
Instrument Front-End Cleaning Procedure

For Customers



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Follow this procedure to clean the front end for these mass spectrometers:

- Skimmer-equipped systems (3200 and 4000 series systems)
- QJet[®]/IonDrive[™] QJet ion guide-equipped systems (3500, 4500, 4600, 5000, 5500, 5500+, 5600, 5600+, 6500, 6500+, 6600, 6600+, and X500 QTOF Systems)

Note: For safety information, refer to the *System User Guide* or the *Safety Practices Guide*.

Clean the Vacuum Interface

Inspect the front-end components, including the curtain plate, the orifice plate, the QJet[®]/IonDrive[™] QJet Ion Guide, which includes the IQ0 lens, or skimmer, and the Q0 rod set, for contamination, and then clean them.

This section provides instructions for performing both routine cleaning and full cleaning. Routine cleaning is performed without breaking the vacuum of the mass spectrometer. Full cleaning is performed under atmospheric pressure, after the mass spectrometer is vented.

Symptoms of Contamination

The system might be contaminated if any one of the following is observed:

- Significant loss in sensitivity
- Increased background noise
- Additional peaks that are not part of the sample are shown in full scan or survey scan methods

If any of these issues are observed, then clean the mass spectrometer front-end.

Chemical Precautions



WARNING! Ionizing Radiation Hazard, Biohazard, or Toxic Chemical Hazard. Determine whether decontamination is required before cleaning or maintenance. The customer must decontaminate the system before cleaning or maintenance if radioactive materials, biological agents, or toxic chemicals have been used with the system.



WARNING! Puncture Hazard, Ionizing Radiation Hazard, Biohazard, or Toxic Chemical Hazard. Discontinue use of the ion source if the ion source window is cracked or broken and then contact a SCIEX Field Service Employee (FSE). Any toxic or injurious materials introduced in the equipment will be present in the source exhaust output. Exhaust from equipment should be vented from the room. Dispose of sharps following established laboratory safety procedures.



WARNING! Environmental Hazard. Do not dispose of system components in municipal waste. Follow local regulations when disposing of components.



WARNING! Biohazard or Toxic Chemical Hazard. Connect the drain tubing to the mass spectrometer and the source exhaust drain bottle properly, to prevent leaks.

- Determine which chemicals have been used in the system prior to service and regular maintenance. Refer to the *Safety Data Sheet* for the health and safety precautions that must be followed for a chemical. Refer to the *Certificate of Analysis* for storage information. To find a SCIEX *Safety Data Sheet* or *Certificate of Analysis*, go to sciex.com/tech-regulatory.
- Always wear assigned personal protective equipment, including powder-free gloves, safety glasses, and a laboratory coat.

Note: Nitrile or neoprene gloves are recommended.

- Work in a well-ventilated area or fume hood.
- Avoid ignition sources when working with flammable materials, such as isopropanol, methanol, and other flammable solvents.
- Take care in the use and disposal of any chemicals. Potential risk of personal injury if proper procedures for handling and disposing of chemicals are not followed.

Introduction

- Avoid skin contact with chemicals during cleaning and wash hands after use.
- Make sure that all exhaust hoses are connected properly and that all connections are functioning as designed.
- Collect all spent liquids and dispose of them as hazardous waste.
- Comply with all of the local regulations for the storage, handling, and disposal of biohazardous, toxic, or radioactive materials.
- (Recommended) Use secondary containment trays beneath the roughing pump, the solvent bottles, and the waste container to capture potential chemical spills.

Cleaning Best Practices



WARNING! Hot Surface Hazard. Let the ion source cool before starting any maintenance procedures. Some surfaces of the ion source and vacuum interface become hot during operation. For cooling times for different ion sources, refer to the following table.

Table 1-1 Cooling Times

Ion Source	Cooling Time (minutes)
DuoSpray™ Ion Source	30
IonDrive™ Turbo V Ion Source	90
NanoSpray® Ion Source	60
Turbo V™ Ion Source	30
OptiFlow® Turbo V Ion Source	60



WARNING! Toxic Chemical Hazard. Refer to the chemical product *Safety Data Sheets* and follow all of the recommended safety procedures when handling, storing, and disposing of chemicals.



WARNING! Ionizing Radiation Hazard, Biohazard, or Toxic Chemical Hazard. Determine whether decontamination is required before cleaning or maintenance. The customer must decontaminate the system before cleaning or maintenance if radioactive materials, biological agents, or toxic chemicals have been used with the system.



WARNING! Environmental Hazard. Do not dispose of system components in municipal waste. Follow local regulations when disposing of components.

- Allow the ion source to cool before removing it.
- Always wear clean, powder-free gloves, nitrile or neoprene recommended, for the cleaning procedures.
- After cleaning the mass spectrometer components, and before reassembling them, put on a new, clean pair of gloves.
- Do not use cleaning supplies other than those specified in this procedure.
- If possible, prepare cleaning solutions just before cleaning.
- Prepare and store all of the organic solutions and organic-containing solutions in very clean glassware only. Never use plastic bottles. Contaminants can leach from these bottles and further contaminate the mass spectrometer.
- To avoid contaminating the cleaning solution, pour the solution on the wipe or swab.
- Allow only the center area of the wipe to contact the mass spectrometer surface. Cut edges can leave fibers behind.
- To avoid cross-contamination, discard the wipe or swab after it has touched the surface once.
- Larger parts of the vacuum interface, such as the curtain plate, might require several cleanings, using multiple wipes.
- Only dampen the wipe or swab slightly when applying water or cleaning solution. Water, more often than organic solvents, might cause the wipe to deteriorate, leaving residue on the mass spectrometer.
- Do not rub the wipe across the aperture. Wipe around the aperture to prevent fibers from the wipes from entering the mass spectrometer.
- Do not insert the brush in the aperture on the curtain plate, orifice plate, skimmer, or IQ0 lens.

Required Materials

Note: U.S. customers can call 877-740-2129 for ordering information and inquiries. International customers can visit sciex.com/contact-us.

- Powder-free gloves, nitrile or neoprene recommended
- Safety glasses

Introduction

- Laboratory coat
- Fresh, high-quality (pure) water (at least 18 M Ω de-ionized [DI] water or LC-MS-grade water). Old water can contain contaminants that can further contaminate the mass spectrometer.
- LC-MS-grade methanol, isopropanol (2-propanol), or acetonitrile
- Cleaning solution. Use one of:
 - 100% methanol
 - 100% isopropanol
 - 1:1 acetonitrile:water solution, freshly prepared
 - 1:1 acetonitrile:water with 0.1% acetic acid solution, freshly prepared
- Clean 1 L or 500 mL glass beaker to prepare cleaning solutions
- 1 L beaker to catch used solvent
- Organic waste container
- Lint-free wipes. Refer to [Tools and Supplies Available from the Manufacturer](#).
- (Optional) Polyester (poly) swabs

Full Cleaning

- For advanced cleaning of the QJet[®]/IonDrive[™] QJet Ion Guide:
 - (3500, 4500, 5500, 5500+, 6500, 6500+, and 5000 series systems) C-clip removal tool and 1.5 mm hex key
 - (TripleTOF[®] and X500 QTOF Systems) Phillips screwdriver
 - Alconox. Refer to [Tools and Supplies Available from the Manufacturer](#).
 - A separate supply of clean, dry air (CDA) or nitrogen
- (Optional, for advanced cleaning of the orifice plate) 5 mL disposable syringe, with no needle (such as BD Luer-Lok 309646)

Q0 Cleaning

- Q0 cleaning tool. Refer to [Tools and Supplies Available from the Manufacturer](#).
- A separate supply of clean dry air (CDA) or nitrogen

Tools and Supplies Available from the Manufacturer

Description	Part Number
Small poly swab, thermally bonded. Also available in the Cleaning kit.	1017396
Lint-free wipe (11 cm x 21 cm, 4.3 inches x 8.3 inches). Also available in the Cleaning kit.	018027
(3200, 3500, 4000, 4500, 5000, and 5500 series systems) Cleaning kit. Contains the small poly swab, lint-free wipes, Q0 cleaning tool, straight QJet [®] Ion Guide cleaning brush, and Alconox.	5020761
(TripleTOF [®] Systems) Cleaning kit. Contains the small poly swab, lint-free wipes, Q0 cleaning tool, tapered QJet [®] Ion Guide cleaning brush, and Alconox.	5020763
(5500+, 6500, and 6500+ systems) Cleaning kit. Contains the small poly swab, lint-free wipes, Q0 cleaning tool, tapered IonDrive [™] QJet Ion Guide cleaning brush, Q0 cleaning brush, and Alconox.	5021294

Routine Cleaning

2

The following warnings apply to all procedures in this section.



WARNING! Toxic Chemical Hazard. Refer to the chemical product *Safety Data Sheets* and follow all of the recommended safety procedures when handling, storing, and disposing of chemicals.



WARNING! Ionizing Radiation Hazard, Biohazard, or Toxic Chemical Hazard. Determine whether decontamination is required before cleaning or maintenance. The customer must decontaminate the system before cleaning or maintenance if radioactive materials, biological agents, or toxic chemicals have been used with the system.



WARNING! Hot Surface Hazard. Let the ion source cool before starting any maintenance procedures. Some surfaces of the ion source and vacuum interface become hot during operation. For cooling times for different ion sources, refer to the following table.

Table 2-1 Cooling Times

Ion Source	Cooling Time (minutes)
DuoSpray™ Ion Source	30
IonDrive™ Turbo V Ion Source	90
NanoSpray® Ion Source	60
Turbo V™ Ion Source	30
OptiFlow® Turbo V Ion Source	60



WARNING! Environmental Hazard. Do not dispose of system components in municipal waste. Follow local regulations when disposing of components.

For routine cleaning, clean the curtain plate and the front of the orifice plate. Routine cleaning can be performed while the mass spectrometer remains under vacuum.

Prepare the Mass Spectrometer



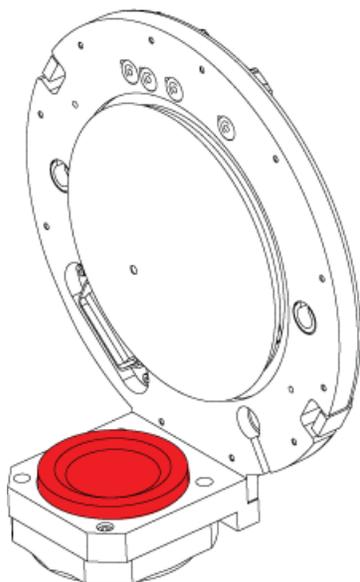
WARNING! Hot Surface Hazard. Let the ion source cool before starting any maintenance procedures. Some surfaces of the ion source and vacuum interface become hot during operation. For cooling times for different ion sources, refer to the following table.

Table 2-2 Cooling Times

Ion Source	Cooling Time (minutes)
DuoSpray™ Ion Source	30
IonDrive™ Turbo V Ion Source	90
NanoSpray® Ion Source	60
Turbo V™ Ion Source	30
OptiFlow® Turbo V Ion Source	60

CAUTION: Potential System Damage. Do not drop anything in the source drain when the ion source is removed.

Figure 2-1 Source Drain on the Vacuum Interface



Routine Cleaning

Note: Mass spectrometers with a NanoSpray[®] ion source might require a full cleaning for best results.

1. Deactivate the device or hardware profile. For 4000 and 5000 series systems, refer to the *Hardware Guide*. For other systems, refer to the *System User Guide*.
2. Remove the ion source. For 3200 systems, refer to the *System User Guide*. For other systems, refer to the *Operator Guide* for the ion source.

When the ion source is not in use, store it to protect it from damage and to maintain operating integrity.

Clean the Curtain Plate

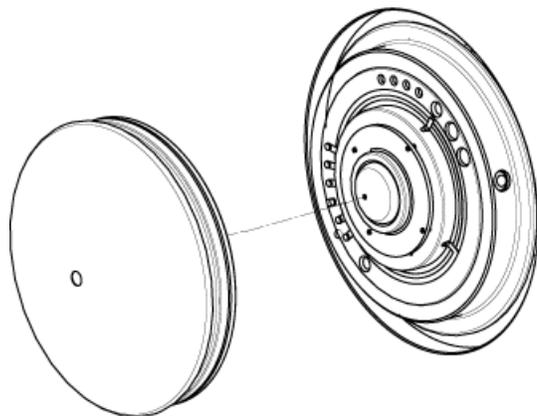
CAUTION: Potential System Damage. Do not rest the curtain plate or orifice plate on the aperture tip. Make sure that the conical side of the curtain plate faces up.

CAUTION: Potential System Damage. Do not insert a wire or metal brush in the aperture on the curtain plate, orifice plate, or interface heater to avoid damaging the aperture.

1. Pull the curtain plate off of the vacuum interface and then put it, conical side up, on a clean, stable surface.

Note: If the nano cell heater assembly is installed, then follow the instructions in the *Operator Guide* for the ion source to remove and clean it.

Figure 2-2 Curtain Plate Removal



The curtain plate is held in place by three retaining ball catches mounted on the orifice plate.

Tip! If the curtain plate does not immediately separate from the orifice plate, then turn the curtain plate slightly, less than 90 degrees, to release the ball spring latches.

2. Dampen a lint-free wipe with LC-MS-grade water and then clean both sides of the curtain plate.

Note: Use multiple wipes, as required.

3. Repeat step 2 using the cleaning solution.
4. Using a dampened wipe or small poly swab, clean the aperture.
5. Wait until the curtain plate is dry.
6. Inspect the curtain plate for solvent stains or lint, removing any residue with a clean, slightly damp, lint-free wipe.

Note: Persistent spotting or filming is an indicator of contaminated solvent.

Clean the Front of the Orifice Plate

CAUTION: Potential System Damage. When cleaning the surface of the orifice plate, do not remove the interface heater. Frequent removal of the interface heater can result in damage to the interface heater. Surface cleaning of the interface heater is adequate for routine cleaning.

1. Wait until the orifice plate is dry.
2. Inspect the orifice plate for solvent stains or lint, removing any residue with a clean, slightly damp, lint-free wipe.

Note: Persistent spotting or filming is an indicator of contaminated solvent.

Put the Mass Spectrometer Back in Service

1. Install the curtain plate on the mass spectrometer.
2. Install the ion source on the mass spectrometer. For 3200 systems, refer to the *System User Guide*. For other systems, refer to the *Operator Guide* for the ion source.

Routine Cleaning

Tighten the ion source by turning the source latches down in the locking position.

3. Activate the devices or the hardware profile. For 4000 and 5000 series systems, refer to the *Hardware User Guide*. For other systems, refer to the *System User Guide*.

Full Cleaning (Excluding the Q0 Region)

3

The following warnings apply to all procedures in this section.



WARNING! Toxic Chemical Hazard. Refer to the chemical product *Safety Data Sheets* and follow all of the recommended safety procedures when handling, storing, and disposing of chemicals.



WARNING! Ionizing Radiation Hazard, Biohazard, or Toxic Chemical Hazard. Determine whether decontamination is required before cleaning or maintenance. The customer must decontaminate the system before cleaning or maintenance if radioactive materials, biological agents, or toxic chemicals have been used with the system.



WARNING! Hot Surface Hazard. Let the ion source cool before starting any maintenance procedures. Some surfaces of the ion source and vacuum interface become hot during operation. For cooling times for different ion sources, refer to the following table.

Table 3-1 Cooling Times

Ion Source	Cooling Time (minutes)
DuoSpray™ Ion Source	30
IonDrive™ Turbo V Ion Source	90
NanoSpray® Ion Source	60
Turbo V™ Ion Source	30
OptiFlow® Turbo V Ion Source	60



WARNING! Environmental Hazard. Do not dispose of system components in municipal waste. Follow local regulations when disposing of components.

Full Cleaning (Excluding the Q0 Region)

If sensitivity loss or charging (a significant loss of sensitivity of the ions of interest over a short period of time) occur, then the curtain plate, orifice plate, and QJet[®]/IonDrive[™] QJet Ion Guide or skimmer must be cleaned.

Before cleaning these components, determine whether the contamination has extended to the Q0 region. Refer to [Verify Q0 Region Operation](#). If it does, then the Q0 region must also be cleaned.

Note: Do not clean the Q0 region unless there is evidence of contamination in this region.

For full cleaning, clean the curtain plate, orifice plate, and QJet[®]/IonDrive[™] QJet Ion Guide or skimmer while the mass spectrometer is at atmospheric pressure (vented). Complete these tasks in the following order:

1. [Prepare the Mass Spectrometer](#).
2. [Clean the Curtain Plate and Orifice Plate](#).
3. (QJet[®]/IonDrive[™] QJet Ion Guide-equipped systems) [Clean the QJet[®]/IonDrive[™] QJet Ion Guide](#).
4. (Skimmer-equipped systems) [Clean the Skimmer](#).
5. [Put the Mass Spectrometer Back in Service](#).

Verify Q0 Region Operation

- Switch polarity, scan for several minutes, and then return to the original polarity. For example, when running a positive mode experiment, switch to negative mode.

Table 3-2 Effects of Polarity Change on Sensitivity

Result	Recommended Action
Sensitivity improves temporarily, and then begins to decline gradually. Q0 region contamination is suspected.	Clean the curtain plate, orifice plate, and QJet®/IonDrive™ QJet Ion Guide or skimmer, and then clean the Q0 region. Refer to Q0 Cleaning (Optional) .
Sensitivity is the same after the polarity change. Q0 region contamination is not suspected.	Clean the curtain plate, orifice plate, and QJet®/IonDrive™ QJet Ion Guide or skimmer only.

Prepare the Mass Spectrometer



WARNING! Hot Surface Hazard. Let the ion source cool before starting any maintenance procedures. Some surfaces of the ion source and vacuum interface become hot during operation. For cooling times for different ion sources, refer to the following table.

Table 3-3 Cooling Times

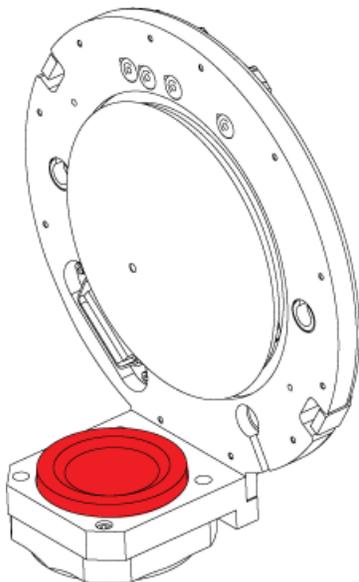
Ion Source	Cooling Time (minutes)
DuoSpray™ Ion Source	30
IonDrive™ Turbo V Ion Source	90
NanoSpray® Ion Source	60
Turbo V™ Ion Source	30
OptiFlow® Turbo V Ion Source	60

CAUTION: Potential System Contamination. Do not force venting. Doing so can cause contaminants to enter the mass spectrometer.

Full Cleaning (Excluding the Q0 Region)

CAUTION: Potential System Damage. Do not drop anything in the source drain when the ion source is removed.

Figure 3-1 Source Drain on the Vacuum Interface



1. Shut down the system by following the procedure in the *System User Guide* or *Hardware Guide*. Wait at least 25 minutes for the mass spectrometer to vent naturally, and then disconnect the mains supply cables of the mass spectrometer and roughing pump from the mains supply outlet.
2. Remove the ion source. For 3200 systems, refer to the *System User Guide*. For other systems, refer to the *Operator Guide* for the ion source.

When the ion source is not in use, store it to protect it from damage and to maintain operating integrity.

Clean the Curtain Plate and Orifice Plate

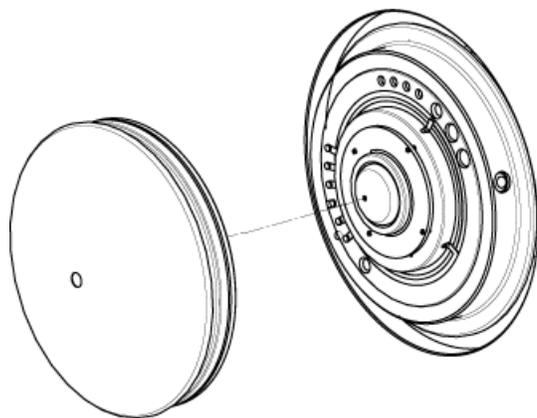
CAUTION: Potential System Damage. Do not insert a wire or metal brush in the aperture on the curtain plate, orifice plate, or interface heater to avoid damaging the aperture.

Note: Be careful to not lose the sealing O-ring. If the O-ring is stuck on the ceramic part of the orifice plate, then carefully remove it and put it in the groove on the interface.

1. Pull the curtain plate off of the vacuum interface and then put it, conical side up, on a clean, stable surface.

Note: If the nano cell heater assembly is installed, then follow the instructions in the *Operator Guide* for the ion source to remove and clean it.

Figure 3-2 Curtain Plate Removal



The curtain plate is held in place by three retaining ball catches mounted on the orifice plate.

Tip! If the curtain plate does not immediately separate from the orifice plate, then turn the curtain plate slightly, less than 90 degrees, to release the ball spring latches.

2. While holding the orifice plate with one hand, use the other hand to release the spring latches at the 4 o'clock and 10 o'clock positions, and then remove the orifice plate and put it, conical side up, on a clean, stable surface.

Figure 3-3 Orifice Plate Removal

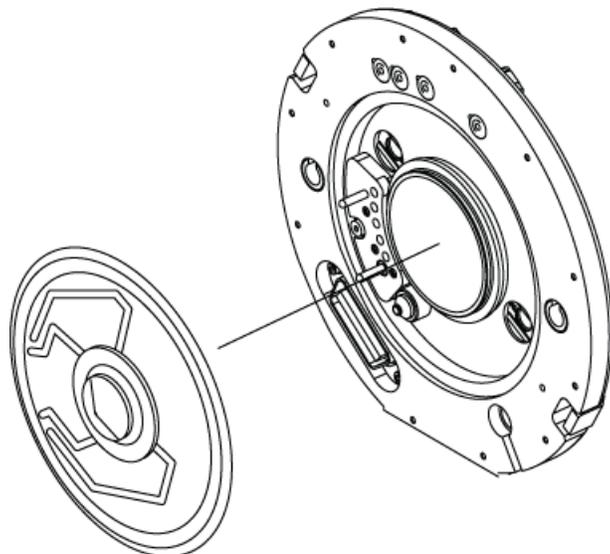
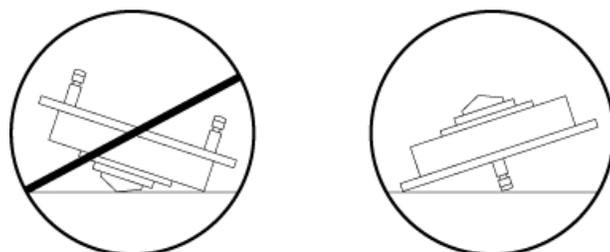


Figure 3-4 Orifice Plate Resting Position



CAUTION: Potential System Damage. Be sure to support the orifice plate firmly during this process, to prevent it from falling and being damaged.

3. Clean the curtain plate. Refer to [Clean the Curtain Plate](#).
4. Using lint-free wipes and water, clean the inner metal portion on each side of the orifice plate.
5. Repeat step 4 using the cleaning solution.
6. Wait until the orifice plate is dry.
7. Inspect the orifice plate for solvent stains or lint, removing any residue with a clean, slightly damp, lint-free wipe.

Note: Persistent spotting or filming is an indicator of contaminated solvent.

8. If the interface heater was removed, then install it on the orifice plate.
9. For the orifice plate for the NanoSpray[®] Ion Source, if the interface heater was removed, make sure that the PTFE washer is in place, and then install the heater on the standoffs with the 2 mm hex screws. Tighten the screws until snug. Do not over-tighten.

Clean the QJet[®]/IonDrive[™] QJet Ion Guide

This procedure is applicable for 3500, 4500, 4600, API 5000[™], 5500, 5500+, 5600, 5600+, 6500, 6500+, 6600, and 6600+ (QJet[®]/IonDrive[™] QJet Ion Guide) Systems.

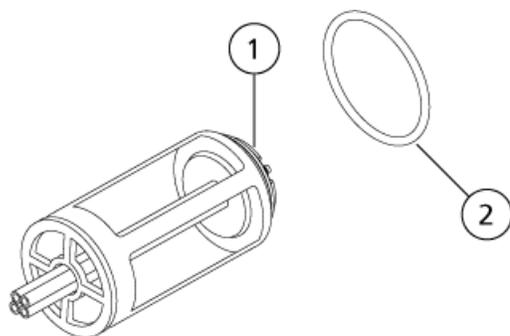
Perform a basic cleaning regularly. If it does not resolve contamination problems, and a more rigorous cleaning is required, then perform the advanced cleaning.

Perform a Basic Cleaning of the QJet[®]/IonDrive[™] QJet Ion Guide

Perform this procedure regularly to clean the QJet[®]/IonDrive[™] QJet Ion Guide. If this procedure does not resolve contamination issues, then refer to [Perform an Advanced Cleaning of the QJet[®]/IonDrive[™] QJet Ion Guide](#).

1. Remove the QJet[®]/IonDrive[™] QJet Ion Guide and then put it on a clean, stable surface.
2. (3500, 4500, 5500, 5500+, 6500, 6500+, and API 5000[™] Systems) Remove the O-ring from the back of the ion guide.

Figure 3-5 QJet[®]/IonDrive[™] QJet Ion Guide and O-Ring

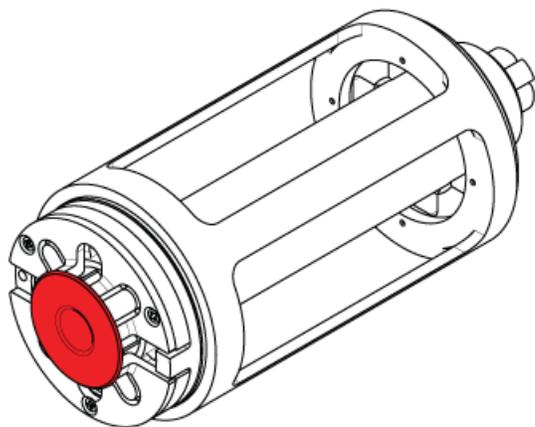


Item	Description
1	IQ0 lens
2	O-ring

Full Cleaning (Excluding the Q0 Region)

- (TripleTOF[®] and X500 QTOF Systems) Optionally, remove the three Phillips screws holding the IQ0 lens to the ion guide and then pour water over both sides of the lens. Repeat with methanol.

Figure 3-6 IQ0 Lens



- (X500 QTOF Systems) Optionally, remove the Phillips screw that secures the isolation shield on the ion guide and then remove the shield. Pour water over both sides of the shield. Repeat with methanol.
- Hold the ion guide over a 500 mL beaker (or equivalent), with the IQ0 lens side down, and then pour LC-MS-grade water over and through it.
- Invert the ion guide, and then repeat step 5.
- Repeat step 5 and step 6 with methanol.
- Wait until the ion guide is dry.
- Inspect the ion guide for solvent stains or lint, removing any residue with a clean, slightly damp, lint-free wipe.

Note: Persistent spotting or filming is an indicator of contaminated solvent.

- (TripleTOF[®] and X500 QTOF Systems) If the IQ0 lens was removed, then install it on the ion guide.
- (X500 QTOF Systems) If the isolation shield was removed, then install it on the ion guide.
- (3500, 4500, 5500, 5500+, 6500, 6500+, and API 5000[™] Systems) Clean the O-ring by pulling it gently through a lint-free wipe that has been slightly dampened with methanol or isopropanol.
- (3500, 4500, 5500, 5500+, 6500, 6500+, and API 5000[™] Systems) Install the O-ring on the back of the ion guide.

Perform an Advanced Cleaning of the QJet®/IonDrive™ QJet Ion Guide

Perform this procedure when the basic cleaning does not resolve contamination problems.

Prepare the Alconox Solution

1. Empty an Alconox packet into a clean, dry glass container, such as a 1 L beaker.
2. Add 25 mL hot water (if possible, 42 °C to 46 °C), while stirring.

Tip! Tap water can be used. If the quality of the tap water is poor, then use bottled water, heated separately.

Note: To prevent burns and damage to the cleaning tool, avoid scalding water.

3. Continue adding water, 25 mL at a time, until 100 mL have been added.
The result should be a foamy, saturated solution. The Alconox powder should be dissolved as much as possible.

Clean the QJet®/IonDrive™ QJet Ion Guide

1. Prepare the Alconox mixture. Refer to [Prepare the Alconox Solution](#).
2. Remove the QJet®/IonDrive™ QJet Ion Guide and then put it on a clean, stable surface.
3. (3500, 4500, 5500, 5500+, 6500, 6500+ and API 5000™ Systems) Remove the O-ring from the back of the ion guide.

CAUTION: Potential System Damage: Be careful not to scratch the IQ0 lens with the circlip (C-clip) pliers.

4. Remove the IQ0 lens from the ion guide:
 - (3500, 4500, 5000, 5500, 5500+, 6500, 6500+, and API 5000™ systems) Remove the two 1.5 mm hex screws that hold the lens on the ion guide, and then remove the C-clip with the circlip (C-clip) pliers.
 - (TripleTOF® and SCIEX X500 QTOF systems) Remove the three Phillips screws that hold the lens on the ion guide.
 - (SCIEX X500 QTOF systems) Remove the Phillips screw that secures the isolation shield on the ion guide and then remove the shield.
5. Pour hot tap water over and through the ion guide to rinse it.

Full Cleaning (Excluding the Q0 Region)

6. Immerse the brush in the Alconox solution.

CAUTION: Potential System Damage. Avoid contact between the metal handle of the brush and the rods, and do not bend the brush handle.

7. Insert the brush into the center of the ion guide, applying a liberal amount of the foamy Alconox solution.
8. Scrub for one minute.

Note: Do not immerse the ion guide in the Alconox solution, to avoid contaminating the solution.

9. Repeat step 6 to step 8 until the entire surface has been cleaned.
10. Brush across the non-metal parts of the ion guide.
11. Pour hot tap water over and through the ion guide for one minute, while brushing with the soapy brush.
12. Pour hot tap water over and through the ion guide for three minutes, while rinsing any soap from the gloves.
13. Make sure that all of the residue has been rinsed away.
14. Watch for evidence of water beading on the surface to confirm that the QJet®/IonDrive™ QJet Ion Guide is clean.
15. Pour LC-MS-grade water over and through the ion guide for one minute.



WARNING! Toxic Chemical Hazard. Use a fume hood when pouring solvents or evaporating solvents. Refer to the chemical product *Safety Data Sheets* and follow all of the recommended safety procedures when handling, storing, and disposing of chemicals.

16. Under a fume hood, pour 100 mL to 200 mL of isopropanol or methanol over the ion guide, making sure that it is applied to the entire surface. Catch any waste and then discard it in the designated waste container.

Isopropanol and methanol facilitate drying.



WARNING! Compressed Gas Hazard. Follow local regulations when using compressed gas. Make sure that the gas stream is not directed toward the operator.

17. Use clean dry air (CDA) or nitrogen to dry the ion guide. Be sure to remove all droplets.

Note: Gas generators do not have sufficient flow to displace any remaining droplets.

18. Wipe off any remaining spots with a lint-free wipe dampened with isopropanol or methanol.

CAUTION: Potential System Damage. Do not insert a wire or metal brush in the aperture on the curtain plate, orifice plate, or interface heater to avoid damaging the aperture.

19. Repeat step 10 to step 18 to clean the IQ0 lens and isolation shield, if applicable.
20. (3500, 4500, 5500, 5500+, 6500, 6500+ and API 5000™ Systems) Clean the O-ring by pulling it gently through a lint-free wipe slightly dampened with methanol or isopropanol.
21. Install the O-ring, IQ0 lens, and isolation shield on the ion guide, as applicable.

Clean the Skimmer

This procedure is applicable to 3200 and 4000 series systems.

1. Remove the skimmer and put it on a clean, stable surface.

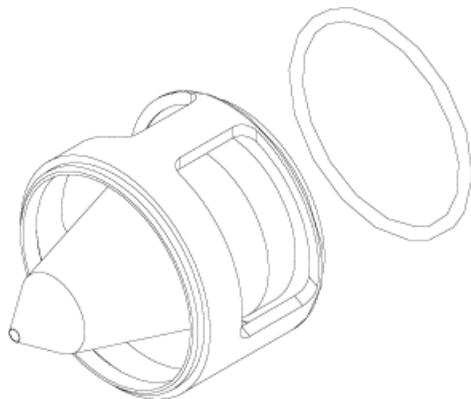
Figure 3-7 Skimmer



2. Using fingers only, carefully remove the O-ring from the back of the skimmer.

Note: The skimmer has only one O-ring, located at the back.

Figure 3-8 Skimmer and O-Ring



3. Using lint-free wipes and water, clean both sides of the skimmer.
4. Repeat step 3 using the cleaning solution.
5. Inspect the skimmer for solvent stains or film, removing any residue with a clean, slightly damp lint-free wipe.

Note: Persistent spotting or filming is an indicator of contaminated solvent.

6. Clean the O-ring by pulling it gently through a lint-free wipe slightly dampened with methanol or isopropanol.
7. Reinstall the O-ring on the skimmer.

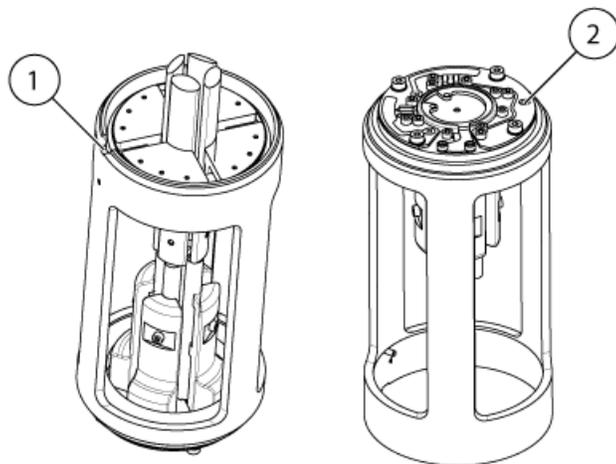
Put the Mass Spectrometer Back in Service

1. (QJet®/IonDrive™ QJet Ion Guide-equipped systems) Align the locator pin in the mass spectrometer with the hole in the ion guide and then install the ion guide. Push it until resistance is felt. If it is properly seated, then it will pop out slightly when released.

The notch at the front of the ion guide aligns with the hole at the back.

Note: If the ion guide is not properly seated, then pull it out slightly, turn it slightly, and try again.

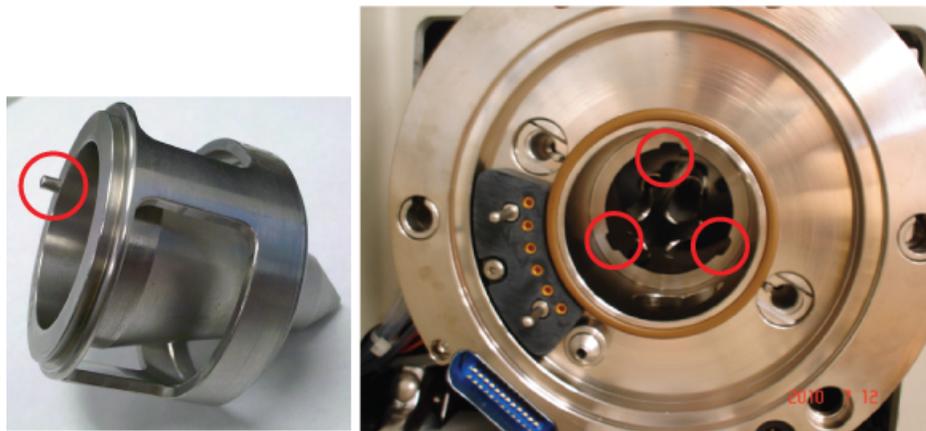
Figure 3-9 QJet®/IonDrive™ QJet Ion Guide



Item	Name
1	Notch
2	Hole for the locator pin

2. (Skimmer-equipped systems) Install the skimmer.
 - a. Align the pin on the back of the skimmer with one of the three notches in the assembly.
 - b. Push the skimmer into place.

Figure 3-10 The Pin on the Skimmer and the Notches on the Mass Spectrometer



Full Cleaning (Excluding the Q0 Region)

Tip! Use the correct orifice plate for the system for optimal performance. Do not use an orifice plate for another system. The model number for the system is etched on the orifice plate.

3. Install the orifice plate.
 - a. Align the pins on the orifice plate with the corresponding holes in the mass spectrometer.
 - b. Insert the orifice plate, pushing it into place until two clicks are heard.
 - c. Make sure that the sealing O-ring is on the interface pressing on the ceramic body of the orifice plate.
4. Install the curtain plate.
5. Install the ion source. For 3200 systems, refer to the *System User Guide*. For other systems, refer to the *Operator Guide* for the ion source.
6. Start up the mass spectrometer.

Q0 Cleaning (Optional)

4

The following warnings apply to all procedures in this section.



WARNING! Hot Surface Hazard. Let the ion source cool before starting any maintenance procedures. Some surfaces of the ion source and vacuum interface become hot during operation. For cooling times for different ion sources, refer to the following table.

Table 4-1 Cooling Times

Ion Source	Cooling Time (minutes)
DuoSpray™ Ion Source	30
IonDrive™ Turbo V Ion Source	90
NanoSpray® Ion Source	60
Turbo V™ Ion Source	30
OptiFlow® Turbo V Ion Source	60



WARNING! Toxic Chemical Hazard. Refer to the chemical product *Safety Data Sheets* and follow all of the recommended safety procedures when handling, storing, and disposing of chemicals.



WARNING! Ionizing Radiation Hazard, Biohazard, or Toxic Chemical Hazard. Determine whether decontamination is required before cleaning or maintenance. The customer must decontaminate the system before cleaning or maintenance if radioactive materials, biological agents, or toxic chemicals have been used with the system.



WARNING! Environmental Hazard. Do not dispose of system components in municipal waste. Follow local regulations when disposing of components.

Q0 Cleaning (Optional)

Tip! Clean the Q0 region regularly to minimize the impact of charging (a significant loss of sensitivity of the ions of interest over a short period of time) on the quadrupoles.

If the Q0 region is contaminated, then it can be cleaned. The mass spectrometer must be at atmospheric pressure and the other front-end components must be removed.

Note: To determine whether the region is contaminated, perform the Q0 test. Refer to [Verify Q0 Region Operation](#).

Complete these tasks in the following order:

1. [Prepare the Mass Spectrometer](#).
2. [Prepare the Q0 Cleaning Tool](#).
3. [Clean the Tip of the Rods](#).
4. [Clean Beyond the Tip Area](#).
5. [Put the Mass Spectrometer Back in Service](#).

Prepare the Mass Spectrometer



WARNING! Hot Surface Hazard. Let the ion source cool before starting any maintenance procedures. Some surfaces of the ion source and vacuum interface become hot during operation. For cooling times for different ion sources, refer to the following table.

Table 4-2 Cooling Times

Ion Source	Cooling Time (minutes)
DuoSpray™ Ion Source	30
IonDrive™ Turbo V Ion Source	90
NanoSpray® Ion Source	60
Turbo V™ Ion Source	30
OptiFlow® Turbo V Ion Source	60

CAUTION: Potential System Contamination. Do not force venting. Doing so can cause contaminants to enter the mass spectrometer.

1. Shut down the system by following the procedure in the *System User Guide* or *Hardware Guide*. Wait at least 25 minutes for the mass spectrometer to vent naturally, and then disconnect the mains supply cables of the mass spectrometer and roughing pump from the mains supply outlet.
2. Remove the ion source. For 3200 systems, refer to the *System User Guide*. For other systems, refer to the *Operator Guide* for the ion source.

When the ion source is not in use, store it to protect it from damage and to maintain operating integrity.

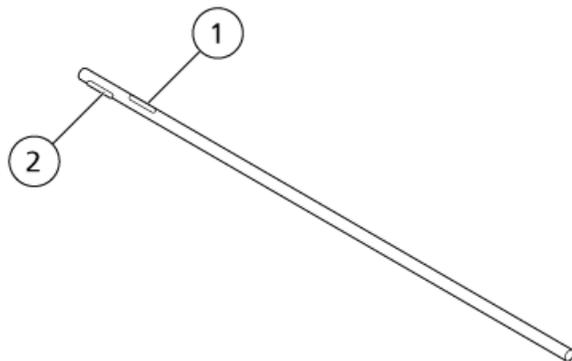
3. Remove the curtain plate, orifice plate, and ion guide or skimmer, and then place them on a clean, stable surface. Make sure that the conical side of the curtain plate and orifice plate is facing upwards.

Prepare the Q0 Cleaning Tool

Note: Clean Q0 in two steps, to avoid pushing contaminants onto the IQ1 lens or through to the other side.

1. Dampen a wipe with methanol and then clean the outside surface of the Q0 cleaning tool.

Figure 4-1 Q0 Cleaning Tool



Item	Description
1	Bottom eyelet
2	Top eyelet

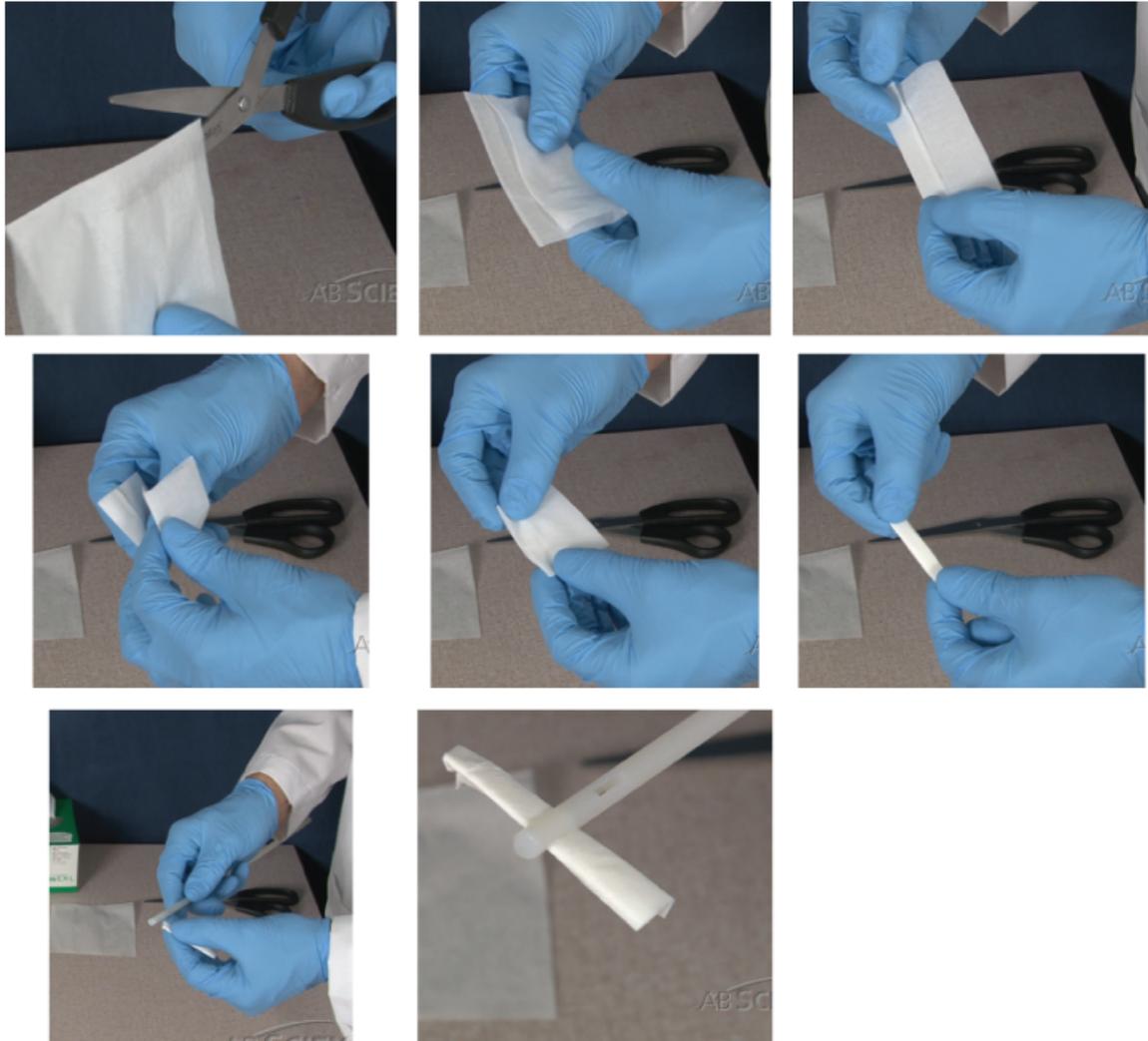
2. Let the Q0 cleaning tool dry.

Q0 Cleaning (Optional)

CAUTION: Potential System Damage. Prepare the wipe properly, to make sure that it is held securely in the eyelet of the cleaning tool, and to prevent it from falling off during use.

3. (QJet®/IonDrive™ QJet ion guide-equipped systems) Follow these steps to prepare the tool:
 - a. (TripleTOF® 6600 Systems) Cut a wipe 1 cm from the fold.
 - b. (All other systems) Cut a wipe in half on the fold.
 - c. Fold the wipe so the cut edge is on the inside. The resulting folded wipe should be about 5.7 cm (2.25 inches) long.
 - d. Insert the wipe into the top eyelet.

Figure 4-2 Preparing the Q0 Cleaning Tool (QJet®/IonDrive™ QJet Ion Guide-Equipped Systems)



CAUTION: Potential System Damage. When using water, do not dampen the wipes excessively. Excessive moisture can cause the wipes to fall apart in the chamber.

4. (Skimmer-equipped systems) Follow these steps to prepare the tool:
 - a. Roll the wipe around the Q0 cleaning tool.
 - b. Flatten the wipe and insert it into the eyelet.The wipe should be 1 cm (3/8 in.) wide.

Q0 Cleaning (Optional)

Tip! If the wipe is too wide to fit into the eyelet easily, then roll it on a clean, slightly-smaller diameter tool, such as the handle of a poly swab.

Figure 4-3 Preparing the Q0 Cleaning Tool (Skimmer-Equipped Systems)



CAUTION: Potential System Damage. When using water, do not dampen the wipes excessively. Excessive moisture can cause the wipes to fall apart in the chamber.

5. Dampen the wipe slightly with cleaning solution.
6. Blot the wipe with a dry wipe to remove excess moisture.
7. Flatten the wipes for easy insertion into Q0.

Clean the Tip of the Rods

CAUTION: Potential System Damage. Do not force the rods apart during cleaning.

1. Insert the Q0 cleaning tool approximately 2.5 cm (1 inch) deep between the Q0 rods.
-

2. Rotate the Q0 cleaning tool two full revolutions, clockwise. This prevents the wipe from becoming too thickly wound in one spot, which would make the tool difficult to remove.
3. Slowly pull the tool out of the Q0 rod set. Do not push the tool further into the Q0 rod set.
4. Remove the contaminated wipe from the Q0 cleaning tool and then dispose of it according to standard laboratory operating procedures.
5. Insert a clean wipe, dampened with methanol.
6. Repeat step 1 to step 4 at least one more time.

Note: If severe contamination is suspected, then additional cleaning might be required.

7. Remove the contaminated wipe from the Q0 cleaning tool and then dispose of it according to standard laboratory operating procedures.

Clean Beyond the Tip Area

CAUTION: Potential System Damage. Do not force the Q0 cleaning tool past the shield in the Q0 rod set, to avoid striking the IQ1 lens. Resistance will be felt when the tool encounters the shield.

1. Insert a clean wipe, dampened with cleaning solution.
2. Install the Q0 cleaning tool between the Q0 rods until resistance is felt when it contacts the shield.
3. Slowly turn the Q0 cleaning tool while pulling it forward, out of the mass spectrometer. This prevents the wipe from becoming too thickly wound in one spot, which would make the tool difficult to remove.
4. Remove the contaminated wipe from the Q0 cleaning tool and then dispose of it according to standard laboratory operating procedures.
5. Insert a clean wipe, dampened with methanol.
6. Repeat step 2 to step 4.
7. Wait until the Q0 region is dry.
8. (Optional) Dry the Q0 region, while it is still wet, with a flow of clean air or nitrogen.
9. Continue with [Put the Mass Spectrometer Back in Service](#).



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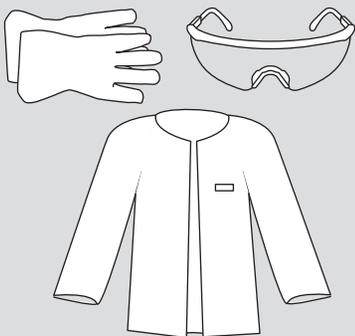
Routine Cleaning Quick Reference



For step-by-step instructions and safety warnings, refer to the procedure in this guide.



Personal Protective Equipment



Supplies



wipe

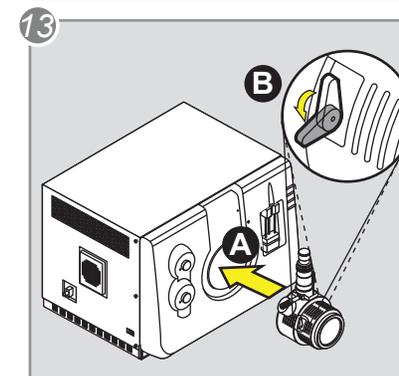
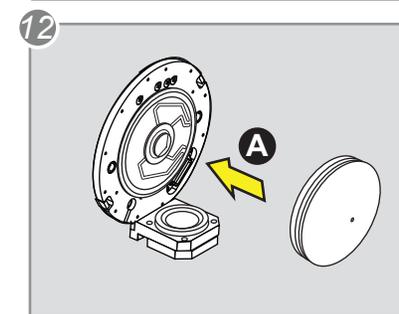
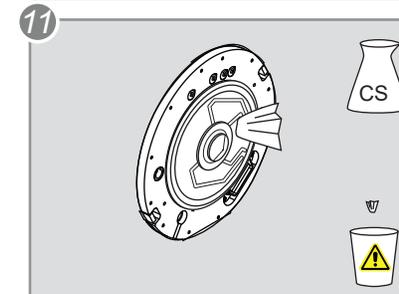
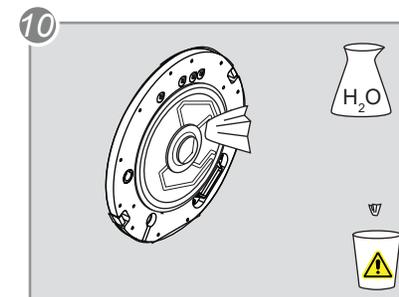
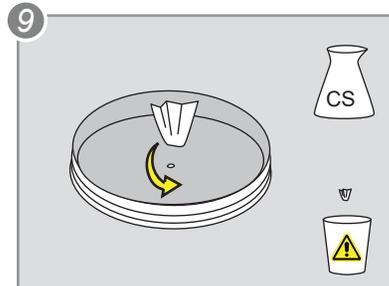
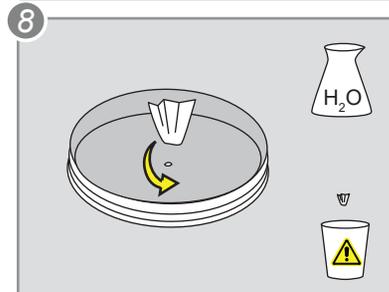
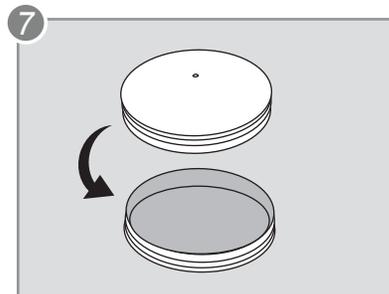
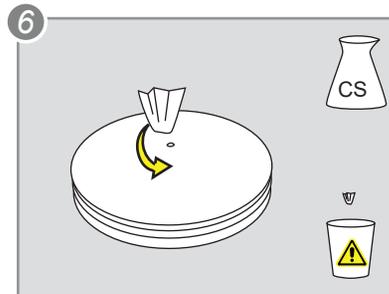
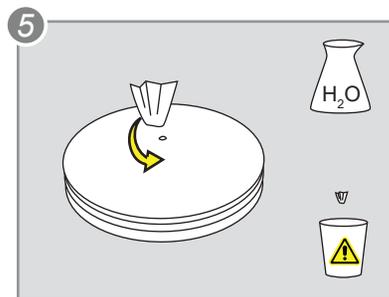
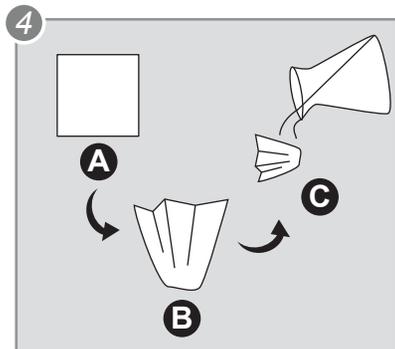
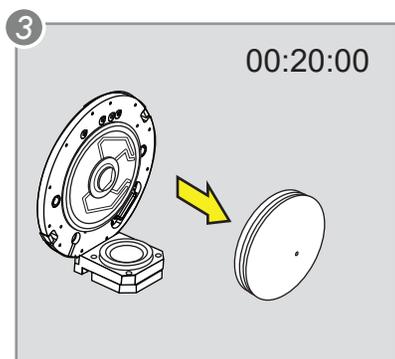
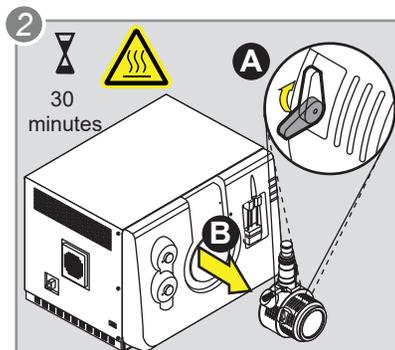
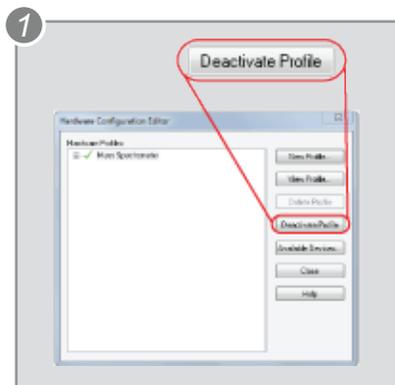
PN WC018027

* Cleaning Solution (CS). Use one of:

- 100% methanol
- 100% IPA
- 50:50 ACN:H₂O
- 50:50 ACN:H₂O + 0.1% acetic acid



All solutions must be MS-grade.



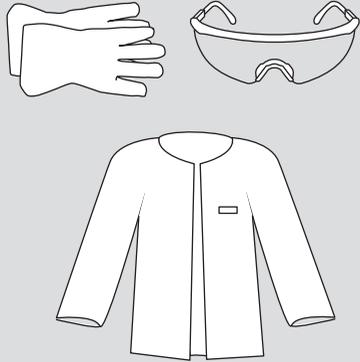
Full Cleaning Quick Reference (QJet® Ion Guide -Equipped Systems)



For step-by-step instructions and safety warnings, refer to the procedure in this guide.



Personal Protective Equipment



Supplies



wipe

PN

WC018027

* Cleaning Solution (CS). Use one of:

- 100% methanol
- 100% IPA
- 50:50 ACN:H₂O
- 50:50 ACN:H₂O + 0.1% acetic acid



Refer to SDS

All solutions must be MS-grade.

2

5500 & 6500

VENT
3 seconds

15 minutes

Other instruments

A B

15 minutes

instrument roughing pump

3

4

30 minutes

A B

5

A B

6

H₂O CS

A B

7

H₂O CS

A B

8

A B

9

H₂O

A B

10

Methanol

A B

11

PN
WC018027

CS

12

A B

13

A B

14

B

15

16

A B

roughing pump instrument

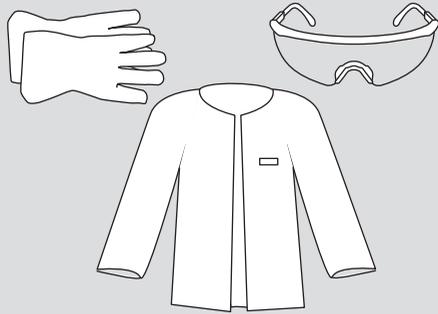
Full Cleaning Quick Reference (Skimmer-Equipped Systems)



For step-by-step instructions and safety warnings, refer to the procedure in this guide.



Personal Protective Equipment



Supplies



* Cleaning Solution (CS). Use one of:

- 100% methanol
- 100% IPA
- 50:50 ACN:H₂O
- 50:50 ACN:H₂O + 0.1% acetic acid

All solutions must be MS-grade.



Refer to SDS

2

A 15 minutes B

instrument roughing pump

6

H₂O CS
A B

10

A B

14

A B

3

10 minutes

7

H₂O CS
A B

11

H₂O CS
A B

15

A B

4

30 minutes

A B

8

H₂O CS
A B

12

PN WC018027 CS

16

5

A B

9

H₂O CS
A B

13

A B

17

A B

roughing pump instrument

1

Hardware Configuration Editor

Hardware Profiles:

5500Q TRAP

Deactivate Profile

Exit B



The Power of Precision

Q0 Region Cleaning Quick Reference

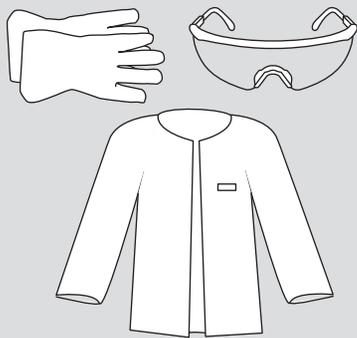
Note: Before cleaning Q0, perform a full cleaning.



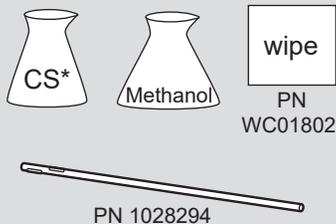
For step-by-step instructions and safety warnings, refer to the procedure in this guide.



Personal Protective Equipment



Supplies



* Cleaning Solution (CS). Use one of:

- 100% methanol
- 100% IPA
- 50:50 ACN:H₂O
- 50:50 ACN:H₂O + 0.1% acetic acid



Refer to SDS

All solutions must be MS-grade.

1 QJet® ion guide-equipped systems PN WC018027

2 Skimmer-equipped systems PN WC018027

3

4

5

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To find software product documentation, refer to the release notes or software installation guide that comes with the software.

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