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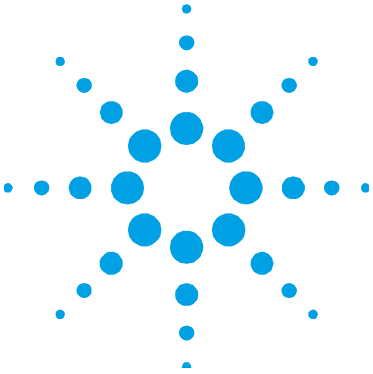
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Agilent Cary 600 Series FTIR

Site Preparation Guide



Agilent Technologies

Notices

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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.

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

After completing each requirement, place a check in the appropriate checkbox. Ensure you compare each box received with the supplied packing list.

Preparation requirement	Complete
The principal installation area is in compliance with all relevant safety regulations.	☐
The work area temperature is maintained between 20 and 26 °C.	☐
The relative humidity is maintained between 20 and 50%, non-condensing.	☐
The work area is free of excessive particulate matter.	☐
The system workbench is free from vibrations.	☐
The workbench can support the system weight.	☐
Sufficient bench space is available for all system units.	☐
Specified electrical supply and power outlets are installed.	☐
A nitrogen supply (at specified purity), regulator, and gas lines are installed.	☐
The entrance to the work area is at least 92 cm (36 in) wide.	☐
The principal operator will be available for the installation and certification period.	☐
Have any additional criteria been agreed within the contract? If yes, please specify: _____ _____ _____	Yes ☐ No ☐
Is there any additional equipment that needs to be connected to the system? If yes, please specify:	Yes ☐ No ☐

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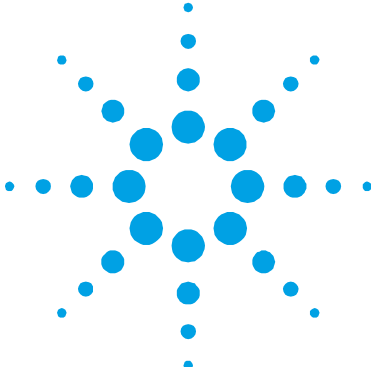
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1. Introduction

Installation Guidelines 7

This manual contains the information required to successfully prepare a site for installation of an Agilent Cary 600 Series FTIR spectrometer and Agilent Cary 610 and 620 Microscope. If you have difficulty preparing for the installation, and for details of operator training courses, contact your Agilent representative.

Installation Guidelines

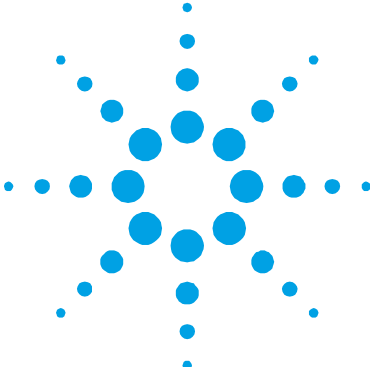
Allow a minimum of 1 day for the installation of the Cary 600 Series FTIR spectrometer by an Agilent representative.

The installation will include:

- Spectrometer installation
- Instrument software installation and registration
- Accessory installation
- Spectrometer installation performance tests
- Basic customer familiarization
- Maintenance overview

Before you request installation, your site must meet all requirements. After completing each preparation requirement, place a check in the appropriate checkbox in the checklist on Page 4. Fax or mail the ‘Request for installation’ to your local Agilent office. As soon as it is received, an Agilent representative will contact you to arrange a convenient time for installation.

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2. Safety Practices and Hazards

Electrical 9
Other precautions 10

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

CAUTION Use of controls or adjustments or performance or procedures other than those specified in this manual, may result in hazardous radiation exposure.

Electrical

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 instrument 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.

Application of the wrong supply voltage can create a fire hazard and a potentially serious shock hazard, and could seriously damage the system, accessories and any attached ancillary equipment. The Cary 600 Series FTIR spectrometer has a universal power supply, which adapts to the supply voltage. However, care must be taken to ensure that the correct voltage is used.

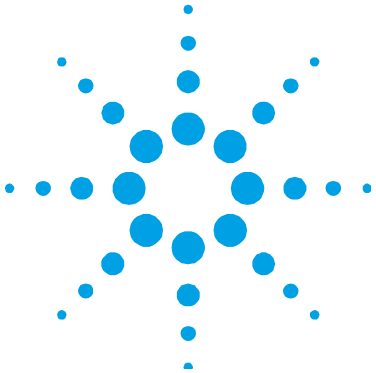
Consult the manuals supplied with your computer, monitor and printer for their specific voltage requirements.

Other precautions

Do not block the ventilation grills on the instrument and accessories. Consult the manuals supplied with your computer, monitor and printer for their specific ventilation requirements.

Use of the Cary 600 Series FTIR spectrometer and accessories may involve materials, solvents and solutions which are flammable, corrosive, toxic or otherwise hazardous. Careless, improper, or unskilled use of such materials, solvents and solutions can create explosion hazards, fire hazards, toxicity and other hazards, which can result in death, serious personal injury, and damage to equipment and property. ALWAYS ensure that laboratory safety practices governing the use, handling and disposal of such materials are strictly observed. These safety practices should include the wearing of appropriate safety clothing and safety glasses.

☑ After all safety regulations have been met, check the checklist box: *The principal installation area is in compliance with all relevant safety regulations.*



3. Work Area

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Workbench 13

Environmental conditions

The area selected for the operation of a Cary 600 Series FTIR spectrometer must be free from drafts, corrosive atmospheres, strong electromagnetic fields and vibration.

Performance degradation may result from the exposure of the spectrometer or microscope to strong radio frequency energy. If degradation is experienced, reorient or relocate the spectrometer or microscope or the radio frequency source.

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

The area should be a dust-free, low-humidity environment. Air-conditioning is strongly recommended for control of the environment.

Altitude

Table 1 Suitable conditions during instrument transportation, non-operation

Condition	Altitude (m, ft)	Temperature (°C, °F)	Relative humidity, non-condensing (%)
Non-operating (transport)	0–3050, 0–10,000	5–45, 41–113	20–50

FTIR spectrometers and microscopes have been thoroughly tested for correct operation at sea level only. Please contact Agilent Technologies for advice if you wish to install a system at an altitude significantly above sea level.

Temperature

For optimum analytical performance, the ambient temperature of the work area must be:

- Temperature: 20 °C to 26 °C (68 °F to 80 °F)
- Temperature gradient: 1 °C/hr (1.8 °F/hr) maximum

NOTE As the work area temperature increases, system reliability decreases due to heat generated by electronic components during operation. This heat must dissipate to the surrounding air for reliable operation.

☑ After the temperature requirements have been met, check the checklist box: *The work area temperature is maintained between 20 and 26 °C.*

Humidity

The relative humidity of the operating environment must be between 20 and 50 percent, with no condensation.

CAUTION The beam splitter is hygroscopic and is damaged by high humidity. Operating the spectrometer at a very low humidity may result in the accumulation and discharge of static electricity, shortening the life of electronic components. Operating the system at high humidity may produce condensation and result in short circuits.

☑ After the humidity requirements have been met, check the checklist box: *The relative humidity is maintained between 20 and 50%, non-condensing.*

Put a temperature/humidity monitor in your work area to assist with conforming to the temperature and humidity specifications.

Cleanliness

Limit dust levels to less than 36,000,000 particles (0.5 micrometers or larger) per cubic meter of air. This is equivalent to a very clean office and is measured using dust monitoring equipment. Occupational hygienic companies can perform this service.

☑ After the cleanliness requirements have been met, check the checklist box: *The work area is free of excessive particulate matter.*

Workbench

The Cary 600 Series FTIR spectrometer is a precision instrument. The workbench must be flat and level, free from vibration, and stable and strong enough to support the total weight of the equipment to be placed on top of the bench without warping or sagging.

Loaded flatness tolerance is 0.4 millimeters per 300 millimeters of length (1/64 inch per foot of length).

Table 2 Equipment weights and dimensions

System unit	Width (mm, in)	Depth (mm, in)	Height (mm, in)	Weight (kg, lb)
Agilent Cary 660 FTIR spectrometer	700, 28	750, 30	366, 15	75, 165
Agilent Cary 670FTIR spectrometers	700, 28	750, 30	366, 15	85, 187
Computer (typical)	160, 6	450, 18	450, 18	N/A
Agilent Cary 610 FTIR microscope	390, 16	720, 29	800, 32	50, 110
Agilent Cary 620 FTIR microscope	390, 16	100, 39	800, 32	55, 121

☑ After the workbench vibration requirements have been met, check the checklist box: *The system workbench is free from vibrations.*

☑ After the workbench support requirements have been met, check the checklist box: *The workbench can support the system weight.*

For comfortable working conditions and easy access to the instrument sample introduction system, the height of the workbench should be approximately 900 mm (36 in.).

The bench top must be large enough to permit free circulation of air between and around units. Space to the right of the spectrometer will be required for the computer and computer-related peripherals. To accommodate interface cable lengths, the computer itself should be no more than 92 cm (3 ft) from the spectrometer.

The Cary 600 Series FTIR spectrometer should not be located close to an access door, window or any other area where drafts may cause unstable temperature conditions.

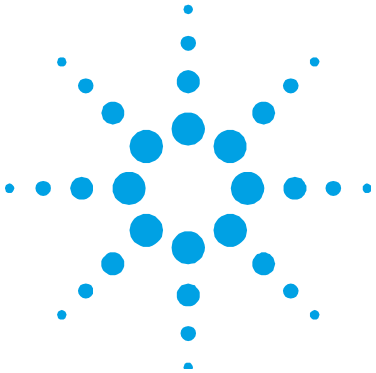
The workbench location should permit service access from all sides.

Position the equipment for easy access to the disconnecting switch on the rear of the instrument.

CAUTION You will need to allow for a further 10 cm (4 in) at the rear of the instrument for cable connections and a further 70 cm (28 in) overhead for service access for the spectrometers and for microscopes a minimum of 30 cm (12 in) at the rear of the microscope for cable connections and an overhead space of 75 cm (30 in).

☑ After the bench space requirements have been met, check the checklist box: *Sufficient bench space is available for all system units.*

To avoid damage from the spilling of samples, cover the instrument bench top with a material that is corrosion-resistant and impervious to liquid spills.



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 the local authorities responsible for the use of electrical energy in the workplace.

All power supplies for the Agilent Cary 600 Series FTIR spectrometer and its accessories should be single phase, AC (alternating current), three wire systems (active, neutral, ground; or two active and ground). Each connection should be terminated at an appropriate receptacle within reach of each assembly's power cable. Use of power boards or extension cables is **not** recommended**.**

A dedicated 10 ampere circuit with grounded receptacles is required. No other instruments should be powered from the same circuit. Each of the system units — computer, monitor (unless powered from the computer), printer and spectrometer — requires a grounded receptacle (four in total). It is useful to have at least two additional receptacles for additional peripheral devices or spectrometer accessories.

The Agilent Large Sample accessory, Focal Plane Array and microscopes will also require a grounded receptacle.

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

Local regulations in several European countries do not permit the use of a breakable wall-mounted power supply connection for high current single phase mains supplies. In these areas, the mains power supply to the Cary 600 Series FTIR spectrometer should be hard-wired to the wall.

The spectrometer heat dissipation is 500 Btu/hr (147 W).

Table 3. Instrument electrical requirements

Instrument	Required supply voltage	Nominal rating
Agilent Cary 600 Series FTIR spectrometer	100–240 VAC, 50 to 60 Hz	200 VA
Agilent Cary 610/620 FTIR microscope (typical)	100–240 VAC, 50 to 60 Hz	60 VA

NOTE Refer to the literature provided with the computer, monitor and printer for details of individual power requirements.

☑ After the electrical requirements have been met, check the checklist box: *Specified electrical supply and power outlets are installed.*

Fuses

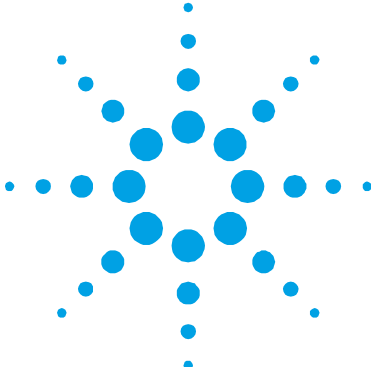
Fuses should be replaced only with the same type and rating as specified on the rear of the power supply.

Table 4. Fuse specifications

Instrument	Fuse type
Agilent Cary 600 Series FTIR spectrometer	T4 AH 250 V, IEC601272-2 Sheet 5, 5x20 mm, Littelfuse 0215004 or equivalent
Agilent Cary 610/620 FTIR microscope (typical)	1FS1: T2.0 AH 250 V, IEC601272-1 Sheet 5, 5 x 20 mm, Littelfuse 0215020 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.

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



5. Gas and Liquid Nitrogen Supply

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The installation of compressed or liquid gas supplies must comply with the rules and/or regulations imposed by safety, electrical, and building codes. Nitrogen supplies are not available from Agilent but may be obtained from commercial suppliers.

Purging

Some spectrometer models are available with a sealed or a purged enclosure. The sealed version does not require purge gas, although purge gas is often used to purge the sample compartment of carbon dioxide, water vapor and other atmospheric gases. Purge gas is also helpful to initially flush out the spectrometer interior after it has been opened to replace the desiccant cartridge, or for other maintenance purposes.

Where fitted, the purge gas is introduced through a 6 mm (1/4 in.) outer diameter ‘push-fit’ connection point on the rear of the instrument for purging the sample compartment and the optical system. For purging the sample compartment only, there is a purge gas inlet on the right side of the spectrometer. There is an identical connector at the rear of the sample compartment for accessory purging.

Nitrogen supply tubing should be clean, free of dust or debris, flexible plastic (polyvinyl chloride or equivalent) tubing of 6 mm (1/4 in.) internal diameter. Do not use tubing treated with talcum powder or similar substances.

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

To purge an instrument, you must have:

- Clean, dry air (free from carbon dioxide, oil, silica, or other particulates) or nitrogen gas (preferably from liquid nitrogen boil-off) dried to a dew point of -70 °C. If you are purging only the sample compartment, the purge gas can be cooled to -40 °C.
- Constant purging (24 hours per day, every day) to assure a non-condensing environment.
- A purge gas input flow rate of 10 liters per minute (0.4 cubic feet per minute). You must have a flow meter to monitor the flow of the purge gas. If purging a microscope as well, this required flow rate is doubled to 10L/min
- A regulator is required if the source pressure is greater than 60 psi (420 kPa).
- Tubing should be clean and free of any dust and debris. Do not use tubing treated with talcum powder.

Liquid or compressed gaseous nitrogen may be used with the Cary 600 Series FTIR spectrometer. Liquid nitrogen (in conjunction with a heat exchanger) is recommended because it is generally less costly per unit volume than compressed nitrogen, is more convenient and is of better quality. Bottled nitrogen should not be used for purged systems as the rate of consumption (about one bottle per day) makes it impractical. Where compressed nitrogen must be used, the gas must be dry, oil-free and uncontaminated with a purity of 99.996% or better.

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.

Air-bearing

There is a second inlet on the right of the spectrometer rear panel for supplying gas to air-bearing interferometers. Use only dry nitrogen or dry air. Agilent provides quick disconnects to attach to 6 mm (1/4 in.) outer diameter polyvinyl tubing.

Air-bearing gas input pressure should not exceed 420 kPa (60 psi). It will be reduced to 140 kPa (20 psi) by a controller inside the spectrometer case. The lower pressure limit is 165 kPa (24 psi).

Storage

Cylinders containing gas under pressure should be firmly secured to a rigid structure, and the storage area must be adequately ventilated.

Never position gas cylinders near a source of ignition, or in a position that is subject to direct heat. Gas storage cylinders often incorporate a pressure release 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 stop valves, pressure gauges and suitable regulators, which are easily accessible to the instrument operator. The gas outlets must be provided within 1.5 meters (5 feet) of the instrument. Bottled nitrogen should not be used for purged systems as the rate of consumption (about one bottle per day) makes it impractical.

Detector cooling

MCT detectors require about 500 milliliters (16 ounces) of liquid nitrogen for the initial fill to bring the Dewar to an equilibrium temperature, then an additional 200 milliliters (7 ounces) to top it up.

WARNING



Extreme Cold Hazard

Contact with the super-cold liquid, gas, or pipe surfaces can cause severe skin damage. Use appropriate protective equipment when handling liquid nitrogen.

Liquid nitrogen may **not** be stored for extended periods and often has special storage requirements. Contact your local authorities and cryogenic gas supplier for more detailed information on storage requirements and boil-off rates for local types of portable liquid cylinders.

Table 5 Cooling methods for available detectors

Detector	Cooling method
High-sensitivity MCT	Liquid nitrogen
Linearized high-sensitivity MCT	Liquid nitrogen
Linearized broadband MCT	Liquid nitrogen
Room temperature DLaTGS	None
Cooled DLaTGS	Peltier
Far-infrared DLaTGS	None
PbSe	None

☑ After the nitrogen requirements have been met, check the checklist box: *A nitrogen supply (at specified purity), regulator, and gas lines are installed.*



6. Shipping Information

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In-house transit routes 21
Inspecting for transit damage 23

Generally, Agilent Cary 600 Series FTIR spectrometers are sold **Free On Board** shipping point, with the transportation from this point at the customer's expense. Due to the size and nature of the spectrometer, a third party should be engaged to assist with transportation from the point of unloading to the final placement of the instrument in the work area. The Agilent field sales and service offices will be able to assist in the task of recommending a third party that specializes in the transportation of precision scientific instrumentation.

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 center, while others may 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 crate dimensions of the spectrometer, which is the largest unit in any system arrangement.

Table 6 Shipping weights and dimensions

Instrument	Weight (kg, lb)	Width (mm, in.)	Depth (mm, in.)	Height (mm, in.)
Agilent Cary 600 Series FTIR spectrometer	120, 264.5	1100, 44	1000, 40	630, 25
Agilent Cary 610/620 FTIR microscope	95, 210	640, 26	870, 34	1100, 44

Figure 1 provides an indication of the minimum turning clearance and minimum door width required for the spectrometer in its shipping crate. Particular attention should be made to the clearance of any doors in the transit route to the work area. The required turning and door clearance may need to take into consideration any lifting device used for transporting the instrument (for example, forklift or pallet truck).

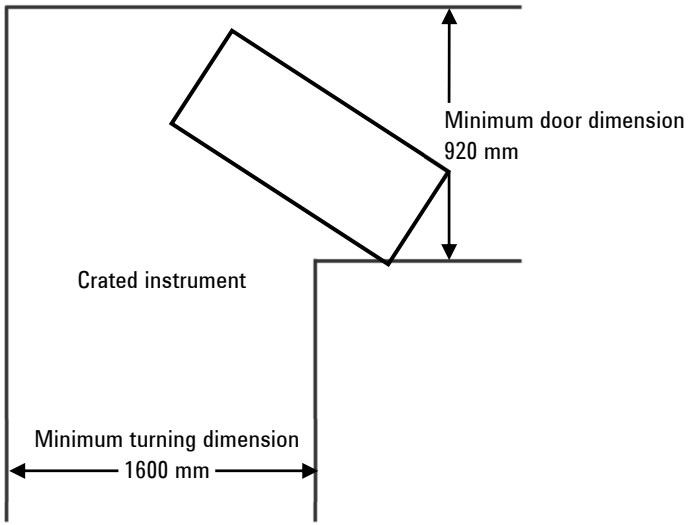


Figure 1. Minimum clearance required for transporting the shipping crate

☑ After the in-house transit route requirements have been met, check the checklist box: *The entrance to the work area is at least 92 cm (36 in) wide.*

Inspecting for transit damage

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 and shocks must be avoided and the packages must not be unnecessarily inverted or tilted. Markings on the shipping cartons generally indicate the required orientation of the carton.

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

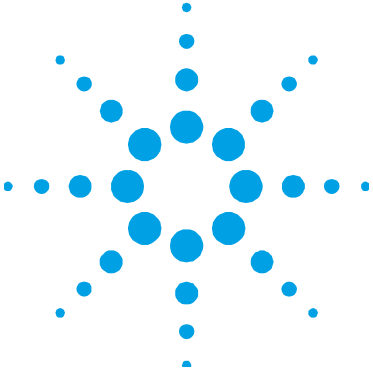
WARNING



Heavy Weight Hazard
The Cary 600 Series FTIR spectrometer weighs approximately 85 kg (187 lb). To avoid injury to personnel or damage to equipment, always use a suitable lifting device and proper lifting techniques when moving the instrument.

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

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7. Computer System Requirements

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Setting up your computer 26

Agilent recommends that you purchase a computer as part of the Cary 600 Series FTIR spectrometer package. The computer included in the package will be of the recommended configuration, and it will arrive formatted, partitioned and loaded with the appropriate Microsoft Windows operating system as loaded by the computer supplier. All software disks and manuals will be supplied.

Minimum configuration

If you are providing your own computer, it must meet the minimum configuration requirements. These represent the absolute minimum on which you can run the Agilent Resolutions Pro software. Higher rated computer components can be substituted for those listed. For example, processor type, amount of memory, and so on.

NOTE

Imaging Systems

PCs for Imaging systems must be ordered from the factory. Agilent will not support customer-supplied PCs for this product.

- 3.50 GHz, 10MB cache, 4 cores
- 8 GB RAM
- 2x 500 GB (or greater) hard drive
- DVD-RW SATA optical drive

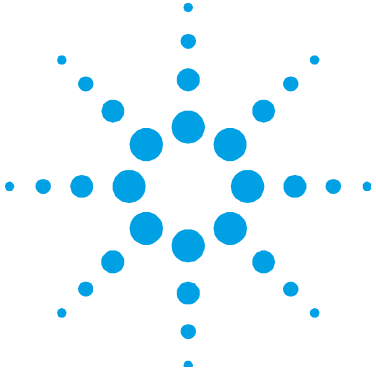
- Video card supporting a minimum resolution of 1280x768 running in 96 dpi
- 16-bit sound card
- Microsoft Windows compatible keyboard and mouse
- One FULL size PCI slot for video card.
- USB 2.0 interface
- 2 serial ports
- Microsoft Windows 10 64-bit Professional and Enterprise operating systems

Setting up your computer

If you are supplying the computer or the operating system, you must ensure that the operating system has been installed and is functional. For instructions on installing the operating system, refer to the appropriate manuals supplied with the operating system software.

NOTE Agilent will not assume responsibility for loss of data.

The Agilent representative will connect the computer to the spectrometer and any factory-approved accessories purchased. Initial Resolutions Pro software installation is also included as part of the system installation. For information on installing the Resolutions Pro software, refer to the Agilent Cary 600 Series FTIR spectrometers and microscope manual.



8. Operator Training

When Agilent installs the instrument, the Agilent representative will demonstrate the basic operating procedures while conducting the installation performance tests during the installation procedure. The Agilent representative, however, is not necessarily experienced in complex analytical routines and is not authorized to conduct extensive training.

To ensure that your operators maximize the benefit of 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 preliminary operational tests will take your Agilent representative around thirty minutes. There is then a period of two hours that must be allowed for instrument warm-up before the detailed instrument tests for conformance to specification can be carried out. An automated software process performs operational tests that will take around thirty minutes. The results from these tests can be directly compared against the same tests completed at the factory before shipment.

While waiting for tests or instrument warm-up to complete, the Agilent representative will demonstrate some of the basic system operating procedures. If you are installing the instrument yourself, use this time to become familiar with the software, following the instructions in the software manual provided with the instrument.

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 Agilent Cary 600 Series FTIR 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.

☑ After the principal operator has been identified, check the checklist box: *The principal operator will be available for the installation and certification period.*

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In This Guide

The guide describes the following:

- Introduction
- Safety Practices and Hazards
- Work Area
- Electrical Specifications
- Gas and Liquid Nitrogen Supply
- Shipping Information
- Computer System Requirements
- Operator Training

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