

# Agilent Triple Quad Mass Spectrometer (Model K6460 and K6420)

## Safety Guide

### *For In Vitro Diagnostic Use*

The K6460 and K6420 mass spectrometer is intended to be used to identify inorganic or organic compounds in human specimens by ionizing the compounds and separating the resulting ions by means of electrical field according to their mass.

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This guide contains information about safety, conformity and standards for your Agilent Triple Quad Mass Spectrometer (Model K6460 and K6420).

### **WARNING**

**Always wear appropriate protection, including eye protection, lab coat, and gloves, when working with solvents and chemicals or when working with unassembled parts.**

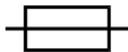
# Safety

## Symbols on Instruments

### Electrical symbols

The following table describes the electrical symbols that can be displayed on the mass spectrometer.

Table 1 Electrical symbols

| Symbol  | Description                            |
|---|--|
|    | Indicates a protective earth terminal. |
|    | Circuit breaker.                       |
|  | Alternating current                    |
|  | Fuse                                   |

## Safety symbols

The following table describes the safety symbols that can be displayed on the mass spectrometer. Each symbol appears by itself or with text that explains the relevant hazard. These safety symbols can also appear next to DANGER, WARNING, or CAUTION.

Table 2 Safety symbols

| Symbol   | Description  |
|--|--|
|  or  | The apparatus is marked with this symbol when the user should refer to the instruction manual in order to protect against harm to the operator and to protect the apparatus against damage.          |
|   | Indicates dangerous voltages.  |
|   | The apparatus is marked with this symbol when hot surfaces are accessible and the user should not touch them when heated up.   |
|    | Electrostatic discharge (ESD) hazard to equipment.   |
|   | Explosion hazard.  |
|   | Do not operate the instrument in the presence of hydrogen or any other flammable gases or fumes. Operation of any electrical instrument in such an environment constitutes a definite safety hazard. |
|   | Do not discard this electrical/electronic product in domestic household waste.   |

## Safety

### Symbols on Instruments

Table 2 Safety symbols (continued)

| Symbol  | Description  |
|---|--|
| <p>1. </p> <p>2. </p>   | Disconnect main plug from electrical outlet prior to fuse replacement. |
|   <p>1.  2.  3. </p> | Two live circuits. Disconnect both power cords before maintenance.     |
|    | Biological risks   |

## General Instrument Safety

### WARNING

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**PHYSICAL INJURY HAZARD:** Use the mass spectrometer only as specified in the user instructions. Using the system in a manner not specified by Agilent Technologies can result in personal injury or damage to the instrument.

### Moving or lifting the system

### WARNING

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**PHYSICAL INJURY HAZARD:** The mass spectrometer is heavy. The mass spectrometer requires at least four people to lift. Check your local regulations for the maximum weight that each person can lift.

### Operating the instrument

Before you operate the instrument, make sure that you have:

- Been given instructions on general safety practices for laboratory and specific safety practices for the instrument, as described in this document.
- Read and understood all safety data sheets (SDS) for chemicals handled.

## Physical Hazard Safety

### Solvents

#### WARNING

**PHYSICAL INJURY HAZARD:** Always wear appropriate protection, including eye protection and gloves, when working with solvents and chemicals. Refer to the applicable MSDS for more information about the materials you are working with.

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### Electrical safety

#### WARNING



When the mass spectrometer is plugged into a power source, even if the power switch is off, dangerous voltages can exist:

- In the wiring between the mass spectrometer power cord and the AC power supply.
  - In the AC power supply
  - In the wiring from the AC power supply to the power switch.
- 

#### WARNING



Never remove a cover unless specifically instructed to do so. With the power switch on, potentially dangerous voltages can exist:

- On all electronics boards in the instrument.
  - In the internal wires and cables connected to these boards.
  - In the wires for any heater.
- 

#### CAUTION



The printed circuit (PC) boards in the mass spectrometer can be damaged by electrostatic discharge. Do not touch any of the boards unless absolutely necessary. If you must handle the PC boards, wear a grounded wrist strap and take other anti-static precautions. Wear a grounded wrist strap any time you must remove the mass spectrometer covers.

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**WARNING**



Severe electrical shock can result from operating the mass spectrometer without the correct Agilent power cords in place. Refer to the *Site Prep Guide*, available from your Agilent representative.

Grounding circuit continuity is required for the safe operation of equipment. Use properly configured and approved line cords for the voltage supply in your facility.

**WARNING**



If the power cord insulation is damaged, frayed, or worn, replace the cord. Contact your Agilent representative.

**WARNING**



Plug the mass spectrometer AC input power cords into properly grounded receptacles with adequate current capacity. The branch circuit over-current protection Circuit Breakers protecting the building receptacles must be rated no more than 20A.

**WARNING**



Be sure that the mass spectrometer main supply cable is routed in such a way as to minimize the risk of a tripping hazard. Agilent Technologies recommends the use of mechanical protection, such as a rubberized cable guard on the floor to cover and protect the main supply cable.

**WARNING**



Make sure that the point at which the detachable power cords are connected to the mass spectrometer is clear from clutter and that it is accessible at all times.

**WARNING**



Do not interrupt the protective conductor inside or outside the mass spectrometer or disconnect the protective earth terminal. Such actions create a shock hazard for the operator and can damage the instrument.

**WARNING**



The use of incorrect or makeshift fuses or the short-circuiting of fuse holders creates a shock hazard for the operator and can damage the instrument. Replace fuses only with fuses of identical current rating and type. Refer to the *Maintenance Guide* for more information. The *Maintenance Guide* can be accessed from the Resource App that is included with your instrument.

**WARNING**



Excessive fluctuations in the line voltage can create a shock hazard and can damage the instrument. This equipment must be installed in a Category II environment as defined in IEC 664.

For all instruments, the supply voltage must not fluctuate more than  $\pm 10\%$ . For the K6460 mass spectrometer (which includes an Agilent Jet Stream source), the line voltage must not fluctuate more than  $+10/-5\%$  from the rated voltage.

### Temperature safety

**WARNING**



Some parts of the mass spectrometer operate at temperatures high enough to cause serious burns. Always cool heated parts of the LC/MS down to room temperature before you work on them.

To cool the instrument faster, set the heated zone to room temperature. Turn the zone off after it has reached the set point.

If you must do maintenance work on a hot part, use a wrench and wear gloves.

## General Chemical Safety

### WARNING

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**CHEMICAL HAZARD:** Before handling any chemicals, refer to the Safety Data Sheet (SDS) provided by the manufacturer, and observe all relevant precautions.

To minimize the hazards of chemicals:

- Read and understand the SDS provided by the manufacturer before you store, handle, or work with any chemicals or hazardous materials.
- Minimize contact with chemicals. Wear appropriate personal protective equipment when handling chemicals (for example, safety glasses, gloves, or protective clothing).
- Minimize the inhalation of chemicals. Do not leave chemical containers open. Use only with adequate ventilation (for example, fume hood).
- Check regularly for chemical leaks or spills. If either of those occur, follow the cleanup procedures from the manufacturer, as recommended in the SDS.
- Comply with all local, state, or national laws and regulations related to chemical storage, handling, and disposal.

## Chemical Waste Safety

### WARNING

**CHEMICAL WASTE HAZARD:** Wastes produced by the MS System are potentially hazardous and can cause injury, illness, or death. Refer to Safety Data Sheets (SDS) and local regulations for handling and disposal.

### WARNING

**CHEMICAL WASTE HAZARD:** The foreline pump and source exhaust contain traces of the chemicals that you are analyzing. The exhaust products can be toxic. Vent the pump and source exhaust outside your laboratory or into a fume hood. Make sure to comply with all local environmental regulations.

To minimize the hazards of chemical waste:

- Read and understand the SDS provided by the manufacturers of the chemicals in the waste container before you store, handle, or dispose of chemical waste.
- Provide primary and secondary waste containers. Both containers must be compatible with the waste material and meet federal, state, and local requirements for container storage.
- Minimize contact with chemicals. Wear appropriate personal protective equipment when handling chemicals (for example, safety glasses, gloves, or protective clothing).
- Minimize the inhalation of chemicals. Do not leave chemical containers open.
- Handle chemical wastes in a fume hood.
- After emptying a waste container, seal it with the cap provided.
- Dispose of the contents of the waste tray and waste bottle in accordance with good laboratory practices and local, state, or national environmental and health regulations.
- Ensure that the mass spectrometer waste is stored, transferred, transported, and disposed of according to all local, state, and/or national regulations.

## Biohazard Safety

### WARNING



If pathogenic, toxic, or radioactive samples are intended to be used in this instrument, it is the responsibility of the user to ensure that all necessary safety regulations, guidelines, precautions and practices are adhered to accordingly. This includes also the handling of genetically modified organisms. Ask your laboratory safety officer to advise you about the level of containment required for your application and about proper decontamination or sterilization procedures to follow if fluids escape from containers.

To minimize hazards of biological material:

- Observe all cautionary information printed on the original solution containers prior to their use.
- Because leaks, spills, or loss of sample can generate aerosols, observe proper safety precautions.
- Spray chamber covers are not designed as bioseals for aerosol or liquid containment.
- Handle body fluids with care because they can transmit disease. No known test offers complete assurance that they are free of micro-organisms. Some of the most virulent - Hepatitis (B and C) and HIV (I-V) viruses, atypical mycobacteria, and certain systemic fungi - further emphasize the need for aerosol protection.
- Always follow local state and federal biohazard handling regulation when disposing of biohazardous waste material.
- Handle all infectious samples according to good laboratory procedures and methods to prevent spread of disease.
- Dispose of all waste solutions and products according to appropriate environmental health and safety guidelines.

## Conformity and Standards

The Agilent Triple Quad Mass Spectrometer (Model K6460 and K6420) are assigned the following IEC (International Electro-technical Commission) classifications:

- Equipment Class: I (Laboratory Equipment)
- Installation Category: II
- Pollution Degree: 2

This unit has been designed and tested in accordance with recognized safety standards and is designed for use indoors. *If the instrument is used in a manner not specified by Agilent Technologies, the protections provided by the instrument may be impaired.*

## Safety and Regulatory Certifications

The Agilent Triple Quad Mass Spectrometer (Model K6460 and K6420) conforms to applicable editions and versions of the following safety standards:

- CSA/Nationally Recognized Test Laboratory (NRTL): UL 61010–1:2005
- International Electrotechnical Commission (IEC): IEC61010–1, 61010-2-010, 61010-2-101

The Agilent Triple Quad Mass Spectrometer (Model K6460 and K6420) conforms to the following regulations on Electromagnetic Compatibility (EMC) and Radio Frequency Interference (RFI):

- CISPR 11/EN 55011: Group 1, Class A
- IEC/EN 61326-1

The Agilent Triple Quad Mass Spectrometer (Model K6460 and K6420) is manufactured under a quality system registered to ISO 13485.

## Electromagnetic Compatibility

Operation of the mass spectrometer is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

If the mass spectrometer does cause harmful interference to other equipment, which can be determined by turning the mass spectrometer off and on, try one or more of the following measures:

- 1** Relocate the susceptible equipment.
- 2** Move the mass spectrometer away from the susceptible equipment.
- 3** Plug the devices into different electrical outlets, so that the devices are on separate electrical circuits.
- 4** Make sure that all peripheral equipment connected to the mass spectrometer are also certified.
- 5** Make sure that appropriate cables, as described in the system installation guide, are used to connect the mass spectrometer to peripheral equipment.
- 6** Consult your equipment dealer, Agilent Technologies, or an experienced technician for assistance.

Changes or modifications not expressly approved by Agilent Technologies could void the user's authority to operate the equipment.

## Sound Emission Declaration

### Sound pressure

Sound pressure  $L_p < 70$  dB

## Environmental Conditions

|                       |   |
|-----------------------|---|
| Equipment Class       | Class I Laboratory Equipment  |
| Pollution Degree      | 2   |
| Installation Category | II  |
| Environment           | Indoor Use  |
| Altitude              | Not to exceed 3000 m  |
| Electrical supply     | 200 - 240 V AC, 50/60 Hz, maximum 2850 VA   |
| Mains supply voltage  | Fluctuations not to exceed 10% of nominal supply voltage.<br>For K6460 mass spectrometers (which includes an Agilent Jet Stream source), fluctuations should not exceed +10/-5% from the rated voltage. |
| Operating Temperature | 15 to 35°C (59 to 95°F)   |
| Storage Temperature   | -40°C to 70°C   |
| Humidity              | < 85% RH at 35°C  |

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## In This Book

This guide contains information about safety, conformity and standards for your Agilent Triple Quad Mass Spectrometer (Model K6460 and K6420).

*For In Vitro Diagnostic Use*

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### Instrument Manufacturing



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