TurboVap®

Installation and Safety

Biotage®

TurboVap®

Installation and Safety

CONTENTS

Site Requirements

Before the system is installed, the installation site should be prepared as follows:

Fume Hood/ Ventilation System

The system must be either connected to a ventilation system using the exhaust outlet at the rear of the system or placed in a well-ventilated fume hood or an equivalent enclosure to reduce the risk of exposure to harmful solvent vapors. The ventilation system or fume hood must be capable of exhausting 1 m^3/min (35.3 ft^3/min).

Connection: The exhaust hose supplied with the system is 3.8 meters (12.5 feet) and has a 50.8 mm (2") inner diameter.

Weight and Dimensions

The total weight of the package including the system is 20 kg (44 lbs). Use suitable lifting equipment when moving the package.

The fume hood or bench must be able to support the weight of the system. The system weighs 17 kg (37.5 lbs) when the water bath is empty and maximum 29 kg (63.9 lbs) when full with deionized water, rack, and tubes.

The dimensions of the system are (W x D x H): 400 x 400 x 390 mm (15.7" x 15.7" x 15.4") including the hinges at the sides and the exhaust outlet at the rear. Note that the height with the lid open is 590 mm (23.2").

The system requires the following clearance for proper evacuation of solvent vapors:

- A minimum of 30 mm (1.2") between the front of the system and any solid objects.
- A minimum of 30 mm (1.2") between the exhaust outlet at the rear of the system and any solid objects. Only applicable when the exhaust hose is not used.

Operating Temperature

18°C to 32°C

Humidity

20% to 90% RH (non-condensing)

Electrical Supply

100–127 V or 220–240 V at 50/60 Hz, 1000 VA

Connect only to a properly grounded outlet.

Gas Supply

The system should operate using inert gas. Compressed air can be used but is not recommended with some solvents due to the possible risk of explosion.

Supply pressure:

Minimum supply pressure: 4 bar (0.4 MPa, 58 PSI).

Required supply pressure for full flow capability: 6 bar (0.6 MPa, 87 PSI).

Maximum supply pressure: 9 bar (0.9 MPa, 130 PSI).

Supply flow:

Required supply flow for TurboVap Classic equivalent capability for each manifold:

- 48 positions: 160 liters/min
- 24 positions: 120 liters/min
- 6 positions: 35 liters/min

Required supply flow for full flow capability for each manifold:

- 48 positions: 200 liters/min
- 24 positions: 160 liters/min
- 6 positions: 50 liters/min

Connection:

The gas inlet tube supplied with the system has a 6 mm outer diameter. The system is also shipped with two connectors for conversion to 1/4" or 3/8" outer diameter.

Note that there is no regulator for the gas inlet supplied with the system. This can be purchased separately as an optional accessory (P/N 352281SP Pressure Regulator and P/N 353480SP Supply Connection Set).

External Fire Protection

External fire protection should be installed according to local regulations for equipment operating unattended.

Installation of TurboVap® LV

Warning

- Follow regional safety practices when handling and moving shipping boxes and containers, and when moving the system.
- The total weight of the package including the system is 20 kg (44 lbs). Use suitable lifting equipment when moving the package.
- Observe general and specific safety regulations for the use of the system and its accessories at all times in order to reduce the risk of personal injury, fire, and explosion; see the "Safety" chapter on page 14.

Unpack the System

Warning

- The system consists partly of glass. Exercise caution when unpacking the system. If glass was broken during transportation, please contact Biotage® 1-Point Support™.

Carefully unpack the system and set aside the exhaust hose and accessory box. Verify that all items listed on the packing list supplied with the system are included. If any parts are damaged or missing, please contact Biotage.

Note: We recommend that the boxes and packing materials are kept by the customer in case the system needs to be returned for service or moved to another location. If you need to ship the system, please contact Biotage 1-Point Support for instructions.

Install the System

Warning

- Before installing the system, please read and observe the safety requirements in the "Safety" chapter on page 14.

1. Prepare the new site according to the site requirements on page 1.
2. Carefully lift the system and place it in a well-ventilated fume hood or on a bench. Note that the work area must be flat and level. Place the system so that the mains switch and gas inlet on the right side of the system are easy to access.
3. If the system is not placed in a fume hood:
   a. Gently push one end of the exhaust hose over the exhaust outlet at the rear of the system (see H in Figure 1) and secure the hose with the clamp supplied in the accessory box.
   b. Route the other end of the exhaust hose to a proper external air ventilation system or hood. Ensure that the ventilation system is operating whenever the system is in use.

   Note: Do not vent the system through a trap.
4. Remove the warning sticker covering the voltage selector switch on the right side of the system (see E in Figure 1) and ensure that the system voltage is configured correctly for your electrical supply.
5. Three power cords are supplied with the system to accommodate regional differences. Plug the appropriate power cord into the power inlet on the right side of the system (see D in Figure 1) and then plug the other end into a grounded (earthed) power outlet.
6. Connect an inert gas supply to the **N_2** port on the right side of the system (see F in Figure 1) using the 6 mm OD tubing supplied with the system. The system is supplied with two connectors for conversion to 1/4" or 3/8" OD that can be used. Use a regulator (not supplied) to adjust the line pressure. For full flow capability, set the pressure to between 6 and 9 bar (0.6 and 0.9 MPa; 87 and 130 PSI). The minimum pressure of 4 bar (0.4 MPa, 58 PSI) provides equivalent performance to the TurboVap Classic system.

   Note: Devices added to the inlet supply line (such as moisture traps or filters) must not drop the pressure below 4 bar (TurboVap Classic capability) or 6 bar (full flow capability) for correct operation.

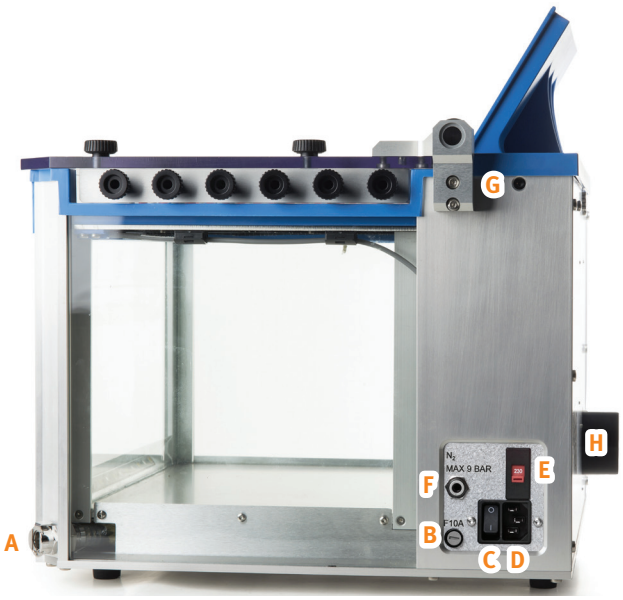

Figure 1. The right side of the system. A = DRAIN port, B= fuse holder, C = mains switch, D = power inlet, E = voltage selector switch, F = N_2 port, G = AUX port, and H = exhaust outlet.

Fill the Water Bath

1. Open the lid of the TurboVap LV system and pour **deionized** water into the water bath until the level reaches the MIN level marked on the water bath; see Figure 2A. This should be about 4.5 liters.
2. Before using a TurboVap LV multi rack (sold separately), it has to be set up for the tube type that you wish to use. Set the height adjustment bars to correspond with the length of your tubes using the adjustment handles on both ends of each row.

   Note: There is a 2.5 mm unit graduated scale on both sides of the rack to help you with the height adjustment.
3. Fill the TurboVap LV multi rack with empty sample tubes in all positions except one.
4. Using the handles built into the multi rack, gently lower the rack with empty tubes into the water bath.
5. Place a funnel (not supplied) in the empty rack position and carefully add more deionized water up to the initial liquid level of your samples, but not higher than just below the blue water bath top cover (see Figure 2B). Remove the funnel.

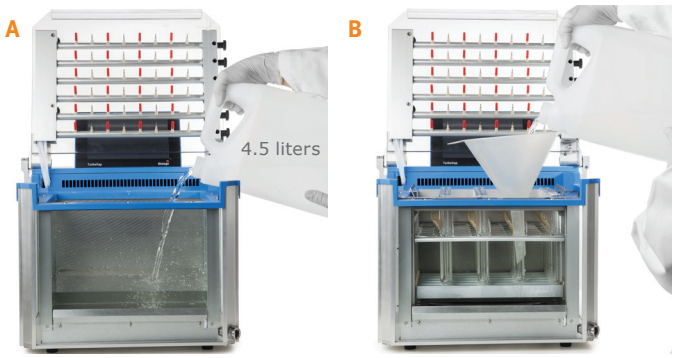

Figure 2. The water's surface must be above the minimum level marked on the water bath but not higher than just below the blue water bath top cover.

Adjust the TurboVap® LV Manifold

1. If using the TurboVap LV multi rack with 24 positions, plug the nozzles that are not in use using nozzle plugs (see Figure 3A).
2. Adjust the nozzles for the selected rack. To avoid broken tubes, we recommend the following procedure:
   a. Ensure that all nozzles are as far to the left as possible.
   b. Close the lid and adjust one nozzle row so that the nozzles are as far to the right as possible without touching the sides of the tubes.
   c. If using rows with different sized tubes, adjust each additional row appropriately. If using the same size tube in all rows, open the lid and adjust the other nozzle rows into the same position using the engraved adjustment lines on the manifold (see Figure 3B).

   Note: It is important that the nozzles are adjusted correctly to generate a vortex shearing action, which contributes to faster evaporation, and to prevent broken tubes and samples potentially leaking into the water bath.

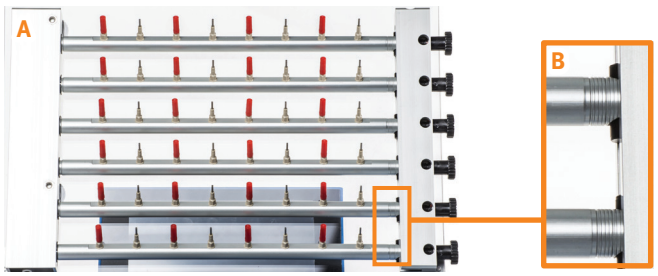

Figure 3. A: If using the TurboVap LV multi rack with 24 positions, plug the nozzles that are not in use using nozzle plugs. B: Engraved adjustment lines.

Turn on the System

1. Ensure that the power cord and any cables, hoses, and tubing connected to the system cannot come in contact with chemicals. Corrosives and solvents can degrade the cord/cable insulation and dissolve the hoses and tubing. There is a risk of electric shock, fire, and/or equipment damage.
2. Turn on the system. The mains switch is located on the right side of the system; see C in Figure 1. The first time the system is started, it will start in manual mode and heat the water bath to 20°C.
3. To set up and start an evaporation run, see the user manual.

Installation of TurboVap® II

Warning

- Follow regional safety practices when handling and moving shipping boxes and containers, and when moving the system.
- The total weight of the package including the system is 20 kg (44 lbs). Use suitable lifting equipment when moving the package.
- Observe general and specific safety regulations for the use of the system and its accessories at all times in order to reduce the risk of personal injury, fire, and explosion; see the "Safety" chapter on page 14.

Unpack the System

Warning

- The system consists partly of glass. Exercise caution when unpacking the system. If glass was broken during transportation, please contact Biotage® 1-Point Support™.

Carefully unpack the system and set aside the exhaust hose and accessory box. Verify that all items listed on the packing list supplied with the system are included. If any parts are damaged or missing, please contact Biotage.

Note: We recommend that the boxes and packing materials are kept by the customer in case the system needs to be returned for service or moved to another location. If you need to ship the system, please contact Biotage 1-Point Support for instructions.

Install the System

Warning

- Before installing the system, please read and observe the safety requirements in the "Safety" chapter on page 14.

1. Prepare the new site according to the site requirements on page 1.
2. Carefully lift the system and place it in a well-ventilated fume hood or on a bench. Note that the work area must be flat and level. Place the system so that the mains switch and gas inlet on the right side of the system are easy to access.
3. If the system is not placed in a fume hood:
   a. Gently push one end of the exhaust hose over the exhaust outlet at the rear of the system (see H in Figure 4) and secure the hose with the clamp supplied in the accessory box.
   b. Route the other end of the exhaust hose to a proper external air ventilation system or hood. Ensure that the ventilation system is operating whenever the system is in use.

   Note: Do not vent the system through a trap.
4. Remove the warning sticker covering the voltage selector switch on the right side of the system (see E in Figure 4) and ensure that the system voltage is configured correctly for your electrical supply.
5. Three power cords are supplied with the system to accommodate regional differences. Plug the appropriate power cord into the power inlet on the right side of the system (see D in Figure 4) and then plug the other end into a grounded (earthed) power outlet.
6. Connect an inert gas supply to the **N_2** port on the right side of the system (see F in Figure 4) using the 6 mm OD tubing supplied with the system. The system is supplied with two connectors for conversion to 1/4" or 3/8" OD that can be used. Use a regulator (not supplied) to adjust the line pressure. For full flow capability, set the pressure to between 6 and 9 bar (0.6 and 0.9 MPa; 87 and 130 PSI). The minimum pressure of 4 bar (0.4 MPa, 58 PSI) provides equivalent performance to the TurboVap Classic system.

   Note: Devices added to the inlet supply line (such as moisture traps or filters) must not drop the pressure below 4 bar (TurboVap Classic capability) or 6 bar (full flow capability) for correct operation.

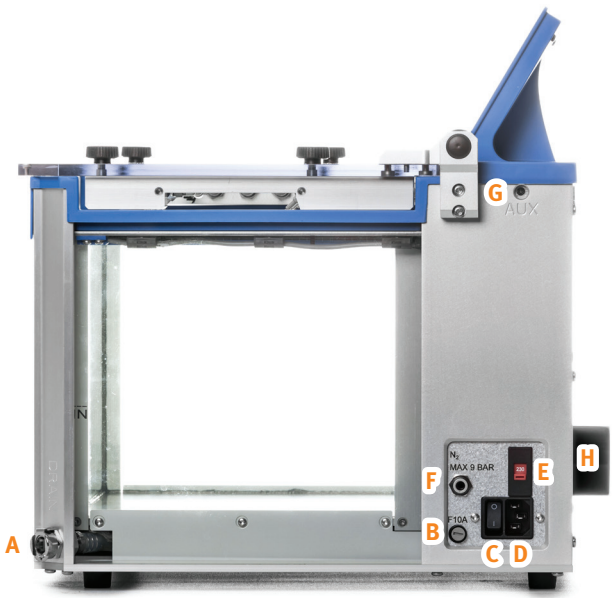

Figure 4. The right side of the system. A = DRAIN port, B= fuse holder, C = mains switch, D = power inlet, E = voltage selector switch, F = N_2 port, G = AUX port, and H = exhaust outlet.

Fill the Water Bath

1. Open the lid of the TurboVap II system and pour **deionized** water into the water bath until the level reaches the MIN level marked on the water bath; see Figure 6A. This should be about 4.5 liters.
2. Before using a TurboVap II rack with end-point sensors (sold separately), ensure that the manifold air shield (see Figure 7) is not installed and all sensors are fully plugged into the bottom of the sensor connection box, which is located on the right side of the rack.
3. Fill the TurboVap II rack with empty sample tubes in all positions except one.
4. Using the handles built into the TurboVap II rack, gently lower the rack with empty tubes into the water bath.
5. If using a TurboVap II rack with end-point sensors, connect the sensor connection box to the **AUX** port on the right side of the system (see Figure 5).

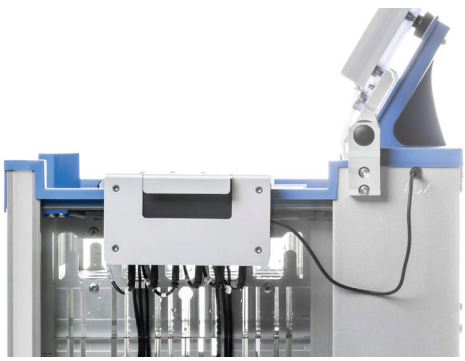

Figure 5. If using a TurboVap II rack with end-point sensors, connect the sensor connection box to the AUX port.

6. Place a funnel (not supplied) in one of the unused rack positions and carefully add more deionized water up to the initial liquid level of your samples, but not higher than just below the blue water bath top cover (see Figure 6B). Remove the funnel.

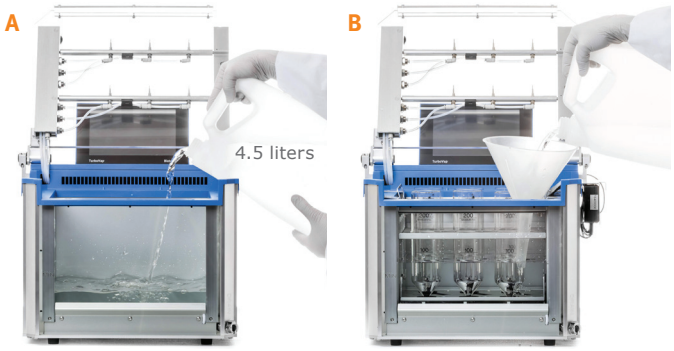

Figure 6. The water's surface must be above the minimum level marked on the water bath but not higher than just below the blue water bath top cover.

Install the Manifold Air Shield

If using a TurboVap II rack without end-point sensors, push in the manifold air shield on the right side of the system as shown in Figure 7.

Figure 7. If using a TurboVap II rack without end-point sensors, a manifold air shield has to be installed.

Turn on the System

1. Ensure that the power cord and any cables, hoses, and tubing connected to the system cannot come in contact with chemicals. Corrosives and solvents can degrade the cord/cable insulation and dissolve the hoses and tubing. There is a risk of electric shock, fire, and/or equipment damage.
2. Turn on the system. The mains switch is located on the right side of the system; see C in Figure 4. The first time the system is started, it will start in manual mode and heat the water bath to 20°C.
3. To set up and start an evaporation run, see the user manual.

Installation of TurboVap® EH

Warning

- Follow regional safety practices when handling and moving shipping boxes and containers, and when moving the system.
- The total weight of the package including the system is 20 kg (44 lbs). Use suitable lifting equipment when moving the package.
- Observe general and specific safety regulations for the use of the system and its accessories at all times in order to reduce the risk of personal injury, fire, and explosion; see the "Safety" chapter on page 14.

Unpack the System

Warning

- The system consists partly of glass. Exercise caution when unpacking the system. If glass was broken during transportation, please contact Biotage® 1-Point Support™.

Carefully unpack the system and set aside the exhaust hose and accessory box. Verify that all items listed on the packing list supplied with the system are included. If any parts are damaged or missing, please contact Biotage.

Note: We recommend that the boxes and packing materials are kept by the customer in case the system needs to be returned for service or moved to another location. If you need to ship the system, please contact Biotage 1-Point Support for instructions.

Install the System

Warning

- Before installing the system, please read and observe the safety requirements in the "Safety" chapter on page 14.

1. Prepare the new site according to the site requirements on page 1.
2. Carefully lift the system and place it in a well-ventilated fume hood or on a bench. Note that the work area must be flat and level. Place the system so that the mains switch and gas inlet on the right side of the system are easy to access.
3. If the system is not placed in a fume hood:
   a. Gently push one end of the exhaust hose over the exhaust outlet at the rear of the system (see H in Figure 8) and secure the hose with the clamp supplied in the accessory box.
   b. Route the other end of the exhaust hose to a proper external air ventilation system or hood. Ensure that the ventilation system is operating whenever the system is in use.

   Note: Do not vent the system through a trap.
4. Remove the warning sticker covering the voltage selector switch on the right side of the system (see E in Figure 8) and ensure that the system voltage is configured correctly for your electrical supply.
5. Three power cords are supplied with the system to accommodate regional differences. Plug the appropriate power cord into the power inlet on the right side of the system (see D in Figure 8) and then plug the other end into a grounded (earthed) power outlet.
6. Connect an inert gas supply to the **N_2** port on the right side of the system (see F in Figure 8) using the 6 mm OD tubing supplied with the system. The system is supplied with two connectors for conversion to 1/4" or 3/8" OD that can be used. Use a regulator (not supplied) to adjust the line pressure. For full flow capability, set the pressure to between 6 and 9 bar (0.6 and 0.9 MPa; 87 and 130 PSI). The minimum pressure of 4 bar (0.4 MPa, 58 PSI) provides equivalent performance to the TurboVap Classic system.

   Note: Devices added to the inlet supply line (such as moisture traps or filters) must not drop the pressure below 4 bar (TurboVap Classic capability) or 6 bar (full flow capability) for correct operation.

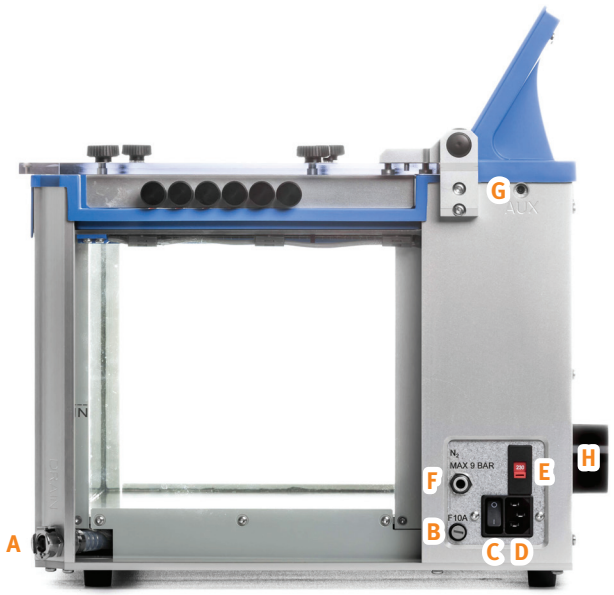

Figure 8. The right side of the system. A = DRAIN port, B= fuse holder, C = mains switch, D = power inlet, E = voltage selector switch, F = N_2 port, G = AUX port, and H = exhaust outlet.

Fill the Water Bath

1. Open the lid of the TurboVap EH system and pour **deionized** water into the water bath until the level reaches the MIN level marked on the water bath; see Figure 9A. This should be about 4.5 liters.
2. Fill one or two Extrahera sample/collection racks with empty sample tubes in all positions and place the rack(s) into the TurboVap EH sample/collection rack holder.
3. Using the handles built into the rack holder, gently lower the rack(s) with empty tubes into the water bath and place a funnel (not supplied) in the back slot of the rack holder. Carefully add more deionized water up to the initial liquid level of your samples, but not higher than just below the blue water bath top cover; see Figure 9B. Remove the funnel.

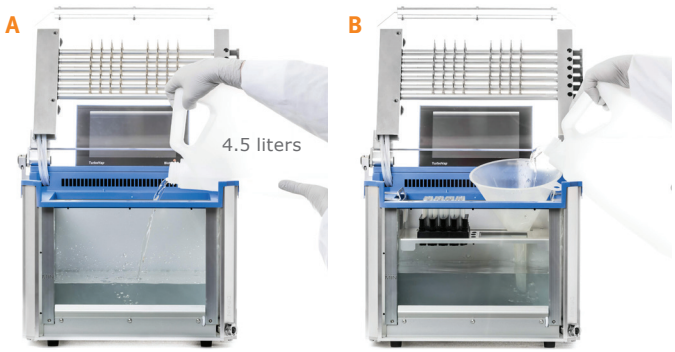

Figure 9. The water's surface must be above the minimum level marked on the water bath but not higher than just below the blue water bath top cover.

Adjust the TurboVap® EH Manifold

1. If using the TurboVap EH system with only one sample/collection rack, plug the nozzles that are not in use using nozzle plugs (see Figure 10A).
2. Adjust the nozzles for the selected rack. To avoid broken tubes, we recommend the following procedure:
   a. Ensure that all nozzles are as far to the left as possible.
   b. Close the lid and adjust one nozzle row so that the nozzles are as far to the right as possible without touching the sides of the tubes.
   c. Open the lid and adjust the other nozzle rows into the same position using the engraved adjustment lines on the manifold; see Figure 10B.

Note: It is important that the nozzles are adjusted correctly to generate a vortex shearing action, which contributes to faster evaporation, and to prevent broken tubes and samples potentially leaking into the water bath.

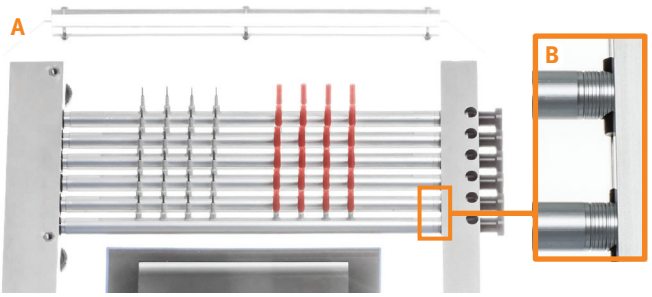

Figure 10. A: If using the TurboVap EH system with only one sample/collection rack, plug the nozzles that are not in use using nozzle plugs. B: Engraved adjustment lines.

Turn on the System

1. Ensure that the power cord and any cables, hoses, and tubing connected to the system cannot come in contact with chemicals. Corrosives and solvents can degrade the cord/cable insulation and dissolve the hoses and tubing. There is a risk of electric shock, fire, and/or equipment damage.
2. Turn on the system. The mains switch is located on the right side of the system; see C in Figure 8. The first time the system is started, it will start in manual mode and heat the water bath to 20°C.
3. To set up and start an evaporation run, see the user manual.

Installation of TurboVap® P+

Warning

- Follow regional safety practices when handling and moving shipping boxes and containers, and when moving the system.
- The total weight of the package including the system is 20 kg (44 lbs). Use suitable lifting equipment when moving the package.
- Observe general and specific safety regulations for the use of the system and its accessories at all times in order to reduce the risk of personal injury, fire, and explosion; see the "Safety" chapter on page 14.

Unpack the System

Warning

- The system consists partly of glass. Exercise caution when unpacking the system. If glass was broken during transportation, please contact Biotage® 1-Point Support™.

Carefully unpack the system and set aside the exhaust hose and accessory box. Verify that all items listed on the packing list supplied with the system are included. If any parts are damaged or missing, please contact Biotage.

Note: We recommend that the boxes and packing materials are kept by the customer in case the system needs to be returned for service or moved to another location. If you need to ship the system, please contact Biotage 1-Point Support for instructions.

Install the System

Warning

- Before installing the system, please read and observe the safety requirements in the "Safety" chapter on page 14.

1. Prepare the new site according to the site requirements on page 1.
2. Carefully lift the system and place it in a well-ventilated fume hood or on a bench. Note that the work area must be flat and level. Place the system so that the mains switch and gas inlet on the right side of the system are easy to access.
3. If the system is not placed in a fume hood:
   a. Gently push one end of the exhaust hose over the exhaust outlet at the rear of the system (see H in Figure 11) and secure the hose with the clamp supplied in the accessory box.
   b. Route the other end of the exhaust hose to a proper external air ventilation system or hood. Ensure that the ventilation system is operating whenever the system is in use.

   Note: Do not vent the system through a trap.
4. Remove the warning sticker covering the voltage selector switch on the right side of the system (see E in Figure 11) and ensure that the system voltage is configured correctly for your electrical supply.
5. Three power cords are supplied with the system to accommodate regional differences. Plug the appropriate power cord into the power inlet on the right side of the system (see D in Figure 11) and then plug the other end into a grounded (earthed) power outlet.
6. Connect an inert gas supply to the **N_2** port on the right side of the system (see F in Figure 11) using the 6 mm OD tubing supplied with the system. The system is supplied with two connectors for conversion to 1/4" or 3/8" OD that can be used. Use a regulator (not supplied) to adjust the line pressure. For full flow capability, set the pressure to between 6 and 9 bar (0.6 and 0.9 MPa; 87 and 130 PSI). The minimum pressure of 4 bar (0.4 MPa, 58 PSI) provides equivalent performance to the TurboVap Classic system.

   Note: Devices added to the inlet supply line (such as moisture traps or filters) must not drop the pressure below 4 bar (TurboVap Classic capability) or 6 bar (full flow capability) for correct operation.

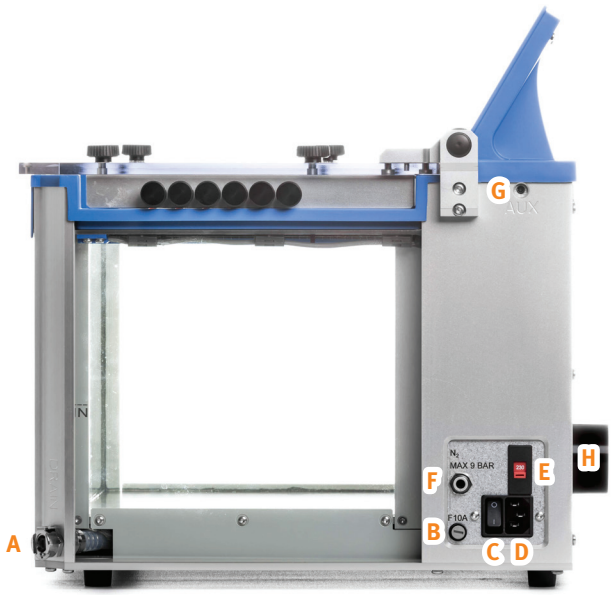

Figure 11. The right side of the system. A = DRAIN port, B= fuse holder, C = mains switch, D = power inlet, E = voltage selector switch, F = N_2 port, G = AUX port, and H = exhaust outlet.

Fill the Water Bath

1. Open the lid of the TurboVap P+ system and pour **deionized** water into the water bath until the level reaches the MIN level marked on the water bath; see Figure 12. This should be about 4.5 liters.
2. Fill a TurboVap P+ rack with empty sample tubes in all positions except one.
3. Using the handles built into the rack, gently lower the rack with empty tubes into the water bath.
4. Place a funnel (not supplied) in the empty rack position and carefully add more deionized water up to the initial liquid level of your samples, but not higher than just below the blue water bath top cover. Remove the funnel.

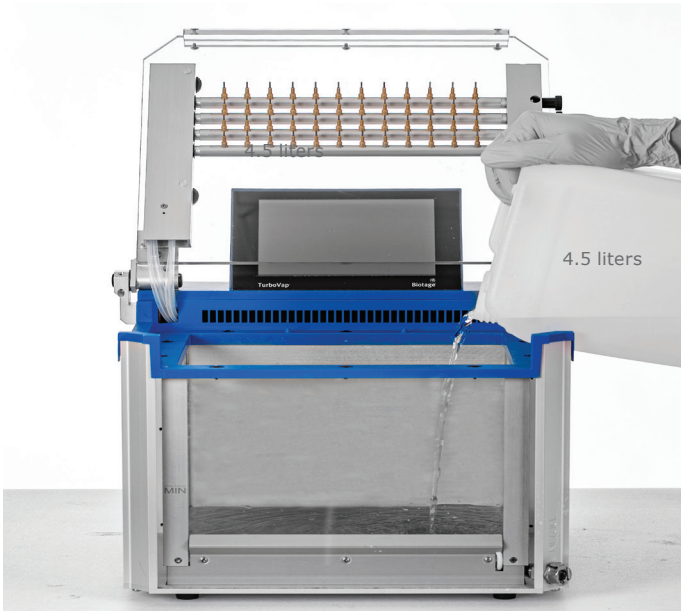

Figure 12. The water's surface must be above the minimum level marked on the water bath but not higher than just below the blue water bath top cover.

Adjust the TurboVap® P+ Manifold

1. If using the TurboVap P+ system for a rack only partly filled with samples, plug the nozzles of any row that is not in use using nozzle plugs (see Figure 13A).
2. Adjust the nozzles for the selected rack. To avoid broken tubes, we recommend the following procedure:
   a. Ensure that all nozzles are as far to the left as possible.
   b. Close the lid and adjust one nozzle row so that the nozzles are as far to the right as possible without touching the sides of the tubes.
   c. Open the lid and adjust the other nozzle rows into the same position using the engraved adjustment lines on the manifold; see Figure 13B.

   Note: It is important that the nozzles are adjusted correctly to generate a vortex shearing action, which contributes to faster evaporation, and to prevent broken tubes and samples potentially leaking into the water bath.

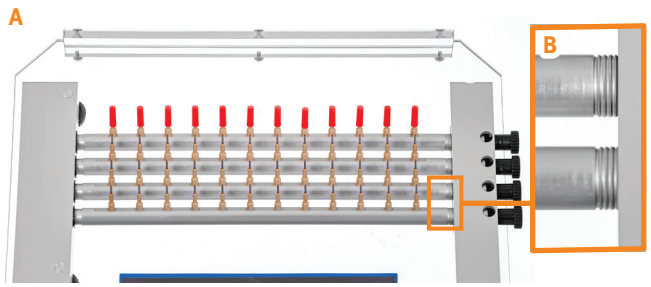

Figure 13. A: If using the TurboVap P+ system with samples in only some rack rows, plug the nozzles of any row that is not in use using nozzle plugs. B: Engraved adjustment lines.

Turn on the System

1. Ensure that the power cord and any cables, hoses, and tubing connected to the system cannot come in contact with chemicals. Corrosives and solvents can degrade the cord/cable insulation and dissolve the hoses and tubing. There is a risk of electric shock, fire, and/or equipment damage.
2. Turn on the system. The mains switch is located on the right side of the system; see C in Figure 11. The first time the system is started, it will start in manual mode and heat the water bath to 20°C.
3. To set up and start an evaporation run, see the user manual.

Change the Manifold

The system can easily be modified between different system configurations by changing the manifold. There are four different manifolds available for the system:

- TurboVap LV manifold with 48 gas nozzles; see Figure 14. This manifold is used with the TurboVap LV multi racks. When using the rack with 24 positions, half of the nozzles must be plugged.
- TurboVap II manifold with 6 gas nozzles; see the left manifold in Figure 15. This manifold is used with the TurboVap II racks.
- TurboVap EH manifold with 2 x 24 gas nozzles; see the right manifold in Figure 15. This manifold is used with the TurboVap EH sample/collection rack holder.
- TurboVap P+ manifold with 48 gas nozzles; see Figure 16. This manifold is used with the TurboVap P+ racks.

Figure 14. TurboVap LV manifold with 48 nozzles (left). In the picture to the right, 24 nozzles are plugged for usage with the multi rack with 24 positions.

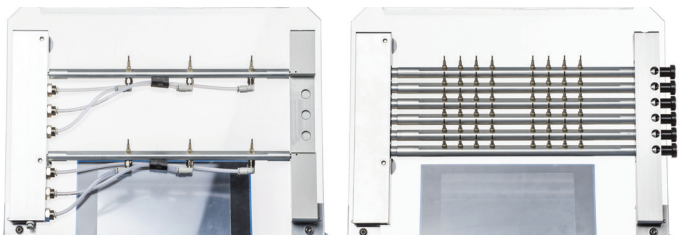

Figure 15. TurboVap II manifold with 6 nozzles (left) and TurboVap EH manifold with 2 x 24 nozzles (right).

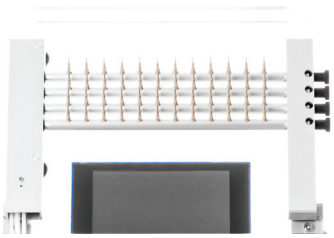

Figure 16. TurboVap P+ manifold with 48 nozzles.

Install a Different Manifold

Warning

- The nozzles have sharp edges and may have come into contact with harmful sample residues. Avoid contact.

1. With the lid closed, remove the four screws on the top of the lid (see Figure 17A).
2. Open the lid and remove the cover for the gas connections on the manifold.

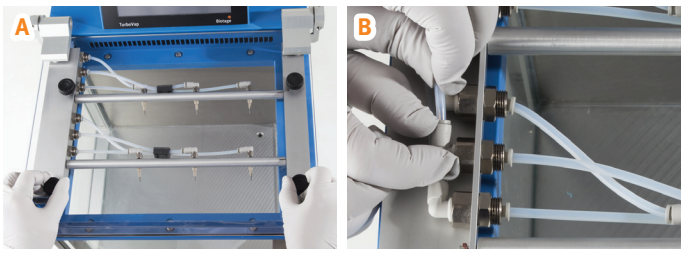

Figure 17. A: The four screws on the top of the lid holds the manifold in position. B: The gas connections on the manifold.

3. Disconnect the gas tubes from the manifold. A tube is released by pushing the tube in, pushing the release collar into the fitting, and then pulling out the tube. See Figure 17B.
4. Clean the manifold using a non-alkaline detergent and let it dry. Store the manifold in a clean and dust free environment.
5. Connect the gas tubes to the desired manifold. The gas tubes and nozzle rows or nozzles are numbered from 1 to 6.

   Note: The TurboVap P+ manifold only uses four gas tubes. Fasten the unused tubes (1-2) using the manifold's tube clip.
6. Place the cover over the gas connections.
7. Close the lid.
8. Fasten the manifold to the lid using the four screws.
9. To get the correct gas flow for the installed manifold, select the correct manifold setup in the software's settings view.

Connections

Power Supply

Warning

- Do not connect the system to an electrical supply that is not in accordance with the system's electrical specifications; see the rating plate located at the rear of the system.
- To avoid the risk of fire or electrical shock, the system must be electrically grounded (earthed). Use only a power cord supplied by Biotage. The plug should only be connected to a grounded outlet as per local and national regulations. Keep the mains plug easily accessible in case the system needs to be disconnected quickly from mains power.
- Ensure that the voltage selector switch on the right side of the system is set to the correct voltage.
- Use only exact replacement fuses supplied by Biotage. Incorrect fuses create a potential fire hazard and personal injury.

The voltage selector switch, power inlet, mains switch, and fuse are located on the right side of the system; see B–E in Figure 18.

Gas Supply

Connect an inert gas supply to the **N_2** port on the right side of the system (see F in Figure 18) using the 6 mm OD tubing and, if necessary, the two connectors for conversion to 1/4" or 3/8" OD that are supplied with the system. For full flow capability, set the pressure to between 6 and 9 bar (0.6 and 0.9 MPa; 87 and 130 PSI). The minimum pressure of 4 bar (0.4 MPa, 58 PSI) provides equivalent performance to the TurboVap Classic system.

Note: Devices added to the inlet supply line (such as moisture traps or filters) must not drop the pressure below 4 bar (TurboVap Classic capability) or 6 bar (full flow capability) for correct operation.

Exhaust Outlet

Warning

- Use only an exhaust hose supplied by Biotage. To avoid excessive pressure drop, it is important to use an exhaust hose with the appropriate length and internal diameter.

Solvent vapors are removed by an exhaust fan and routed to the exhaust outlet at the rear of the system; see H in Figure 18. If the system is not placed in a fume hood, connect it to a ventilation system using the 3.8 meters (12.5 feet) exhaust hose supplied with the system. Do not vent the system through a trap.

Note: If the system is placed in a fume hood, leave a minimum distance of 30 mm (1.2") between the exhaust outlet and any solid objects. The system requires this clearance for proper evacuation of solvent vapors.

End-Point Sensors

If using a rack with end-point sensors, the sensor connection box must be connected to the **AUX** port on the right side of the system (see G in Figure 18).

Water Bath Drain Connector

The drain port for the water bath is located on the front right corner. Ensure that the drain tube (supplied with the system) is inserted into a waste container of a suitable size before connecting it to the **DRAIN** port; see A in Figure 18.

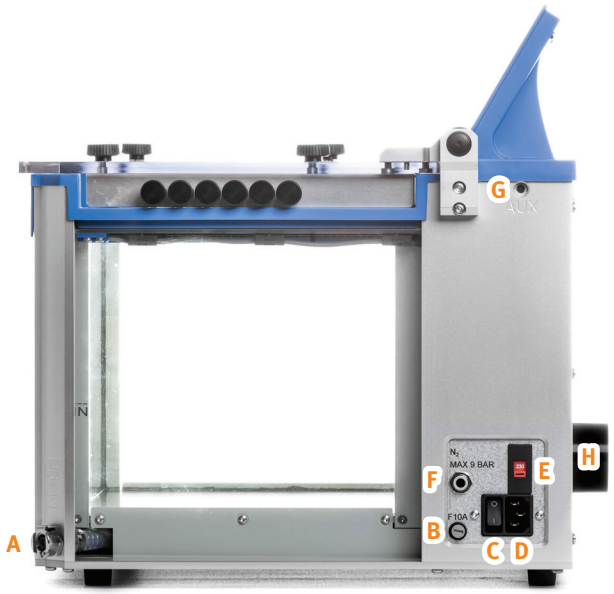

Figure 18. The right side of the system. A = DRAIN port, B= fuse holder, C = mains switch, D = power inlet, E = voltage selector switch, F = N_2 port, G = AUX port, and H = exhaust outlet.

Technical Specifications

Evaporation

Water Bath Temperature Range
Ambient to 90°C, ± 2°C accuracy. The temperature can be set to up to 99°C. The actual bath temperature is limited to 90°C for safety reasons.

Temperature Increase
Heating time from 20°C to 55°C is approximately 40 minutes.

Gas Flow Range
The maximum gas flow depends on the gas supply pressure and flow, the number of available nozzles and how many that are open. The maximum possible gas flow for each nozzle:

- 48 positions: 3.5 liters/min
- 24 positions: 5.5 liters/min
- 6 positions: 7 liters/min

Solvent Compatibility

- Acetone
- Acetonitrile
- Chloroform
- Dichloromethane
- Diethyl ether
- Dimethylformamide
- Dimethylsulfoxide
- Ethanol
- Ethyl acetate
- Heptane
- Hexane
- Isooctane
- Isopropanol
- Methanol
- Methyl *tert*-butyl ether
- Pentane
- Tetrahydrofuran
- Toluene
- Water

Chemical Resistance
The standard system is resistant to the following acids and bases:

- Formic acid 5%
- Acetic acid 10%
- Phosphoric acid 5%
- Propionic acid 10%
- Ammonium hydroxide 10%
- Triethylamine 10%

The PTFE version of the system is also resistant to the following acids at 60°C:

- Hydrochloric acid 0.1 M
- Nitric acid 0.1 M
- Trifluoroacetic acid (TFA) 2%
- Trichloroacetic acid (TCA) 2%

Racks and Tube Sizes

- TurboVap LV multi racks:
  - 48 positions for 10–16 mm (OD), <45 mm (length) mini vials
  - 48 positions for 10–20 mm (OD), 75–165 mm (length) tubes
  - 24 positions for 21–32 mm (OD), 75–165 mm (length) tubes
- TurboVap II rack with or without end-point sensors: 6 positions for 50 and 200 mL evaporation tubes with 0.5 and 1 mL end-point.
- TurboVap EH sample/collection rack holder with 2 positions for the following Extrahera sample/collection racks:
  - 24 positions, 12 x 75 mm tubes
  - 24 positions, 16 x 75 mm tubes
  - 24 positions, 18 x 75 mm tubes
- TurboVap P+ racks:
  - 48 positions for 16 x 100 mm tubes
  - 48 positions for 12–13 mm (OD), 75 or 100 mm (length) tubes

Interfaces

Touch Screen
7"

Auxiliary
Connection for end-point detection.

System

Fume Hood/ Ventilation System
The system must be either connected to a ventilation system using the exhaust outlet at the rear of the system or placed in a well-ventilated fume hood or an equivalent enclosure to reduce the risk of exposure to harmful solvent vapors. The ventilation system or fume hood must be capable of exhausting 1 m^3/min (35.3 ft^3/min).

Operating Temperature
18°C to 32°C

Storage Temperature
-25°C to 60°C

Humidity
20% to 90% RH (non-condensing)

Electrical Supply
100–127 V or 220–240 V at 50/60 Hz

Fuses
10A Fast at the power inlet (1 required)

Max. Power Consumed
1000 VA

Weight
17 kg (37.5 lbs) when the water bath is empty and maximum 29 kg (63.9 lbs) when full with deionized water, rack, and tubes.

Dimensions (W X D X H)	400 x 400 x 390 mm (15.7" x 15.7" x 15.4") including the hinges at the sides and the exhaust outlet at the rear. The height with the lid open is 590 mm (23.2").
Max Sound Level	75 dB(A)
Gas Supply	The system should operate using inert gas. Compressed air can be used but is not recommended with some solvents due to the possible risk of explosion. Supply pressure: Minimum supply pressure: 4 bar (0.4 MPa, 58 PSI). Required supply pressure for full flow capability: 6 bar (0.6 MPa, 87 PSI). Maximum supply pressure: 9 bar (0.9 MPa, 130 PSI). Supply flow: Required supply flow for TurboVap Classic equivalent capability for each manifold: » 48 positions: 160 liters/min » 24 positions: 120 liters/min » 6 positions: 35 liters/min Required supply flow for full flow capability for each manifold: » 48 positions: 200 liters/min » 24 positions: 160 liters/min » 6 positions: 50 liters/min
External Fire Protection	External fire protection should be installed according to local regulations for equipment operating unattended.
Certifications	CE marked and CB and NRTL certified.

Safety

Intended Use

TurboVap® from Biotage is intended solely for concentrating samples for applications in organic and inorganic chemistry. The system has to be operated in a laboratory environment by trained professionals. All operations must be performed:

- According to the user documentation delivered with the system.
- According to instructions available at www.biotage.com.
- According to instructions provided through dialogs appearing on the screen.
- According to instructions given by the technical support staff from Biotage.
- Within limits set by the system's technical specification.

Failure to follow those instructions and operate within the limits set by the technical specification may result in personal injury and/or equipment damage.

Education, Training, and Competence

It is your responsibility to provide all applicable health and safety regulations to your personnel. You must also ensure that all personnel involved in the operation and maintenance of the system fulfill the following criteria:

- Have the necessary education, training, and competence required for the intended use of the system.
- Observe general and specific safety regulations for the use of the system and its accessories at all times in order to reduce the risk of personal injury, fire, and explosion.

Warranty and Liability

See the "Biotage Terms & Conditions of Sale" document at www.biotage.com.

Service

All service must be performed by an authorized Biotage service engineer. Before handing over the system for service, it should be emptied of all liquid and cleaned from harmful residues.

It is the responsibility of the customer to inform Biotage 1-Point Support representatives if the system has been used with hazardous biological, radioactive, or toxic samples and/or solvents, prior to any service being performed. When returning equipment to Biotage, this should be done in accordance with the material return procedures supplied separately by Biotage.

Only genuine Biotage spare parts must be used in the system.

Labels

Labels used on the system:

CE	In accordance with all the essential requirements of all applicable European product directives; see the Declaration of Conformity.
TÜV SÜD C US	In accordance with both U.S. and Canadian safety standards; see the Declaration of Conformity.
RoHS	In accordance with the Restriction of Hazardous Substances Directive; see "Restriction of Hazardous Substances Directive (RoHS) Policy" on page 16 and the Declaration of Conformity.
	Subject to the Waste Electrical and Electronic Equipment (WEEE) Directive; see "WEEE Compliance Statement" on page 16.
	Manufacturer.
	Consult accompanying user documentation.

Product Safety Warning

The system is not classified as "Explosion Proof." The power switch is an arcing source and could ignite explosive vapors. Do not change the position of the power switch (turn on or off the system) when explosive vapors are present. If it is necessary to turn off the system, disconnect the power cord from the power outlet.

Safety Requirements

You must observe all safety requirements when installing and operating the system. Failure to install or use the system in a manner specified by Biotage may result in personal injury and/or equipment damage.

If the system has been damaged or does not function properly, turn it off immediately and contact Biotage 1-Point Support (www.biotage.com).

Installation

- The system must be unpacked and installed as described in this document.
- Follow regional safety practices when handling and moving shipping boxes and containers, and when moving the system.
- The total weight of the package including the system is 20 kg (44 lbs). Use suitable lifting equipment when moving the package.
- The system consists partly of glass. Exercise caution when unpacking the system. If glass was broken during transportation, please contact Biotage 1-Point Support.
- The system must be either connected to a ventilation system using the exhaust outlet at the rear of the system or placed in a well-ventilated fume hood or an equivalent enclosure to reduce the risk of exposure to harmful solvent vapors. The ventilation system or fume hood must be capable of exhausting 1 m^3/min (35.3 ft^3/min).
- Use only an exhaust hose supplied by Biotage. To avoid excessive pressure drop, it is important to use an exhaust hose with the appropriate length and internal diameter.
- Do not connect the system to an electrical supply that is not in accordance with the system's electrical specifications; see the rating plate located at the rear of the system.
- To avoid the risk of fire or electrical shock, the system must be electrically grounded (earthed). Use only a power cord supplied by Biotage. The plug should only be connected to a grounded outlet as per local and national regulations. Keep the mains plug easily accessible in case the system needs to be disconnected quickly from mains power.
- Ensure that the voltage selector switch on the right side of the system is set to the correct voltage.
- To avoid injury to yourself or damage to the system, do not exceed the maximum inlet pressure of 9 bar (0.9 MPa, 130 PSI).
- Always connect inert gas such as nitrogen to the gas inlet.
- Ensure that the power cord and any cables, hoses, and tubing connected to the system cannot come in contact with chemicals. Corrosives and solvents can degrade the cord/cable insulation and dissolve the hoses and tubing. There is a risk of electric shock, fire, and/or equipment damage.
- Do not place any equipment or bottles on top of or above the system.
- External fire protection should be installed according to local regulations for equipment operating unattended.

Operation

- Use the system only for its intended purpose, as described in the user documentation delivered with the system and user documentation available at www.biotage.com. If the system is used in a manner not specified by Biotage, the safety features of the system may be impaired.
- The temperature of the water bath and the drain connector can be up to 90°C. Avoid contact.
- Always ensure that the drain tube is inserted into a waste container of a suitable size before connecting the drain tube to the system's drain port.
- Do not operate the system without water in the water bath.
- Never operate a damaged system.
- When using flammable solvents, read and follow your local static discharge codes of practice and available national recommended procedures for the avoidance of hazards due to static electricity.
- If not in contradiction with your local practices and procedures, wear antistatic protective clothing and footwear, or stand on an anti-static floor mat when using flammable solvents. If you cannot take the usual anti-static measures, touch a grounded metal object before opening the lid on the system to discharge any static electricity that may have accumulated on your body.
- The nozzles have sharp edges and may have come into contact with harmful sample residues. Avoid contact.
- If (glass) debris, sample, or solvent enters the water bath, immediately remove the rack, empty the water bath, and clean both the rack and the water bath as described in the user manual.
- Exhaust solvent vapors exiting the system may be hazardous and can contaminate the surrounding air. Maintain proper ventilation and consult the safety data sheets (SDS) for all of the solvents used.
- The system operates using electricity, which can introduce additional hazards with certain solvents if not properly connected, vented, or set up with recommended manufacturer approved settings.
- Follow all generally-accepted lab safety procedures and applicable laws and regulations.
- Always follow local and national safety regulations related to storage, handling and disposal of chemicals, samples and waste.
- Read and understand the safety data sheet (SDS) provided by the chemical manufacturer before storing, handling, working with, or disposing of any chemical or hazardous substance.

- Personnel working with or near the system must wear protective clothing, safety gear, and eye protection that comply with local and national safety regulations.

Maintenance and Troubleshooting

- Follow all maintenance instructions in the “Maintenance” chapter of the user manual (P/N 415390).
- Always turn off the system, unplug the power cord, and let the water bath cool down before performing maintenance.
- Always empty the water bath as described in the user manual before moving the system.
- There are no user serviceable parts inside the system. Covers and safety shields may only be removed by an authorized Biotage service engineer. Potential electrical hazard exists due to high voltage circuits inside the system.
- The power cord should be inspected periodically and replaced if damaged or altered. Use only a power cord supplied by Biotage.
- Use only exact replacement fuses supplied by Biotage. Incorrect fuses create a potential fire hazard and risk of personal injury.
- If the exhaust fan at the back of the system stops working, take the necessary precautions to avoid exposure to potentially harmful solvent vapors, remove any samples, and then turn off the system by disconnecting the power cord from the power outlet and contact Biotage 1-Point Support.

Restriction of Hazardous Substances Directive (RoHS) Policy

The RoHS directive is a European Union-derived initiative in which the elimination of certain hazardous substances is the key objective. The elimination of these substances will contribute to the protection of human health and the environmentally sound recovery and disposal of equipment.

WEEE Compliance Statement

Valid for customers in EU countries

We are committed to being a good corporate citizen. As part of that commitment, we strive to maintain an environmentally conscious manufacturing operation. The European Union (EU) has enacted a directive on product recycling (Waste Electrical and Electronic Equipment, WEEE).

Products falling under the scope of the WEEE Directive are identified with a crossed over “wheelie bin” symbol on the product label, as indicated to the left. To forward a product for recycling or proper disposal, use an authorized collection system or return it to Biotage Sweden AB. Before forwarding a product for recycling or disposal, it should be emptied of all liquid and cleaned from harmful residues. When returning a product to Biotage, this should be done in accordance with the material return procedures supplied separately by Biotage.

Safety in Other Languages

A document with translations of the safety chapter is supplied with the system and can also be downloaded at www.biotage.com. If you have problems downloading the safety translations (P/N 415391), please contact your local Biotage representative. See contact information on the back of this document or visit our website www.biotage.com.

General Information

Software License Agreement

Biotage Sweden AB licenses the TurboVap® software to you only upon the acceptance of all of the terms and conditions in the software license agreement supplied with the system. By using the software, you consent to be bound by and are becoming a party to that agreement.

TurboVap® User Documentation

The following user documentation is supplied with the system and/or can be downloaded at www.biotage.com:

- TurboVap® Installation and Safety, P/N 415389 (this document)
- TurboVap® User Manual, P/N 415390
- TurboVap® Safety Translations, P/N 415391
- Quick Start Guide to TurboVap® LV, P/N 415877
- Quick Start Guide to TurboVap® II, P/N 415878
- Quick Start Guide to TurboVap® EH, P/N 415879
- Quick Start Guide to TurboVap® P+, P/N 417371
- TurboVap® LV Multi Rack for 75 to 165 mm Tubes, P/N 415880
- TurboVap® LV Multi Rack for Mini Vials, P/N 415881

If you have problems downloading the user documentation, please contact your local Biotage representative. See contact information on the back of this document or visit our website www.biotage.com.

Accessories and Spare Parts

Only genuine Biotage accessories must be used in the system. To order consumables and accessories, see contact information on the back of this document or visit our website www.biotage.com.

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Biotage Sweden AB

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