



Agilent Cary 100/300/4000/5000/6000i/7000  
Spectrophotometer

## Site Preparation Guide

# Notices

## Manual Part Number

8510128000

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## Safety Notices

### CAUTION

A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a **CAUTION** notice until the indicated conditions are fully understood and met.

### WARNING

A **WARNING** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a **WARNING** notice until the indicated conditions are fully understood and met.

## Request for Installation

All preparations have been completed. Please arrange for the installation to be completed as soon as possible. I understand that if the installation site is not prepared in accordance with the enclosed instructions, additional installation charges may apply.

Company name: \_\_\_\_\_

Company address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Name: \_\_\_\_\_

Position: \_\_\_\_\_

Telephone: \_\_\_\_\_

Preferred installation date: \_\_\_\_\_

Signed: \_\_\_\_\_

Date: \_\_\_\_\_

## Site Preparation Checklist

Your site must meet all requirements before you request installation. Complete each requirement listed in the table. After completing each requirement, place a check in the appropriate checkbox. Ensure you compare each item inside the boxes with the packing list supplied with the boxes.

### NOTE

Do not unpack the instrument. If unpacked incorrectly, equipment may become damaged. Your Agilent representative will do this for you.

<b>Requirements</b>	<input checked="" type="checkbox"/>
The work area is prepared and meets requirements (see Chapter 3).	<input type="checkbox"/>
The power supply meets requirements (see Chapter 4).	<input type="checkbox"/>
A nitrogen gas supply for optics path purging is ready (Cary 100/300 needs the Extended Sample Compartment option) (see Chapter 5).	<input type="checkbox"/>
The Cary instrument and accessories are on site and packages have been inspected (see Chapter 6).	<input type="checkbox"/>
The computer meets requirements (see Chapter 7). Computer type: _____	<input type="checkbox"/>
The Microsoft Windows operating system is installed (see Chapter 7).	<input type="checkbox"/>
Operator training is required (see Chapter 8).	<input type="checkbox"/>

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# 1 Introduction

The range of Agilent Cary spectrophotometers are complete analysis systems that have been fully tested and proven to specification before dispatch from the manufacturing plant.

This manual contains general information relevant to the preparation of an installation site, and details the facilities that must be provided to ensure that the system can be effective. Detailed operating procedures are provided in the operation manual that is supplied with the spectrophotometer.

You should complete the site preparation checklist on Page 4 and then send a copy of the checklist to the Agilent sales and service office or local Agilent agent dealing with the supply of the equipment. On receipt of this document, the Agilent representative will contact you and arrange a convenient time for installation.

As a guide to the time required for installation by an Agilent representative, a typical Cary system will be completed and ready for use within four hours. This time may be extended if the system includes accessories. The installation time can be kept to a minimum by ensuring proper preparation of the site and arrangement of all units to allow for easy access.

## NOTE

The remainder of this manual contains information such as the environmental requirements and technical specifications for the Cary spectrophotometer, and it should not be discarded — keep this manual for future reference.

## Introduction

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## 2

# Safety Practices and Hazards

Your Agilent Cary instrument and accessories have been carefully designed so that when used properly you have an accurate, fast, flexible and safe analytical system.

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Information on safety practices appears throughout the documentation (both printed and online) provided with your instrument and accessories. Before using the instrument or accessories, you must thoroughly read these safety practices.

Observe all relevant safety practices at all times.

## Instrument ventilation

Ozone can be generated by radiation from the source lamps. Exposure to ozone can result in severe irritation to the skin, eyes, and upper respiratory system. The maximum permissible exposure level is 0.1 parts per million (0.2 milligrams per cubic meter).

ALWAYS ventilate the area surrounding the spectrophotometer such that the concentration of ozone does not exceed the maximum permissible level. All venting must be to outside air, never within the building.

## Electrical hazards

Good grounding/earthing is essential to avoid a potentially serious electric shock hazard. Ensure that there is an integral ground connection between the metal base of the spectrophotometer and accessories and the 3-pin earth-grounded receptacle. Consult the manuals or product labels supplied with your computer, monitor and printer for the relevant grounding requirements.

## Safety Practices and Hazards

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# 3

## Work Area

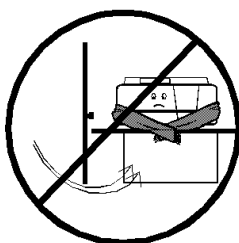
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### Suitability

The instrument is suitable only for indoor use. It is suitable for these categories:

- Installation category II (EN 61010-1)
- Pollution degree 2
- Equipment class I

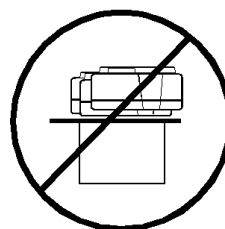
### Environmental conditions



No drafts



No corrosive fumes



No vibration

Sample preparation areas and materials storage facilities should be located in a separate room.

For optimum performance the area should have a dust-free, low humidity atmosphere. Air conditioning is recommended. The room should be temperature-controlled if your analyses are particularly sensitive.

## Work Area

### CAUTION

The Cary instrument is designed for operation in clean air conditions. The work area must be free of all contaminants that could have a degrading effect on the instrument components. Dust, acid and organic vapors, such as acetone, must be expelled from the work area. The instrument warranty will be void if the equipment is operated in substandard conditions.

For optimum analytical performance, it is recommended that the ambient temperature of the laboratory be between 20 and 25 °C (68 and 77 °F) and be held constant to within  $\pm 2$  °C ( $\pm 3.6$  °F) throughout the entire working day. When performing the limiting resolution test on the Cary 4000/5000/6000i/7000 systems it is a requirement that these environment conditions are met.

**Table 1.** Suitable conditions during instrument transportation, non-operation and operation

Instrument	Condition	Altitude (m, ft)	Temperature (°C, °F)	Relative humidity, non-condensing (%)
Cary 100/300	Non-operating	0–2133, 0–7000	5–45, 41–113	20–80
	Operating within performance specifications	0–2133, 0–7000	10–35, 50–95	8–80
Cary 4000/5000/6000i/7000	Non-operating	0–2133, 0–7000	5–45, 41–113	<90
	Operating within performance specifications	0–853, 0–2800	10–35, 50–95	15–80
		853–2133, 2800–7000	10–25, 50–77	

### CAUTION

Operating specifications for the computer, monitor and printer may differ from those for the Cary spectrophotometer. You must check in the literature provided with these units and arrange the operating environment to suit the complete system.

## Workbench

The workbench must be stable and strong enough to support the total weight of equipment to be used.

## Work Area

**Table 2.** Equipment weights and dimensions

<b>Instrument</b>	<b>Weights</b>	<b>Dimensions (width x depth x height)</b>
Cary 100/300	Packed: 75 kg (165 lb)	Packed: 860 x 770 x 655 mm (34 x 30 x 26 in)
	Unpacked: 45 kg (99 lb)	Unpacked: 640 x 650 x 320 mm (25 x 26 x 13 in)
Cary 4000/5000/ 6000i/7000	Packed: 141 kg (310 lb)	Packed: 1425 x 800 x 670 mm (56 x 31 x 26 in)
	Unpacked: 91 kg (200 lb)	Unpacked: 1000 x 650 x 340 mm (40 x 26 x 14 in)

The bench tops should be large enough to permit a free circulation of air around each unit in the system. Remember to provide space for the computer, monitor and printer.

The workbench should be about 90 cm (36 in.) high.

To avoid damage through spillage of the samples being analyzed, the worktops should be covered with a material that is corrosion-resistant and impervious to liquids.



After the work area requirements have been met, check the checklist box: *The work area is prepared and meets requirements.*

## Work Area

This page is intentionally left blank.

## 4 Electrical Specifications

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### Mains supply

The installation of electrical power supplies must comply with the rules and/or regulations imposed by local authorities responsible for the supply of electrical energy to the workplace.

#### WARNING



#### Electrical Shock Hazard

**Good electrical grounding is essential to avoid potentially serious shock hazards. A 3-wire outlet with ground connection must be provided for the instrument. Ensure that power outlets are earth-grounded at the grounding pin.**

All power supplies must be single phase AC (alternating current) voltage, three wire system (active, neutral, earth) and should be terminated at an appropriate power outlet receptacle that is within reach of the instrument power cord assembly. For safety reasons, a separate power outlet receptacle should be provided for each unit in the system. Do not plan to use extension cords or outlet adaptors.

All Cary 100/300/4000/5000/6000i/7000 instruments are supplied with a 2 meter (6 ft. 6 in.) long power cord and three-pin plug assembly that is compatible with common standards applicable in the local area.

Avoid using power supplies from a source that may be subject to electrical or RF interference from other services; for example, large electric motors, elevators, and welders.

**Table 3.** Mains voltage requirements

System unit	Required supply voltage	Power rating (typical)	Maximum power consumption
Cary 100/300	100, 120, 220, 240 VAC, 50–60 Hz	270 VA	173 W
Cary 4000/5000/6000i/7000	100–240 VAC, 50–60 Hz	300 VA	185 W

#### NOTE

For the computer, refer to the literature provided with the computer for details of individual power requirements.

## Electrical Specifications

### Fuses

**Table 4.** Fuses

	220-240 VAC	100-120 VAC
Cary 100/300	T4 AH 250 V, IEC60127-2 Sheet 5, 5x20 mm, Littelfuse 0215004 or equivalent	T5 AH 250V IEC 60127-2 Sheet 2, 5x20mm, Littelfuse 217.800 or equivalent
Cary 4000/5000/6000i/7000	T10 AH 250V, IEC60127-2 sheet 5, 5x20mm, Littelfuse 0215010. or equivalent	T10 AH 250V, IEC60127-2 sheet 5, 5x20mm, Littelfuse 0215010. or equivalent

**NOTE**

For safety reasons, any other internal fuse or circuit breaker is not operator accessible, and should be replaced only by Agilent authorized personnel.

**NOTE**

Fuse information on the rear of the instrument is the most up-to-date.

## External connections

### Mains inlet coupler

3/2 A 120/250 VAC 50–60 Hz IEC type

### Mains power cord

Country	Mains power cord	Plug
Australia	10 A 250 VAC	Complies with AS3112
Europe	6 A 250 VAC	Complies with CEE7 sheet vii or NFC61.303 VA
USA	10 A 125 VAC	Complies with NEMA 5–15P



After the power requirements have been met, check the checklist box: *The power supply meets requirements.*



## 5 Optional Nitrogen Supply

The Cary 4000/5000/6000i instruments are fitted with connection points for purging the optical system with nitrogen to enhance the performance of each instrument at extremes of its range. More details are provided in the Cary User's Guide supplied with the instrument.

Nitrogen supplies are not available from Agilent but may be obtained from commercial suppliers. Liquid nitrogen (in conjunction with a heat exchanger) is recommended because it is generally less costly than compressed nitrogen and is of better quality. Where compressed nitrogen must be used, the gas must be dry, oil-free and uncontaminated.

### CAUTION

**Do not use compressed nitrogen from a supplier who uses oil or water in the compression process. These methods leave fine particles of oil or water suspended in the nitrogen that may be deposited on the instrument optics. Only use nitrogen from a supplier who fills containers from immersion pumps that are lubricated with liquid nitrogen.**

### NOTE

The instrument warranty will be void if damage is caused by the use of contaminated nitrogen.

All gas supply installations must comply with the rules and/or regulations that are imposed by the local authorities responsible for the supply of compressed gas energy to the workplace.

Cylinders containing gas under pressure should be firmly secured to a rigid structure and the storage area must be well ventilated. Never locate gas cylinders near a source of ignition or in a position that is subject to direct heat. Gas storage cylinders often incorporate a pressure relief device, which will discharge the gas at a pre-determined temperature, usually around 52 °C (125 °F).

If gases are to be plumbed from a remote storage area to the instrument site, ensure that the local outlets are fitted with shut-off valves and suitable regulators that are easily accessible to the instrument operator.

Nitrogen supply tubing should be clean, flexible plastic tubing of 6 millimeters (1/4 inch) internal diameter (polyvinylchloride or equivalent).

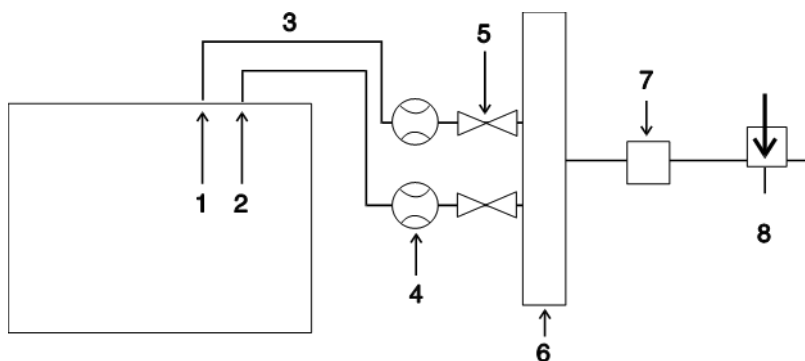
## Optional Nitrogen Supply

### CAUTION

**Do not use rubber tubing, as this is usually treated internally with talc, which will be carried into and contaminate the instrument optics.**

Operating pressure for the nitrogen purging system is 83 to 172 kPa (12 to 25 psi). Use a suitable regulator and gauge assembly to ensure that the nitrogen supply is maintained at the correct pressure.

The nitrogen system should include a manifold assembly with inlet from the supply and two outlets for connection to the instrument. Manifold outlets should each be fitted with a stop valve and flow meter for control of gas flow to the instrument. Flow meters should be adjustable for flow rates of 0 to 30 liters per minute (0 to 64 cubic feet per hour). Refer to Figure 1 for more details.



**Figure 1.** The position of flow meters when purging with nitrogen where:

- |                      |                          |            |
|----------------------|--------------------------|------------|
| 1 Instrument         | 2 Sample compartment     | 3 Tubing   |
| 4 Flow meters        | 5 Shut off valves        | 6 Manifold |
| 7 Pressure regulator | 8 Nitrogen control valve |            |

### NOTE

The sample compartment of the Cary 100/300 instruments can be purged if the optional Extended Sample Compartment is fitted. Refer to the Extended Sample Compartment section of the Cary WinUV Help for specifications and instructions for use.



After the gas requirements have been met, check the checklist box: *A nitrogen gas supply for optics path purging is ready (Cary 100/300 needs the Extended Sample Compartment option).*

## 6 Equipment On-Site

### Insurance

As the carrier's liability ceases when the equipment is delivered, Agilent recommends that the instrument owner arranges separate insurance to cover transportation from the delivery point to the installation site. The delivery point will vary according to the carrier, the shipping method and in some cases the terms of sale. Some carriers will deliver only to their own distribution centre, while others may deliver to your off-loading bay. Very few carriers will deliver to the actual installation site.

### In-house transit routes

In-house transit routes must be carefully considered. Vertical, horizontal and turning clearances should be calculated from the shipping carton dimensions of the spectrophotometer, which is the largest unit in any system configuration. See Page 13 for shipping dimensions.

### Inspecting for transit damage

Transit damage can be obvious or concealed and in either case will be admitted by the carrier only if it is reported within the terms of the carrier's agreement. For any claims against damage in transit, the following general rules apply:

- Before accepting delivery, you must inspect the packages for signs of obvious damage. The nature of any obvious damage must be noted on the carrier's waybill, which then must be countersigned by a representative of the carrier.
- Within the time limit stated in the terms and conditions of carriage, a further inspection must be made for concealed damage. If any damage is found at this

## Equipment On-Site

stage, the carrier must be notified in writing. You must retain all packaging material for subsequent inspection by a representative of the carrier.

- A copy of any damage report must be forwarded to the Agilent sales office dealing with the supply of your equipment.

### WARNING



#### Heavy Weight Hazard

**As many of the packages are heavy, use mechanical lifting devices when possible to avoid the chance of injury to personnel or accidental damage to the equipment. If manual lifting is unavoidable, always use two or more people to handle packages and lift equipment into position. Never attempt to lift the packages alone.**

### NOTE

Do not unpack the instrument. Your Agilent representative will do this for you.

After accepting delivery, take the equipment to the installation site.

Agilent instruments are inherently robust, and the packaging is designed to prevent internal damage. However, the contents form part of a precision measuring system and all packages should be handled with care. In transit, sharp jolts must be avoided and the packages should not be inverted or tilted unnecessarily. Markings on the shipping cartons generally indicate which side of the package should be kept on top.

All shipping packages should be together for the Agilent service personnel prior to installation. Compare all packages to the shipping list. Do not discard any packaging components or filler materials.



After the requirements have been met, check the checklist box: *The Cary instrument and accessories are on site and packages have been inspected.*

# 7

## Computer System Requirements

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### Recommended configuration

The Cary spectrophotometers were evaluated under Agilent's ISO9001 procedures using Cary WinUV software and a desktop computer. We strongly recommend a computer configuration that matches the system that was used during evaluations:

	<b>Workstation</b>	<b>Laptop</b>
CPU	3.3 GHz, 8MB cache	2.4 GHz, 3 MB cache, 2 cores
RAM	Windows 7: 4 GB, Windows 10: 8 GB	Windows 7: 4 GB, Windows 10: 8 GB
Hard drive	500 GB 7200 RPM SATA Hard Drive	500 GB Hard Drive
Graphics	Intel HD Graphics P530	14-inch LED HD SVA
DVD drive	16X DVD+RW	DVD±RW
Communications	PCIe GbE Controller; 2nd Serial Port Adapter	802.11 a/b/g/n/ac (2x2) +Bluetooth 4.2
Operating system	Microsoft Windows 7 64-bit SP1 or Microsoft Windows 10 64-bit	Microsoft Windows 7 64-bit SP1 or Microsoft Windows 10 64-bit
Expansion	8 USB 3.0 (2 front, 6 rear), 2 USB 2.0 (1 front, 1 front battery charging port)	3 USB 3.0 ports: 1 standard, 1 charging, and one USB-C
Peripherals	Compatible keyboard and USB Optical Scroll mouse	

Agilent can supply a computer for the Cary WinUV software in the recommended configuration. The computer will be formatted, partitioned and loaded with its operating system. Computers ordered from Agilent will come with the software installed. All software disks and manuals will be supplied.

#### NOTE

Computers supplied with Letter of Credit orders will be an international brand and will be the recommended configuration or better.

Better computer components, for example, processor type, amount of memory, screen size and resolution, operating system version, and so on, can be substituted for those listed above.

### Recommended printer

You can use any printer supported by your Microsoft Windows operating system.

### IEEE 488.2 interface

The Cary instruments require a GPIB-USB-HS converter to be attached to the computer. One will usually be included in your instrument order as a separate line item:

- GPIB-USB-HS converter

#### NOTE

The NI (National Instruments) AT-GPIB card will not work with the Cary WinUV software.

The NI PCI-IEEE card will not work when purchasing the HP Compaq 8000 Elite Small Form Factor Desktop or the HP Z210 SFF workstation.

---

### Interconnecting cables

The monitor, printer keyboard and spectrophotometer are connected to the computer via cables that plug into the back of the computer. The spectrophotometer is connected via a USB-GPIB-HS converter provided with the instrument. Consult your monitor, printer and keyboard manuals for details of their individual cabling requirements.



After the computer requirements have been met, enter the computer type and then check the checklist box: *The computer meets requirements.*

### Setting up your computer

When setting up your own computer for use with the Cary WinUV software, ensure that your computer meets the specified requirements listed on Page 21 and that:

- The operating system is installed and all devices such as the sound and DVD drive are working.
- Microsoft Internet Explorer version 9\* or later has been installed.
- You have set your computer screen desktop area resolution to at least 800 x 600 pixels and have set the color palette to at least High Color.
- RS232 serial port
- One COM port if using the Agilent SPS 3 Sample Preparation System in conjunction with the Internal Routine Sampler
- Two COM ports if using the Agilent SPS 3 Sample Preparation System in conjunction with the External Sipper accessory

\* The Cary WinUV software uses functionality provided by Microsoft Internet Explorer version 9.0 or greater. You do not need to use this as your Web browser. If your company rules prevent the installation of Internet Explorer, you can use another browser, with some loss in functionality.

#### NOTE

The Agilent representative will install the Cary WinUV software if the computer was not purchased from Agilent. However, installation of a Windows operating system is not included as part of the standard instrument installation.



After the operating system installation requirements have been met, check the checklist box: *The Microsoft Windows operating system is installed.*

## Computer System Requirements

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## 8 Operator Training

[Use - \\_Toc506206031](#) If the Cary instrument is installed by Agilent field service, the Agilent representative will demonstrate the basic operating procedures while conducting the installation performance tests during the installation procedure. The representative however, is not necessarily experienced in complex analytical routines and is not authorized to conduct extensive training.

To ensure that your operators benefit the most from witnessing the installation performance tests, operator training should be completed before your equipment is installed. It is strongly recommended that you take advantage of the special training courses that are conducted at various locations by the Agilent customer support and sales organization.

In some areas it may be possible to arrange for operator training to be carried out after the installation, using your own instrument. To investigate this possibility, contact your local Agilent sales and service office.

The initial software installation and elementary performance tests will take around thirty minutes. There is then a period of two hours that must be allowed for warm-up before the detailed instrument tests for conformance to specification can be carried out, and during this time the representative will demonstrate some of the basic system operating procedures.

Detailed tests verifying the instrument is performing to specification are automated and take around one hour to complete.

### NOTE

You must have a working knowledge of the computer operating system, as this type of instruction is not provided by Agilent. The literature supplied with the spectrophotometer provides step-by-step instructions for setting up the system and detailed operating instructions for the analysis procedures — it does not include instructions for operation of the computer.



If operator training is required, check the checklist box: *Operator training is required.*

## Operator Training

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# In This Book

The manual describes the following:

- Introduction
- Safety Practices and Hazards
- Work Area
- Electrical Specifications
- Optional Nitrogen Supply
- Equipment On Site
- Computer System Requirements
- Operator Training

This information is subject to change without notice.



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