

ABI 3900 High Throughput Nucleic Acid Synthesizer

Site Preparation and Safety Guide

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Introduction

Overview

About the Site Preparation and Safety Guide

The *Site Preparation and Safety Guide* is sent to all customers who have purchased a Applied Biosystems instrument. This guide provides the information you need to fully prepare your site for the arrival and installation of the instrument. Complete preparation helps ensure a smooth installation process, as well as correct and safe instrument operation.

In This Guide

This guide for the ABI 3900 High Throughput Nucleic Acid Synthesizer contains the following:

Chapter Title	Description
Introduction	Provides orientation to this guide and Customer Support contact information
Site Preparation	Provides installation requirements and the preinstallation checklists
Chemical Safety	Provides general chemical handling guidelines and instrument waste profiles
Instrument Safety	Explains safety alert symbols on instrument and shows instrument input and output connections
Acronyms and Abbreviations	Explains terms used in Material Safety Data Sheets (MSDSs) and in this guide

About Preinstallation

Preparing Your Site

Preinstallation checklists start on page 2-2 of this guide. An Applied Biosystems employee will contact you to verify that everything on the checklists has been done before making an appointment for installation.

Choosing a Location

When deciding where to put the instrument, keep in mind the following:

- ◆ You must be able to disconnect the main power supply to the instrument immediately if necessary.
- ◆ You must be able to comply with local, state/provincial, or national air quality regulations while venting the exhaust from this instrument.

About Safety

Using the Instrument Correctly Use this instrument as specified by Applied Biosystems. If the instrument is used in a manner not specified by the manufacturer, the protection provided by the instrument may be impaired.

User Attention Words Five user attention words appear in the text of all Applied Biosystems user documentation. Each word implies a particular level of observation or action as described below.

Note Calls attention to useful information.

IMPORTANT Indicates information that is necessary for proper instrument operation.

⚠ CAUTION Cautions the user that a potentially hazardous situation could occur, causing injury to the user or damage to the instrument, if this information is ignored.

⚠ WARNING Warns the user that serious physical injury or death to the user or other persons could result, if these precautions are not taken.

⚠ DANGER Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury.

About Chemical Safety

About Material Safety Data Sheets (MSDSs) Some of the chemicals used with this instrument may be listed as hazardous by their manufacturer. When hazards exist warnings are prominently displayed on the labels of all chemicals.

Chemical manufacturers supply a current MSDS before or with shipments of hazardous chemicals to new customers and with the first shipment of a hazardous chemical after an MSDS update. MSDSs provide you with the safety information you need to store, handle, transport and dispose of the chemicals safely.

We strongly recommend that you replace the MSDSs in your files each time you receive one packaged with hazardous chemicals.

⚠ WARNING CHEMICAL HAZARD. Be sure to familiarize yourself with the MSDSs before using reagents or solvents.

About Waste Profiles

A waste profile is provided in this guide. The waste profile lists the percentage composition of the reagents within the waste stream during a typical user application, although this application may not be used in your laboratory. The profile is to assist users in planning for instrument waste handling and disposal, which must be in accordance with local, state/provincial, or national regulations. Read the waste profile and all applicable MSDSs before handling or disposing of waste.

IMPORTANT Waste profiles are not a substitute for MSDS information.

Chemical Hazard Warning

⚠ WARNING CHEMICAL HAZARD. Some of the chemicals used with Applied Biosystems instruments are potentially hazardous and can cause injury, illness or death.

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

Chemical Waste Hazard Warning

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

- ◆ Read and understand the material safety data sheets (MSDSs) provided by the manufacturers of the chemicals in the waste container before you store, handle, or dispose of chemical waste.
 - ◆ Handle chemical wastes in a fume hood.
 - ◆ Minimize contact with and inhalation of chemical waste. Wear appropriate personal protective equipment when handling chemicals (e.g., safety glasses, gloves, or clothing).
 - ◆ After emptying the 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.
-
-

Customer Support

To Reach Us on the Web

We strongly encourage you to visit our web site for answers to frequently asked questions and to learn more about our products. You can also order technical documents and/or an index of available documents and have them faxed or e-mailed to you through our site (see “Documents on Demand” on page 1-6)

The Applied Biosystems Web site address is:

<http://www.appliedbiosystems.com/techsupp>

To submit technical questions from North America or Europe:

Step	Action
1	Access the Applied Biosystems Technical Support Web site.
2	Under the Troubleshooting heading, click Support Request Forms , then select the relevant support region for the product area of interest.
3	Enter the requested information and your question in the displayed form, then click Ask Us RIGHT NOW (blue button with yellow text).
4	Enter the required information in the next form (if you have not already done so), then click Ask Us RIGHT NOW . You will receive an e-mail reply to your question from one of our technical experts within 24 to 48 hours.

To Contact ABI 3900 High Throughput Nucleic Acid Synthesizer Technical Support

In the United States and Canada, technical support for this instrument is available in the following ways:

To contact Technical Support by...	Use...
Telephone	1-800-831-6844, then press 21 5:30am–5:00pm Pacific Time
Fax	1-650-638-5981
E-mail	corelab@appliedbiosystems.com

See “Regional Offices Sales and Service” on page 1-6 for sales and service representatives outside of the United States and Canada.

Ordering MSDSs You can order free additional copies of MSDSs for chemicals manufactured or distributed by Applied Biosystems using the contact information below.

To order MSDSs...	Then...							
Over the Internet	a. Go to our Web site at www.appliedbiosystems.com/techsupp							
	b. Click MSDSs .							
	<table border="1"> <thead> <tr> <th>If you have...</th> <th>Then...</th> </tr> </thead> <tbody> <tr> <td>The MSDS document number or the Document on Demand index number</td> <td>Enter one of these numbers in the appropriate field on this page</td> </tr> <tr> <td>The product part number</td> <td rowspan="2">Select Click Here, then enter the part number or keyword(s) in the field on this page.</td> </tr> <tr> <td>Keyword(s)</td> </tr> </tbody> </table>	If you have...	Then...	The MSDS document number or the Document on Demand index number	Enter one of these numbers in the appropriate field on this page	The product part number	Select Click Here , then enter the part number or keyword(s) in the field on this page.	Keyword(s)
	If you have...	Then...						
The MSDS document number or the Document on Demand index number	Enter one of these numbers in the appropriate field on this page							
The product part number	Select Click Here , then enter the part number or keyword(s) in the field on this page.							
Keyword(s)								
c. You can open and download a PDF (using Adobe® Acrobat® Reader™) of the document by selecting it, or you can choose to have the document sent to you by fax or email.								
By automated telephone service	Use "Documents on Demand" on page 1-6.							
By telephone in the United States	Dial 1-800-327-3002 , then press 1 .							
By telephone from Canada	<table border="1"> <thead> <tr> <th>To order in...</th> <th>Dial 1-800-668-6913 and...</th> </tr> </thead> <tbody> <tr> <td>English</td> <td>Press 1, then 2, then 1 again</td> </tr> <tr> <td>French</td> <td>Press 2, then 2, then 1</td> </tr> </tbody> </table>	To order in...	Dial 1-800-668-6913 and...	English	Press 1 , then 2 , then 1 again	French	Press 2 , then 2 , then 1	
	To order in...	Dial 1-800-668-6913 and...						
	English	Press 1 , then 2 , then 1 again						
French	Press 2 , then 2 , then 1							
By telephone from any other country	See "Regional Offices Sales and Service" on page 1-6.							

For chemicals not manufactured or distributed by Applied Biosystems, call the chemical manufacturer.

Documents on Demand Free, 24-hour access to Applied Biosystems technical documents, including MSDs, is available by fax or e-mail or by download from our Web site.

To order documents...	Then...
by index number	a. Access the Applied Biosystems Technical Support Web site at http://www.appliedbiosystems.com/techsupp b. Click the Index link for the document type you want, then find the document you want and record the index number. c. Use the index number when requesting documents following the procedures below.
by phone for fax delivery	a. From the U.S. or Canada, call 1-800-487-6809 , or from outside the U.S. and Canada, call 1-858-712-0317 . b. Follow the voice instructions to order the documents you want. Note There is a limit of five documents per request.
through the Internet for fax or e-mail delivery	a. Access the Applied Biosystems Technical Support Web site at http://www.appliedbiosystems.com/techsupp b. Under Resource Libraries , click the type of document you want. c. Enter or select the requested information in the displayed form, then click Search . d. In the displayed search results, select a check box for the method of delivery for each document that matches your criteria, then click Deliver Selected Documents Now (or click the PDF icon for the document to download it immediately). e. Fill in the information form (if you have not previously done so), then click Deliver Selected Documents Now to submit your order. Note There is a limit of five documents per request for fax delivery but no limit on the number of documents you can order for e-mail delivery.

Regional Offices Sales and Service If you are outside the United States and Canada, you should contact your local Applied Biosystems service representative

Outside North America

Region	Telephone Dial...	Fax Dial...
Africa and the Middle East		
Africa (English Speaking) and West Asia (Fairlands, South Africa)	27 11 478 0411	27 11 478 0349
South Africa (Johannesburg)	27 11 478 0411	27 11 478 0349
Middle Eastern Countries and North Africa (Monza, Italia)	39 (0)39 8389 481	39 (0)39 8389 493
Eastern Asia, China, Oceania		
Australia (Scoresby, Victoria)	61 3 9730 8600	61 3 9730 8799
China (Beijing)	86 10 64106608	86 10 64106617
Hong Kong	852 2756 6928	852 2756 6968
Korea (Seoul)	82 2 593 6470/6471	82 2 593 6472

Region <i>(continued)</i>	Telephone Dial...	Fax Dial...
Malaysia (Petaling Jaya)	60 3 758 8268	60 3 754 9043
Singapore	65 896 2168	65 896 2147
Taiwan (Taipei Hsien)	886 2 22358 2838	886 2 2358 2839
Thailand (Bangkok)	66 2 719 6405	66 2 319 9788
Europe		
Austria (Wien)	43 (0)1 867 35 75 0	43 (0)1 867 35 75 11
Belgium	32 (0)2 712 5555	32 (0)2 712 5516
Czech Republic and Slovakia (Praha)	420 2 61 222 164	420 2 61 222 168
Denmark (Naerum)	45 45 58 60 00	45 45 58 60 01
Finland (Espoo)	358 (0)9 251 24 250	358 (0)9 251 24 243
France (Paris)	33 (0)1 69 59 85 85	33 (0)1 69 59 85 00
Germany (Weiterstadt)	49 (0) 6150 101 0	49 (0) 6150 101 101
Hungary (Budapest)	36 (0)1 270 8398	36 (0)1 270 8288
Italy (Milano)	39 (0)39 83891	39 (0)39 838 9492
Norway (Oslo)	47 23 12 06 05	47 23 12 05 75
Poland, Lithuania, Latvia, and Estonia (Warszawa)	48 (22) 866 40 10	48 (22) 866 40 20
Portugal (Lisboa)	351 (0)22 605 33 14	351 (0)22 605 33 15
Russia (Moskva)	7 095 935 8888	7 095 564 8787
South East Europe (Zagreb, Croatia)	385 1 34 91 927	385 1 34 91 840
Spain (Tres Cantos)	34 (0)91 806 1210	34 (0)91 806 1206
Sweden (Stockholm)	46 (0)8 619 4400	46 (0)8 619 4401
Switzerland (Rotkreuz)	41 (0)41 799 7777	41 (0)41 790 0676
The Netherlands (Nieuwerkerk a/d IJssel)	31 (0)180 331400	31 (0)180 331409
United Kingdom (Warrington, Cheshire)	44 (0)1925 825650	44 (0)1925 282502
All other countries not listed (Warrington, UK)	44 (0)1925 282481	44 (0)1925 282509
Japan		
Japan (Hacchobori, Chuo-Ku, Tokyo)	81 3 5566 6006	81 3 5566 6505
Latin America		
Del.A. Obregon, Mexico	305-670-4350	305-670-4349

Site Preparation

2

Before You Start

Preinstallation Before the ABI 3900 High Throughput Nucleic Acid Synthesizer is installed, the installation site must be prepared so that the instrument can be operated correctly and safely. Follow the requirements presented in “Preinstallation Checklists” on page 2-2, to simplify the installation procedure.

Operator Training Training of operators is one of the primary goals of installation. Personnel requiring training should set aside 1 uninterrupted day to work with the Applied Biosystems service representative. If this is not possible, please call Applied Biosystems Service Administration to reschedule the installation.

Performance Verification Calibration of the instrument and verification of performance will be performed by an Applied Biosystems service representative during the installation.

Ordering Supplies Before installation, be sure to contact Sales Administration or your sales representative to order the additional supplies necessary for the ongoing operation of the instrument. The chemicals shipped with this instrument will be completely consumed during the installation and initial testing of the instrument.

Preinstallation Checklists

About These Checklists Use the following preinstallation checklists to ensure that all preparations are made for installing your instrument. All of the personnel and supplies on these checklists are required at the time of installation, but most of them are not supplied by Applied Biosystems. A service representative will contact you to confirm that everything is checked off before making an appointment for installation.

Components Supplied by Applied Biosystems The following components are supplied by Applied Biosystems. Check off the items after performing the actions.

√	Date Confirmed	Action
		Received instrument(s) and inspected the crates and boxes.
		Verified that instrument(s), serial number(s), and system configuration, as shown on the packing list and in "Items Shipped with This Instrument" on page 2-5, are the same as ordered.
		Reported any discrepancies in instrument, serial numbers or system configuration, or damage to the crates or boxes to your Applied Biosystems service representative.
		Read all sections of this <i>Site Preparation and Safety Guide</i> .
		Read the MSDSs provided with the Installation Chemistry Kit.
		Unpacked and stored contents of Installation Chemistry Kit, verifying the contents against the packing list in the kit or the list on page 2-6 of this manual.

On-Site Personnel Check off the items below after confirming the following with your laboratory personnel.

√	Date Confirmed	Action
		Have available 1 uninterrupted day for in-lab training during installation.
		Designated one person to be the laboratory safety representative. This person is familiar with laboratory safety procedures, knows the location of all safety equipment, and must be available to the Applied Biosystems engineer while the engineer is at your facility.
		Designated at least one person to be present to assist the service engineer in lifting and/or positioning the instrument.

Laboratory Facility Requirements

Check off each item as you verify that the instrument location meets each of the requirements.

√	Date Confirmed	Requirement
Safety		
		Met requirements specified in "Laboratory Safety Requirements" on page 2-7.
Instrument Location		
		Verified a pathway from the receiving dock to the storage area (if applicable) to accommodate the instrument's 93.5-cm (36.8-in.) crated width.
		Verified a pathway from the storage area to the laboratory to accommodate the instrument's 69.8-cm (27.5-in.) width.
		Laboratory space is of correct dimensions to accommodate the system and its ventilation clearances, and is situated so that the instrument is accessible to the installer on all four sides. See "Laboratory Space Required" on page 2-8.
		Total vertical clearance of 99 cm (39 in.) is required to raise the cover of the instrument.
		The computer will be no more than 1.3 m (5 ft) from the instrument.
		Laboratory bench is of the correct dimensions and weight tolerance to accommodate the system and computer. See "Laboratory Space Required" on page 2-8.
		Situated the computer to allow for proper ergonomics during use.
Ventilation and Waste		
		A properly functioning ventilation system is within 2.4 m (8 ft) of the instrument.
		Provided a duct system for exhausting gaseous instrument waste with a minimum draw of -2 in. of H ₂ O, or a fume hood with a minimum draw of 30 linear m/min (100 linear ft/min).
		Ensured that instrument ventilation and exhaust systems to outside air will meet all local, state/provincial, or national air quality regulations. Obtained permit if necessary.
		Met other laboratory ventilation requirements, as specified in "Laboratory Environmental Requirements" on page 2-17.
		Established proper handling and disposal method(s) for hazardous chemical waste (if appropriate).
		Verified that room ventilation can accommodate an instrument heat output of 853 Btu/h (250 W).
		Verified that laboratory ventilation can accommodate other environmental requirements as specified in "Laboratory Environmental Requirements" on page 2-17.
Electrical		
		A dedicated 1.5-kVA power line and ground is required for the system. A line conditioner or UPS on the power line is recommended.
		One standard power outlet is within 2.1 m (7 ft) of the instrument location, preferably near the back of the instrument.

√	Date Confirmed	Requirement
		Separate power outlets on the same dedicated line are required for the computer, monitor, and printer.
		Met requirements specified in "Electrical Requirements" on page 2-18.

Equipment and Consumables Required

You must supply the following items for installation. Check off each item as you verify its availability.

√	Date Confirmed	Item
		Required equipment that is specified in "Pressurized Gas and Regulator Requirements" on page 2-19
		Top-loading balance that can measure to within ± 0.01 g
		Safety glasses, lab coats
		Chemical-resistant disposable gloves

Items Shipped with This Instrument

Summary List The ABI 3900 High Throughput Nucleic Acid Synthesizer is shipped with the following:

- ◆ ABI 3900 High Throughput Nucleic Acid Synthesizer in 1 crate
- ◆ Dell GX100 (or equivalent) computer (P/N 4319568) and keyboard with a Dell monitor (P/N 4319562) in two boxes
- ◆ Installation Chemistry Kit (P/N 4323062) in three boxes
- ◆ Installation Kit (P/N 4317721) in one box

Do Not Move or Unpack Instrument Do not move or unpack instrument cartons. This protects you from liability if any damage occurred during shipping. Inspect instrument cartons, and report any damage to your Applied Biosystems service representative.

▲ WARNING PHYSICAL INJURY HAZARD. Do not move or unpack instrument cartons. This instrument is heavy. Any incorrect lifting or moving of the instrument can cause painful and sometimes permanent back injury. The instrument may tip over if moved or unpacked incorrectly, causing serious injury to persons in its path or damage to the instrument itself. Unpacking the instrument will also void your warranty with Applied Biosystems.

Unpacking Chemicals You must unpack the Installation Chemistry Kit, which is boxed separately from the instrument. Read the MSDSs supplied with the chemicals, and store the components as specified on page 2-6.

▲ WARNING CHEMICAL HAZARD. Some chemicals used with Applied Biosystems instruments are hazardous and can cause injury, illness, or death. Always read the appropriate MSDSs before interacting with the instrument and chemicals in any way. Hazardous Chemical Warnings are prominently displayed on the labels of all hazardous materials.

Installation Chemistry Kit

Unpack the ABI 3900 High Throughput Nucleic Acid Synthesizer Installation Chemistry Kit upon receipt, and store the chemicals and reagents as indicated in the table below. The chemicals in this kit are completely consumed during the installation and initial testing of the instrument.

Part Number	Description	Shipping Condition	Storage Condition
4323063	ABI 3900 HT Mixed DNA Synthesis columns (50 dAbz, 50 dCbz, 50 dGdmf, and 50 T) 1 x 200/pkg	Room Temperature	Room Temperature
401173	Tetrazole/Acetonitrile ^a , 2 x 450 mL		
402220	Acetic Anhydride/Pyridine/THF, 2 x 450 mL		
401175	1-Methylimidazole/THF, 2 x 450 mL		
401632	0.02 M Iodine/Water/Pyridine/THF, 2 x 450 mL		2 to 6 °C
401272	Trichloroacetic Acid/Dichloromethane, 1 x 2 L		Room Temperature
400443	Acetonitrile, 2 x 4 L		
401159	dA ^{bz} , 1 x 2 g		
401165	dG ^{dmf} , 1 x 2 g		
401160	dC ^{bz} , 1 x 2 g		
401162	T, 1 x 2 g		
4319805	Column, plugged natural polyprop 3900, 1 x 50		
GEN084034	Trap pack bags (mini), 8 x 1		
GEN084033	Trap pack bags (medium), 4 x 1		

a. Temperatures below 16 °C (60 °F) cause tetrazole to precipitate from solution.

Computer Specifications

The computer that accompanies this instrument is a Dell GX100 (or equivalent) with a Windows NT 4.0 (Service Pack 5) operating system. Do not use this computer for purposes other than operating this instrument.

IMPORTANT Do not install optional or unnecessary software. Applied Biosystems reserves the right to remove all software not supplied by Applied Biosystems in order to determine system functionality.

Networking

Applied Biosystems will supply and install, but not support or connect, a network card or install network connections. Customers must make arrangements with their own network administration to have this done concurrent with or immediately after installation of the instrument.

Laboratory Safety Requirements

On-Site Representative We request that a representative from your laboratory be in the vicinity and available to the Applied Biosystems engineer at all times while the engineer is at your facility. This person should be familiar with laboratory safety procedures and know the location of all the safety equipment.

Required Safety Equipment Your laboratory has specific safety practices and policies designed to protect laboratory personnel from potential hazards that are present. We expect that all applicable safety-related procedures will be followed at all times.

The following safety equipment must be available:

- ◆ Fire extinguisher (Halon)
 - ◆ Eyewash
 - ◆ Safety shower
 - ◆ Eye and hand protection
 - ◆ Adequate ventilation
 - ◆ First-aid equipment
 - ◆ Spill cleanup equipment
 - ◆ Protection from any sources of hazardous chemicals, radiation (lasers, radioisotopes, contaminated equipment, radioactive wastes, etc.) and potentially infectious biological material that may be present in the area where Applied Biosystems engineer(s) will be working
-

Laboratory Space Required

Dimensions and Weight The ABI 3900 High Throughput Nucleic Acid Synthesizer, computer, keyboard and monitor have the following dimensions:

Component	Width	Depth	Height	Weight
ABI 3900 High Throughput Nucleic Acid Synthesizer, crated	93.5 cm (36.8 in.)	82.6 cm (32.5 in.)	94 cm (37 in.)	113.4 kg (250 lb)
ABI 3900 High Throughput Nucleic Acid Synthesizer, uncrated	69.8 cm (27.5 in.)	54.5 cm (21.5 in.)	54.5 cm (21.5 in.)	93 kg (205 lb)
ABI 3900 High Throughput Nucleic Acid Synthesizer with all required clearances	100.3 cm (39.5 in.)	75 cm (29.5 in.)	99 cm (39 in.)	
Computer	40.1 cm (15.8 in.)	44.5 cm (17.5 in.)	10.2 cm (4.0 in.)	18.4 kg (41 lb)
Keyboard	45.2 cm (18 in.)	19 cm (7.5 in.)	3.8 cm (1.5 in.)	
Monitor	41.9 cm (16.5 in.)	43.2 cm (17 in.)	45 cm (17.7 in.)	22.5 kg (50 lb)

Note Computer, keyboard and monitor dimensions are subject to minor changes without notification.

Instrument Location Plan on providing sufficient laboratory space for the instrument system as well as the following accommodations:

- ◆ 20.3 cm (8 in.) of clearance at the rear of the instrument to allow room for the cords and waste lines.
- ◆ 44.5 cm (17.5 in.) of vertical clearance to raise the instrument cover.
- ◆ 30.5 cm (12 in.) of clearance to the left of the instrument to allow room for checking and changing reagent bottles.
- ◆ Access to all four sides of instrument for servicing. Do not block access to the rear of the instrument.
- ◆ Laboratory bench of correct dimensions and weight tolerance to accommodate the system.
- ◆ Room under the bench (recommended) for the waste bottle within its secondary container.

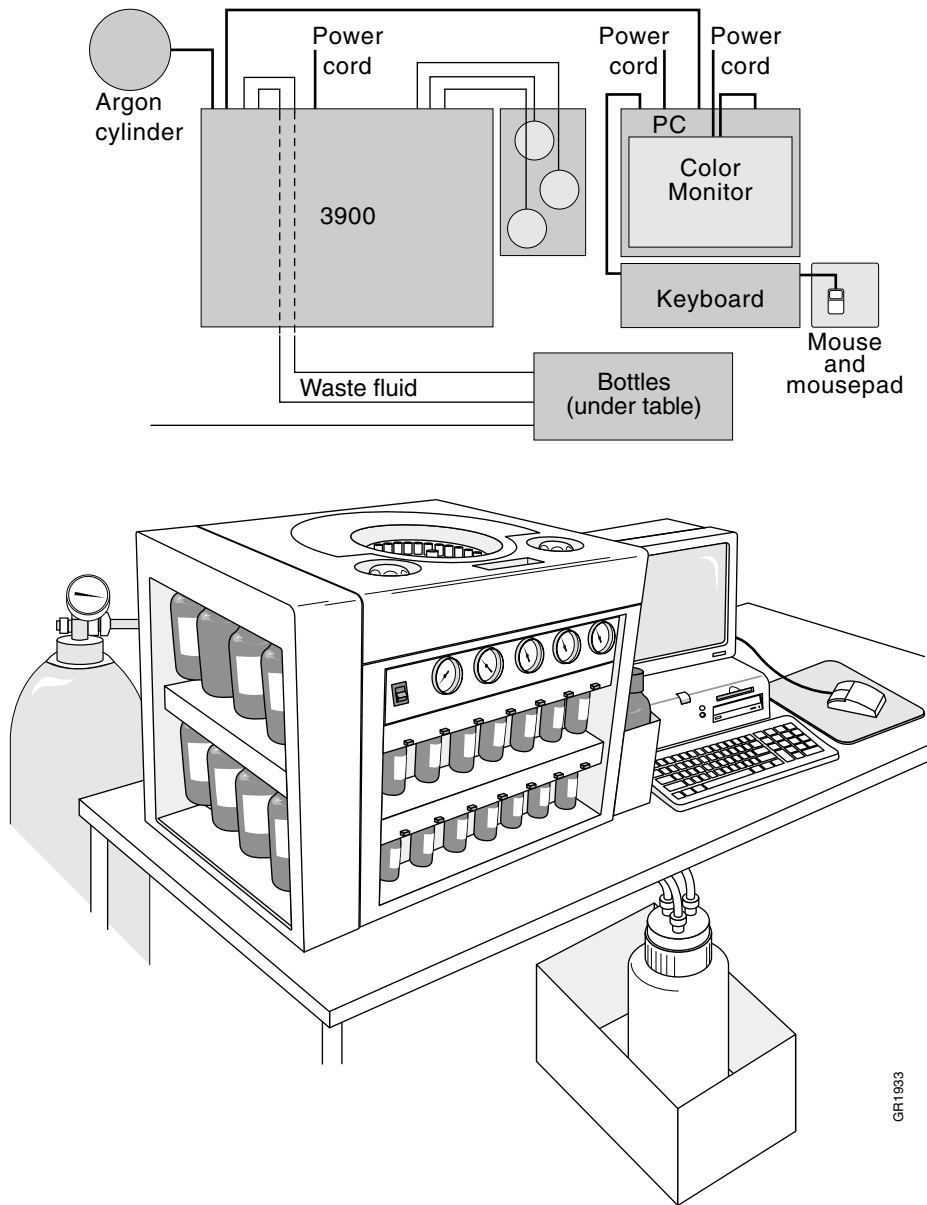
Lab Bench Recommendations A laboratory bench with a height of no more than 76.2 cm (30 in.) is recommended. The workspace height of the 3900 is 44.5 cm (17.5 in.) above bench level. When placed on a standard 91.4 cm (36 in.) laboratory bench, many people will find it difficult to load, unload, and observe the functions of the instrument.

Computer Location

- ◆ The computer must be no more than 1.3 m (5 ft) from the instrument.
- ◆ Situate the computer to the right of the instrument.
- ◆ The computer monitor and keyboard situated to allow for proper ergonomics during use. The following guidelines are recommended:
 - Bench space (or pull-out tray) provided so that the keyboard is positioned directly in line with the monitor
 - Open space under the keyboard so that the operator can sit comfortably, directly facing the monitor
 - Work space provided next to the monitor

**Typical Laboratory
Layout**

A typical laboratory layout is shown below.



**Assisting the
Engineer to Move
the Instrument**

At least one person will be required to assist the service representative place the instrument onto the laboratory bench. Do not unpack or move the instrument before the service representative arrives to install it.

⚠ WARNING PHYSICAL INJURY HAZARD. Do not attempt to lift the instrument or any other heavy objects unless you have received related training. Incorrect lifting can cause painful and sometimes permanent back injury. Use proper lifting techniques when lifting or moving the instrument. Two or three people are required to lift the instrument, depending upon instrument weight.

Laboratory Ventilation Requirements

Laboratory Ventilation Specifications The laboratory ventilation system(s) to this instrument must be independent of the room air ventilation system and operating properly whenever the instrument power is on, waste is in the waste container, or reagents are on the instrument.

For the ABI 3900 High Throughput Nucleic Acid Synthesizer, proper ventilation equipment and operation specifications include either of the following:

- ◆ A fume hood with 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).
- ◆ A duct that is dedicated to exhausting chemical vapors with a draw of -5.1 cm H_2O (-2.0 in. H_2O).

About the Waste System The waste system is composed of a common fluid and gaseous waste tube that exits the back of the instrument and is attached to a 4-L (1-gal.) polyethylene bottle in a secondary container. The gaseous waste fumes are conducted out of the waste bottle to the laboratory ventilation system for disposal by 9.5-mm o.d. (3/8-in. o.d.) tubing.

▲ WARNING CHEMICAL HAZARD. Four-liter reagent and waste bottles can crack and leak. Each 4-L 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. For more information on handling liquid waste, see Chapter 3.

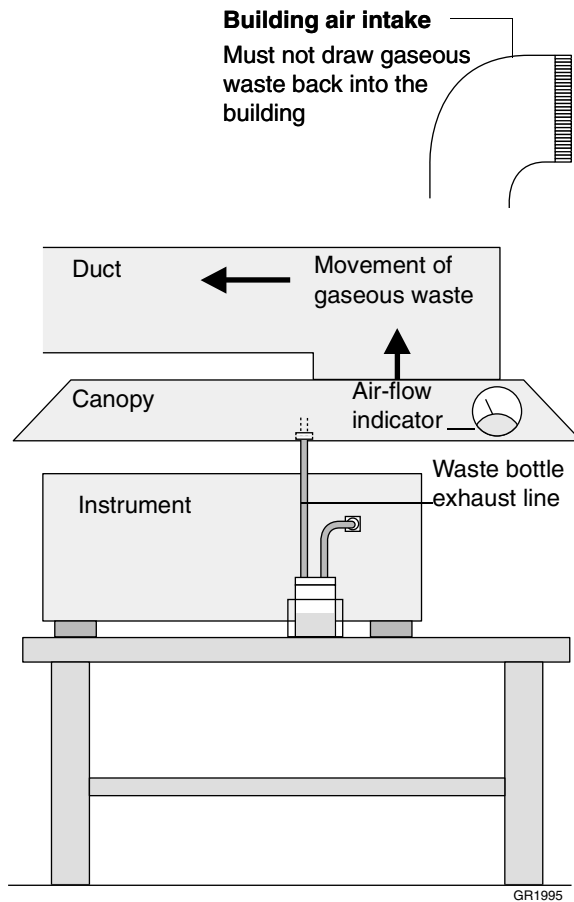
Connecting the Gaseous Waste Exhaust Line Follow these guidelines to connect the tubing from the instrument's gaseous waste exhaust to your laboratory ventilation system:

- ◆ Use the shortest possible length and the straightest possible run of polypropylene tubing. Tubing length should not exceed 2.4 m (8 ft).
- ◆ Make sure that the tubing does not have low points that can trap residue or condensation.
- ◆ Fasten the tubing securely. Use polypropylene or Teflon fasteners. Do not use brass; it corrodes. Be careful not to puncture tubing.
- ◆ Place the tubing away from sources of potential damage, such as heat, flame, or points of contact (rubbing) with other objects.
- ◆ Place the tubing end as far as possible into the duct, canopy, or hood.
- ◆ Make sure that oncoming air movement through the duct or canopy does not face the open end of the tubing.

Connecting the Fluid Waste Line Connect the fluid waste line from the instrument to the waste bottle so that it drops vertically. Doing so prevents liquid and waste from accumulating and blocking the flow.

Heat Production The thermal output of the instrument is 853 Btu/h (250 W). Consult your facilities department regarding ventilation requirements for this level of heat output.

**Laboratory
Ventilation System:
Canopy and/or Duct**



Ductwork

- ◆ Verify that ducts are constructed of materials that are compatible with vented waste.
- ◆ Do not simultaneously vent strong oxidizers, bases or other chemicals that are incompatible with gaseous waste.
- ◆ Maintain negative pressure in duct.

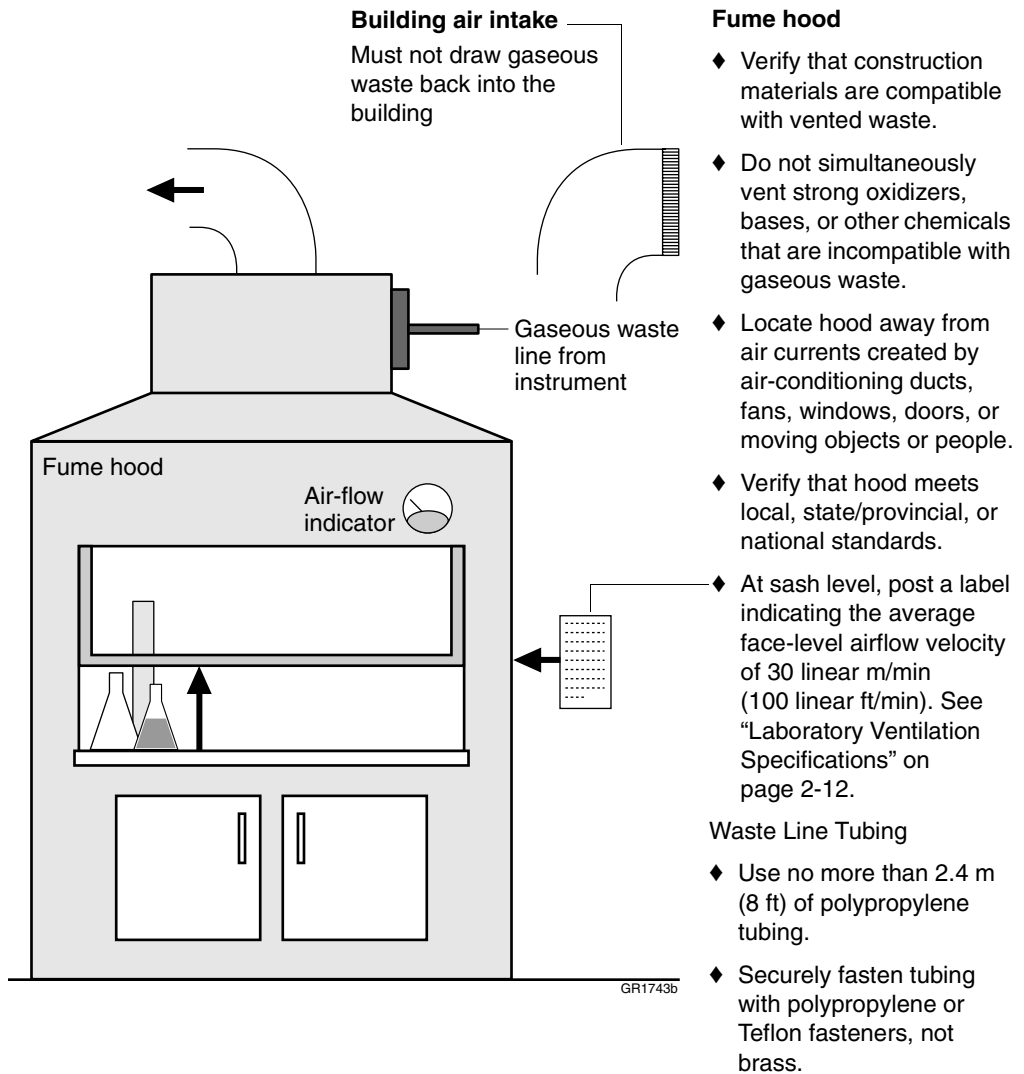
**Waste line tubing
(or flexible duct)**

- ◆ Face open end of tubing away from incoming air.
- ◆ Place tubing as far into the hood or canopy as possible.
- ◆ Use a straight-upward run of no more than 2.4 m (8 ft) of polypropylene tubing.
- ◆ Securely fasten tubing with polypropylene or Teflon fasteners, not brass.

Ventilation Operation

- ◆ Operate laboratory ventilation system whenever the instrument power is on, waste is in the waste bottle, or reagents are on the instrument. This includes nights and weekends.
 - ◆ Do not connect instrument to a ductless hood or a system that purifies/filters air and returns it to the room.
-

**Laboratory
Ventilation System:
Fume Hood**



Ventilation Operation

- ◆ Operate laboratory ventilation system whenever the instrument power is on, waste is in the waste bottle, or reagents are on the instrument. This includes nights and weekends.
- ◆ Do not connect instrument to a ductless hood or a system that purifies/filters air and returns it to the room.

**Fume Hood
Operation**

Follow these guidelines for fume hood operation and maintenance:

- ◆ Operate the fume hood whenever the instrument power is on, waste is in the waste container, or reagents are on the instrument.
- ◆ Use a fume hood that is constructed of materials that are compatible with the waste materials/chemicals being generated or exhausted.
- ◆ 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 vent 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 airflow of 100 linear ft/min face velocity. The minimum flow velocity at any point in the hood is 80 linear ft/min, and the maximum is 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.

**Duct System
Operation**

Follow these guidelines for duct system operation and maintenance:

- ◆ Operate the duct system whenever the instrument power is on, waste is in the waste container, or reagents are on the instrument.
 - ◆ Use a duct system constructed of PVDF tubing or other materials compatible with the waste material being generated.
 - ◆ Do not allow the duct system to come into contact with strong oxidizers, bases, or other chemicals that are incompatible with gaseous waste.
-
-

**Waste Ventilation
Warnings**

⚠ WARNING CHEMICAL WASTE HAZARD. Waste produced by Applied Biosystems instruments can be hazardous and can cause injury, illness, or death.

- ◆ Operate a vented instrument only if it is connected in accordance with all requirements.
 - ◆ Operate the system venting gaseous waste whenever the instrument power is on, waste is in the waste container, or reagents are on the instrument.
 - ◆ Handle all liquid, solid, and gaseous waste as potentially hazardous.
 - ◆ See the MSDSs provided by the manufacturer(s) of chemicals used at your site for more information.
 - ◆ Connect the exhaust line so that it leads to the fume hood or duct in a straight and upward direction. Low points will allow condensation to collect, preventing flow through the instrument.
 - ◆ Do not connect the waste vent line to a ductless hood or to a system that purifies and filters air and returns it to the room.
 - ◆ Always mix and prepare hazardous materials beneath an operating fume hood.
 - ◆ Dispose of waste in accordance with all local, state/provincial, or national health and safety regulations and laws.
 - ◆ Venting hazardous waste may require local, state/provincial, or national air permits.
-

Laboratory Environmental Requirements

Altitude This instrument is for indoor use only and for altitudes not exceeding 1524 m (5000 ft) above sea level.

Temperature and Humidity The laboratory temperature should be maintained between 10 and 35 °C (50 and 95 °F). The instrument can tolerate up to 80% relative humidity at 31 °C, decreasing linearly to 50% relative humidity at 35 °C. Avoid placing the instrument adjacent to heaters, cooling ducts, or in direct sunlight.

Pollution The installation category (overvoltage category) for this instrument is II, and it is classified as portable equipment. The instrument has a pollution degree rating of 2 and may be installed in an environment that has nonconductive pollutants only.

Emission/Immunity Statement For our European customers, any product marked with the CE label meets the European EMC Directive 89/336/EEC and the Low Voltage Directive 72/23/EEC. This product meets Class B emission limits.



Electrical Requirements

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

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

Location	Voltage (VAC)	Frequency	Amperage (A)
Japan	100 ±10%	50/60 Hz ±1%	< 2
USA/Canada	120 ±10%	50/60 Hz ±1%	< 2
Europe (pre-1992)	220 ±10%	50/60 Hz ±1%	< 2
EC	230 ±10%	50/60 Hz ±1%	< 2
UK (pre-1992)	240 +6%/-10%	50/60 Hz ±1%	< 2
Australia	240 +6%/-10%	50/60 Hz ±1%	< 2

Power Line The electrical receptacle must have a dedicated 1.5-kVA power line and ground or a 1.5-kVA power line with a line conditioner or uninterruptible power supply (UPS).

Electrical Outlets This instrument requires a Nema 5-15 receptacle in the United States.

The electrical receptacle must be located within 2.1 m (7 ft) of the instrument rear panel. Do not use extension cords.

Power Rating This instrument is rated for a maximum output (draw) of 265 VAC.

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

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

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

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

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

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

If your environment contains devices that are electrically noisy or you are in an area with frequent electrical storms, a line conditioner with a recommended capacity of 2.0 kVA will enhance the reliability of your system.

Power Outages If you want protection during a power outage, install an uninterruptible power supply (UPS) with a capacity of 2.0 kVA.

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

Pressurized Gas and Regulator Requirements

Gas Cylinders You must supply the required argon gas cylinder and accessories for installation. This instrument requires a pressurized house line, or 1 size 1-A argon gas cylinder that holds approximately 7.2 m^3 (257 ft^3) of gas when full. Use only prepurified argon of 99.998 % or greater purity.

There should be at least 2 argon cylinders in the laboratory at all times, 1 full and 1 in use.

⚠ CAUTION Damage to the instrument and its products can result from using impure argon, gases other than argon, or an inadequate amount of argon.

⚠ WARNING EXPLOSION HAZARD. Pressurized gas cylinders are potentially explosive. Always cap the gas cylinder when it is not in use, and attach it firmly to the wall or gas cylinder cart with approved brackets or chains.

Pressure Regulator

You must supply a two-gauge regulator with a Compressed Gas Association (CGA) 580-cylinder adapter on the inlet side and a Swagelok® type end-fitting that accepts 6.35-mm (¼-in.) o.d. tubing. The primary gauge (0 to 3000 psi; 0 to 25,000 kPa recommended) measures tank pressure, and the secondary gauge (0 to 200 psi; 0 to 2000 kPa recommended) measures regulated pressure. The secondary gauge must allow regulation between 50 and 70 psi. Compressed Gas Association (CGA) 580-cylinder adapter with a needle-type shutoff valve on the exit side. The needle valves should have Swagelok-type end-fittings ready for connection to 6.35-mm (0.25-in.) o.d. tubing.

The second-stage output of the regulator should be set at 60 psi.

▲ WARNING BOTTLE EXPLOSION HAZARD. Bottle explosion can cause severe physical injury. To prevent reagent bottles from becoming overpressurized and possibly exploding, the pressure regulator and the pressure relief valve must be in place and working properly. Failure of these two components will cause bottle overpressurization and bottle explosion.

**Attaching the
Cylinder**

Attach the pressurized gas cylinder firmly to a wall or gas cylinder cart by means of approved straps or chains.

▲ WARNING EXPLOSION HAZARD. Pressurized gas cylinders are potentially explosive. Always cap the gas cylinder when it is not in use, and attach it firmly to the wall or gas cylinder cart with approved brackets or chains.

Chemical Safety

3

Overview

In This Chapter This chapter contains general information about handling hazardous chemicals and waste. It also contains information for the ABI 3900 High Throughput Nucleic Acid Synthesizer about:

- ◆ Material safety data sheets (MSDSs)
- ◆ Hazardous waste produced (if any) during the installation procedure.
- ◆ Hazardous waste produced during typical use of the instrument, if appropriate.

Applied Biosystems assumes that all operations in your laboratory will be conducted in accordance with safety practices detailed in the MSDSs for the chemicals used in your laboratory, and with all local, state/provincial, or national regulations.

Material Safety Data Sheets Overview

About MSDSs Some of the chemicals used with this instrument may be listed as hazardous by their manufacturer. When hazards exist, warnings are prominently displayed on the labels of all chemicals.

MSDSs are supplied by the chemical manufacturer and provide information about:

- ◆ Physical characteristics
- ◆ Safety precautions
- ◆ Health hazards
- ◆ First aid
- ◆ Spill cleanup
- ◆ Disposal procedures

⚠ WARNING CHEMICAL HAZARD. Be sure to familiarize yourself with the MSDSs before using reagents or solvents.

Explanations of acronyms and abbreviations used in MSDSs can be found in Appendix A of this guide.

Updating MSDSs Chemical manufacturers supply a current MSDS before or with shipments of hazardous chemicals to new customers, and with the first shipment of a hazardous chemical after an MSDS update.

Replace the MSDSs in your files regularly so that the safety information is current.

Ordering MSDSs from Applied Biosystems You can order free additional copies of MSDSs for chemicals manufactured or distributed by Applied Biosystems. See “Ordering MSDSs” on page 1-5 for details.

Ordering MSDSs from Other Manufacturers Applied Biosystems does not furnish MSDSs for chemicals used on this instrument that are not manufactured or distributed by Applied Biosystems. Contact the manufacturer(s) of those chemicals to obtain additional MSDSs.

Hazardous Chemicals

Overview This instrument may use chemicals that are hazardous.

⚠ WARNING CHEMICAL HAZARD. Hazardous chemicals used with this instrument can cause injury, illness, or death. Handle all chemicals as potentially hazardous.

Chemicals are classified as hazardous when they are physically hazardous or if they can cause acute or chronic health hazards upon exposure.

- ◆ Physically hazardous chemicals are materials that are flammable, combustible, under compression (gases), explosive, oxidative, organically peroxidic, pyrophoric, reactive or unstable, or water reactive.
- ◆ Chemicals that may cause health hazards include carcinogens; materials that are toxic or highly toxic; reproductive toxins; irritants; corrosives; sensitizers; materials that are toxic to the liver, kidney or blood-forming (hematopoietic) system; and agents that damage the lungs, skin, eyes, or mucous membranes.

Handling Hazardous Chemicals Here are some of the important requirements for handling hazardous chemicals:

- ◆ Read and understand all applicable MSDSs before handling hazardous chemicals.
 - ◆ When replacing reagents, always install a new bottle on the instrument. Do not add new solution to previously used reagent bottles. Some chemicals reduce the integrity of glass bottles. As a result, repeated use beyond 6 weeks may result in the bottle fracturing when it is pressurized during operation.
 - ◆ Always wear gloves, safety glasses, and protective clothing when handling chemicals.
 - ◆ Always provide adequate ventilation when handling chemicals. Some chemicals require handling only in a properly functioning fume hood.
 - ◆ Provide secondary containment for all reagent bottles.
 - ◆ Do not store chemicals in direct sunlight or heat (on or off the instrument).
-

Hazardous Waste

Overview This instrument may generate hazardous waste.

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

- ◆ Read and understand the material safety data sheets (MSDSs) provided by the manufacturers of the chemicals in the waste container before you store, handle, or dispose of chemical waste.
 - ◆ Handle chemical wastes in a fume hood.
 - ◆ Venting hazardous waste may require local, state/provincial, or national air permits.
 - ◆ Minimize contact with and inhalation of chemical waste. Wear appropriate personal protective equipment when handling chemicals (e.g., safety glasses, gloves, or clothing).
 - ◆ 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.
 - ◆ Seal the waste container with the cap provided after disposing of the contents.
-

Instrument Waste System The waste for this instrument is collected in a 10-L (2.7-gallon) plastic container. Dispose of the waste when the waste bottle is 75 % full.

The composition of the chemical waste may vary depending upon the protocols used, the number of samples, the volumes specified, and the reagents included in the protocols.

Handling Chemical Waste When handling chemical waste we strongly recommend that you:

- ◆ Read the waste profile(s) in this chapter before handling or disposing of hazardous waste.
 - ◆ Read all applicable MSDSs before handling or disposing of hazardous waste.
 - ◆ Ensure that the waste container is correctly installed.
 - ◆ Always handle hazardous materials beneath a fume hood that is connected in accordance with all installation requirements.
 - ◆ Always wear chemical-resistant gloves, safety glasses, and protective clothing when handling hazardous waste material.
 - ◆ During transfer, ensure that the waste container is tightly sealed with the waste cap provided.
 - ◆ Dispose of hazardous waste in accordance with all local, state/provincial, or national regulations.
-

Storing Hazardous Waste

⚠ 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.

The following are guidelines for storing hazardous waste:

- ◆ Always use secondary containment when storing chemical waste.
- ◆ Store waste for only short periods of time.
- ◆ Store only small amounts of waste in the laboratory.
- ◆ Store waste away from direct sunlight or sources of heat (on or off the instrument).

Disposing of Hazardous Waste

As the generator of potentially hazardous waste, it is your responsibility to:

- ◆ Characterize the waste generated with your applications
 - ◆ Ensure the health and safety of all personnel in your laboratory
 - ◆ Ensure that instrument waste is stored, transferred, transported, and disposed of according to all local, state/provincial, or national regulations
-
-

Waste Profiles

Overview The waste profiles for the instrument are provided to assist you in disposing of hazardous waste in accordance with local, state/provincial, or national regulations. The waste profiles include the following:

- ◆ Percent composition of chemicals in the instrument waste
 - ◆ Chemical Abstract Service (CAS) number, if the chemical is not a mixture.
-

About the Instrument Waste Profiles The instrument waste profile characterizes the waste produced during a typical user application. The specific application profiled was chosen to provide the most useful information to the largest number of users, given the variety of uses of the instrument. It may not be an application used in your laboratory.

The composition of the chemical waste may vary depending upon the specific reagents, the number of samples, and the volumes specified in each application.

IMPORTANT The instrument waste profile is not a substitute for MSDS information. See specific MSDSs for chemical constituent, health, toxicological, and hazard information.

Instrument Waste Profile

The following table characterizes the waste that will be in the waste container after a typical run of forty-eight 23-base oligonucleotides at 200 nmol.

Instrument Waste Profile

CAS # (if available)	Chemical	Volume (mL)	Percent Composition
75-09-2	Dichloromethane	235.5	19.0
76-03-9	Trichloroacetic acid	9.7	<1
75-05-8	Acetonitrile	779.6-780.7	63.1-63.2
288-94-8	1H-Tetrazole	0.94-2.0	<1
98796-53-3	◆ Deoxyadenosine benzoyl cyanoethyl phosphoramidite	0.3 g	<1
102212-98-6	◆ Deoxycytidine benzoyl cyanoethyl phosphoramidite	0.3 g	<1
98796-51-1	◆ Thymidine cyanoethyl phosphoramidite	0.3 g	<1
Not assigned	◆ Deoxyguanosine dimethylformamidine cyanoethyl phosphoramidite	0.3 g	<1
109-99-9	Tetrahydrofuran	98-106.7	7.9-8.6
108-24-7	Acetic anhydride (5-15%)	1.7-5.0	<1
616-47-7	1-Methylimidazole (5-15%)	1.7-5.0	<1
110-86-1	Pyridine (5-15%)	16-19.6	1.2-1.6
7553-56-2	Iodine	0.7	<1
7732-18-5	Water	5.3-7.2	<1
	Total Volume	1236.72	

Instrument Safety

4

Overview

In This Chapter This chapter provides you with the safety information you need to prepare your laboratory and personnel for the installation and use of the ABI 3900 High Throughput Nucleic Acid Synthesizer. The safety labels and safety alert symbols that may be found on this instrument are provided in several languages. The inputs and outputs for the instrument are also provided.

Safe Operation This manual provides only site preparation information. Before operating this instrument, read the information in the *ABI 3900 High Throughput Nucleic Acid Synthesizer User's Manual* concerning hazards and potential hazards. Ensure that anyone involved with the operation of the instrument is instructed both in general safety practices for laboratories and in specific safety practices for the instrument.

Detailed safety information on the following topics is included in the user's manual for this instrument:

- ◆ Compressed gas safety
 - ◆ Electrical safety
 - ◆ Pressurized bottle safety
 - ◆ Moving part safety
-

Routine Maintenance for Safe Operation Maintain the instrument in good working order. If the instrument has been subjected to adverse environmental conditions (such as fire, flood, or earthquake), an Applied Biosystems service representative should inspect the instrument.

We recommend that an Applied Biosystems service representative check the instrument yearly to verify that:

- ◆ The safety interlocks protecting the user from various hazards are working properly.
 - ◆ The protective housing is functional. Loose or distorted panels will not protect the user or the equipment.
 - ◆ Airflow is not hindered in any way.
-

Instrument Labeling

Safety Labels Safety labels are located on the instrument. Each label consists of a Signal Word panel and a Message panel. A Safety Alert symbol indicates a potential personal safety hazard. If multiple hazards exist, the signal word corresponding to the greatest hazard is used.

Signal Words

- ◆ **CAUTION** indicates a potentially hazardous situation that could result in minor or moderate injury to the user or damage to the instrument.
- ◆ **WARNING** indicates a potentially hazardous situation that could result in death or serious injury.
- ◆ **DANGER** indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury (most extreme).










Labels That May Be Found on the Instrument

The following Danger, Caution, and Warning labels, listed in English and French, may be found on your instrument:



English	French
CAUTION: Hazardous chemicals. Read the Material Safety Data Sheets before handling.	Attention: Produits chimiques dangereux. Lire les fiches techniques de sûreté de matériels avant la manipulation des produits.
CAUTION: Hazardous waste. Read the Waste Profile before handling or disposal.	Attention: Déchets dangereux. Lire les renseignements sur les déchets avant de manipuler ou d'éliminer.
WARNING: Risk of electric shock. Disconnect power cord from supply before replacing fuses or removing power supply module from instrument.	Avertissement: Risque de choc électrique. D'électrique. D'ébrancher le cordon d'alimentation avant de remplacer les fusibles ou de retirer le block d'alimentation de l'instrument.
WARNING: For continued protection against risk of fire, replace only with Listed and Certified fuse of the specified type and ratings.	Avertissement: Pour assurer une protection continue contre les risques d'incendie, remplacer les fusibles uniquement par des fusibles énumérés et certifiés du type de courant nominal spécifiés.
WARNING: HOT LAMP.	Avertissement: LAMPE CHAUDE.
WARNING: HOT. Replace lamp with a Applied Biosystems lamp.	Composants chauds. Remplacer la lampe par une lampe Applied Biosystems.
WARNING: Disconnect supply cord before opening. Grounding circuit continuity is vital for safe operation of equipment. Never operate equipment with grounding conductor disconnected.	Avertissement: Débrancher la corde d'approvisionnement avant l'ouverture. La continuité de circuit au sol est essentiel pour l'exploitation sûre du matériel. N'actionnez jamais le matériel avec le conducteur débranché.
WARNING: For protection against fire hazard, replace only same type and rating of fuse.	Avertissement: A fin d'assurer la protection contre les risques d'incendie, remplacer uniquement par un fusible de même type et de même courant nominal.
CAUTION: HOT.	Attention: Surface chaude.
DANGER: High voltage.	Danger: Haut Voltage.
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 réduire la chance du choc électrique ne retirez pas les couvertures qui exigent l'accès d'outil. Aucune pièce utile d'utilisateur n'est intérieur. Référez l'entretien au personnel de service de Applied Biosystems.
DANGER: Laser radiation when open and interlock defeated. Avoid direct exposure to beam.	Danger: Rayonnement de Laser si ouvert et couplage a défaut. Evitez l'exposition directe au faisceau.
CAUTION: Moving parts.	Attention: Pièces mobiles.

Safety Alert Symbols

Electrical Symbols The following chart is an illustrated glossary of all electrical symbols that are used on Applied Biosystems instruments. Whenever such symbols appear on instruments, please observe appropriate safety procedures.

	This symbol indicates the On position of the main power switch.
	This symbol indicates the Off position of the main power switch.
	This symbol indicates the On/Off position of a push-push main power switch.
	This symbol indicates that a terminal may be connected to another instrument's signal ground reference. This is not a protected ground terminal.
	This symbol indicates that this is a protective grounding terminal that must be connected to earth ground before any other electrical connections are made to the instrument.
	A terminal marked with this symbol either receives or delivers alternating current or voltage.
	A terminal marked with this symbol can receive or supply an alternating and a direct current or voltage.
	CAUTION This symbol indicates the presence of high voltage and warns the user to proceed with caution.
	CAUTION This symbol alerts you to consult the manual for further information and to proceed with caution.

Nonelectrical Symbols The following is an illustrated glossary of all nonelectrical safety alert symbols found on Applied Biosystems instruments.



	CAUTION This symbol illustrates a heater hazard. Proceed with caution when working around these areas to avoid being burned by hot components.
	This symbol indicates that a laser is present inside the instrument.

安全警告符號

電源符號 下列為 PE 公司「生物系統部」儀器之電源符號所代表的意思：





	本符號表示主電源處於「開」的位置。
	本符號表示主電源處於「關」的位置。
	本符號表示按鍵式電源開關。
	本符號表示此端與另一儀器接地端相連接，但並非安全接地端。
	本符號表示此端需接好安全地線方可將此儀器插上電源。
	本符號表示可接受或提供交流電源。
	本符號表示可接受或提供交流以及直流電源。
	小心 本符號表示此處有高壓電，小心處理。
	小心 本符號表示請查閱操作手冊並小心處理。

非電源符號 下列為 PE 公司「生物系統部」儀器之非電源符號所代表的意思：



	小心 此處燙熱，小心處理以免燙傷。
	此符號表示儀器內含有雷射光（極光）。

Symboles des alertes de sécurité

Symboles électriques Le tableau suivant donne la signification de tous les symboles électriques qui figurent sur les appareils Applied Biosystems. En présence de l'un de ces symboles, il est impératif de se conformer aux consignes de sécurité appropriées.

	Position <i>MARCHE</i> de l'interrupteur d'alimentation principal.
	Position <i>ARRÊT</i> de l'interrupteur d'alimentation principal.
	Positions <i>MARCHE-ARRÊT</i> de l'interrupteur d'alimentation principal à bouton poussoir.
	Borne pouvant être reliée à la mise à la terre d'un autre appareil. Ce n'est pas une borne de mise à la terre protégée.
	Borne de mise à la terre de protection devant être reliée à la terre avant d'effectuer tout autre raccordement électrique à l'appareil.
	Borne recevant ou fournissant une tension ou un courant de type alternatif.
	Borne pouvant recevoir ou fournir une tension ou un courant de types alternatif et continu.
	ATTENTION Indique la présence d'une haute tension et avertit l'utilisateur de procéder avec précaution.
	ATTENTION Avertit l'utilisateur de la nécessité de consulter le manuel pour obtenir davantage d'informations et de procéder avec précaution.

Symboles non électriques Le tableau suivant donne la signification des symboles d'alertes de sécurité non électriques qui figurent sur les appareils Applied Biosystems.



	ATTENTION Danger associé à la présence d'un appareil de chauffage. Procéder avec précaution pour éviter de se brûler au contact de pièces ou d'éléments chauds.
	Indique que l'appareil renferme un laser.

Sicherheitswarnsymbole

Elektrische Symbole Die folgende Tabelle enthält Beschreibungen aller auf den Instrumenten von Applied Biosystems verwendeten elektrischen Symbole. Wenn diese Symbole auf den Instrumenten erscheinen, beachten Sie bitte die entsprechenden Sicherheitsvorkehrungen.

	Dieses Symbol zeigt die <i>EIN</i> -Position des Hauptnetzschalters an.
	Dieses Symbol zeigt die <i>AUS</i> -Position des Hauptnetzschalters an.
	Dieses Symbol zeigt die <i>EIN/AUS</i> -Position eines Druck-Zug-Hauptnetzschalters an.
	Dieses Symbol zeigt an, daß ein Anschluß an die Betriebserde eines anderen Instruments angeschlossen werden kann. Dies ist kein geschützter Erdanschluß.
	Dieses Symbol zeigt einen geschützten Erdanschluß an, der geerdet werden muß, bevor andere elektrische Anschlüsse zum Instrument hergestellt werden.
	Ein mit diesem Symbol gekennzeichneter Anschluß kann Wechselstrom oder -spannung erhalten oder abgeben.
	Ein mit diesem Symbol gekennzeichneter Anschluß kann Wechselstrom oder -spannung und Gleichstrom oder -spannung erhalten oder abgeben.
	VORSICHT Dieses Symbol zeigt das Vorliegen von Hochspannung an und warnt den Anwender, mit Vorsicht fortzufahren.
	VORSICHT Dieses Symbol fordert Sie auf, das Handbuch zwecks näherer Informationen zu konsultieren und mit Vorsicht fortzufahren.

Nicht-elektrische Symbole Die folgende Tabelle enthält Beschreibungen aller auf den Instrumenten von Applied Biosystems verwendeten nicht-elektrischen Symbole.



	VORSICHT Dieses Symbol zeigt eine Gefahr durch die Heizung an. Gehen Sie mit Vorsicht vor, wenn Sie in der Nähe dieser Bereiche arbeiten, damit Sie sich nicht an heißen Komponenten verbrennen.
	Dieses Symbol zeigt das Vorliegen eines Lasers im Innern des Instruments an.

Simboli degli allarmi di sicurezza

Simboli elettrici La tabella seguente è un glossario illustrato di tutti i simboli elettrici utilizzati su strumenti Applied Biosystems. Ogni volta che tali simboli compaiono sugli strumenti, rispettare le procedure di sicurezza appropriate.

	Questo simbolo indica la posizione <i>ON</i> dell'interruttore di alimentazione generale.
	Questo simbolo indica la posizione <i>OFF</i> dell'interruttore di alimentazione generale.
	Questo simbolo indica la posizione <i>ON/OFF</i> di un interruttore di alimentazione generale a pulsante.
	Questo simbolo indica che un terminale può essere collegato al riferimento di terra del segnale di un altro strumento. Non è un terminale di terra protetto.
	Questo simbolo indica un terminale protettivo di messa a terra che deve essere collegato a terra prima di realizzare qualsiasi altro collegamento elettrico allo strumento.
	Un terminale contrassegnato con questo simbolo riceve o fornisce tensione o corrente alternata.
	Un terminale contrassegnato con questo simbolo può ricevere o fornire tensione o corrente alternata e continua.
	ATTENZIONE questo simbolo indica la presenza di alta tensione e invita l'utente a procedere con cautela.
	ATTENZIONE questo simbolo invita l'utente a consultare il manuale per ulteriori informazioni e procedere con cautela.

Simboli non elettrici Segue un glossario illustrato dei simboli degli allarmi di sicurezza non elettrici trovati su strumenti Applied Biosystems.



	ATTENZIONE questo simbolo illustra un rischio da alte temperature. Procedere con cautela quando si lavora in queste aree per evitare ustioni causate da componenti a temperature elevate.
	Questo simbolo indica la presenza di laser nello strumento.

安全上の警告マーク

電気に関するマーク PE Biosystems 装置に使用されている全ての電気に関するマークを下表に示します。このようなマークが装置に表示されている場合は、安全上、該当する指示を必ず守ってください。

	主電源スイッチのオンの位置を示します。
	主電源スイッチのオフの位置を示します。
	押しボタン式主電源スイッチのオン/オフの位置を示します。
	この表示は、端子を別の機器のグラウンドに接続できることを示します。これはグラウンド保護端子ではありません。
	この装置に電氣的接続を行う前に、アースに接続する必要があるグラウンド端子を示します。
	この表示のある端子は、交流電流または交流電圧を受信または供給します。
	この表示のある端子は、交流および直流電流または電圧を受信・供給することができます。
	警告 高電圧のため注意が必要です。
	警告 詳細についてはマニュアルを参照した上で、注意して行ってください。

電気以外のマーク 次に示すマークは PE Biosystems 装置で使用されている電気以外の安全上のマークです。



	警告 このマークはヒータに関する危険を示します。この表示のある周囲で作業する場合は、部品が高温になっているため火傷を負わないように注意が必要です。
	装置内にレーザを用いていることを示します。

안전 경고 기호

전기 기호 다음의 차트는 PE Biosystems 기기에서 사용되는 모든 전기 기호들의 도해 해설입니다.

	이 기호는 주 전원 스위치가 <i>on</i> 임을 나타냅니다.
	이 기호는 주 전원 스위치가 <i>off</i> 임을 나타냅니다.
	이 기호는 푸쉬푸쉬 주 전원 스위치가 on/off 됨을 나타냅니다.
	이 기호는 전극이 다른 기기의 신호 접지 레퍼런스에 연결되었을 수 있음을 나타냅니다. 이것은 보호되는 접지 전극이 아닙니다.
	이 기호는 기기에 어떠한 전기 연결이 되기전에 접지로 반드시 연결되어야 하는 보호되는 접지 전극임을 나타냅니다.
	이 기호가 있는 전극은 교류 또는 전압을 받거나 보낼 수 있습니다.
	이 기호가 있는 전극은 교류 및 직류 또는 전압을 받거나 공급할 수 있습니다.
	주의 이 기호는 고압이 흐름을 나타내며 사용자들이 주의할 것을 경고합니다.
	주의 이 기호는 더 자세한 정보를 얻기 위해 설명서를 참고할 것을 알리며 주의할 것을 알려줍니다.

비 전기 기호 다음의 차트는 PE Biosystems 기기에서 발견되는 비 전기 안전 경고의 도해 해설입니다.



	주의 이 기호는 가열 위험을 나타냅니다. 이 주변에서 작업할 때는 뜨거운 부품에 의한 화상을 피하기 위해 주의해야 합니다.
	이 기호는 레이저가 기기내에 존재함을 나타냅니다.

Símbolos de alerta de segurança

Símbolos elétricos A tabela a seguir constitui um glossário ilustrado de todos os símbolos elétricos usados nos instrumentos Applied Biosystems. Sempre que um desses símbolos aparecer num instrumento, siga os procedimentos adequados de segurança.

	Este símbolo indica que o interruptor de energia elétrica está na posição <i>ligado</i> .
	Este símbolo indica que o interruptor de energia elétrica está na posição <i>desligado</i> .
	Este símbolo indica a posição ligado/desligado de um interruptor principal de energia elétrica do tipo botão de pressão.
	Este símbolo indica que um terminal pode estar conectado a uma referência de aterramento de sinal de um outro instrumento. Este não é um terminal terra protegido.
	Este símbolo indica que este é um terminal de aterramento de proteção, que deve ser ligado à terra antes de se fazer qualquer outra ligação elétrica ao instrumento.
	Um terminal marcado com este símbolo recebe ou transmite tensão ou corrente alternada.
	Um terminal marcado com este símbolo recebe ou fornece tensão ou corrente alternada ou contínua.
	CUIDADO Este símbolo indica a presença de alta tensão e avisa o usuário para proceder com cuidado.
	CUIDADO Este símbolo serve como alerta, para que se consulte o manual a fim de se obter mais informações e que se proceda com cuidado.

Símbolos não-elétricos A seguir, apresentamos um glossário ilustrado de todos os símbolos de alerta de segurança não relacionados à eletricidade encontrados nos instrumentos Applied Biosystems.



	CUIDADO Este símbolo representa um perigo devido a aquecedor no local. Proceda com cuidado ao trabalhar em áreas próximas a aquecedores, para evitar queimaduras devidas ao contato com componentes quentes.
	Este símbolo indica que há um laser dentro do instrumento.

Símbolos de alerta de seguridad

Símbolos eléctricos En la siguiente tabla se muestra un glosario ilustrado de todos los símbolos eléctricos que se utilizan en los instrumentos de Applied Biosystems.

	Este símbolo indica la posición de <i>encendido</i> del interruptor principal.
	Este símbolo indica la posición de <i>apagado</i> del interruptor principal.
	Este símbolo indica la posición de encendido/apagado de un interruptor principal de presión.
	Este símbolo indica que existe la posibilidad de conectar esta terminal a la toma de tierra de referencia de otro instrumento. Esta no es una toma de tierra protegida.
	Este símbolo indica que la toma de tierra protegida debe ser conectada a tierra antes de realizar cualquier otro tipo de conexión eléctrica al instrumento.
	Una terminal marcada con este símbolo recibe o suministra corriente o tensión alterna.
	Una terminal marcada con este símbolo puede recibir o suministrar corriente o tensión alterna y continua.
	PRECAUCIÓN Este símbolo indica la presencia de alta tensión y advierte al usuario que proceda con precaución.
	PRECAUCIÓN Este símbolo indica que consulte el manual para obtener más información y que proceda con precaución.

Símbolos no eléctricos A continuación se presenta un glosario ilustrado de todos los símbolos de seguridad y alerta no eléctricos que aparecen en los instrumentos de Applied Biosystems.

	PRECAUCIÓN Este símbolo indica peligro de altas temperaturas. Proceda con cautela cuando trabaje cerca de estas zonas para evitar quemarse con componentes calientes.
	Este símbolo indica que hay un láser dentro del instrumento.

เครื่องหมายเตือนเพื่อความปลอดภัย



เครื่องหมายที่เกี่ยวข้องกับไฟฟ้า

แผนภูมิต่อไปนี้ ทำไว้เพื่ออธิบายความหมายของเครื่องหมายต่างๆ ที่ใช้ในเครื่องวัดชนิดต่างๆ ของ **Applied Biosystems** โปรดปฏิบัติตามขั้นตอนที่เหมาะสมเพื่อรักษาความปลอดภัย ทุกครั้งที่เครื่องหมายประเภทนี้ได้ปรากฏบนเครื่องวัดชนิดใด

	เครื่องหมายนี้ แสดงตำแหน่งเปิด (ON) ของสวิตช์กำลังหลัก
	เครื่องหมายนี้ แสดงตำแหน่งปิด (OFF) ของสวิตช์กำลังหลัก
	เครื่องหมายนี้ แสดงตำแหน่งเปิด-ปิด (ON/OFF) ของสวิตช์กำลังหลักชนิดผลึก-ผลึก
	เครื่องหมายนี้ แสดงว่าขั้วต่อสามารถเชื่อมต่อกับสายดินร่วมกับสายดินของสัญญาณอ้างอิงของเครื่องวัดอีกเครื่องหนึ่ง ซึ่งไม่ใช่ขั้วต่อลงดินที่ได้รับการป้องกัน
	เครื่องหมายนี้ แสดงว่ามีขั้วต่อลงดินเพื่อความปลอดภัยอยู่อันหนึ่งที่ต้องเชื่อมต่อกับสายลงดินก่อนที่จะสามารถทำการต่อไฟอื่นใดกับเครื่องวัดชนิดนี้ได้
	ขั้วต่อที่ติดเครื่องหมายนี้ ได้รับหรือส่งกระแสหรือแรงดันสลับ
	ขั้วต่อที่ติดเครื่องหมายนี้ สามารถรับหรือจ่ายกระแสหรือแรงดันไฟฟ้าทั้งกระแสสลับและกระแสตรงได้
	ระวัง เครื่องหมายนี้แสดงว่ามีกระแสแรงดันสูง และเตือนผู้ใช้เครื่องว่าจะต้องทำงานด้วยความระมัดระวัง
	ระวัง เครื่องหมายนี้มีไว้เพื่อเตือนผู้ใช้เครื่องว่า จะต้องดูรายละเอียดเพิ่มเติมในคู่มือ แล้วทำงานด้วยความระมัดระวัง

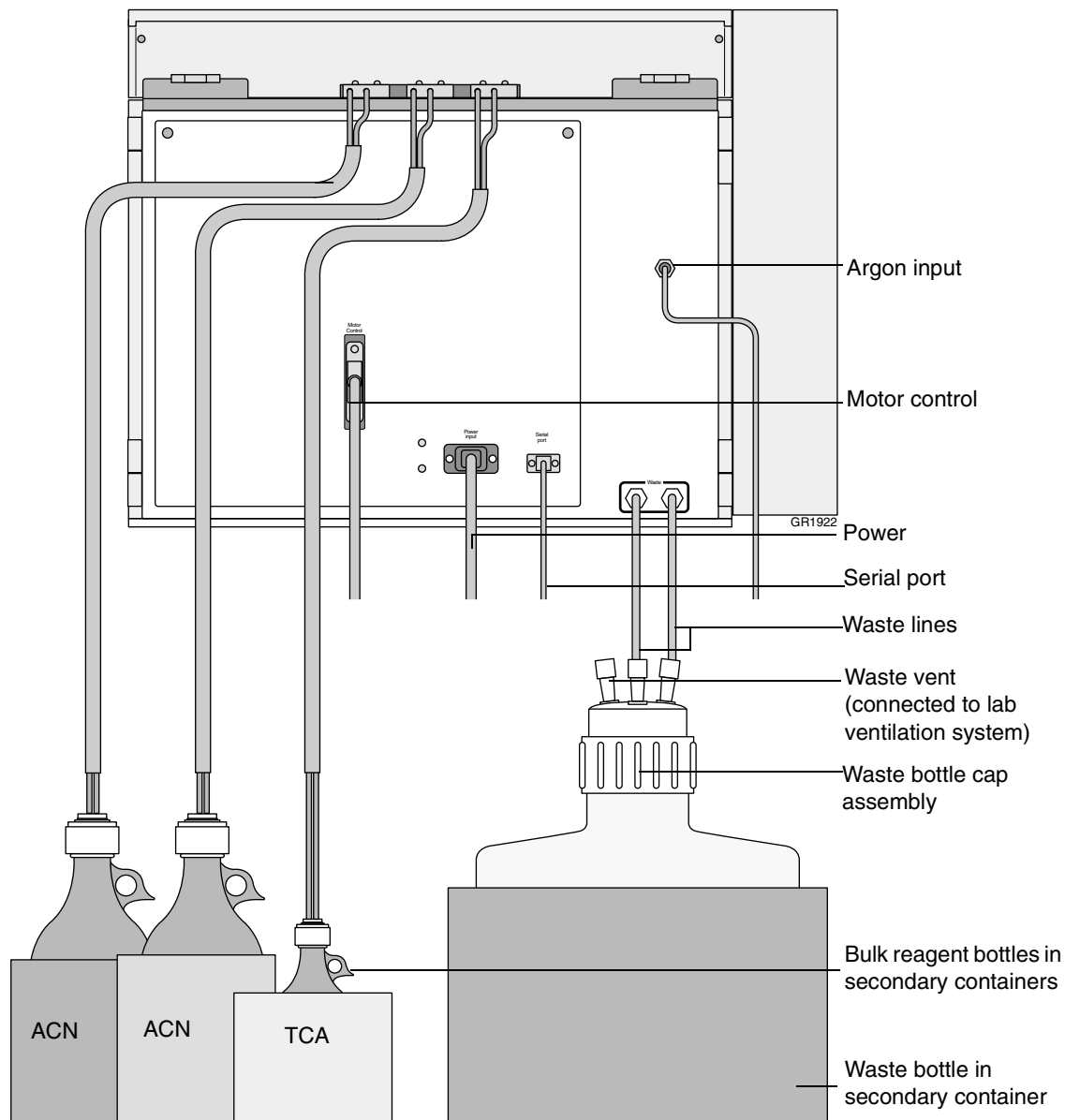
เครื่องหมายที่ไม่เกี่ยวข้องกับไฟฟ้า

ข้อความต่อไปนี้ เขียนไว้เพื่ออธิบายความหมายของเครื่องหมายเตือนอันตรายต่างๆ ที่ไม่เกี่ยวข้องกับไฟฟ้า และปรากฏบนเครื่องวัดชนิดต่างๆ ของ **Applied Biosystems**

	ระวัง เครื่องหมายนี้ แสดงภาวะอันตรายที่เกิดจากเครื่องทำความร้อน จงใช้ความระมัดระวังในขณะที่ทำงานในบริเวณเหล่านี้ เพื่อหลีกเลี่ยงไม่ให้ถูกไหม้จากชิ้นส่วนใด ๆ ที่ร้อนจัด
	เครื่องหมายนี้ แสดงว่ามีเลเซอร์อยู่ภายในเครื่องวัดนี้

Input/Output Connections

Location The locations of the input/output connections on the ABI 3900 synthesizer are shown in the figure below. The input/output connections are also labeled on the instrument.



Gas Safety

Pressurized Gas Safety This instrument uses a pressurized gas cylinder for operation. Some kinds of rapidly leaking gas can displace normal atmosphere and cause suffocation. If knocked over, a pressurized gas cylinder can explode. Keep in mind the following:

- ◆ When working with gas cylinders, screw the gas cap on tightly when the cylinder is not in use and when you are transporting it.
- ◆ Attach the cylinder firmly to a wall or gas cylinder cart by means of an approved strap or clamp.

EXPLOSION HAZARD. Pressurized gas cylinders are potentially explosive. Always cap the gas cylinder when it is not in use, and attach it firmly to the wall or gas cylinder cart with approved brackets, chains, or clamps.

Gaseous Waste Safety Instruments that use gas cylinders for operation emit gaseous waste that is potentially hazardous. To handle gaseous waste safely in your laboratory, perform the following steps:

- ◆ Follow the instructions provided in “Laboratory Ventilation Requirements” on page 2-12.
- ◆ Read the MSDSs provided by the manufacturer of the chemicals used in your laboratory.
- ◆ Read “About the Instrument Waste Profiles” on page 3-6, if applicable.
- ◆ Operate the fume hood whenever the instrument power is on, waste is in the waste container, or reagents are on the instrument.
- ◆ Vent according to the manual instructions and your local regulations.

GASEOUS CHEMICAL WASTE HAZARD. Waste produced by Applied Biosystems instruments can be hazardous and can cause injury, illness, or death.

- ◆ Operate a vented instrument only if it is connected in accordance with all requirements.
 - ◆ Venting hazardous waste may require local, state/provincial, or national air permits.
 - ◆ Operate the system venting gaseous waste whenever the instrument power is on, waste is in the waste container, or reagents are on the instrument.
 - ◆ Handle all liquid, solid, and gaseous waste as potentially hazardous.
 - ◆ See the MSDSs provided by the manufacturer(s) of chemicals used at your site for more information.
 - ◆ The exhaust line must lead to the fume hood in a straight and upward direction. Low points will allow condensation to collect, preventing flow through the instrument.
 - ◆ Do not connect the waste vent line to a ductless hood or to a system that purifies and filters air and returns it to the room.
 - ◆ Always mix and prepare hazardous materials beneath an operating fume hood.
 - ◆ Dispose of waste in accordance with all local, state/provincial, or national health and safety regulations and laws.
-

Acronyms and Abbreviations



Acronyms and Abbreviations Used in MSDSs

Introduction MSDSs use acronyms and abbreviations for certain organizations, government regulations, common scientific terminology, units of measurement, and chemicals. This appendix is provided to help you understand these references while reading the MSDSs for the chemicals used in your laboratory.

Organizations, Regulations, and Scientific Terminology The following table lists acronyms and abbreviations for organizations, government regulations, and scientific terminology.

Term	Explanation
ACGIH	American Conference of Governmental Industrial Hygienists
CAS#	Chemical Abstract Service Reference Number for Specific Pure Chemical
cc	Closed cup testing of flash point
CFR	Code of Federal Regulations. Regulations published by the United States Government
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act (Superfund) is a federal law administered by EPA
DFG MAK	Federal Republic of Germany's Maximum Contamination Value in the workplace (similar to PEL in the USA)
DOT	United States Department of Transportation, regulates transportation of hazardous material (USA)
EPA	United States Environmental Protection Agency, regulates use, disposal, or emission of hazardous material (USA)
IDLH	Immediate Danger to Life and Health
LC _{LO}	Lowest published lethal concentration
LC ₅₀	Lethal concentration in air that kills 50% of a specified population
LD ₅₀	Lethal dose that kills 50% of a specified population
LEL	Lower Explosion Limit
MSHA	Mine Safety and Health Administration, recommends respirators
NFPA	National Fire Protection Association, publishes recommended regulations for local or state governments in the United States (Hazardous rating system developed by this Association)
NIOSH	National Institute of Occupational Safety and Health (USA), recommends exposure levels and respirators
oc	Open cup testing for flash point

Term	Explanation
OSHA	Occupational Safety and Health Administration (USA), sets chemical exposure levels.
PEL	Permissible Exposure Limit. The federal OSHA limit, usually expressed as time weighted average (TWA) for an 8-hour work shift.
PPM	Parts Per Million
Prop 65	A California Law requiring warnings for chemicals that are known to the state to be carcinogenic or cause reproductive harm.
RCRA	Resource Conservation and Recovery Act
RTECS	Registry of Toxic Effects of Chemical Substances
SARA	Superfund Amendments and Reauthorization Act, a federal act administered by EPA
SCBA	Self-Contained Breathing Apparatus
STCC	Standard Transportation Commodity Code
STEL	Short Term Exposure Level, published by ACGIH
TC _{LO}	Lowest published toxic concentration
TLV	Threshold Limit Value. The ACGIH-recommended TWA, usually for an 8-hour work shift
TWA	Time Weighted Average
UEL	Upper Explosive Limit
u or U	Unknown
UN	United Nations. This designation identifies hazardous chemicals in the process of worldwide transportation.

Units of Measure The following table lists abbreviations for common units of measure.

Abbrev.	Unit of Measure
#	number
°C	degrees Celsius
°F	degrees Fahrenheit
µL	microliter
µm	micron
µmol	micromole
AUFS	absorbency units full-scale
Btu	British thermal unit
ft	foot
gal.	gallon
h	hour
i.d.	inside diameter
in.	inch
kVA	kilovoltampere
L	liter
m	meter
mg	milligram

Abbrev.	Unit of Measure
mL	milliliter
mm	millimeter
o.d.	outside diameter
P/N	part number
psi	pounds per square inch
sec	second
V	volt
VA	voltampere
VAC	volts, alternating current
W	watt

Chemicals The following table lists abbreviations for common chemicals.

Abbrev.	Definition
A	adenine
AA	amino acid
1Ac	acetyl
AcI	acetylimidazole
Acm	acetamidomethyl
Ac ₂ O	acetic anhydride
ACN	acetonitrile
ACT	activator vessel
BHA resin	benzhydramine resin
t-Boc	tert-butyloxycarbonyl
Bzl	benzyl
Br-Z	2-bromobenzyloxycarbonyl
t-Bu	tert-butyl
C	cytosine
CHO	formyl
CH ₃ Bzl	4-methylbenzyl
CH ₃ OBzl	4-methoxybenzyl
Cl-Z	2-chlorobenzyloxycarbonyl
CPG	Controlled Pore Glass
DCA	dichloroacetic acid
DCC	dicyclohexylcarbodiimide
DCM	dichloromethane
DCU	dicyclohexylurea
DIEA	diisopropylethylamine
DMAP	4-dimethylaminopyridine
DMF	dimethylformamide
DMSO	dimethylsulfoxide
DNA	deoxyribonucleic acid

Abbrev.	Definition
Dnp	2,4-dinitrophenyl
Et	ethyl
EtOH	ethanol
Fmoc	9-fluorenylmethyloxycarbonyl
G	guanine
HBTU	2-(1 <i>H</i> -benzotriazol-1-yl)-1,1,3,3-tetramethyl-uronium hexafluorophosphate
HLP	high loaded polystyrene
HMP resin	<i>p</i> -hydroxymethylphenoxyethyl-polystyrene resin
HOAc	acetic acid
mBHA resin	4-methylbenzhydramine resin
MeOH	methanol
Mob	4-methoxybenzyl
Mtr	4-methoxy-2,3,6-trimethyl-benzene sulfonyl
Mts	mesitylene-2-sulfonyl
NMI	1-methylimidazole
NMP	<i>N</i> -methylpyrrolidone, <i>N</i> -methyl-2-pyrrolidone
OBt	ethyl ester
OMe	methyl ester
PAM resin	phenylacetamidomethyl resin
PEG	polyethylene glycol
RV	reaction vessel
SSPS	solid-phase peptide synthesis
T	thymine
TETD	tetraethylthiuram disulfide
TFA	trifluoroacetic acid
TFMSA	trifluoromethane sulfonic acid
THF	tetrahydrofuran
Tos	4-toluenesulfonyl (tosyl)
Tri	trityl
U	uracil
Z	benzyloxycarbonyl

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