Safety

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 topics marked, "IMPORTANT," 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 symbols that are affixed to Applied Biosystems instruments* (see "Safety symbols").

Examples

The following examples show the use of safety alert words:

IMPORTANT! You must create a separate 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 SDS, 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.

Instrumentation safety

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 symbols 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). 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.
	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.
	Indicates the presence of a biological hazard and to proceed with appropriate caution.
	Indicates the presence of a radiological hazard and to proceed with appropriate caution.
	Indicates the presence of a slipping hazard and to proceed with appropriate caution.
	Indicates the presence of an overhead hazard and to proceed with appropriate caution.

Environmental symbols on instruments

The following symbol applies to all Applied Biosystems electrical and electronic products placed on the European market after August 13, 2005.

Symbol	Description
	**Do not dispose of this product as unsorted municipal waste.** Follow local municipal waste ordinances for proper disposal provisions to reduce the environmental impact of waste electrical and electronic equipment (WEEE). **European Union customers:** Call your local Applied Biosystems Customer Service office for equipment pick-up and recycling. See **http://www.appliedbiosystems.com** for a list of customer service offices in the European Union.

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.

Hazard symbol	English	Français
	**CAUTION!** Hazardous chemicals. Read the Safety Data Sheets (SDSs) before handling.	**ATTENTION!** Produits chimiques dangereux. Lire les fiches techniques de sûreté de matériels avant toute manipulation de produits.
	CAUTION! Hazardous waste. Refer to SDS(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.
	**CAUTION!** Potential slipping hazard.	**ATTENTION!** Risque potentiel d'avoir un sol glissant.
	**WARNING!** Hot lamp.	**AVERTISSEMENT!** Lampe brûlante.
	WARNING! Hot. Do not remove lamp until **15** min after disconnecting supply.	**AVERTISSEMENT!** Lampe brûlante, après avoir déconnecté le câble d'alimentation de l'appareil, attendre environ **15** minutes avant d'effectuer un remplacement de la lampe.
	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.
	CAUTION! Replace only with Applied Biosystems recommended light source (PN 4388441).	**ATTENTION!** La Lampe devra être remplacée par un model recommandé par Applied Biosystems, Réf de la lampe: 4388441.
	**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 venant de chez Applied Biosystems.
	**CAUTION!** Moving parts. Crush/pinch hazard.	**ATTENTION!** Pièces en mouvement, risque de pincement et/ou d'écrasement.
	**CAUTION!** Watch your head. Indicates the potential hazard of bumping one's head on the equipment.	**ATTENTION!** Présence d'objet pouvant heurter la tête.

General instrument safety

WARNING **PHYSICAL INJURY HAZARD.** Using the 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.

CAUTION **POTENTIAL SLIPPING HAZARD.** Opening the door to the computer rack requires moving the side cart. To move the side cart the tubing must be detached from the waste container. This may cause a spill. The spill can create a potential slipping hazard. If the waste container contents are spilled, clean up immediately.

IMPORTANT! Applied Biosystems provides primary and secondary waste containers. A primary waste container holds the immediate waste. A secondary container contains spills or leaks from the primary container. Assure waste collection containers meet federal, state, and local requirements for waste collection and storage.

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 Safety Data Sheets (SDSs). See "About SDSs."

Cleaning or decontaminating the instrument

CAUTION Use only the cleaning and decontamination methods described by the manufacturer. Other methods may compromise safety or quality.

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.

Solvents and pressurized fluids

PHYSICAL INJURY HAZARD. Always wear eye protection when working with solvents or any pressurized fluids.

PHYSICAL INJURY HAZARD. To avoid hazards associated with high-pressure fluids in polymeric tubing:

- Be aware that PEEK™ tubing is a polymeric material. Use caution when working with any polymer tubing that is under pressure.
- Always wear eye protection when near pressurized polymer tubing.
- Extinguish all nearby flames if you use flammable solvents.
- Do not use polymeric tubing that has been severely stressed or kinked.
- Do not use polymeric tubing with tetrahydrofuran or concentrated nitric and sulfuric acids.
- Be aware that methylene chloride and dimethyl sulfoxide cause polymeric tubing to swell and greatly reduce the rupture pressure of the tubing.
- Be aware that high solvent flow rates (~40 mL/min) may cause a static charge to build up on the surface of the tubing. Electrical sparks may result.

Electrical safety

DANGER **ELECTRICAL SHOCK HAZARD.** Severe electrical shock can result from operating the SOLiD™ 4 System without its instrument panels in place. Do not remove instrument panels. High-voltage contacts are exposed when instrument panels are removed from the instrument.

Fuses

WARNING **FIRE HAZARD.** Improper fuses or high-voltage supply can damage the instrument wiring system and cause a fire. Before turning on the instrument, verify that the fuses are properly installed and that the instrument voltage matches the power supply in your laboratory.

WARNING **FIRE HAZARD.** For continued protection against the risk of fire, replace fuses only with fuses of the type and rating specified for the instrument.

Power

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

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

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

CAUTION **MULTIPLE POWER CORDS.** Disconnect Both Power Cords Before Servicing Instrument.

Overvoltage rating

The SOLiD™ 4 System has an installation (overvoltage) category of II, and is classified as portable equipment.

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.

CAUTION **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

The instrument has been tested to and complies with standard:

UL 61010-1/CSA C22.2 No. 61010-1, “Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use, Part 1: General Requirements.”

UL 61010-2-010, “Particular Requirements for Laboratory Equipment for the Heating of Materials.”

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 2006/95/EC). 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.”

EN 61010-2-010, “Particular Requirements for Laboratory Equipment for the Heating of Materials.”

EN 61010-2-081, “Particular Requirements for Automatic and Semi-Automatic Laboratory Equipment for Analysis and Other Purposes.”

EMC

This instrument meets European requirements for emission and immunity (EMC Directive 2004/108/EC). This instrument has been tested to and complies with standard EN 61326 (Group 1, Class A), “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.”

Chemical safety

Chemical hazard warning

WARNING **CHEMICAL HAZARD.** Before handling any chemicals, refer to the Safety Data Sheet (SDS) 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.

WARNING **CHEMICAL HAZARD.** Reagent and waste bottles can crack and leak. The waste bottle should be secured in a low-density polyethylene safety container with the cover fastened and the handles locked in the upright position. Wear appropriate eyewear, clothing, and gloves when handling reagent and waste bottles.

WARNING **CHEMICAL STORAGE HAZARD.** Never collect or store waste in a glass container because of the risk of breaking or shattering. Reagent and waste bottles can crack and leak. Each waste bottle should be secured in a low-density polyethylene safety container with the cover fastened and the handles locked in the upright position. Wear appropriate eyewear, clothing, and gloves when handling reagent and waste bottles.

Chemical safety guidelines

To minimize the hazards of chemicals:

- 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. (See About SDSs.)
- 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 SDS.
- 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 SDS.
- Check regularly for chemical leaks or spills. If a leak or spill occurs, follow the manufacturer's cleanup procedures as recommended in the SDS.
- Comply with all local, state/provincial, or national laws and regulations related to chemical storage, handling, and disposal.

About SDSs

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

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

Obtaining SDSs

The SDS for any chemical supplied by Applied Biosystems is available to you free 24 hours a day. To obtain SDSs:

1. Go to **www.appliedbiosystems.com**, click **Support**, then select **SDS**.
2. In the Keyword Search field, enter the chemical name, product name, SDS part number, or other information that appears in the SDS of interest. Select the language of your choice, then click **Search**.
3. 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

Note: For the SDSs of chemicals not distributed by Applied Biosystems, contact the chemical manufacturer.

Chemical waste safety

Chemical waste hazard

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

POTENTIAL SLIPPING HAZARD. Spilled waste will create a slick floor. Clean spilled waste immediately.

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

CHEMICAL STORAGE HAZARD. Never collect or store waste in a glass container because of the risk of breaking or shattering. Reagent and waste bottles can crack and leak. Each waste bottle should be secured in a low-density polyethylene safety container with the cover fastened and the handles locked in the upright position. Wear appropriate eyewear, clothing, and gloves when handling reagent and waste bottles.

Chemical waste safety guidelines

To minimize the hazards of chemical waste:

- Read and understand the Safety Data Sheets (SDSs) 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 SDS.
- 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 SDS.
- 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 biohazard materials may require special handling, and disposal limitations may apply.

SOLiD™ 4 System Room Configuration 1

Figure 5 This chapter includes the following topics:

General information

Suggested room requirements

The suggested room requirements for the SOLiD™ 4 System are as follows:

Room 1: Library preparation (amplicon-free)

Room 2: Bead preparation: emulsion PCR (ePCR), bead, and slide preparation

Room 3: Sequencing instrument

Note: Rooms 2 and 3 can be combined, if needed.

Note: If you have purchased any of the SOLiD™ EZ Bead™ System modules for bead preparation, refer to the *SOLiD™ EZ Bead™ System Emulsifier Site Preparation Guide* (4452499), the *SOLiD™ EZ Bead™ System Amplifier Site Preparation Guide* (4454035), or the *SOLiD™ EZ Bead™ System Enricher Site Preparation Guide* (4454036) for the room requirements.

Static IP address

Before the scheduled installation, obtain a static IP address (including gateway IP address, DNS server, and subnet mask) for your site and send the information to the Applied Biosystems Field Service Engineers staff assigned to your location.

IMPORTANT! The static IP address must be provided before the installation.

Library preparation (amplicon-free) room

Room features

A 28 to 37 m^2 (300 to 400 ft^2) room, or larger, equipped with:

- De-Ionized (DI) water system
- Solid and liquid hazardous waste disposal
- Sink

Room temperature

15 to 24 °C

Equipment

- Gel setups for agarose gels

  CAUTION Do not reuse gels due to contamination risks.
- Dedicated pipettors that remain in the room
- Dedicated solutions that remain in the room
- Vortexer
- Picofuge
- –20 °C freezer
- 4 °C refrigerator or cold-room
- Benchtop microcentrifuge capable of generating 21,000 x g
- Gel imager that can take photographs
- Heat block capable of 70 °C

  CAUTION The heat block is a major source of sample contamination. Keep it clean and use DNA degrading solutions such as 10% bleach or DNAZap™ solution (250 mL of each solution) by Ambion (AM9890) after each use.
- Lab coats to be worn only in this lab
- Sticky mats for floors at room entrances
- Portable, benchtop hood for PCR set up (recommended)
- Hydroshear® DNA Shearing Device from Genomic Solutions
- Covaris™ S2 System
- Thermal Cycler (GeneAmp® PCR System 9700 is recommended)
- NanoDrop® ND-1000 Spectrophotometer (computer required)

Consumables

See Chapter 2, SOLiD™ 4 System Materials.

Electrical

See Chapter 5, Sample-Preparation Equipment Site Preparation.

Bead preparation room

The bead preparation room is used for emulsion PCR (ePCR), templated bead preparation, and slide preparation.

Note: If you have purchased a SOLiD™ EZ Bead™ System module for preparing beads, refer to the *SOLiD™ EZ Bead™ System Emulsifier Site Preparation Guide* (4452499), the *SOLiD™ EZ Bead™ System Amplifier Site Preparation Guide* (4454035), or the *SOLiD™ EZ Bead™ System Enricher Site Preparation Guide* (4454036), for the room requirements.

Note:

IMPORTANT! Emulsion breaking, enrichment, modification, and depositions must be performed in the ePCR room.

Room features

The room should be at least 18.5 m^2 (200 ft^2), or larger, equipped with:

- DDI (Distilled De-Ionized) water system
- Solid and liquid hazardous waste disposal
- Sinks
- Fume hood

Fume hood venting system guidelines

The fume hood venting system must be operated according to the safety standards established by the industry.

In the case of hot-air exhaust (no fumes or vapors), venting can be directed into the laboratory air space only if the room ventilation system can maintain room temperature with the additional thermal output from the instrument.

- Keep the fume hood on at all times.
- Locate the fume hood away from air currents generated by air conditioning ducts, fans, windows, doors, and moving equipment and persons.
- Locate the fume hood exhaust outlet where gaseous waste cannot be drawn back into the building.
- Affix a sign or label to indicate the position of the fume hood sash that produces an average of 30 linear m/min (100 linear ft/min) face-level velocity of airflow. The minimum velocity at any point in the hood is 24 linear m/min (80 linear ft/min), and the maximum velocity is 38 linear m/min (125 linear ft/min).
- Ensure that the fume hood meets all local, state/provincial, or national safety requirements.
- Have a safety professional or mechanical ventilation expert check and record air velocity at least once a year.
- Inspect and maintain the exhaust system, including fans and motors, at least once a year.

Room temperature

15 to 24 °C

Note: Room temperature should not fluctuate more than 5 °C per 24 hour period.

Equipment

IMPORTANT! Strictly follow the manufacturer's recommendations for changing and degassing water in the water bath and other maintenance. Cross-contamination of samples can be prevented by ensuring that samples are tightly capped and surfaces are treated with DNA*zap*™ solution or other DNA-degrading solutions. Shearing DNA with the Covaris™ S2 sonicator should be scheduled either early or late in the day to minimize the disruption of other lab activities.

Table 3 lists the equipment required for bead preparation, for customers who have purchased the SOLiD™ EZ Bead™ System, and customers who perform manual bead preparation. Refer to the *SOLiD™ EZ Bead™ System Emulsifier Site Preparation Guide* (4452499), the *SOLiD™ EZ Bead™ System Amplifier Site Preparation Guide* (4454035), or the *SOLiD™ EZ Bead™ System Enricher Site Preparation Guide* (4454036), for information on the SOLiD™ EZ Bead™ System equipment requirements.

Table 3 Equipment customer must provide for bead preparation

Equipment	SOLiD™ EZ Bead™ System	Manual bead preparation
Covaris™ S2 System	Yes	Yes
ULTRA-TURRAX® Tube Drive from IKA	—	Yes
NanoDrop® ND-1000 Spectrophotometer (computer required)	Yes	Yes
–20 °C freezer	Yes	Yes
4 °C refrigerator or cold-room	Yes	Yes
Floor model centrifuge capable of generating 2,284 x g	Yes	Yes
Benchtop microcentrifuge capable of generating 21,000 x g	—	Yes
Multiple thermal cyclers (GeneAmp® PCR System 9700 recommended)	—	Yes
Fume hood	—	Yes
Heat block or water bath capable of 80 °C	—	Yes
Vortexers	Yes	Yes
Rotating mixers or platforms	Yes	Yes
Magnetic racks	Yes	Yes
Pipettors	Yes	Yes
Organic solvent storage	Yes	Yes
Incubators	Yes	Yes

Consumables

See Chapter 2, SOLiD™ 4 System Materials.

Electrical

See Chapter 5, Sample-Preparation Equipment Site Preparation.

Sequencing instrument room

The Sequencing Instrument Room contains the SOLiD™ 4 Analyzer.

Room features

The instrument area should be 28 m^2 (300 ft^2) or larger, equipped with:

- DDI (Distilled De-Ionized) water system
- Solid and liquid hazardous waste disposal
- Sink
- Cooling system
- Ventilation
- Specified electrical outlets (see Chapter 5, Sample-Preparation Equipment Site Preparation)
- Ethernet connection (less than 3 m from the instrument)

Room temperature

15 to 24 °C

Note: Room temperature should not fluctuate more than 2 °C over a 2-hour period.

Humidity: 20% to 80% (noncondensing)

Equipment

- SOLiD™ 4 Analyzer
- –20 · C freezer
- 4 · C refrigerator or cold-room

Consumables

See Chapter 2, SOLiD™ 4 System Materials.

Electrical

AB recommends:

- Two NEMA L6-30 Receptacles (30 A lines, with a dedicated ground)
  and either
  – Two 3 kVA UPS that has 2 NEMA L6-30 R receptacles outlets
  or
  – Two 2.5 kVA UPS that have one L6-30 Receptacles each
- At least 4 standard 10 to 15 A, 120 V commercial grade receptacles with 3 prongs (2 Pole, 3rd wire grounding), one outlet per 3.5 m (10 ft)

For more information, see Chapter 3, SOLiD™ 4 Analyzer Site Preparation.

SOLiD™ 4 System Materials 2

This chapter includes the following topics:

Sample-preparation equipment materials summary

The sample-preparation equipment includes:

- The SOLiD™ EZ Bead™ System (optional), sold separately (refer to the *SOLiD™ EZ Bead™ System Emulsifier Site Preparation Guide* (4452499), the *SOLiD™ EZ Bead™ System Amplifier Site Preparation Guide* (4454035), and the *SOLiD™ EZ Bead™ System Enricher Site Preparation Guide* (4454036), for information on its installation and site requirements)
- Covaris™ S2 System
- HydroShear® DNA Shearing Device from Genomic Solutions
- ULTRA-TURRAX® Tube Drive from IKA (optional)

Note: The ULTRA-TURRAX® Tube Drive from IKA is not part of the SOLiD™ System. This equipment is optional and may be purchased separately. Customers using the SOLiD™ EZ Bead™ System Enricher do not also use the ULTRA-TURRAX® Tube Drive from IKA.

Covaris™ S2 System materials summary

- Covaris™ S-series Machine
- Holder for (one) 0.65-mL microcentrifuge tube
- Holder for (one) 1.5-mL microcentrifuge tube
- Holder for (one) tube (13 × 65 mm)
- Holder for (one) microTUBE
- Covaris microTUBE Prep Station
- Covaris Water Tank Label Kit
- Covaris microTUBEs (1 pack of 25)
- Latitude™ laptop from Dell Inc.
- VWR® Compact Chiller, Model 117-612 (for the U.S. customers)

  or

  VWR® Compact Chiller, Model 117-612 (for the International customers)
- User manuals

Minimum computer requirements for the Covaris™ S2 System

- Hardware: Intel® Celeron® 430, 1.73 GHz
- Operating system: Microsoft® Windows® XP Professional, Service Pack 2
- RAM (Installed): 512 MB
- Hard disk storage: 80 GB hard drive

If purchased from Applied Biosystems, the following table shows the Covaris™ S2 System materials.

ULTRA-TURRAX® Tube Drive from IKA (optional) materials summary

The ULTRA-TURRAX® Tube Drive from IKA shipment includes the:

- ULTRA-TURRAX® Tube Drive from IKA
- Starter package of Tubes, SOLiD™ePCR Tubes and Caps (10 pack)

Do *not* unpack the ULTRA-TURRAX® Tube Drive from IKA shipping containers, to protect you from liability if any damage occurred during shipping.

Note: Use of the ULTRA-TURRAX® Tube Drive with the SOLiD™ 4 System is optional and is not required if you use the SOLiD™ EZ Bead™ System Emulsifier.

For details on Covaris™ S2 sonicator, refer to the manufacturer's documentation.

Table 4 Covaris™ S2 System materials summary

Product Name and Descriptions	Vendor or Supplier	Catalogue, Model, or Part Numbers‡
Covaris™ S-series Machine, Holder for (one) 0.65-mL microcentrifuge tube	Covaris	Part Number: 500018 Model Number: THQMT-0.65
Covaris™ S-series Machine, Holder for (one) 1.5-mL microcentrifuge tube	Covaris	Part Number: 500019 Model Number: THQMT-1.5
Covaris™ S-series Machine, Holder for (one) tube (13 × 65 mm)	Covaris	Part Number: 500011 Model Number: THQ13
Covaris™ S-series Machine, Holder for (one) tube microTUBE	Covaris	Part Number: 500014
Covaris™ S-series Machine, microTUBE prep station	Covaris	Part Number: 5000142
Covaris™ S-series Machine, Water tank label kit	Covaris	Part Number: 5000165
Covaris™ S-series Machine, microTUBEs, 1 pack of 25 tubes and snap-caps	Covaris	Part Number: 520045
VWR® Compact Chiller, Model 117-612 U.S. (120 V, 60 Hz, 7 A)	VWR	VWR Catalog #: 13270-120
VWR® Compact Chiller, Model 117-612 International (240 V, 50 Hz, 3.5 A)	VWR	VWR Catalog #: 13270-122

‡ Applied Biosystems has validated this protocol using this specific material. Substitution may adversely affect system performance.

If your lab is equipped with a Covaris™ S-series Machine, check the model and follow the instructions below:

- Covaris™ S1: Not suitable for the SOLiD™ 4 System. Conversion to Covaris™ S2 system is required.
- Covaris™ S2: Provide the following parts, when necessary:
  - Holder for (one) 0.65-mL microcentrifuge tube
  - Holder for (one) 1.5-mL microcentrifuge tube
  - Holder for (one) tube (13 x 65 mm)
  - Latitude™ laptop from Dell Inc. (or equivalent)

– VWR® Compact Chiller, Model 117-612 (or equivalent)

HydroShear® DNA Shearing Device from Genomic Solutions materials summary

- HydroShear® DNA Shearing Device from Genomic Solutions (115 V) (PN 4392889)

  or

- HydroShear® DNA Shearing Device from Genomic Solutions (230 V) (PN 4392890)

  IMPORTANT! Use the part numbers above to ensure that the power cords are included in the shipment.

- User manuals

If purchased from Applied Biosystems, the HydroShear® DNA Shearing Device from Genomic Solutions device includes:

- Base unit equipped with a 550 µL syringe
- Shearing control software
- Standard shearing assemblies (4)
- Power cord
- RS-232 cord and connectors
- Tool kit assembly
- User manuals

For details on the HydroShear® DNA Shearing Device from Genomic Solutions, refer to the manufacturer's documentation.

Recommended equipment (Applied Biosystems)

This section describes recommended power equipment available from Applied Biosystems.

Uninterruptible power supply (UPS)

Applied Biosystems highly recommends **two** Uninterruptible Power Supply (UPS) units to supply power to and safeguard operation of the SOLiD™ 4 Analyzer.

Note: The part numbers below provide two UPS units to be used with the SOLiD™ 4 Analyzer.

The UPS units available from, and supported by, Applied Biosystems are:

- SOLiD™ UPS for North America (4397781)
- SOLiD™ UPS for International (4393695)

For details, see "Electrical requirements" on page 69.

General UPS specifications

The general UPS specifications are as follows:

- Two UPS units: 2.5 kilovolt ampere (kVA) and 3.0 kilovolt ampere (kVA)
- 1750 W
- 5 minutes runtime
- Power Factor 0.8
- UL or CSA Listed and/or marked with European Agency Safety mark (for example: TUV,VDE, GS, FIMKO, BSI or equivalent)

Regional UPS specifications

North America and Japan

Including Mexico, using NEMA-type grounded connections, require the following input power connection:

- NEMA L6-30P

The input/output power (VAC–Hz) are:

- 208 VAC–60 Hz only (UCL, cUL approved)

  or
- 208/12 VAC–60 Hz only (UCL, cUL approved)

  or
- Using 200 VAC requires NEMA L6-30P (must have PSE approval)

The output connections are:

- (2) NEMA L6-20R
- (2) NEMA L6-30R

International

UPS requires the following input power connections:

- IEC-320 C20
- British BS1363A
- Schuko CEE 7/EU1-16P

The input/output power (VAC–Hz) are:

- 230 VAC–50 Hz only (Continental Europe)
  or
- 220–240 VAC–50 Hz only (the rest)

The output connections are:

- (8) IEC 320 C13
- (2) IEC 320 C19
- (3) IEC Jumpers

Regional UPS specifications diagrams

The regional specifications diagrams are shown below in Figure 6 and Figure 7. In these diagrams "Circuit 1" and "Circuit 2" refer to wall sockets with independent power feeds backed by appropriate circuit breakers.

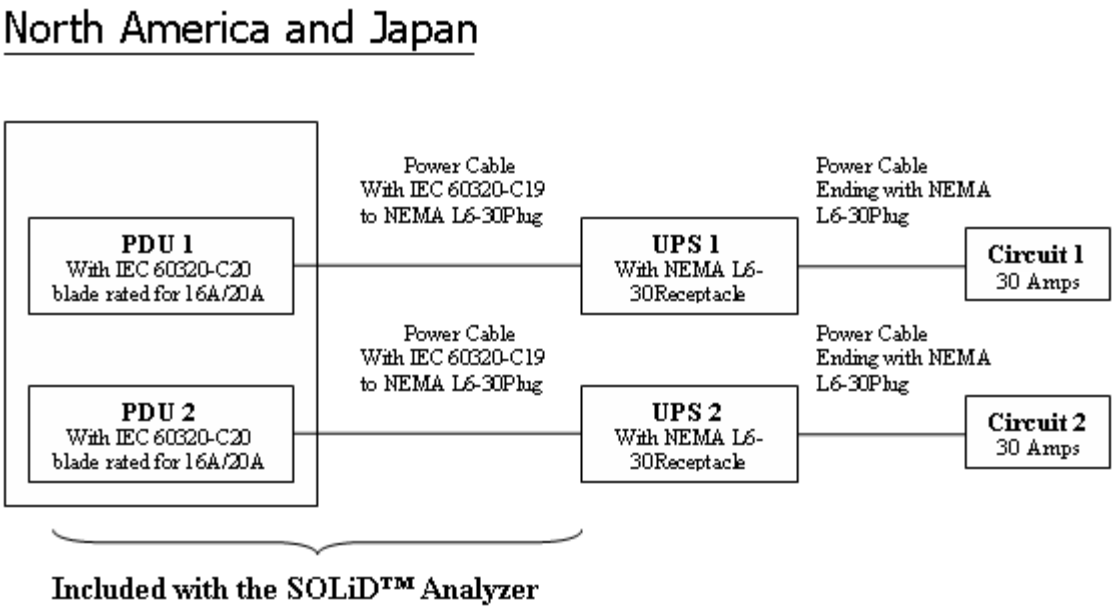


Figure 6 UPS specifications for the United States and Japan.

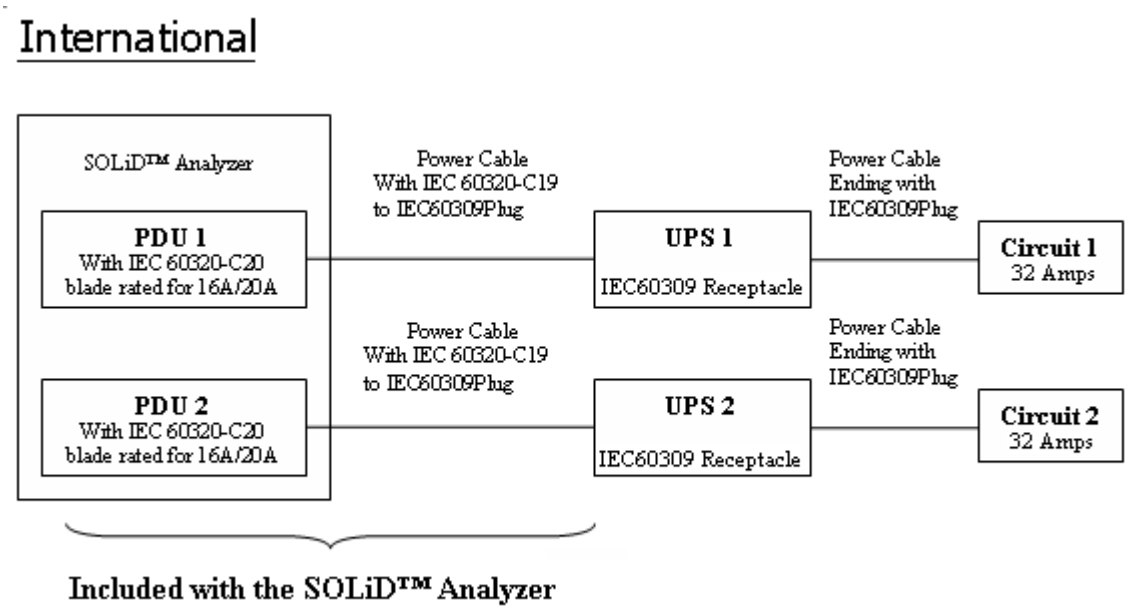


Figure 7 UPS specifications for international customers (except in Japan).

SOLiD™ 4 System ordering information

The following table contains ordering information.

Table 5 SOLiD™ 4 System ordering information

Description	Part Number
SOLiD™ 4 System (110 V)	4452773
SOLiD™ 4 System (220 V)	4452774
SOLiD™ 4 Analyzer	4452775
Covaris™ S2 System (110 V)	4387833
Covaris™ S2 System (220 V)	4392718
Hydroshear® DNA Shearing Device from Genomic Solutions (110 V)	4392889
Hydroshear® DNA Shearing Device from Genomic Solutions (230 V)	4392890
ULTRA-TURRAX® Tube Drive from IKA (115 V) (optional)‡ ULTRA-TURRAX® Tube Drive from IKA (230 V) (optional)	4400335
SOLiD™ UPS North America, 2 UPS units of 3000 VA each	4397781
SOLiD™ UPS International, 2 UPS units of 3000 VA each	4393695
SOLiD™ Accessory Disk Drive	4426101
SOLiD™ EZ Bead™ System Emulsifier	4448419
SOLiD™ EZ Bead™ System Amplifier	4448418
SOLiD™ EZ Bead™ System Enricher	4448420
SOLiD™ 3 to SOLiD™ 4 Upgrade Kit §	4452785
SOLiD™ 3 Plus to SOLiD™ 4 Upgrade Kit §	4452784

‡ Customers using the SOLiD™ EZ Bead™ System Enricher do not also use the ULTRA-TURRAX® Tube Drive from IKA
§ Upgrade kits are available only to existing SOLiD™ 3 and SOLiD™ 3 Plus System customers.

Note: Hydroshear® DNA Shearing Device from Genomic Solutions and Covaris™ S2 System can be purchased from Applied Biosystems only in conjunction with the SOLiD™ 4 Analyzer.

List of equipment (SOLiD™ 4 System)

The following is a list of equipment provided by Applied Biosystems with purchase of the SOLiD™ 4 System:

Table 6 List of equipment provided by Applied Biosystems with purchase of the SOLiD™ 4 System

Product Name	Units	Vendor	Catalog Number
SOLiD™ 4 Analyzer	1	Applied Biosystems	4452775
Hydroshear® DNA Shearing Device from Genomic Solutions: ‡	1	Applied Biosystems	Select Voltage
Hydroshear® DNA Shearing Device from Genomic Solutions (110 V)	—	—	4392889
Hydroshear® DNA Shearing Device from Genomic Solutions (230 V)	—	—	4392890
Covaris™ S2 System:	1	Applied Biosystems or Covaris	Select Voltage
Covaris™ S2 System (110 V) For the U.S. customers.	—	—	4387833
Covaris™ S2 System (220 V) For the international customers.	—	—	4392718
SOLiD™ Deposition Chambers:		Applied Biosystems	
SOLiD™ Deposition Chambers, 1-Well	1 set of 2	—	4406352
SOLiD™ Deposition Chambers, 4-Well	1 set of 2	—	4406358
SOLiD™ Deposition Chambers, 8-Well	1 set of 2	—	4406359
SOLiD™ Slide Storage Chamber	2 sets of 2	Applied Biosystems	4406354
SOLiD™ 4 Slide Carriers	2 sets of 2	Applied Biosystems	4453027
SOLiD™ Light Source	1	Applied Biosystems	4388441

‡ Hydroshear® is used only with mate-paired library preparation, not with fragment library preparation.

List of equipment (SOLiD™ 4 Analyzer)

The following is a list of equipment provided by Applied Biosystems with purchase of the SOLiD™ 4 Analyzer.

Note: Applied Biosystems may send the materials required for installation with the SOLiD™ 4 Analyzer or in a separate shipment.

SOLiD™ 4 Analyzer

The SOLiD™ 4 Analyzer consists of:

- SOLiD™ 4 Instrument Components
- SOLiD™ 4 Computer System
- SOLiD™ Software Suite

For details, see "SOLiD™ 4 Analyzer components" on page 63.

SOLiD™ 4 Instrument Components

The SOLiD™ 4 Instrument consists of:

- Reagent Delivery System
- Independent Dual Flow cells
- Camera (4 Megapixel)
- Electronics
- Instrument side cart

SOLiD™ 4 Computer System

The SOLiD™ 4 Computer System consists of:

- 19-inch flat screen monitor, mouse, and keyboard
- Instrument controller computer
- Head node: 6 x 1TB
- Three compute nodes (each 2 x 1TB)
- Data storage
- Two power distribution units
- Two cords (attached)

SOLiD™ Software Suite

The SOLiD™ Software Suite consists of:

- SOLiD™ Instrument Control Software (ICS)
- SOLiD™ Experiment Tracking Software (SETS)
- SOLiD™ System BioScope™ Software

IMPORTANT! Do not unpack SOLiD™ 4 Analyzer shipping containers, to protect you from liability if any damage occurred during shipping.

List of consumables (SOLiD™ 4 Analyzer)

The following tables show the list of instrument installation consumable kits and starter pack consumables provided by Applied Biosystems with the purchase of a new SOLiD™ 4 Analyzer for fragment, paired-end, and mate-paired libraries.

IMPORTANT! Applied Biosystems has validated these protocols using these specific materials. Substitution may adversely affect system performance.

Instrument Installation Kit

The following table shows the typical instrument installation consumable kits provided by Applied Biosystems with purchase of the SOLiD™ 4 System.

Note: The following items are not available for purchase. The instrument installation kit is included in the purchase of the SOLiD™ 4 System.

IMPORTANT! For the storage conditions, see the package label.

Table 7 List of instrument installation consumable kits

SOLiD™ 4 Instrument Installation Kit contents	Units
SOLiD™ Dye Standard - Reagents	Reagents for 8 slides
SOLiD™ Dye Standard - Slides, 2 boxes	4 slides
SOLiD™ ToP Workflow Analysis Reagents, 2 boxes *or* SOLiD™ Workflow Analysis Reagents, 2 boxes	Reagents for 4 slides
SOLiD™ S3 Control Bead Slides, 1 box	3 slides
SOLiD™ ToP Instrument Buffer Kit	110 cycles
SOLiD™ Installation Fragment Sequencing Kit - Master Mix 25	Reagents for 1 slide
SOLiD™ 3 Instrument Buffer Kit - 1X Phosphatase Buffer	1 bottle

Consumables Starter Packs (optional)

SOLiD™ 4 consumables starter packs are optional. SOLiD™ 4 System customers may order ONE type of starter pack. The consumables starter packs are:

- SOLiD™ 4 Fragment Starter Pack
- SOLiD™ 4 Paired-End Starter Pack
- SOLiD™ 4 Mate-Pair Starter Pack

Note: The starter pack is not included in the SOLiD™ 4 System purchase. The starter pack is optional equipment, and must be ordered and purchased separately.

Note: These kits include reagents required to construct up to 10 libraries and to sequence at least 1 slide on the instrument.

Table 8 shows the **typical** SOLiD™ 4 System starter pack consumables.

IMPORTANT! For the storage conditions, see the package label.

Table 8 List of SOLiD™ 4 starter pack consumables

SOLiD™ 4 System starter pack contents	Units	Starter pack			Room
		Frag-ment	Paired -end	Mate -pair	
SOLiD™ Fragment Library Construction Kit with Size Selection Gels	Reagents and gels for 10 fragment libraries	F	PE	—	Library
SOLiD™ Fragment Library Oligos Kit	Oligos for 10 fragment libraries	F	PE	—	Library
SOLiD™ Long Mate-Paired Library Construction Kit	Reagents and gels for 10 mate-paired libraries	—	—	MP	Library
SOLiD™ Mate-Paired Library Oligos Kit	Oligos for 10 mate-paired libraries	—	—	MP	Library
SOLiD™ ToP Sequencing Kit - Frag. Lib., F3 Tag, MM35	Reagents for 2 slides	F	—	—	Instrument
SOLiD™ ToP Paired End Sequencing Kit - Frag. Lib., MM50/25	Reagents for 1 slide	—	PE	—	Instrument
SOLiD™ ToP Mate-Paired Sequencing Kit - M-P. Lib., MM50/50	Reagents for 1 slide	—	—	MP	Instrument
SOLiD™ Pre Deposition Kit	10 reactions	F	PE	MP	Instrument
SOLiD™ XD Slide & Deposition Kit	8 slides	F	PE	MP	Instrument
SOLiD™ ToP Instrument Buffer Kit	110 cycles	F	PE	MP	Instrument
SOLiD™ ToP Workflow Analysis Reagents	Reagents for 2 slides	F	PE	MP	Instrument

List of equipment (customer)

This section lists equipment that the customer must provide. The equipment lists include items that Applied Biosystems sells and items that the customer must obtain from other vendors.

Note: The equipment is used in various phases of preparation. The “Room” column identifies in which room(s) the product is used. The room entries in Table 9 on page 45 refer to the following room breakdown:

- Library: library preparation room (amplicon-free)
- Bead: emulsion PCR (ePCR), bead, and slide preparation room
- Instrument: sequencing instrument room
- All: item is used in all three rooms

The rooms required for the SOLiD™ 4 System are described in Chapter 1, "SOLiD™ 4 System Room Configuration."

IMPORTANT! Applied Biosystems has validated these protocols using these specific materials. Substitution may adversely affect system performance.

Table 9 List of equipment that the customer must provide

Product Name	Units	Vendor	Catalog Number	Room
E-Gel® iBase™ and E-Gel® Safe Imager™ Combo Kit	1	Invitrogen	G6465	Library
Thermal cycler:		Applied Biosystems		Library, Bead ‡
96-Well GeneAmp® PCR System 9700, base module	1 or 2	—	N8050200	
Gold-plated Silver 96-Well GeneAmp® PCR System 9700, sample block module	1 or 2	—	4314443	
Real-Time PCR System: (optional)		Applied Biosystems	—	Library
StepOne™ Real-Time PCR System	1	—	4376357	
StepOnePlus™ Real-Time PCR System	1	—	4379216 (Upgrade only)	
7500 Fast Real-Time PCR System with Dell® Tower	1	—	4351107	
SOLiD™ UPS:	1	Applied Biosystems	—	Instrument
SOLiD™ UPS North America (110 V), 2 UPS units, 2100 W/3000 VA each;		—	4397781	
SOLiD™ UPS International (220 V), 2 UPS units, 2100 W/3000 VA each		—	4393695	
6-Tube Magnetic Stand	1	Applied Biosystems/ Ambion	AM10055	Library, Bead
Microcentrifuge:	1	Eppendorf		Library, Bead §
Microcentrifuge 5417 R, refrigerated, without rotor, 120 V/60 Hz **Note:** Or equivalent, but validation of the equipment for library preparation is required.	—	—	022621807	
Microcentrifuge 5417 R, refrigerated, without rotor, 230 V/50 Hz **Note:** Or equivalent, but validation of the equipment for library preparation is required.	—	—	022621840	

Table 9 List of equipment that the customer must provide *(continued)*

Product Name	Units	Vendor	Catalog Number	Room
Fixed-angle rotor FA-45-24-11 for Centrifuge 5417 C / 5417 R (Microcentrifuges) 24 × 1.5/2 mL Maximum rotational speed: 16,400 rpm (max. rcf: 25,000 x g) Including aluminum lid and aerosol-tight **Note:** Or equivalent, but validation of the equipment for library preparation is required.	1	Eppendorf	022636006	Library, Bead §
Eppendorf Repeater® Xstream	1	Eppendorf	022460811	Bead #
NanoDrop® ND-1000 Spectrophotometer (computer required)	1	NanoDrop Technologies	ND-1000	Library, Bead
Barnstead/Thermolyne Labquake* Rotisserie Rotator **Note:** Or equivalent, but validation of the equipment for workflow analysis and SOLiD™ System sequencing is required.	1	Thermo Scientific	400110	Bead
Tabletop or floor centrifuge	1	MLS (Major Laboratory Supplier)	Varies	Bead
Freezer (-20 °C)	1	MLS	Varies	All
Fume hood	Varies	MLS	Varies	Bead §
Heat block or water bath capable of heating to 80 ºC and holding 1.5-mL tubes	Varies	MLS	Varies	Library, Bead §
Incubators	1	MLS	Varies	Bead
Magnetic Stirrer	1	MLS	Varies	Instrument
Pipettors (2 µL, 20 µL, 200 µL, 1000 µL)	1	MLS	Varies	Library, Bead
Refrigerator (4 °C)	1	MLS	Varies	All
Vortexer	1	MLS	Varies	Library, Bead
Picofuge	Varies	MLS	Varies	Library, Bead
Gel imaging system	Varies	MLS	Varies	Library ‡‡
Scale	Varies	MLS	Varies	Library ‡‡
Thermometer	Varies	MLS	Varies	Library ‡‡, Bead §

‡ Equipment needed for bead preparation only if the customer does not have the SOLiD™ EZ Bead™ System Amplifier.
§ Equipment needed for bead preparation only if the customer does not have the SOLiD™ EZ Bead™ System Enricher.
# Equipment needed for bead preparation only if the customer does not have the SOLiD™ EZ Bead™ System Emulsifier.
‡‡ Applies to mate-paired library preparations only.

Table 10 lists optional equipment that, if used, must be provided by the customer.

IMPORTANT! Applied Biosystems has validated these protocols using these specific materials. Substitution may adversely affect system performance.

Table 10 List of equipment optionally provided by the customer

Product Name	Units	Vendor	Catalog Number	Room
Agilent 2100 Bioanalyzer Includes 2100 Bioanalyzer with software CD and chip priming station, without cartridge and license.	1	Agilent Technologies	G2938C	Library
Qubit® Fluorometer	1	Invitrogen	Q32857	Library

Table 11 applies only to customers upgrading from a SOLiD™ 3 or 3 Plus System. Table 11 lists equipment which is provided with SOLiD™ 3 and 3 Plus System. SOLiD™ 3 and SOLiD™ 3 Plus System upgrade customers also use these items with SOLiD™ 4.

Customers upgrading from the SOLiD™ 3 System refer to Table 11.

Customers upgrading from the SOLiD™ 3 Plus System refer to both Table 11 and Table 12.

Table 11 List of SOLiD™ System equipment that SOLiD™ 3 and 3 Plus System upgrade customers provide

Product Name	Units	Vendor	Catalog Number	Library Type		Room
				Fragment‡	Mate-Paired§	
SOLiD™ Slide Storage Chambers	1 set of 2	Applied Biosystems	4406354	Yes	Yes	Instrument
SOLiD™ Deposition Chambers:		Applied Biosystems		Yes	Yes	Instrument
SOLiD™ Deposition Chambers, 1-Well	1 set of 2	—	4406352			
SOLiD™ Deposition Chambers, 4-Well	1 set of 2	—	4406358			
SOLiD™ Deposition Chambers, 8-Well	1 set of 2	—	4406359			

‡ Fragment library preparation.
§ Mate-paired library preparation.

Table 12 applies only to customers upgrading from SOLiD™ 3 Plus Systems (not from SOLiD™ 3 System or other versions of the SOLiD™ System). The equipment listed in Table 12 is provided with 3 Plus Systems, and upgrade customers also use this item with the SOLiD™ 4 System.

Table 12 List of additional SOLiD™ System equipment that SOLiD™ 3 Plus System upgrade customers provide

Product Name	Units	Vendor	Catalog Number	Library Type		Room
				Fragment‡	Mate-Paired§	
SOLiD™ Opti Slide Carriers	1 set of 2	Applied Biosystems	4443967	Yes	Yes	Instrument

‡ Fragment library preparation.
§ Mate-paired library preparation.

List of consumables (customer)

The following tables lists the consumables that the customer must provide according to library preparation (fragment, mate-paired, barcoded fragment), templated bead preparation, instrument operation, and general consumables. Construction of barcoded fragment libraries requires the same consumables as the consumables that are used for the construction of standard fragment libraries.

Library Preparation

IMPORTANT! Applied Biosystems has validated these protocols using these specific materials. Substitution may adversely affect system performance.

Table 13 Applied Biosystems consumables for LIBRARY preparation

Product name	Units	Catalog number	Library type			
			Fragment (non-barcoded)‡	Long mate-paired §	2 × 25 bp mate-paired#	Barcoded fragment‡‡
SOLiD™ Fragment Library Oligos Kit	Oligos for 10 fragment libraries	4401151	Yes	—	—	—
SOLiD™ Fragment Library Construction Kit with Size Selection Gels	Reagents, purification columns, and gels for 10 fragment libraries	4443471	Yes	—	—	Yes
SOLiD™ Fragment Library Construction Kit (optional)§§	Reagents and purification columns for 10 fragment libraries	4443473	Yes	—	—	Yes
SOLiD™ Fragment Library Construction Kit Reagents (optional)	Reagents for 10 fragment libraries	4443713	Yes	—	—	Yes
SOLiD™ Mate-Paired Library Oligos Kit	Oligos for 10 mate-paired libraries	4400468	—	Yes	Yes	—
SOLiD™ Long Mate-Paired Library Construction Kit	Reagents and purification columns for 10 long mate-paired libraries	4443474	—	Yes	—	—
SOLiD™ Long Mate-Paired Library Construction Reagent Modules & Gel Extraction Kit (optional) ##	Reagents for 10 long mate-paired libraries	4443711	—	Yes	—	—
SOLiD™ 2 × 25 bp Mate-Paired Library Construction Kit	Reagents and purification columns for 10 2 × 25 bp mate-paired libraries	4443472	—	—	Yes	—

Table 13 Applied Biosystems consumables for LIBRARY preparation *(continued)*

Product name	Units	Catalog number	Library type			
			Fragment (non-barcoded)‡	Long mate-paired §	2 × 25 bp mate-paired#	Barcoded fragment‡‡
SOLiD™ Fragment Library Barcoding Modules 1-96	Oligos for 96 barcoded fragment libraries	4449637	—	—	—	Yes
SOLiD™ Fragment Library Barcoding Module 1-16 (optional) ‡‡‡	Oligos for 16 barcoded fragment libraries	4444837	—	—	—	Yes
SOLiD™ Fragment Library Barcoding Module 17-32 (optional) ‡‡‡	Oligos for 16 barcoded fragment libraries	4449636	—	—	—	Yes
SOLiD™ Fragment Library Barcoding Module 33-48 (optional) ‡‡‡	Oligos for 16 barcoded fragment libraries	4449635	—	—	—	Yes
SOLiD™ Fragment Library Barcoding Module 49-64 (optional) ‡‡‡	Oligos for 16 barcoded fragment libraries	4449641	—	—	—	Yes
SOLiD™ Fragment Library Barcoding Module 65-80 (optional) ‡‡‡	Oligos for 16 barcoded fragment libraries	4449642	—	—	—	Yes
SOLiD™ Fragment Library Barcoding Module 81-96 (optional) ‡‡‡	Oligos for 16 barcoded fragment libraries	4449643	—	—	—	Yes
SOLiD™ Library TaqMan® Quantitation Kit	Reagents to quantitate 10 libraries	4449639	Yes	Yes	Yes	Yes
MicroAmp® Optical Adhesive Film	100 seals	4360954	Yes	Yes	Yes	Yes
MicroAmp® Optical 96-Well Reaction Plates	10 plates	N8010560	Yes	Yes	Yes	Yes
Nuclease-free Water (1 L)	1 L	AM9932	Yes	Yes	Yes	Yes
1 x Low TE Buffer	25 mL	4389764	Yes	Yes	Yes	Yes
Covaris™ Tubes and Caps	125	4399054	—	Yes	Yes	—

‡ Fragment (non-barcoded) library preparation.
§ Long mate-paired library preparation (2 × 50 bp mate-paired library or 2 × 35 bp mate-paired library).
# 2 × 25 bp mate-paired library preparation.
‡‡ Barcoded fragment library preparation.
§§Components in this kit are included in the SOLiD™ Fragment Library Construction Kit with Size Selection Gels (4443471).
Components in this kit are included in the SOLiD™ Long Mate-Paired Library Construction Kit (4443474).
‡‡‡Components in this kit are included in the SOLiD™ Fragment Library Barcoding Kit 1-96 (4449637).

Table 14 lists optional application-specific Applied Biosystems kits that customers may purchase. For more information about these kits, go to the SOLiD System website http://solid.appliedbiosystems.com, or contact your field applications specialist.

Table 14 Optional Applied Biosystems consumables for application-specific LIBRARY preparation

Product name	Catalog number
SOLiD™ ChIP-Seq Kit	4449640
SOLiD™ ChIP-Seq Kit with ChIP Magnet	4449638
SOLiD™ SAGE™ Kit	4443475
SOLiD™ SAGE™ Kit for Barcoding	4452811
SOLiD™ Total RNA-Seq Kit	4445374
SOLiD™ RNA Barcode Module 1-16	4427046
SOLiD™ RNA Barcode Module 17-32	4453189
SOLiD™ RNA Barcode Module 33-48	4453191

Table 15 lists required library preparation consumables that the customer must purchase from other vendors.

Table 15 Required LIBRARY preparation consumables from other vendors

Product name	Units	Vendor	Catalog number	Library type		
				Fragment or barcoded Fragment‡	Long mate-paired§	2 × 25 bp mate-paired#
50-bp DNA Ladder	50 µg	Invitrogen	10416-014	Yes	—	—
UltraPure™ Glycerol	500 mL	Invitrogen	15514-011	—	Yes	Yes
SYBR® Safe DNA Gel Stain, 10,000×	400 µL	Invitrogen	S33102	—	Yes	Yes
10× BlueJuice™ Gel Loading Buffer	3 × 1 mL	Invitrogen	10816-015	—	Yes	Yes
UltraPure™ DNA Typing Grade 50× TAE Buffer	1 L	Invitrogen	24710-030	—	Yes	Yes
1 Kb Plus DNA Ladder	250 µg	Invitrogen	10787-018	—	Yes	Yes
100-bp DNA Ladder	250 µg	Invitrogen	15628-050	—	Yes	—
25-bp DNA Ladder	50 µg	Invitrogen	10597-011	—	Yes	Yes
E-Gel® EX Gel, 2%, 10-Pak	10/pack	Invitrogen	G4010-02	—	Yes	Yes

Table 15 Required LIBRARY preparation consumables from other vendors *(continued)*

Product name	Units	Vendor	Catalog number	Library type		
				Fragment or barcoded Fragment‡	Long mate-paired§	2 × 25 bp mate-paired#
Agarose-LE™ Kit or UltraPure™ Agarose 1000	100 g	Applied Biosystems or Invitrogen	AM9040 or 10975-035	—	Yes	Yes
Covaris™ microTube with AFA fiber and Snap-Cap with pre-split Teflon/silicone/Teflon septa	25	Covaris	520045	Yes	—	—
EcoP15I (10 U/µL)	2,500 U	New England Biolabs	R0646L	—	—	Yes
S-adenosylmethionine (SAM) (32 mM)	0.5 mL	New England Biolabs	B9003S	—	—	Yes
0.5-mL DNA LoBind Tubes (Eppendorf tubes)	250 pieces	Eppendorf	022431005	Yes	Yes	Yes
1.5-mL DNA LoBind Tubes (Eppendorf tubes)	250 pieces	Eppendorf	022431021	Yes	Yes	Yes
2.0-mL DNA LoBind Tubes (Eppendorf tubes)	250 pieces	Eppendorf	022431048	—	Yes	Yes
Thermo Scientific NanoDrop® CF-1 Calibration Fluid Kit	1	NanoDrop (Thermo Scientific)	CF-1	Yes	Yes	Yes
Thermo Scientific NanoDrop® PR-1 Calibration Fluid Kit ‡‡	1	NanoDrop (Thermo Scientific)	PR-1	Yes	Yes	Yes
Ethylene Glycol 1,2-Ethanediol; glycol	1 L	American Bioanalytical	AB00455-01000	Yes	Yes	Yes
Isopropyl alcohol	25 mL	Sigma-Aldrich	I9516	Yes	Yes	Yes
Ethanol	500 mL	Sigma-Aldrich	E7023	—	Yes	Yes
HydroShear Wash Solution I, Hydrochloric Acid 0.20N	100 mL	VWR	VW8888-0	—	Yes	Yes
HydroShear Wash Solution II, Sodium Hydroxide 0.20N	100 mL	VWR	VW8889-0	—	Yes	Yes
15-mL polypropylene conical tubes	Varies	MLS (Major Laboratory Supplier)	Varies	—	Yes	Yes
PCR strip tubes	Varies	MLS	Varies	Yes	Yes	Yes

Table 15 Required LIBRARY preparation consumables from other vendors *(continued)*

Product name	Units	Vendor	Catalog number	Library type		
				Fragment or barcoded Fragment‡	Long mate-paired§	2 × 25 bp mate-paired#
Filtered pipettor tips	Varies	MLS	Varies	Yes	Yes	Yes
Razor blades	Varies	MLS	Varies	—	Yes	Yes

‡ Fragment or barcoded fragment library preparation.
§ Long mate-paired library preparation (2 × 50 bp mate-paired library or 2 × 35 bp mate-paired library).
# 2 × 25 bp mate-paired library preparation.
‡‡ The NanoDrop® Conditioning Kit is useful for "reconditioning" pedestals to a hydrophobic state if they become "unconditioned." (See the NanoDrop® user's manual for more information.) The PR-1 kit consists of a container of specially formulated polishing compound and a supply of convenient applicators.

Table 16 lists optional library preparation consumables from non-Applied Biosystems vendors.

Table 16 Non-Applied Biosystems optional LIBRARY preparation consumables

Product name	Units	Vendor	Catalog number	Library type		
				Fragment or barcoded Fragment‡	Long mate-paired§	2 × 25 bp mate-paired#
Quant-iT™ dsDNA HS Assay (Assay for Qubit® Fluorometer)	1 Kit	Invitrogen	Q32851	Yes	Yes	Yes
Quant-iT™ dsDNA BR Assay (Assay for Qubit® Fluorometer)	1 Kit	Invitrogen	Q32850	Yes	Yes	Yes
Quant-iT™ PicoGreen® dsDNA Assay Kit	1 Kit	Invitrogen	P7589	—	Yes	Yes
E-Gel® EX Gel, 1%, 10-Pak	10/pack	Invitrogen	G4010-02	—	Yes	Yes
Agilent DNA 1000 Kit (DNA chip for the Bioanalyzer)	1 Kit	Agilent	5067-1505	Yes	Yes	Yes

‡ Fragment or barcoded fragment library preparation.
§ Long mate-paired library preparation (2 × 50 bp mate-paired library or 2 × 35 bp mate-paired library).
# 2 × 25 bp mate-paired library preparation.

Templated Bead Preparation

IMPORTANT! If you have purchased SOLiD™ EZ Bead™ System modules, refer to the *SOLiD™ EZ Bead™ System Emulsifier Site Preparation Guide* (4452499), the *SOLiD™ EZ Bead™ System Amplifier Site Preparation Guide* (4454035), or the *SOLiD™ EZ Bead™ System Enricher Site Preparation Guide* (4454036) for its consumables requirements. This section lists consumables required for templated bead preparation using the manual process only.

The tables in this section list the consumables for templated bead preparation:

- Table 17 lists Applied Biosystems consumables (both required and optional).
- Table 18 lists required consumables from other vendors.

Table 17 lists Applied Biosystems both required consumables and optional consumables for manual templated bead preparation.

Table 17 Applied Biosystems consumables for TEMPLATED BEAD preparation

Product name	Units	Catalog number	Scale	
			Mini ‡	Full § / macro #
SOLiD™ ePCR Kit V2 ‡‡	10 full-scale reactions	4400834	—	Yes
SOLiD™ XD Bead Enrichment Kit	10 full-scale reactions	4453663	—	Yes
SOLiD™ Buffer Kit	10 full-scale reactions	4387918	—	Yes
SOLiD™ ePCR Kit V2, 20 Mini-Reactions	20 mini-scale reactions	4407756	Yes	—
SOLiD™ Bead Enrichment Kit, 20 Mini-Reactions	20 mini-scale reactions	4407757	Yes	—
SOLiD™ Buffer Kit, 20 Mini-Reactions	20 mini-scale reactions	4407759	Yes	—
SOLiD™ Pre Deposition Kit	10 reactions	4445808	Yes	Yes
SOLiD™ ePCR Tubes and Caps, 10 tubes	10 reactions	4400401	Yes	Yes
SOLiD™ Emulsion Collection Trays	10 trays	4415129	Yes	Yes
MicroAmp® Optical Adhesive Film	100 seals	4360954	Yes	Yes
MicroAmp® Optical 96-Well Reaction Plates	10 plates	N8010560	Yes	Yes
SOLiD™ DH10B Fragment Library Control Kit (optional)	Control fragment library DNA and beads for 1 slide	4391889	Yes	Yes
SOLiD™ DH10B Mate-Paired Library Controls (optional) §§	Control mate-paired library DNA and beads for 1 slide	4391890	Yes	Yes
Nuclease-free Water	1 L	AM9932	Yes	Yes

‡ Mini-scale templated bead preparation (generally used to prepare enough templated beads for 1 well of an 8-well slide).
§ Full-scale templated bead preparation (generally used to prepare enough templated beads for 1 well of a 4-well slide).
# Macro-scale templated bead preparation (generally used to prepare enough templated beads for a full slide).
‡‡ The SOLiD™ ePCR Kit V2 is delivered in multiple boxes.
§§ 2 x 25 bp mate-paired library generated from insert size of 2-3 kb.

Table 18 lists other vendors' consumables for manual templated bead preparation.

Table 18 Required non-Applied Biosystems consumables for manual TEMPLATED BEAD preparation

Product Name	Units	Vendor	Catalog Number
Ethylene Glycol 1,2-Ethanediol; glycol	1 L	American Bioanalytical	AB00455-01000

Table 18 Required non-Applied Biosystems consumables for manual TEMPLATED BEAD preparation

Product Name	Units	Vendor	Catalog Number
1-mL BD slip-tip disposable tuberculin syringe	100 pack	BD (Becton, Dickinson)	309602
50-mL high-clarity polypropylene conical centrifuge tube, 9400 rcf rating, sterile	500 tubes	BD (Becton, Dickinson)	352070
Eppendorf Combitips Plus, Sterile (5 mL)	Set of 100	Eppendorf	022496107
Eppendorf Combitips Plus, Sterile (10 mL)	Set of 100	Eppendorf	022496123
0.5-mL LoBind Tubes (Eppendorf Tubes)	250 pieces	Eppendorf	022431005
1.5-mL LoBind Tubes (Eppendorf Tubes)	250 pieces	Eppendorf	022431021
2.0-mL LoBind Tubes (Eppendorf Tubes)	250 pieces	Eppendorf	22431048
Polypropylene wide-mouth jars (0.5 oz, 15mL, 38mm cap)	72 jars/case	Nalgene	2118-9050
Thermo Scientific NanoDrop® CF-1 Calibration Fluid Kit	1	NanoDrop (Thermo Scientific)	CF-1
Thermo Scientific NanoDrop® PR-1 Conditioning Kit ‡	1	NanoDrop (Thermo Scientific)	PR-1
10-mL serological pipette	Varies	MLS	Varies
15-mL polypropylene conical tubes	Varies	MLS	Varies
3-mL syringes	Varies	MLS	Varies
10-mL syringes	Varies	MLS	Varies
Razor blades	Varies	MLS	Varies
Filtered pipettor tips	Varies	MLS	Varies
Parafilm	Varies	MLS	Varies

‡ The NanoDrop® Conditioning Kit is useful for “reconditioning” the sample measurement pedestals to a hydrophobic state if they become “unconditioned.” (See the NanoDrop® user’s manual for more information.) The PR-1 kit consists of a container of specialty formulated polishing compound and a supply of convenient applicators.

Instrument operation

Table 19 lists Applied Biosystems consumables (both required and optional) for sequencing instrument operation.

Table 19 Applied Biosystems consumables for INSTRUMENT OPERATION

Product name	Units	Catalog number	Sequencing run type				
			Fragment‡	Paired-end §	Mate pair#	Multiplex fragment‡‡	Multiplex paired-end §§
SOLiD™ XD Slide and Deposition Kit v2 **Note:** If this kit is not available, use the SOLID™ XD Slide & Deposition Kit (4448393).	8 slides and reagents for 8 slides	4456997	Yes	Yes	Yes	Yes	Yes
SOLiD™ ToP Instrument Buffer Kit	110 cycles	4452688	Yes	Yes	Yes	Yes	Yes
SOLiD™ Flowcell O-rings	10/pack	4398217	Yes	Yes	Yes	Yes	Yes
SOLiD™ Light Source	1	4388441	Yes	Yes	Yes	Yes	Yes
SOLiD™ ToP Sequencing Kit – Frag. Lib., F3 Tag, MM35 (35-bp reads)	Reagents for 1 slide	4449352	Yes	—	—	—	—
SOLiD™ ToP Sequencing Kit – Frag. Lib., F3 Tag, MM50 (50-bp reads)	Reagents for 1 slide	4449388	Yes	—	—	—	—
SOLiD™ ToP Paired End Sequencing Kit – Frag. Lib., MM35/25 (35-bp and 25-bp reads)	Reagents for 1 slide	4452690	—	Yes	—	—	—
SOLiD™ ToP Paired End Sequencing Kit – Frag. Lib., MM50/25 (50-bp and 25-bp reads)	Reagents for 1 slide	4452693	—	Yes	—	—	—
SOLiD™ ToP Mate-Paired Sequencing Kit – M-P. Lib., MM35/35 (35-bp reads)	Reagents for 1 slide	4452684	—	—	Yes	—	—
SOLiD™ ToP Mate-Paired Sequencing Kit – M-P. Lib., MM50/50 (50-bp reads)	Reagents for 1 slide	4452685	—	—	Yes	—	—
SOLiD™ ToP Fragment BC Sequencing Kit – BC Frag., Lib., MM35/5 (35-bp reads, 16 barcodes)	Reagents for 1 slide	4452696	—	—	—	Yes	—
SOLiD™ ToP Fragment BC Sequencing Kit – BC Frag., Lib., MM50/5 (50-bp reads, 16 barcodes)	Reagents for 1 slide	4452697	—	—	—	Yes	—
SOLiD™ ToP Fragment BC Sequencing Kit – BC Frag., Lib., MM35/10 (35-bp reads, 96 barcodes)	Reagents for 1 slide	4452698	—	—	—	Yes	—

Table 19 Applied Biosystems consumables for INSTRUMENT OPERATION *(continued)*

Product name	Units	Catalog number	Sequencing run type				
			Fragment‡	Paired-end §	Mate pair#	Multiplex fragment‡‡	Multiplex paired-end §§
SOLiD™ ToP Fragment BC Sequencing Kit – BC Frag., Lib., MM50/10 (50-bp reads, 96 barcodes)	Reagents for 1 slide	4452699	—	—	—	Yes	—
SOLiD™ ToP Paired End Sequencing Kit – BC Frag. Lib., MM35/25/5 (35-bp and 25-bp reads, 16 barcodes)	Reagents for 1 slide	4452691	—	—	—	—	Yes
SOLiD™ ToP Paired End Sequencing Kit – BC Frag. Lib., MM50/25/5 (50-bp and 25-bp reads, 16 barcodes)	Reagents for 1 slide	4452694	—	—	—	—	Yes
SOLiD™ ToP Paired End Sequencing Kit – BC Frag. Lib., MM35/25/10 (35-bp and 25-bp reads, 96 barcodes)	Reagents for 1 slide	4452692	—	—	—	—	Yes
SOLiD™ ToP Paired End Sequencing Kit – BC Frag. Lib., MM50/25/10 (50-bp and 25-bp reads, 96 barcodes)	Reagents for 1 slide	4452695	—	—	—	—	Yes
SOLiD™ ToP Workflow Analysis Reagents (optional)	Reagents for 2 slides	4453237	Yes	Yes	Yes	Yes	Yes
SOLiD™ Mixing Strip Tubes with Zinc (optional)	2 strip tubes	4449506	Yes	Yes	Yes	Yes	Yes
SOLiD™ Mixing Strip Tubes (optional)	2 strip tubes	4406595	—	Yes	—	—	Yes

‡ Fragment sequencing run to sequence one end of a fragment library.
§ Paired-end sequencing run to sequence both ends of a fragment library.
# Mate-pair sequencing run to sequence two tags of a mate-paired library.
‡‡ Multiplex fragment sequencing run to sequence one end of a barcoded fragment library and the barcode.
§§ Multiplex paired-end sequencing run to sequence both ends of a barcoded fragment library and the barcode.

Table 20 lists other vendors' consumables for instrument operation.

Table 20 Non-Applied Biosystems consumables for SOLiD™ 4 SYSTEM INSTRUMENT OPERATION

Product Name	Units	Vendor	Catalog Number
Adhesive seal tabs	200/pack	Grace Bio-Labs	ST200
Kimwipes®	Varies	MLS (Major Laboratory Supplier)	Varies
Filtered pipettor tips	Varies	MLS	Varies

SOLiD™ 4 Analyzer Site Preparation 3

This chapter includes the following topics:

Overview

Before an Applied Biosystems service representative arrives to install the SOLiD™ 4 Analyzer, prepare your site for the installation according to the instructions in this chapter. Checklists are provided in Chapter 4.

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 3).
2. Fill out the corresponding checklists (Chapter 4).
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 workflow

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

- Review this guide first.
- Unpack reagents as soon as you receive them.
- Do not uncrate the instrument until an Applied Biosystems service representative arrives.

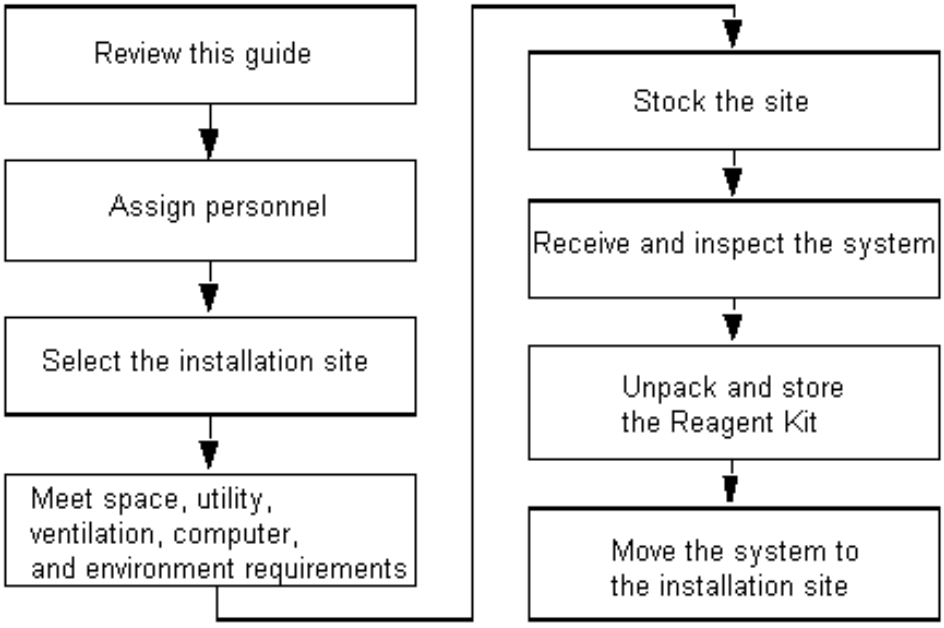


Figure 8 Site preparation tasks and their suggested sequence.

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 21 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 21 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. • Ensures that the sources of vibration are limited. • 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. • Places the SOLiD™ 4 Analyzer in the installation site. • 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 entire installation.
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 2 people are available to help the Applied Biosystems service representative move and position the system.

Table 21 Suggested personnel tasks *(continued)*

Personnel	Tasks
Network or IT Specialist (To connect the system to the network)	• Ensures that one active, tested local area network (LAN) connection is in place before the scheduled installation date. • Ensures that network hardware is compatible with a RJ45-type connector. • If necessary, supplies additional cables. • Is available during installation to connect the system to the network. **IMPORTANT!** *Do not* attempt to connect the system components to the network before the Applied Biosystems service representative arrives. • If applicable, provides and installs a network or dedicated printer.

Selecting the site

When deciding where to install the instrument, refer to:

- "Room requirements" on page 62
- "Space requirements" on page 63
- "Environmental requirements" on page 65
- "Ventilation and waste collection requirements" on page 67
- "Electrical requirements" on page 69
- "Computer requirements" on page 71
- "Safety and materials" on page 73

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.

Room requirements

The section Suggested room requirements in Chapter 1, "SOLiD™ 4 System Room Configuration," describes the room requirements for the SOLiD™ 4 System. The room breakdown is repeated here as a convenience:

Room 1: Library preparation (amplicon-free)

Room 2: Bead preparation: emulsion PCR (ePCR), bead, and slide preparation

Room 3: Sequencing instrument

Note: Rooms 2 and 3 can be combined, if needed.

If you purchased any of the SOLiD™ EZ Bead™ System modules for bead preparation, refer to the *SOLiD™ EZ Bead™ System Emulsifier Site Preparation Guide* (4452499), the *SOLiD™ EZ Bead™ System Amplifier Site Preparation Guide* (4454035), or the *SOLiD™ EZ Bead™ System Enricher Site Preparation Guide* (4454036), for the room requirements.

Space requirements

Required tools

Pallet jack to expedite the handling of the instrument crate.

SOLiD™ 4 Analyzer components

Note: Applied Biosystems may send the materials required for installation with the SOLiD™ 4 Analyzer or in a separate shipment.

The SOLiD™ 4 Analyzer components include:

- SOLiD™ 4 Instrument Components
- SOLiD™ 4 Computer System

IMPORTANT! Do not place the instrument next to any object or appliance that causes vibration.

SOLiD™ 4 Instrument Components

The SOLiD™ 4 Instrument consists of:

- Reagent Delivery System
- Independent Dual Flow cells
- Camera (4 megapixels)
- Electronics
- Instrument side cart

SOLiD™ 4 Computer System

The SOLiD™ 4 Computer System consists of:

- 19-inch flat screen monitor, mouse, and keyboard
- Instrument controller computer
- Head node: 6 × 1TB
- Three compute nodes (each 2 x 1TB)
- Data storage
- Two power distribution units
- Two cords (attached)

IMPORTANT! Do not unpack the SOLiD™ 4 Analyzer shipping containers, to protect you from liability if any damage occurred during shipping.

Figure 9 shows the SOLiD™ 4 Analyzer components.

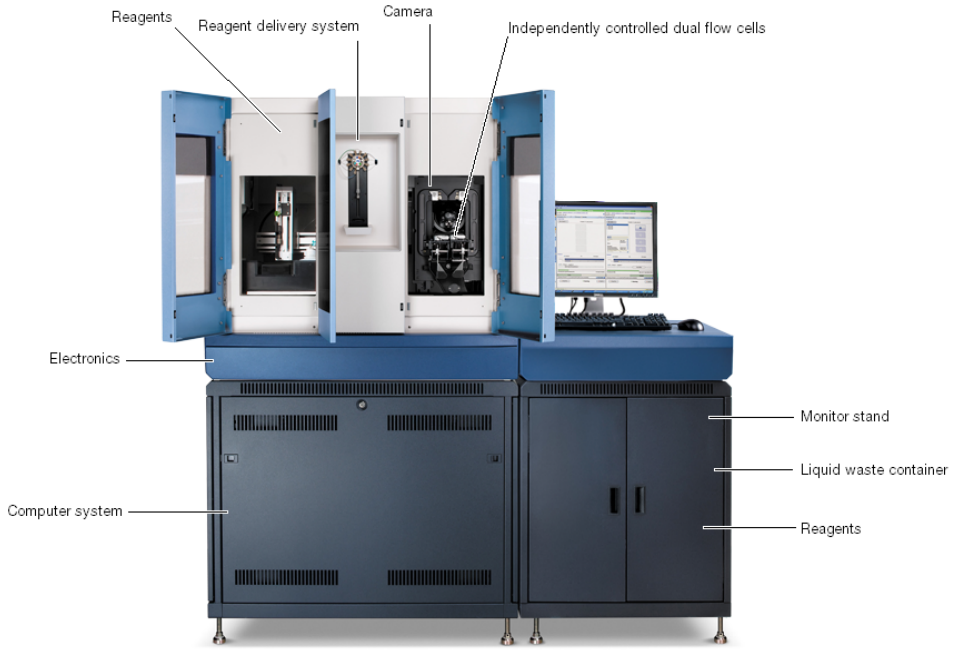


Figure 9 SOLiD™ 4 Analyzer System components

CAUTION **POTENTIAL SLIPPING HAZARD.** Opening the door to the computer rack requires moving the side cart. To move the side cart, the tubing must be detached from the waste container. This may cause a spill. The spill can create a potential slipping hazard. If the waste container contents are spilled, clean up immediately.

IMPORTANT! 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.

Layout requirements

See the Dimensions and weights of the SOLiD™ 4 Analyzer to help with basic layout considerations.

Dimensions and weights

Ensure that the installation site (floor space and/or bench space) can accommodate the dimensions and support the weights indicated in the table below. The following table lists the dimensions and weights.

Table 22 SOLiD™ 4 Analyzer dimensions and weights

Component	Width	Depth	Height	Weight
SOLiD™ 4 Analyzer *without* the side cart	163 cm (~65 in)	60 cm (23.5 in)	178 cm (70 in)	~363 kg (~800 lbs)
SOLiD™ 4 Analyzer *with* the side cart	175 cm (~69 in)	60 cm (23.5 in)	178 cm (70 in)	373 kg (~822 lbs)

Package dimensions and weights

The SOLiD™ 4 Analyzer package dimensions and weights are as follows.

Table 23 SOLiD™ 4 Analyzer package dimensions and weights

Component	Width	Depth	Height	Weight
SOLiD™ 4 Analyzer	163 cm (~65 in)	64.77 cm (25.5 in)	178 cm (70 in)	~363 kg (~800 lbs)

SOLiD™ 4 Analyzer side cart package dimensions and weights are as follows.

Table 24 SOLiD™ 4 Analyzer side cart package dimensions and weights

Component	Width	Depth	Height	Weight
Side cart	71.12 cm (28 in)	61.59 cm (24.25 in)	101.6 cm (40 in)	44.45 kg (98 lbs) Including keyboard, mouse, and 3 empty bottles 64.41 kg (142 lbs) Including keyboard, mouse, and 3 full bottles

Required clearances

Clearance on all sides

The SOLiD™ 4 System requires at least 113 cm (44.5 in) of clearance on all sides of the instrument, for ventilation, service access, and cable routing.

Note: Do not allow any side of the instrument to be close to a wall. For proper ventilation and cooling the instrument must have air flow from all sides.

IMPORTANT! Access to the back of the SOLiD™ 4 Analyzer is required for changing the light bulbs and other service activities.

Vertical clearance

The SOLiD™ 4 System requires at least 100 cm to 113 cm (39.5 in to 44.5 in) of unobstructed vertical clearance above the top of the SOLiD™ 4 Analyzer to allow the top to be lifted during service.

Environmental requirements

Ensure that the installation site is maintained under correct environmental conditions.

Altitude

The SOLiD™ 4 Analyzer is for indoor use only and for altitudes not exceeding 2000 m (6500 ft) above sea level.

Temperature and humidity

The following table lists the temperature and humidity requirements.

Table 25 SOLiD™ 4 Analyzer temperature and humidity requirements

Condition	Acceptable Range
Temperature	15 to 24 °C Room temperature should not fluctuate more than 2 °C over a 2-hour period.
Humidity	20 to 80% relative humidity, noncondensing

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

Pollution

The Applied Biosystems SOLiD™ 4 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.

Vibration criteria

To ensure optimum system performance, environmental sources of vibration that can compromise positional stability between critical components within the instrument must be limited.

The SOLiD™ 4 Analyzer must be installed in a location with a floor vibration intensity, for any given frequency, less than or equal to that of a VC-C standard vibration criterion (VC) curve used to specify stability of facilities that house vibration-sensitive instruments and tools.

Ventilation and waste collection requirements

The SOLiD™ 4 Analyzer has:

- A liquid waste port, inside the side cart. Tubing is shipped with the instrument.
- A hot-air exhaust port (80 cfm), not shown.

CAUTION **POTENTIAL SLIPPING HAZARD.** Opening the door to the computer rack requires moving the side cart. To move the side cart, the tubing must be detached from the waste container. This may cause a spill. The spill can create a potential slipping hazard. If the waste container contents are spilled, clean up immediately.

Venting waste-fume exhaust

This instrument does *not* have a waste-fume exhaust port.

Hot-air exhaust (no fumes or vapors) may be vented directly into the laboratory air space *only if* the room ventilation system can maintain room temperature with the additional thermal output from the instrument.

Liquid waste must be handled according to GLP and local, state/provincial, and/or national regulations.

Liquid waste must drain from the liquid waste port through the supplied tubing to a polyethylene bottle in a secondary container.

If the liquid waste is volatile, the supplied tubing must be used to vent vapors from the liquid waste collection bottle to a suitable fume hood or fume duct.

Venting hot-air-only exhaust

Hot-air exhaust is vented from the SOLiD™ 4 Analyzer through the hot-air waste port on the rear panel. The hot air exhaust dissipates heat produced by the instrument.

The maximum thermal output of the SOLiD™ 4 Analyzer instrument is 5000 W (~17000 BTU).

Consult your facilities department to determine if the laboratory ventilation system can maintain room temperature with this level of thermal output. If it can maintain room temperature during instrument operation, you can vent the hot-air exhaust port directly to room air.

Connecting the hot-air-only exhaust line (SOLiD™ 4 Analyzer)

If the room ventilation system cannot maintain room temperature because of the heat exhaust from the instrument, connect a 10-cm (4-inch) i.d. duct from the hot-air exhaust port to a venting device such as a fume hood or fume duct.

IMPORTANT! If the vent is ducted, it must have negative pressure of 4.25 cmm (Cubic Meter per Minute), 150 cfm. Ducting without negative pressure will cause problems with instrument performance and light source lifetime.

A male adapter is provided to attach the flexible duct to the instrument.

Collecting liquid waste

Liquid waste exits from the liquid waste port on the lower right panel of the SOLiD™ 4 Analyzer. The location of the liquid waste collection bottle must allow the liquid to drain from the port by gravity.

Connecting the liquid waste line (SOLiD™ 4 Analyzer)

Before connecting the liquid waste ports to the liquid waste collection bottle, ensure that the:

- Shortest and the straightest possible run of polypropylene tubing is used. Tubing is provided.
- Tubing drops vertically and does not have low points that could prevent liquid from accumulating and blocking the flow.
- Tubing is securely fastened to the liquid waste port using the fasteners provided with the instrument. Do not use brass fasteners, which can corrode, and take care not to puncture the tubing.
- Tubing is securely attached to the waste-collection bottle.
- Tubing is kept away from sources of potential damage, such as heat, flame, or points of contact (rubbing) with other objects.
- Collection bottle is contained within a secondary container. You must supply the waste-collection bottle and secondary container.

IMPORTANT! 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.

POTENTIAL SLIPPING HAZARD. Opening the door to the computer rack requires moving the side cart. To move the side cart, the tubing must be detached from the waste container. This may cause a spill. The spill can create a potential slipping hazard. If the waste container contents are spilled, clean up immediately.

CHEMICAL STORAGE HAZARD. Never collect or store waste in a glass container because of the risk of breaking or shattering. Reagent and waste bottles can crack and leak. Each waste bottle should be secured in a low-density polyethylene safety container with the cover fastened and the handles locked in the upright position. Wear appropriate eyewear, clothing, and gloves when handling reagent and waste bottles.

Venting vapors from liquid waste

If the liquid waste that is collected includes volatile chemicals, vent the vapors from the liquid waste collection vessel to a proper venting device.

Connecting the liquid waste vapor line

Before connecting the vapor line from the liquid collection vessel to a venting device, ensure that the:

- Shortest and straightest possible run of tubing is used.
- Tubing does not have low points, which can trap residue or condensation.
- Tubing is securely fastened to the liquid waste vessel.

- Tubing is kept away from sources of potential damage, such as heat, flame, or points of contact (rubbing) with other objects.
- Tubing end is placed as far as possible into the duct, canopy, or hood.
- Open end of the flexible duct does not face oncoming air movement through the venting device.

WARNING **CHEMICAL STORAGE HAZARD.** Never collect or store waste in a glass container because of the risk of breaking or shattering. Reagent and waste bottles can crack and leak. Each waste bottle should be secured in a low-density polyethylene safety container with the cover fastened and the handles locked in the upright position. Wear appropriate eyewear, clothing, and gloves when handling reagent and waste bottles.

Electrical requirements

System electrical requirements

The SOLiD™ 4 Analyzer is configured automatically for operating voltages between 200 and 240 VAC at 50 or 60 Hz. The analyzer is rated 10 A per power cord. During installation, the Applied Biosystems service representative configures the system for the proper input voltage.

CAUTION Do not unpack or plug in any components until the Applied Biosystems service representative has configured the system for the proper operating voltage.

Table 26 provides electrical specifications for the SOLiD™ 4 Analyzer. See "Recommended equipment (Applied Biosystems)" on page 37.

IMPORTANT! For all indicated input voltages, a 30 A circuit with dedicated ground is required.

Table 26 Electrical specifications (SOLiD™ 4 Analyzer)

Input Voltage (VAC)	Frequency (Hz)	Nominal Current Draw (A)‡	Power (W)
200	50	15	5000
	60	15	5000
220	60	13.6	5000
	50	13.6	5000
240	60	12.5	5000
	50	12.5	5000

‡ The approximate current draw from both power cords.

Power line regulator

In areas where the supplied power is subject to voltage fluctuations exceeding ±10% of the nominal value, a power line regulator may be required. High or low voltages can adversely affect the electronic components of the instrument.

Power connectors and receptacles

The SOLiD™ 4 Analyzer is shipped with **two** power cords.

CAUTION **MULTIPLE POWER CORDS.** Disconnect Both Power Cords Before Servicing Instrument.

Applied Biosystems highly recommends using the Uninterruptible Power Supply (UPS) hardware with the SOLiD™ 4 Analyzer. See "Recommended equipment (Applied Biosystems)" on page 37.

Disconnecting power

In case of emergency, you must be able to immediately disconnect the main power supply to all the instruments.

Safe power down

To prevent data loss during a power outage, you are required to purchase and use the UPS Network Management Card with Environmental Monitoring for controlled shut down (APC PN AP9631). The APC UPS Network Management Card with Environmental Monitoring is for use *only* with the SOLiD™ UPS from APC.

Note: If your UPS is from a different supplier, consult your Applied Biosystems Professional Services Representative.

The key benefits of UPS monitoring are:

- UPS monitoring notifies you of a power failure, then gives you 5 minutes to safely shut down the SOLiD™ 4 Analyzer.
- If the power fails and the instrument is in the middle of the run, UPS monitoring pauses the ICS software, so that you can run the store method to wet the slides. You can store the slides, then complete the analysis later.
- If power fails during analysis, UPS monitoring allows the system to pause all jobs before shutting down the cluster. When power is restored, the analysis continues automatically without manual restart.
- UPS monitoring allows you to safely shut down all nodes and the MD1000 to avoid data corruption.

The current software version of the UPS Network Management Card with Environmental Monitoring does not monitor temperature and humidity.

North America and Japan UPS setup

In the USA, Canada, and Japan, the instrument is supplied with **two** National Electrical Manufacturers Association (NEMA) plugs.

The electrical requirements can be configured in one of two ways:

- The NEMA L6-30P into the 5kVA UPS.
  - Either Each NEMA L6-30P power cord can be plugged into two separate 2.5 (or 5) kVA UPS, which are then plugged into two independently grounded L6-30R outlets.

    or
  - Each L6-30P power cord can be plugged directly into independently grounded L6-30R outlets.
- The NEMA L6-30P power cord from the UPS into the wall.

The UPS requires **two** NEMA L6-30R receptacles with twist locks.

See the "Regional UPS specifications" on page 37.

International UPS setup

In Europe and Australia, the instrument is supplied with two detachable electrical cords equipped with standard CE plugs.

- The IEC 60309 into the 5kVA UPS.
- The IEC 60309 power cord from the UPS into the wall.

Because both plugs should be connected, the UPS should have two receptacles for each of the two instrument plugs.

IMPORTANT! The instrument requires two dedicated power lines with two IEC 309 (32 A) Blue Commando sockets (RS part no: 352-2547 or equivalent) to be mounted within 2.5 m of the rear panel.

These connectors require electrical receptacles with dedicated 2.5 kVA power lines with proper grounding. The electrical receptacles must be located within 3 (10 ft) of the back of the instrument.

IMPORTANT! Do not use extension cords.

The computer, CPU, and monitor are all powered through the PDUs.

See the "Regional UPS specifications" on page 37.

Backup power

Customers must provide backup power by way of an external UPS or through an in-house backup system.

Computer requirements

Computer hardware

The SOLiD™ 4 Analyzer includes an integrated computer that has Microsoft® Windows® XP operating system with Service Pack 2 and Internet Explorer 6. The figure below shows some components of the SOLiD™ 4 Analyzer's computer system.

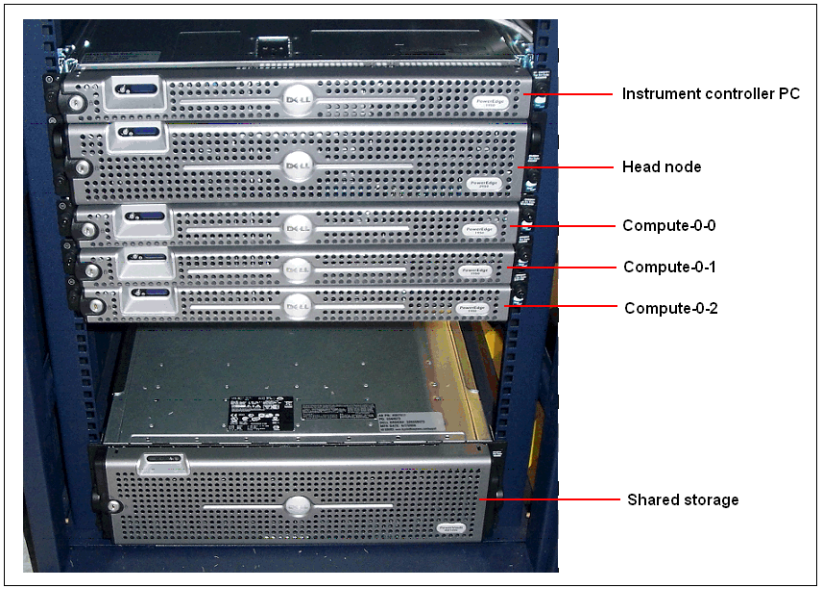


Figure 10 SOLiD™ 4 Analyzer computer system.

Other components of the SOLiD™ 4 Computer System consist of:

- 19-inch flat screen monitor, mouse, and keyboard
- Two power distribution units
- Two power cords

Software requirements

For information about the software requirements, refer to the following documents:

Table 27 Documents with information on software requirements

Document	Part number
Applied Biosystems SOLiD™ ICS Software Online Help	—
Applied Biosystems SOLiD™ SETS Software User Guide	4448411
Applied Biosystems SOLiD™ BioScope Software v1.2 User Guide	4448431

Note: The system is equipped with Windows® XP (service pack 2) and Internet Explorer® 6 internet browser.

IMPORTANT! Do not install any software on the Instrument Controller PC (identified in the figure above) before consulting with an Applied Biosystems service representative.

Network requirements

Antivirus software

When the SOLiD™ 4 Analyzer is connected to a private network, no antivirus software is needed because the Linux head node acts as a firewall to protect the system.

IMPORTANT! Antivirus software, spyware, or any similar software programs should not be installed because they interfere with the SOLiD™ Software Suite.

IMPORTANT! Do not connect the XP computer directly to an outside or public network because it will not be protected from computer viruses.

LAN connection

If the SOLiD™ 4 Analyzer will be connected to a LAN, an active, tested LAN connection must be in place before the scheduled installation date. Due to differences in network connections, the Applied Biosystems service representative cannot configure the system to access a specific network without assistance from the Customer's network or IT specialist.

Network cables

The computer is factory configured for the TCP/IP protocol. The product includes a fast Ethernet adapter (10/100/1000baseT) with an RJ45-type connector. A proper cable is included in the shipment.

IMPORTANT! The Ethernet cable for the SOLiD™ 4 Analyzer is a CAT5E Shielded Blue (4 m) cable.

Printer requirements

The SOLiD™ 4 Analyzer can use a network or dedicated printer. The printer is optional, but if used, it and any necessary print drivers must be available before the scheduled installation. It is the responsibility of the customer (or of the customer's IT department) to install, connect, and configure the printer.

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.

Applied Biosystems expects that you will follow all applicable safety-related procedures at all times.

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

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 SDSs.

Materials for installation

- Safety glasses, lab coats, and chemical-resistant disposable gloves (powder-free)
- Glassware washing solution
- Lint-free tissues
- Methanol or isopropanol, HPLC-grade or better
- 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 sample tubes

Materials for routine operation

Additional supplies and consumables are necessary for routine operation of the SOLiD™ 4 Analyzer. See Chapter 2, "SOLiD™ 4 System Materials."

IMPORTANT! Before the system is installed, contact the Applied Biosystems sales representative to order supplies for routine operation.

Receiving and inspecting the SOLiD™ 4 System

Shipped contents

IMPORTANT! To protect you from liability if any damage occurred during shipping, do *not* unpack SOLiD™ 4 Analyzer shipping containers.

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.

Unpacking and storing

IMPORTANT! Unpack only items that are temperature sensitive.

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 equipment from the receiving area to the installation site.

  IMPORTANT! Make a 9.15 × 2.5 m (30 × 8 ft) area available to receive the crate before placing it in the laboratory.

- If possible, move the other shipping containers from the shipping area to the installation site.

IMPORTANT! Service engineers should be careful when moving the instrument across thresholds or elevator gaps with a slight angle. Cross each gap using only one one wheel at a time to minimize stress to the wheels and server frame.

Required building clearances

The largest container (crate) included with the SOLiD™ 4 System shipment contains the SOLiD™ 4 Analyzer. To move the crate to the installation site, verify that the building clearances and local specifications are observed.

Table 28 SOLiD™ 4 Analyzer required building clearances

Crate Dimension	Minimum Building Clearance
Height	215.9 cm (85 in.)
Length	180.3 cm (71 in.)
Depth	96.52 cm (38 in.)
Weight	~363 kg

Instrument weight

The SOLiD™ 4 Analyzer alone weighs approximately 363 kg (~800 lbs). The SOLiD™ 4 Analyzer side cart alone weighs approximately 44.45 kg (98 lbs). The total instrument weight is approximately 373 kg (~822 lbs).

WARNING **PHYSICAL INJURY HAZARD.** Do not attempt to lift the crated SOLiD™ 4 Analyzer. The SOLiD™ 4 Analyzer is mounted on wheels. After the Applied Biosystems service representative uncrates the SOLiD™ 4 Analyzer, it can be pushed from location to location.

Moving and lifting the instrument

CAUTION **PHYSICAL INJURY HAZARD.** The instrument is to be moved and positioned under the supervision of 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 SOLiD™ 4 Analyzer on end. Tipping damages the SOLiD™ 4 Analyzer hardware and electronics.

During installation

Installation and testing

After the system is uncrated (with assistance from people at your site), installation and testing of the SOLiD™ 4 Analyzer by the Applied Biosystems service representative takes about 5 days.

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.

IT requirements

SOLiD™ 4 System remote access

During the installation period, Applied Biosystems requires remote access to the system.

One or more of the following Applied Biosystems personnel will access the system:

- Field Application Specialist
- Territory Specialist
- Bioinformatics Specialist
- Professional Services Representative

Applied Biosystems requires that the customer's Network or IT technician be available to assist the Applied Biosystems representatives in establishing remote access, namely through SSH (preferred remote access method) or VPN.

Remote access using SSH (Secure Shell)

The static IP address must be assigned to the Linux head node (see the "SOLiD™ 4 System Network Information" section below for more information). The Applied Biosystems representatives set up port forwarding on the Field Service Engineer's laptop so that the SSH connection is forwarded to port 5900 (or 5800). Port 5900 (or 5800) is used to connect to VNC running on the Linux head node.

IMPORTANT! Contact the Field Service Engineers for concerns regarding connections and restrictions.

Remote access using VPN (Virtual Private Network)

The customer's Network or IT technician must set up four VPN accounts and provide the access information to the Applied Biosystems representatives. If necessary, establish one account for each of the following:

- Field Application Specialist
- Territory Specialist
- Bioinformatics Specialist
- Professional Services Representative

SOLiD™ 4 System network information

The following sections describe the requirements from the Customer's IT Department.

Network access

For the SOLiD™ 4 System, the customer's IT department must provide one active Ethernet port that is connected to the customer's corporate network.

DNS entry

If needed, the Applied Biosystems representatives provide the customer's IT department with the MAC address of the Linux head node. The customer's IT department adds an entry into its DNS maps for the Linux head node.

Static IP address

To establish a Static IP Address, the Applied Biosystems representatives need the following from the customer's IT department:

- IP address to use for the Linux head node
- Subnet mask
- IP address of the gateway
- IP address of the DNS nameserver

If you are using a 10.1.x.x subnet for network, then you need to install a gigabit router. Connect the SOLiD™ 4 System to the router, then connect the router to local network.

Data transfer

Data transfer from the SOLiD™ 4 System is supported and tested on a 1-GB LAN. Applied Biosystems strongly recommends that the you set up a *dedicated* 1-GB network between the SOLiD™ 4 System and your offline computing systems. To ensure the appropriate transfer speed, you are solely responsible for configuring your network according to one of the suggested solutions.

Current network	Solution
1-GB LAN	On a shared network, the effective network speed is much lower than 1GB. Use or install a *dedicated* 1-GB network between the instrument and the offline systems to ensure top transfer speeds.
No Gigabit LAN	Install a gigabit switch with the shortest path spanning tree. Connect all the SOLiD™ 4 System outgoing connections to the switch so that data transfer between the SOLiD™ 4 System and offline clusters only occurs through the extra switch at 1 Gbps.

SOLiD™ 4 Analyzer Checklists 4

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.

Assigning personnel checklist (SOLiD™ 4 Analyzer)

For more information, see "Assigning personnel" on page 61.

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.
	Network or IT specialist: • (o connect the system to the network.

Space and layout checklist (SOLiD™ 4 Analyzer)

For more information, see "Space requirements" on page 63.

Date verified	Requirements
	A Pallet Jack is available for moving the instrument crate.
	Location is away from: • Heating or cooling ducts. • Direct sunlight. • Objects or appliances that cause vibration.
	If generating liquid waste, a double containment waste container is positioned below the waste outlet and is protected from mechanical impact and spillage.
	Computer workspace allows for proper ergonomics during use.

Date verified	Requirements
	Location accommodates the dimensions and weights specified in "Dimensions and weights" on page 64.
	Location meets the requirements specified in "Required clearances" on page 65.

Environmental checklist (SOLiD™ 4 Analyzer)

For more information, see "Environmental requirements" on page 65.

Date verified	Requirement
	The conditions specified in "Temperature and humidity" on page 66 have been met.

Ventilation and waste collection checklist (SOLiD™ 4 Analyzer)

For more information, see "Ventilation and waste collection requirements" on page 67.

Date verified	Requirement
Instrument waste–fume exhaust venting	
	Materials (including a trap) are available for connecting the instrument to the venting device through a vent line, as described in "Venting hot-air-only exhaust" on page 67.
Instrument hot-air exhaust venting	
	One of the following conditions exists: • Facilities personnel have certified that the normal room ventilation system can maintain room temperature if the maximum thermal output of the system (specified in "Venting hot-air-only exhaust" on page 67) is vented directly into the room air. • A suitable venting device such as a fume hood or fume dust is available to vent the hot air exhaust from the instrument space.
	Materials are available for connecting the instrument to the venting device through a vent line, as described in "Venting hot-air-only exhaust" on page 67.
Liquid waste collection and venting	
	Primary and secondary waste containers are available to collect liquid waste.

Date verified	Requirement
	Liquid waste containers can be positioned below and close to the liquid waste port for gravity flow.
	Materials are available for connecting the liquid waste collection vessel to the venting device through a vent line (see "Ventilation and waste collection requirements" on page 67).

Electrical checklist (SOLiD™ 4 Analyzer)

For more information, see "Electrical requirements" on page 69.

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 69).

Computer checklist (SOLiD™ 4 Analyzer)

For more information, see "Computer requirements" on page 71.

Date verified	Requirement
	Software
	Received a copy of the *Applied Biosystems SOLiD™ SETS Software User Guide* (PN 4448411). See "Software requirements" on page 72.
	Antivirus software
	Antivirus software, spyware, or any similar software programs are not installed because they interfere with SOLiD™ 4 software. See "Network requirements" on page 72.
	Network
	LAN Connection One active, tested LAN connection is available. A Network or IT Specialist has been assigned. See "LAN connection" on page 72.
	Network Cables Network hardware is compatible with an RJ45-type connector. See "Network requirements" on page 72.
	Printer

Date verified	Requirement
	A network printer or a dedicated printer and necessary print drivers are available. If a printer is used, it is the responsibility of the customer (or of the customer's IT department) to install, connect, and configure the printer. **Note:** Installing a printer is optional.

Safety checklist (SOLiD™ 4 Analyzer)

For more information, see "Safety practices" on page 73.

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 is available.
	Eye and hand protection is available.
	Eyewash is available.
	Safety shower is available.
	Vent lines/fume hood, if applicable, are available.
	Biohazard waste container, if applicable, is available.
	First-aid equipment is available.
	Spill cleanup equipment is available.
	SDSs are readily available.

Materials checklist (SOLiD™ 4 Analyzer)

For more information, see "Safety and materials" on page 73.

Date verified	Requirement
Materials for general installation	
	Safety glasses and lab coats.
	Chemical-resistant disposable gloves (powder free).
	Glassware washing solution.
	Lint-free tissues.
	Methanol or Isopropanol, HPLC-grade or better.
	Water, Milli-Q grade.
	Three sizes of micropipettors and tips are present: • 1- to 10-µL • 10- to 100-µL • 100- to 1000-µL
	A mini vortexer, centrifuge, and sample tubes are present.
Materials for routine operation	
	Materials for routine operation after the installation are available or have been ordered (see Chapter 2, SOLiD™ 4 System Materials).

Equipment provided by Applied Biosystems

For more information, see Chapter 2, "SOLiD™ 4 System Materials."

Date verified	Requirement
Equipment provided by Applied Biosystems	
	Equipment provided for routine operation after the installation is available or has been ordered. See Chapter 2, "SOLiD™ 4 System Materials."

Equipment provided by customers

For more information, see Chapter 2, "SOLiD™ 4 System Materials."

Date verified	Requirement
Equipment provided by customers	
	Equipment provided for routine operation after the installation is available or has been ordered. See Chapter 2, "SOLiD™ 4 System Materials."

System receipt and inspection checklist (SOLiD™ 4 Analyzer)

For more information, see "Receiving and inspecting the SOLiD™ 4 System" on page 74.

Date verified	Action
	Received the system and inspected the shipping containers for mishandling or damage. **IMPORTANT!** Do not open any shipping containers except for the Chemistry Kits.
	Reported any damage to the shipping containers to the Applied Biosystems representative.

Moving the crated instrument checklist (SOLiD™ 4 Analyzer)

For more information, see "Moving the crated instrument to the laboratory" on page 75.

Date verified	Item
	The measured building clearances can accommodate the SOLiD™ 4 Analyzer crate dimensions (see "Moving the crated instrument to the laboratory" on page 75). If the crate dimensions exceed building clearances, contact the Applied Biosystems service representative. Do not unpack the crate without authorization.
	If possible, moved all the *crated* equipment, excluding the crated SOLiD™ 4 Analyzer, 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.

IT requirements checklist (SOLiD™ 4 Analyzer)

For more information, see "IT requirements" on page 76.

Date verified	Item
Remote access using VPN (Virtual Private Network)‡	
	One account for the Field Application Specialist.
	One account for the Territory Specialist.
	One account for the Bioinformatics Specialist.
	One account for the Professional Services Representative.
Remote access using SSH (Secure Shell)	
	Static IP address.
	Remote SSH access.
SOLiD™ 4 System network information (provided by customer's IT department)	
	Network access.
	DNS entry.
	Static IP address.

‡ If VPN is required.

5 Sample-Preparation Equipment Site Preparation

This chapter includes the following topics:

Overview

Before an Applied Biosystems service representative arrives to install the sample-preparation equipment, prepare your site for the installation according to the instructions in this chapter. Checklists are provided in Chapter 6, "Sample-Preparation Equipment Checklists."

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

Sample-preparation equipment

The components of the sample-preparation equipment are the:

- **Covaris™ S2 System from Covaris Inc.** – Used to shear DNA in library preparation protocol, and to declump beads in bead and slide preparation protocol.
- **HydroShear® DNA Shearing Device from Genomic Solutions** – Used to shear DNA in library preparation protocol.
- **ULTRA-TURRAX® Tube Drive from IKA** – Optionally used to produce water-in-oil emulsions.
- **SOLiD™** EZ Bead™ System – Optionally used for automated bead preparation.

Note: The ULTRA-TURRAX® Tube Drive from IKA and the SOLiD™ EZ Bead™ System are each ordered and purchased separately from the SOLiD™ 4 System.

Note: For detailed site preparation information on HydroShear® DNA Shearing Device from Genomic Solutions and Covaris™ S2 System, refer to the users' guides provided by the manufacturers. For information on the SOLiD™ EZ Bead™ System, refer to the SOLiD™ EZ Bead™ System documentation**.**

The following figure shows the sample-preparation equipment.

Figure 11 Sample-preparation equipment.

Site preparation schedule

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

1. Complete the site preparation tasks (Chapter 5, Sample-Preparation Equipment Site Preparation).
2. Fill out the corresponding checklists (Chapter 6, Sample-Preparation Equipment Checklists).
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 workflow

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

- Review this guide first and store.
- Unpack reagents as soon as you receive them.
- Do not uncrate the instrument until an Applied Biosystems service representative arrives.

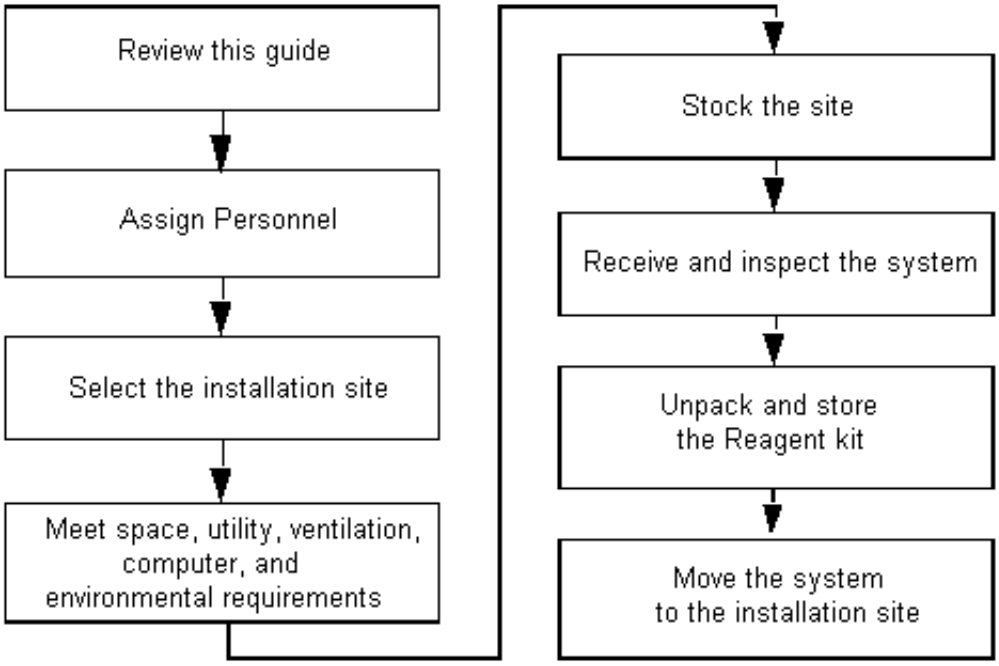


Figure 12 Site preparation tasks and suggested sequence.

Assigning personnel

The following applies to all sample-preparation equipment.

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 29 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 29 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 and identifies the rooms to be used with the SOLiD™ 4 System. • 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. • Places the sample-preparation equipment. • 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 entire installation.

Table 29 Suggested personnel tasks *(continued)*

Personnel	Tasks
Facilities personnel	• Ensure that installation requirements are met for: – Space at the installation site – Building clearances – Vibration standards – 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 2 people are available to help the Applied Biosystems service representative move and position the system.

Selecting the site

When deciding where to install the sample-preparation equipment, refer to the following sections for site requirements:

- "Space requirements" on page 93
- "Room requirements" on page 94
- "Environmental requirements" on page 97
- "Electrical requirements" on page 99
- "Safety and materials" on page 101

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

The following explains the space requirements for the sample-preparation equipment. Table 31 on page 95 lists the dimensions and weight for this equipment.

System components

Covaris™ S2 System

Applied Biosystems ships one Covaris™ S2 System.

Figure 13 Covaris™ S2 System components.

Provide enough benchtop space to accommodate all the components of the Covaris™ S2 System. Refer to the manufacturer's user's guide for more information.

ULTRA-TURRAX® Tube Drive from IKA (optional)

Applied Biosystems ships one unit of ULTRA-TURRAX® Tube Drive from IKA.

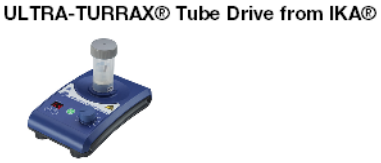


Figure 14 ULTRA-TURRAX® Tube Drive from IKA.

Provide enough benchtop space to accommodate this piece of equipment.

Note: Use of the ULTRA-TURRAX® Tube Drive with the SOLiD™ 4 System is optional.

HydroShear® DNA Shearing Device from Genomic Solutions

Applied Biosystems ships one HydroShear® DNA Shearing Device from Genomic Solutions.

HydroShear® DNA Shearing Device from Genomic Solutions®

Figure 15 HydroShear® DNA Shearing Device from Genomic Solutions.

Provide enough benchtop space next to the control computer to accommodate the machine. Choose a location away from any vents that could expel particulate material on the machine. Refer to the manufacturer's user's guide for more information.

Room requirements

The section Suggested room requirements in Chapter 1, "SOLiD™ 4 System Room Configuration," describes the room requirements for the SOLiD™ 4 System. The room breakdown is repeated here as a convenience:

Room 1: Library preparation (amplicon-free)

Room 2: Bead preparation: emulsion PCR (ePCR), bead, and slide preparation

Room 3: Sequencing instrument

Note: Rooms 2 and 3 can be combined, if needed.

Note: If you purchased any Applied Biosystems SOLiD™ EZ Bead™ System modules, refer to the *SOLiD™ EZ Bead™ System Emulsifier Site Preparation Guide* (4452499), the *SOLiD™ EZ Bead™ System Amplifier Site Preparation Guide* (4454035), or the *SOLiD™ EZ Bead™ System Enricher Site Preparation Guide* (4454036) for its room requirements.

Table 30 describes the room destinations for your sample-preparation equipment:

Table 30 Room locations for sample-preparation equipment

Equipment name	SOLiD™ 4 System room
Covaris™ S2 System	Library or bead preparation (room 1 or 2)
HydroShear® from Genomic Solutions®	Library preparation (room 1)
ULTRA-TURRAX® Tube Drive from IKA® (optional)	Bead preparation (room 2)

Equipment and package specifications

Table 31 explains the equipment and package dimensions and weights. Ensure that the installation site (floor space and/or bench space) can accommodate the indicated dimensions and support the weights. For the required clearances, see "Required clearances" on page 96.

Table 31 Equipment and package specifications

Sample-Preparation Equipment	Equipment Dimensions (W x D x H) and Weights	Package Dimensions (W x D x H) and Weights
Covaris™ S2 System **Note:** Designate additional space for the Latitude™ laptop from Dell Inc. and the VWR® Compact Chiller, Model 117-612.	21 cm x 52 cm x 31 cm 8.3 in x 20.5 in x 12.2 in ~13.6 kg (~30 lb)	84 cm x 33.5 cm x 46 cm 33 in x 13 in x 18 in 15 kg (33 lb)
Latitude™ laptop from Dell Inc.	36 cm x 25.5 cm x 4 cm 14 in x 10 in x 1.4 in 1.4 kg (3 lb)	46 cm x 43.5 cm x 20.5 cm 18 in x 17 in x 8 in 5 kg (11 lb)
VWR® Compact Chiller, Model 117-612	30.5 cm x 47 cm x 33 cm 12 in x 18.5 in x 13 in 28 kg (62 lb)‡	61 cm x 48.5 cm x 43.5 cm 24 in x 19 in x 17 in 26 kg (57 lb)
HydroShear® DNA Shearing Device from Genomic Solutions	13 cm x 25.5 cm x 30.5 cm 5 in x 10 in x 12 in 4.5 kg (10 lb)	30 cm x 30 cm x 24 cm 12 in x 12 in x 9.5 in 5.4 kg (12 lb)
ULTRA-TURRAX® Tube Drive from IKA (optional)	10 cm x 16 cm x 4 cm ~4 in x ~6.3 in x ~1.6 in 0.75 kg (~1.7 lb)	~27 cm x ~22.5 cm x ~8.5 cm 10.5 in x 8.75 in x 3.25 in ~1.5 kg (~3. lb)

‡ Excluding water.

Required clearances

Table 32 shows the required clearances for the sample-preparation equipment.

Table 32 Sample-preparation required clearances

Sample-preparation equipment	Clearance on all sides	Vertical clearance
Covaris™ S2 System	At least 30.5 cm (12 in.) of clearance for ventilation, service access, and cable routing is required. Allow space for the Applied Biosystems service representative to move the instrument for easy access to the back and sides.	At least 51 cm (20 in.) of unobstructed vertical clearance is required above the top of the Covaris™ S2 System to allow the top to be lifted during service.
HydroShear® DNA Shearing Device from Genomic Solutions	At least 15.5 cm (6 in.) of clearance for ventilation, service access, and cable routing is required. Allow space for the Applied Biosystems service representative to move the instrument for easy access to the back and sides.	At least 51 cm (20 in.) of unobstructed vertical clearance is required above the top of the HydroShear® DNA Shearing Device from Genomic Solutions to allow the top to be lifted during service.
ULTRA-TURRAX® Tube Drive from IKA (optional)	At least 15.5 cm (6 in.) of clearance for ventilation, service access, and cable routing is required. Allow space for the Applied Biosystems service representative to move the instrument for easy access to the back and sides.	At least 51 cm (20 in.) of unobstructed vertical clearance is required above the top of the ULTRA-TURRAX® Tube Drive from IKA to allow the top to be lifted during service.

Environmental requirements

Altitude

The sample-preparation equipment is for indoor use only and for altitudes not exceeding 2000 m (6500 ft) above sea level.

Pollution

The sample-preparation equipment has a Pollution Degree rating of II. The equipment 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.

Room temperature and humidity

Ensure that the installation site is maintained under the conditions shown in table below, for the sample-preparation equipment:

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

Table 33 Sample-preparation room temperature and humidity

Sample-preparation equipment	Condition	Acceptable range
Covaris™ S2 System	Temperature	15 to 32 °C
	Humidity	Maximum humidity: • 80% at 31 °C • 50% at 40 °C
HydroShear® DNA Shearing Device from Genomic Solutions	Temperature	15 to 40 °C
	Humidity	20 to 80% relative humidity, at 40 °C
ULTRA-TURRAX® Tube Drive from IKA (optional)	Temperature	5 to 40 °C
	Humidity	80% relative humidity, noncondensing

Ventilation and waste collection requirements

Covaris™ S2 System

For the Covaris™ S2 System:

- Covaris™ S-series Machine

  The air intake is on the rear panel and the exhaust is on the left side. Do not place the rear panel or the left side of the instrument close to a wall.

  No waste collection requirements for the Covaris™ S-series Machine liquid bath.

  Note: Use De-Ionized (DI) water, only.

  IMPORTANT! Avoid direct sun light onto the bath as this may negatively alter the gas sensor resulting in false low-water signals.

- Latitude™ laptop from Dell Inc.

  No waste collection requirements are applicable. For ventilation specifications, refer to the manufacturer's documentation.

- VWR® Compact Chiller, Model 117-612

  For proper ventilation, the openings on the side of the chiller must not be blocked. Refer to the manufacturer's user manual.

  IMPORTANT! Vacuum the aeration openings and the condenser coil frequently.

  The waste requirements on the chiller depend on the cooling fluid used. If pure water is used, there will be no waste requirements. If an algicide is added to the cooler bath, handling of the waste must be done according to the regulations. If using a cold protocol at 5 °C, use a cryosopic agent such as propylene/ethylene glycol to prevent icing of the chiller. The collection of waste must be done according to the regulations.

  Note: The water used in the bath must be fresh, and it must be disposed of at the end of the day. On the day of the run, refill the bath with fresh water, and properly degas (at least 1/2 hour) before operation.

HydroShear® DNA Shearing Device from Genomic Solutions

No ventilation and waste collection requirements are applicable.

ULTRA-TURRAX® Tube Drive from IKA (optional)

No ventilation and waste collection requirements are applicable.

Electrical requirements

Disconnecting power

In case of emergency, you must be able to immediately disconnect the main power supply to all the sample-preparation equipment.

Power connectors and receptacles

Covaris™ S2 System

The Covaris™ S2 System is shipped to customers with a Voltage Universal Kit (4392957) and corresponding adapters (4392962 & 4392963).

The Covaris™ S2 System is shipped to customers in North American with NEMA 5-15 power connectors. These connectors require NEMA 5-15 electrical receptacles (standard 10 A wall receptacles) with proper grounding.

WARNING Do not use extension cords.

HydroShear® DNA Shearing Device from Genomic Solutions

The HydroShear® DNA Shearing Device from Genomic Solutions is shipped to customers in North America with NEMA 5-15 power connectors. These connectors require NEMA 5-15 electrical receptacles (standard 10 A wall receptacles) with proper grounding.

WARNING Do not use extension cords.

ULTRA-TURRAX® Tube Drive from IKA (optional)

The ULTRA-TURRAX® Tube Drive from IKA is shipped to customers in North America with NEMA 5-15 power connectors. These connectors require NEMA 5-15 electrical receptacles (standard 10 A wall receptacles) with proper grounding.

WARNING Do not use extension cords.

System electrical requirements

Covaris™ S2 System

The Covaris™ S2 System must be operated with the following supply voltages:

Table 34 Electrical specifications (Covaris™ S2 System)

Region	Input voltage (VAC)	Frequency (Hz)	Nominal current draw (A)	Power (W)
U.S.	120 V (± 10%)	60 Hz (± 10%)	2	300
Japan	100 V	50/60 Hz	2	300
International	220 V to 240 V	50/60 Hz	1	300

The rating for the fuse, the input power, is 3 A 250 V.

HydroShear® DNA Shearing Device from Genomic Solutions

The HydroShear® DNA Shearing Device from Genomic Solutions must be operated with the following supply voltages:

Table 35 Electrical specifications (HydroShear® DNA Shearing Device from Genomic Solutions)

Region	Input voltage (VAC)	Frequency (Hz)	Nominal current draw (A)	Power (W)
U.S.	110 V	50/60 Hz	15 A	300
International	220 V	50/60 Hz	10 A	300

ULTRA-TURRAX® Tube Drive from IKA (optional)

CAUTION Do not unpack or plug in any component until the Applied Biosystems service representative has configured the system for the proper operating voltage.

Table 36 provides electrical specifications for the ULTRA-TURRAX® Tube Drive from IKA. For all indicated input voltages, a 10 A circuit is required.

Table 36 Electrical specifications (ULTRA-TURRAX® Tube Drive from IKA)

Input voltage (VAC)	Frequency (Hz)	Nominal current draw (A)	Power (W)
100 - 240	50/60 Hz	0.8	20

Power line regulator

In areas where the supplied power is subject to voltage fluctuations exceeding ±10% of the nominal value, a power line regulator may be required. High or low voltages can adversely affect the electronic components of the instrument.

Safety and materials

The following applies to all sample-preparation equipment. For information on specific materials, see Chapter 2, "SOLiD™ 4 System 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 SDSs.

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
- Methanol or isopropanol, HPLC-grade or better
- 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 sample tubes

Materials for routine operation

Additional supplies and consumables are necessary for routine operation of the sample-preparation equipment.

IMPORTANT! Before the sample-preparation equipment is installed, contact the Applied Biosystems sales representative to order these additional supplies.

Receiving and inspecting the sample-preparation equipment

Shipped contents

Covaris™ S2 System

The Covaris™ S2 System shipment includes the:

- Covaris™ S2 machine
- Holder for (one) 0.65-mL microcentrifuge tube
- Holder for (one) 1.5-mL microcentrifuge tube
- Holder for (one) tube (13 × 65 mm)
- Latitude™ laptop from Dell Inc.
- VWR® Compact Chiller, Model 117-612 (for the U.S. customers) or VWR® Compact Chiller, Model 117-612 (for the International customers)

IMPORTANT! Do *not* unpack the Covaris™ S2 System shipping containers, to protect you from liability if any damage occurred during shipping.

HydroShear® DNA Shearing Device from Genomic Solutions

When purchased through Applied Biosystems, the HydroShear® DNA Shearing Device from Genomic Solutions consists of the following components:

- Base unit equipped with a 500 µL syringe
- Shearing control software compatible with Microsoft® Windows® 95 and Window NT operating systems
- Standard shearing assemblies (4)
- Power cord
- RS-232 cord and connectors
- Tool kit assembly

IMPORTANT! Do *not* unpack HydroShear® DNA Shearing Device from Genomic Solutions shipping containers, to protect you from liability if any damage occurred during shipping.

ULTRA-TURRAX® Tube Drive from IKA (optional)

The ULTRA-TURRAX® Tube Drive from IKA shipment includes the:

- ULTRA-TURRAX® Tube Drive from IKA
- Starter package of tubes, SOLiD™ ePCR tubes, and caps (10 pack)

IMPORTANT! Do *not* unpack the ULTRA-TURRAX® Tube Drive from IKA shipping containers, to protect you from liability if any damage occurred during shipping.

Shipping list

For all sample-preparation equipment, verify that the items shown on the shipping lists are the same items that you ordered.

Inspecting shipping containers for damage

For all sample-preparation equipment, carefully inspect the shipping containers and report any damage to the Applied Biosystems service representative. Record any damage or mishandling on the shipping documents.

Unpacking and storing

IMPORTANT! Only unpack items that are temperature sensitive.

Moving the crated sample-preparation equipment to the laboratory

The following information applies to all sample-preparation equipment.

Moving schedule

Before the date of installation:

- Identify the rooms to house the library preparation, bead preparation, and sequencing equipment, as described in Chapter 1, "SOLiD™ 4 System Room Configuration."
- Clear the installation site of all unnecessary materials.
- If possible, move the crated equipment 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

To move the crate to the installation site, verify that the building clearances allow passage of the sample-preparation equipment.

Instrument weight

Covaris™ S2 System

- The Covaris™ S-series Machine weighs approximately 13.6 kg (30 lb)
- The Latitude™ laptop from Dell Inc. weighs approximately 1.4 kg (3 lb)
- The VWR® Compact Chiller, Model 117-612, included with the purchase, weighs approximately 25 kg (55 lb)

HydroShear® DNA Shearing Device from Genomic Solutions

The HydroShear® DNA Shearing Device from Genomic Solutions weighs approximately 4.5 kg (10 lb).

ULTRA-TURRAX® Tube Drive from IKA (optional)

The ULTRA-TURRAX® Tube Drive from IKA weighs approximately 0.75 kg (~1.7 lb).

Moving and lifting the instrument

CAUTION **PHYSICAL INJURY HAZARD.** The instrument is to be moved and positioned under the supervision of 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 any of the sample-preparation equipment on end. Tipping damages the instruments' hardware and electronics.

During installation

Installation and testing

After the systems are uncrated (with assistance from people at your site), installation and testing of the Sample-Preparation Instruments (by the Applied Biosystems service representative) takes about 5 days.

CAUTION While the Sample-Preparation Instruments are 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, refer to the user documents provided with the instrument.

IT requirements for sample-preparation equipment

Covaris™ S2 System

Refer to the manufacturer's user's guide.

HydroShear® DNA Shearing Device from Genomic Solutions

Refer to the manufacturer's user's guide.

ULTRA-TURRAX® Tube Drive from IKA (optional)

There are no IT requirements applicable to the optional ULTRA-TURRAX® Tube Drive from IKA.

Sample-Preparation Equipment Checklists 6

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 91.

IMPORTANT! The following applies to all sample-preparation equipment.

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. • Two people to help the service representative move and position the instrument, if applicable.

Space and layout checklist

For more information, see "Space requirements" on page 93.

IMPORTANT! The following applies to all sample-preparation equipment.

Date verified	Requirements
	Location is away from: • Heating or cooling ducts. • Direct sunlight. • Object or appliance that cause vibration.
	Location accommodates the dimensions and weights specified in Equipment and package specifications.
	Location meets the requirements specified in "Required clearances" on page 96.

Environmental checklist

For more information, see “Environmental requirements” on page 97.

IMPORTANT! The following applies to all sample-preparation equipment.

Date verified	Requirement
	The conditions specified in “Room temperature and humidity” on page 97 have been met.

Electrical checklist

For more information, see “Electrical requirements” on page 99.

IMPORTANT! The following applies to all sample-preparation equipment.

Date verified	Requirement
	The main power supply to the instrument can be immediately disconnected.
	Appropriate grounded power receptacles are available.

Safety checklist

For more information, see “Safety practices” on page 101.

IMPORTANT! The following applies to all sample-preparation equipment.

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 is available.
	Eye and hand protection is available.
	Eyewash is available.
	Safety shower is available.
	Vent lines/fume hood, if applicable, are available.
	Biohazard waste container, if applicable, is available.
	First-aid equipment is available.
	Spill cleanup equipment is available.
	SDSs are readily available.

Sample-preparation equipment materials checklist

IMPORTANT! The following applies to all sample-preparation equipment.

For more information, see "Sample-preparation equipment materials summary" on page 34.

Covaris™ S2 System materials checklist

For more information, see "Covaris™ S2 System materials summary" on page 34.

Date verified	Item
	Covaris™ S2 sonicator.
	Latitude™ laptop from Dell Inc.
	VWR® Compact Chiller, Model 117-612.
	Copy of the manufacturer's user's guide.

HydroShear® DNA Shearing Device from Genomics Solutions materials checklist

For more information, see "HydroShear® DNA Shearing Device from Genomic Solutions materials summary" on page 36.

Date verified	Item
	HydroShear® DNA Shearing Device from Genomic Solutions.
	Copy of the manufacturer's user's guide.

ULTRA-TURRAX® Tube Drive from IKA (optional) materials checklist

For more information, see "ULTRA-TURRAX® Tube Drive from IKA (optional) materials summary" on page 34.

Date verified	Item
	ULTRA-TURRAX® Tube Drive from IKA.

The SOLiD™ EZ Bead™ System (optional) materials checklist

For more information on the SOLiD™ EZ Bead™ System materials, refer to the *SOLiD™ EZ Bead™ System Emulsifier Site Preparation Guide* (4452499), the *SOLiD™ EZ Bead™ System Amplifier Site Preparation Guide* (4454035), or the *SOLiD™ EZ Bead™ System Enricher Site Preparation Guide* (4454036).

System receipt and inspection checklist

For more information, see "Receiving and inspecting the sample-preparation equipment" on page 103.

IMPORTANT! The following applies to all sample-preparation equipment.

Date verified	Action
	Verified that items on the packing list are those that were ordered. Otherwise, reported to the Applied Biosystems service representative discrepancies in the packing list.
	Received the system and inspected the shipping containers for mishandling or damage. **IMPORTANT!** Do not open any shipping container except for the Chemistry Installation Kit.
	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 sample-preparation equipment checklist

For more information, see "Moving the crated sample-preparation equipment to the laboratory" on page 104.

IMPORTANT! The following applies to all sample-preparation equipment.

Date verified	Item
	The measured building clearances can accommodate all sample-preparation equipment's crate dimensions (see "Required clearances" on page 96). If the crate dimensions exceed building clearances, contact the Applied Biosystems service representative. Do not unpack the crate without authorization.

Date verified	Item
	If possible, moved all the *crated* equipment 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.

Sample-preparation equipment IT requirements checklist

For more information, see “IT requirements for sample-preparation equipment” on page 105.

Covaris™ S2 System Refer to the manufacturer's user's guide.

HydroShear® DNA Shearing Device from Genomics Solutions Refer to the manufacturer's user's guide.

ULTRA-TURRAX® Tube Drive from IKA (optional) Not applicable.

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