Agilent Molecular Spectroscopy

Safety Information

Cary 630 FTIR	4300 Handheld FTIR	4500 Series FTIR	5500 Series FTIR
Cary 60 UV-Vis	Cary 3500 UV-Vis Engine	Cary UV-Vis Multicell	Cary UV-Vis Multicell Peltier
Cary UV-Vis Compact	Cary UV-Vis Compact Peltier	Cary UV-Vis Flexible	Cary 4000 UV-Vis
Cary 5000 UV-Vis-NIR	Cary 6000i UV-Vis-NIR	Cary 7000 UV-Vis-NIR	Cary 7000 UV-Vis-NIR Universal Measurement Spectrophotometer
Cary Eclipse Fluorescence Spectrophotometer	8700 LDIR Chemical Imaging System	Insight200M	Vaya Raman
RapID Raman	TRS100 Raman	Resolve Raman	

For your safety, the following general safety precautions must be observed during all phases of operation of your Agilent spectroscopy instrument and installation. This document should be used in conjunction with installation requirements listed in your instrument Site Preparation Guide. The documentation supplied with your instrument provides detailed safety requirements for your instrument.

Documentation is provided with your instrument on the software installation media, or in printed form. Documentation may also be available on the Web. Visit www.agilent.com and type your product number in the Search field at the top of the page.

Your Agilent 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.

Always observe all relevant safety practices.

This instrument may require specific safety procedures that are covered in the documentation but may not be included in this safety document.

Always review the complete documentation before installing or operating this equipment.

Installing the instrument

Some instruments can be awkward to lift or carry. Refer to the instrument's documentation for lifting instructions.

Before connecting to power, check the following:

- Line voltage matches equipment rating

- Instrument line voltage switch matches line voltage (if applicable)
- Instrument line fuse is correct for the line voltage (if applicable)
- Power cord matches the power receptacle (use the power cord included with the instrument). Use only Agilent supplied power cord for your country.
- Do not position the equipment so that it is difficult to operate the disconnecting device.

Verify all other safety precautions described in the documentation have been taken.

PC placement and set up

This section is only applicable to instruments that are used with a PC. Refer to the documentation that came with your PC for ergonomic considerations when setting up the PC. Locate the PC keyboard and mouse for ergonomically correct access.

Ground the instrument

If your instrument is provided with a grounding-type power plug, the power plug must be connected to a properly-grounded electrical receptacle to minimize shock hazard.

Fuses and batteries

See the documentation or rear of the instrument for information about line-fuse or battery replacement. Do not use a different fuse or battery than is specified for the instrument.

Instrument operation

Do not cover the ventilation holes on the instrument, the modules, or accessories. Allow for sufficient clearance space between the instrument and other equipments, accessories or wall for proper cooling. Refer to the instrument's documentation for set up and ventilation instructions.

Do not operate in explosive atmosphere

Do not operate the instrument in hazardous (potentially explosive) atmospheres.

Do not operate in wet environment

Unless otherwise specified in the documentation, this instrument is intended for use in dry, indoor locations only.

In case of damage

Instruments that appear damaged or defective should be secured against unintended operation until they can be repaired by qualified service personnel.

Instrument modification

Do not remove the instrument cover

Unless otherwise specified in the documentation, there are no user-serviceable parts inside this instrument. Refer all servicing to qualified service personnel.

Do not modify the instrument

Do not install substitute parts or perform any unauthorized modification to the product. Contact your Agilent Sales and Service office to arrange for service and repair to ensure that safety features are maintained. Failure to do so may void the safety certification and create a safety hazard. Do not replace power cord with one of a lower rating than specified.

Safety symbols

These symbols, which have these meanings, may be marked on this instrument. Other symbols may also be marked on this instrument. In some cases, the symbols may be used together to indicate a specific meaning. Refer to the hardware user documentation for more information.


Direct current


Alternating current


Either direct or alternating current


Earth ground terminal


Protective earth ground terminal


Frame or chassis ground terminal

On (mains supply)


Off (mains supply)


Standby (mains supply). The instrument is not completely disconnected from the mains supply when the power switch is in the standby position.


Caution, refer to accompanying documentation


Risk of electric shock


Hot surface


Explosion hazard


Broken glass


Corrosive liquid


Ejecting parts


Eye hazard


Fire hazard


Heavy weight (danger to feet)


Heavy weight (danger to hands)


Moving parts


Noxious gas


Extreme cold


Laser hazard


RF radiation, Non-ionizing radiation

NOTE Consult the Site Preparation Guide and the User's Guide for your instrument for details.

Ozone

This section is not applicable to Raman instruments.

Ozone can be generated by radiation from the light 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 instrument such that the concentration of ozone does not exceed the maximum permissible level. All venting must be to outside air, never within the building.

Ultraviolet radiation

UV-Vis-NIR

The deuterium and mercury lamps (standard in the Cary 4000/5000/6000i/7000 instruments) emit hazardous ultraviolet (UV) radiation. This radiation can cause serious damage to eyes. NEVER look directly at either lamp and NEVER operate either lamp unless it is correctly mounted in the lamp turret (Cary 4000/5000/6000i/7000 only) and the turret is correctly mounted in the instrument.

The xenon flashlamp (standard in the Cary Eclipse lamp module) emits high intensity visible and ultraviolet (UV) radiation that can cause serious damage to eyes. NEVER operate the lamp outside the instrument.

FTIR

Tungsten halogen source lamps (for near-infrared analysis) emit hazardous ultraviolet (UV) radiation. This radiation can cause serious damage to eyes. NEVER look directly at the lamp and always wear appropriate protective equipment and clothing when required.

Laser safety

Safety warning labels

See the User's Guide provided with your instrument for laser safety warning label information and locations.

Agilent 8700 LDIR Chemical Imaging System

The LDIR system uses Quantum Cascade Laser (QCL) technology to provide ultra-bright light across the mid-IR fingerprint region. The light is coupled with rapidly scanning optics to provide clear, high definition, high quality IR spectra and images. The LDIR instrument works in either reflectance or ATR mode by automatically switching between these two modes by directing the incident beam to the appropriate objective. The movement of the sample relative to the beam is fully automated. The Agilent 8700 LDIR Chemical Imaging System use a quantum cascade laser module operating in the region at 5555.56 to 10256.41 nanometers. The spectrometer is a Class 1 laser product. In no operation or maintenance mode will the user be exposed to radiation levels that exceed those that define a Class 1 laser product. The Agilent 8700 LDIR Chemical Imaging System complies with FDA and CE standards for light emitting products.

Agilent Insight200M Liquid Explosive Detection System

The Insight200M system operates as a Class 1 laser system. It incorporates a Class 4 infrared laser and a Class 1 red laser. Do not open or remove the rear cover when the Insight is operating.

The system is protected by access restrictions and interlocks. It is built to meet BS EN 60825-1 2014 Laser Safety Specifications provided safety interlocks are not defeated.

Agilent TRS100 Quantitative Pharmaceutical Analysis System

The TRS100 operates as a Class 1 laser system. Although incorporating a powerful (Class 4) laser, the system is rendered inherently safe by the whole system design that is protected by access restrictions and interlocks. It is built to meet BS EN 60825-1 2014 Laser Safety Specifications provided safety interlocks are not defeated.

Agilent Resolve Handheld Raman Analyzer and Agilent Vaya Raman Material Identity Verification System

Resolve and Vaya operate as a Class 3B laser system (incorporating a Class 4 near-infrared laser). The system is not inherently eye-safe, and care must be taken during system operation. Precautions described in this information sheet should be taken to avoid serious damage to the eye. Risk assessments and operating procedures ("SOPs") must be put in place to allow safe usage by operators.

Resolve also has two Class 1 visible red lasers (640 nm) that act as a position guidance system in "non-contact mode" operation. The proximity guidance lasers are intended to be visible by the user when wearing the recommended eye protection.

The Vaya system incorporates a barcode scanner. The barcode scanner uses a red LED light (640 nm visible hyper red) for aiming wavelength and a white LED with CCT 500K light for illumination. Both LEDs have been tested and are classified as “Low Risk Group” according to the standard IEC62471:2006.

Safety Glasses

Safety glasses LB5 or higher at 830 nm should be worn during operation. They should also be worn by spectators within the Nominal Ocular Hazard Distance (NOHD) (See below for more details).

Maximum Permissible Exposure to Radiation (MPE) and Nominal Ocular Hazard Distance (NOHD)

The MPE, calculated with the specification of EN 60825-1:2014, is 5.15 mW. The NOHD has been determined to be 1.5 m. Personnel not operating Resolve or Vaya should remain outside of the NOHD of the operator unless also wearing the appropriate safety eyewear.

Additional operating recommendations:

- Avoid looking at the laser output and diffuse reflections
- Avoid exposing any part of the body to the laser output
- Ensure beam paths are enclosed where possible
- Do not allow untrained operators to operate the laser
- Thoroughly read the operator’s manual before operation

Agilent RapID Raw Material ID Verification System

The RapID operates as a Class 3B laser system (incorporating a Class 4 near-infrared laser). The system is not inherently eye-safe and care must be used in operation. In particular, the customer must put in place risk assessments and operating procedures ("SOPs") to allow safe usage by their users.

A four-pin XLR socket can be found at the rear of the system; this provides one part of the override to the dual channel interlock circuit. Interlocks should only be overridden in a laser-safe environment. The RapID comes fitted with an interlock override plug.

The RapID also incorporates a barcode scanner. The barcode scanner uses a red LED light for aiming wavelength and a white LED light for illumination. Both LEDs have been tested and are classified as “Low Risk Group” according to the standard IEC62471:2006.

Safety Glasses

Safety glasses LB5 or higher at 830 nm should be worn during operation. They should also be worn by spectators within the Nominal Ocular Hazard Distance (NOHD) (See below for more details).

Maximum Permissible Exposure to Radiation (MPE) and Nominal Ocular Hazard Distance (NOHD)

Using the MPE calculated with the specification of EN 60825-1:2014, the Nominal Ocular Hazard Distance (NOHD) has been derived to be less than 1.2 m.

Additional operating recommendations:

- Always wear protective eyewear suitable for the wavelength and intensity of the radiation (two pairs are provided with the system)
- Staff not operating RapID should not be within the Nominal Ocular Hazard Distance (NOHD) of the RapID operator unless also wearing the appropriate safety eyewear
- Avoid looking at the laser output and diffuse reflections
- Avoid exposing any part of the body to the laser output

- Ensure beam paths are enclosed where possible
- Do not allow untrained operators to operate the laser
- Thoroughly read the operator's manual

4500 and 5500 Series FTIR systems

Agilent 4500/5500 Series FTIR systems contain a low-powered solid state laser required for operation. The laser emits radiation and can cause injury to the eye. Do not stare into the beam.

Cary 630

The Cary 630 FTIR system contains a low-powered solid state laser required for operation. In no operation or maintenance mode will the operator be exposed to radiation levels that exceed those that define a Class 1 laser product.

Agilent Cary 600 Series FTIR spectrometers

The Agilent Cary 600 Series FTIR spectrometers use a helium-neon laser operating in the visible region at 632.8 nanometers. The spectrometer is a Class 2 laser product, powerful enough to warrant caution in its use. Agilent Cary 600 Series FTIR spectrometers and microscopes comply with FDA and CE standards for light emitting products.

An attenuated portion of the laser beam passes into and through the spectrometer sample compartment. Although not powerful enough to harm your skin should your hand intercept it, the laser light could cause retinal (eye) damage during prolonged direct viewing. This is not possible given the normal optical layout of the spectrometer. However, if a highly reflective surface such as a mirror is allowed to intercept the beam, the beam could be redirected out of the sample compartment resulting in on-axis or direct viewing. Care must be taken to avoid this.

The laser in the spectrometer is operating when the green power indicator of the spectrometer is active. The Agilent Cary 600 Series FTIR spectrometers incorporate an interlock switch that automatically turns off power to the laser if the interferometer compartment cover is opened. No maintenance of the spectrometer or microscope by users is required to maintain specifications, proper operation, and compliance with FDA and CE standards for light-emitting products.

Gas hazards

This section is not applicable to Raman instruments.

All compressed gases (other than air) can create a hazard if they leak into the atmosphere. Even small leaks in gas supply systems can be dangerous. Any leak (except that of air) can result in an oxygen-deficient atmosphere, which can cause asphyxiation. The area in which cylinders are stored and the area surrounding the instrument must be adequately ventilated to prevent such gas accumulations.

Gas cylinders must be stored and handled strictly in accordance with local safety codes and regulations. Cylinders must be used and stored only in a vertical position and secured to an immovable structure or a properly constructed cylinder stand. Move cylinders only by securing them to a properly constructed trolley.

Use only approved regulator and hose connectors (refer to the gas supplier's instructions). Keep gas cylinders cool and properly labeled. (All cylinders are fitted with a pressure relief device that will rupture and empty the cylinder if the internal pressure is raised above the safe limit by excessive temperatures.) Ensure that you have the correct cylinder before connecting it to the instrument.

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 that are easily accessible to the instrument operator.

If using cryogenic gases (for example, liquid argon or liquid nitrogen), prevent severe burns by wearing suitable protective clothing and gloves.

Use only 'instrument grade' gases with your spectrometer that are water-free.

Use only connector tubing that is chromatographically clean and has a pressure rating significantly greater than the highest outlet pressure from the regulator.

Check the condition of the tubing. Replace as needed during operation or maintenance.

Solvents, solutions, and reagents

This section is not applicable to Raman instruments.

Use only solvents, solutions, or reagents recommended in the instrument User's Guide or Help.

Use of the hardware and accessories may involve solvents, solutions, or reagents which are flammable, corrosive, toxic or otherwise hazardous. Careless, improper, or unskilled use of such solvents, solutions, or reagents can create explosion hazards, fire hazards, toxicity and other hazards which can result in death, serious personal injury, and damage to equipment and property.

Read the Material Safety Data Sheet (MSDS) for each chemical used.

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.

Do not use solvents with an auto-ignition temperature below 200º C.

Cleaning

Clean the outside of the instrument with a soft, lint-free, slightly dampened cloth. Do not use detergent or chemical solvents.

IPA and diluted bleach (if required) are allowed for the decontamination of Agilent Resolve, Insight and Vaya instruments. Refer to the instrument's documentation for specific cleaning instructions.

Glassware

Handle fragile glass parts carefully.

Moving the instrument

This section is not applicable to the handheld instruments (Agilent Resolve, Agilent Vaya, 4300 Handheld FTIR), and the Agilent RapID. Refer to the instrument's documentation for moving instructions.

Make sure the Power switch is turned OFF. Make sure all cables between other units are unplugged before moving equipment.

If you need to lift a heavy instrument, it should be lifted by at least 4 people or with a mechanical lifter.

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