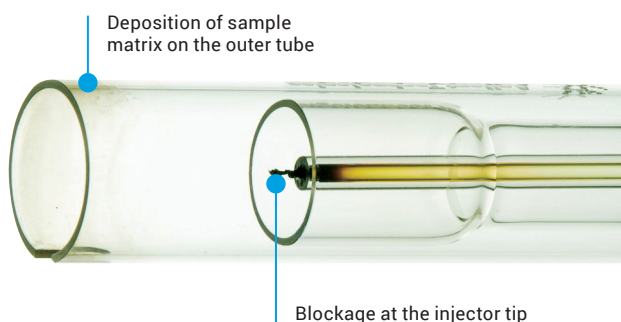


Simple Steps for Clearing a Blocked Injector in Your ICP-OES Torch



Remove blockages to ICP-OES productivity

Deposition of the sample matrix, salts or even carbon build-up can lead to injector blockage in the torch. How quickly blockages occur varies, depending on sample type, sample workload, torch type, and even the method parameters. A blocked injector can restrict the flow of sample aerosol into the plasma, decreasing sensitivity and degrading accuracy and precision.

Prevention is the best cure to reduce injector blockage and extend the operating time. Make sure that you are using the recommended torch type and check that you have the recommended instrument parameters for your application. Filter all samples to ensure you remove large particulates.

Regular rinsing between samples and at the end of the run can also help to keep the injector clear. However, improper cleaning techniques can permanently damage the torch. Follow the steps outlined in this technical overview to safely clean your torch, and to remove blockages if or when they occur.

Routine cleaning

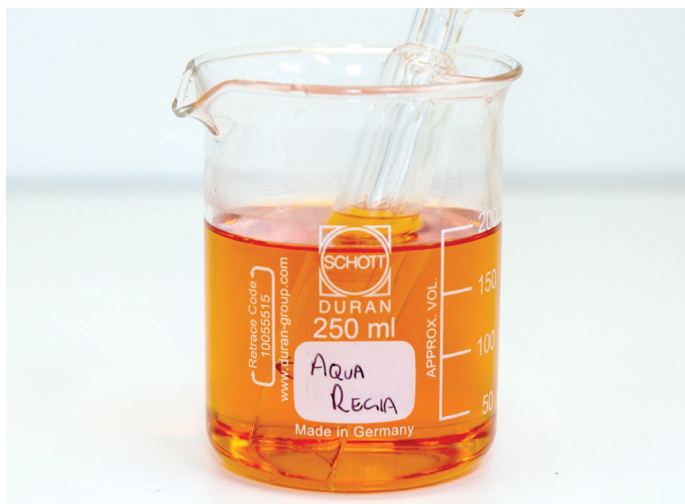


5100/5110 ICP-OES

- Prepare a 50% aqua regia solution (1 part deionized water to 1 part aqua regia [three parts hydrochloric acid and one part nitric acid]) in a wide diameter tall form beaker.
- Place the beaker under the torch cleaning stand (P/N G8010-68021). This suspends the torch (or injector/base assembly) in the cleaning solution, reducing the risk of spills and damage to the quartz outer tube.

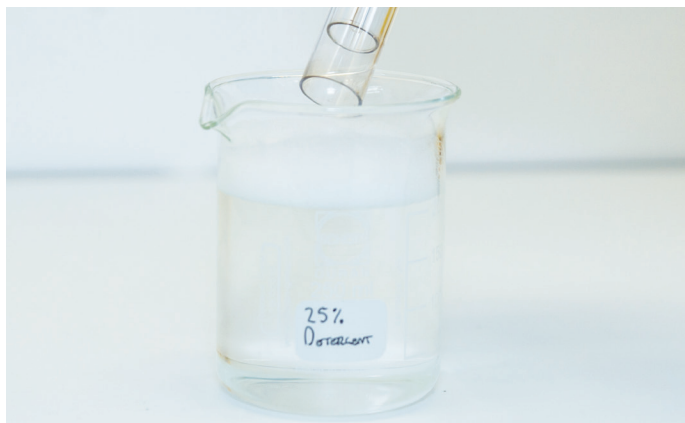
- Invert the torch and position this on the torch cleaning stand so that the quartz outer tube and injector is immersed in the aqua regia solution.
- Pipette some of the aqua regia through the ball joint of the injector to remove buildup from the lower part of the injector.
- Soak the torch for at least 1 hour.
- If deposits remain, repeat the cleaning process using a higher concentration of aqua regia.
- Thoroughly flush the inside and outside of the torch with deionized water (18 MΩ cm) using a wash bottle. Invert the torch and flush deionized water through the quartz tubes so that the water flows out of the gas entry ports and ball joint connector for at least 30 s.
- Invert the torch and dry by blowing clean compressed air or nitrogen through the gas ports on the base and through the opening of the ball joint to remove moisture.

Caution: Do not place the torch in a drying oven. It is not as effective at removing moisture as using compressed air or nitrogen, and may damage the torch.



One-piece quartz torch for 700, Vista, and Liberty Series ICP-OES

- Soak the torch overnight in concentrated aqua regia (three parts hydrochloric acid and one part nitric acid).
- If necessary, use a pipe cleaner dipped in aqua regia to gently remove persistent deposits from the injector tube.
- Rinse with deionized water and allow to dry.



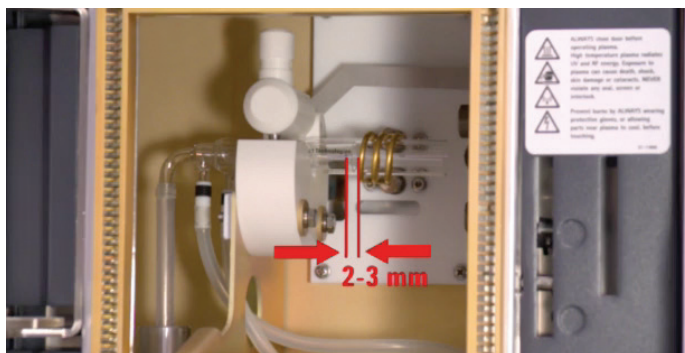
Removing salt deposits

- Rinse the torch with water.
- Soak overnight in a 25% detergent solution.
- Rinse the torch with deionized water and allow to dry.

Important: The torch must be completely dry before re-installing. Replace the torch if chipped, cracked, or distorted.

ICP-OES Troubleshooting and Maintenance Video: Torches

See how to clean and maintain torches, and learn more about different torch types. [Watch now](#)



Re-installing the torch for 700, Vista, and Liberty Series ICP-OES

- Position the torch in the center of the RF coil, resting on the torch stand.
- Close the torch clamp and turn the locking knob.
- Gently attach the transfer tube to the base of the torch.
- Align the torch so the intermediate tube is about 2 to 3 mm away from the RF induction coil.
- Connect the auxiliary and plasma gas hoses to the appropriate inlets on the torch.
- Complete the torch alignment procedure to ensure the optics are viewing the highest emission signal from the plasma.



Caution:

- Never place a torch in an ultrasonic bath, or use a wire to clean the injector.
- Do not use hydrofluoric acid with glass or quartz sample introduction components.
- Always use care when handling or installing a torch. Excessive force can break the torch.
- Do not touch quartz torches with bare hands. This can reduce torch life.

Torch selection tips

- A one-piece quartz torch is simple to install and use and delivers great performance for most applications.
- For organic solvents, use a torch with a smaller ID injector. For volatile organic solvents, use a torch with a narrow-bore (0.8 mm ID) injector.
- For greater flexibility and reduced running costs, choose a semi-demountable torch. The injector and/or outer tube is removable and replaceable separately.
- For fusions and HF digests, use a torch with an alumina injector.
- A fully demountable torch allows you to replace components individually, which can help lower your operating costs.

Video resources for overcoming common ICP-OES challenges

Agilent OneNeb Series 2 Nebulizer

Learn how to achieve better sensitivity and precision, and improve tolerance to samples with high levels of total dissolved solids (TDS) by switching to the Agilent OneNeb Series 2 nebulizer. [Watch now](#)

ICP-OES Troubleshooting and Maintenance: Nebulizers

See how to clean and maintain nebulizers—and get the most from your peristaltic pump tubing. [Watch now](#)

ICP-OES Troubleshooting and Maintenance: Spray Chambers

Learn how to clean and maintain spray chamber performance, and learn more about different spray chamber types. [Watch now](#)

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