

Preparing your lab for a potential shutdown

Dealing with operating impacts from the COVID-19 Coronavirus

HPLC and LC/MS	March 24 and March 31
GC and GC/MS	March 25 and April 1
ICP-OES and ICP-MS	March 26 and April 2



Important general lab shut down information

Follow your SOP's – but here are some additional things to consider

- Document everything with extensive detail – Ask yourself: “Will I remember in 2 or 3 weeks?”
- Check expiration dates, shelf life, etc for all chemicals and supplies – factoring in the anticipated shutdown duration.
- Check all gases and gas clean filters.
- Check vacuum systems - pumps/oil.
- Do a lab clean-up! Clean out those drawers, dispose of old columns, properly discard old chemicals, etc.
- How stable is your electrical service (failures, spikes, etc.)? Should I power everything down?
- Are service providers allowed on-site? Or is there remote work they can do? Discuss this before any scheduled visit.
- Can any tasks be shifted remote or online (training, remote monitoring, data analysis)? Is your IT department aware of these and is bandwidth/VPN/remote access capable of handling this.
- Do you have the necessary supplies to restart and run for a month or more? Some vendors may not have stock because they were shutdown (or still shutdown) or there is a spike in demand from labs coming back online. Call your vendor NOW to check inventory/manufacturing of your critical supplies?
- If you resupply now, can your lab receive the materials? Is someone on-site?
- What is your anticipated sample load when coming back online? Backlog, urgent samples, etc.

Preparing your lab for a potential shutdown

Dealing with operating impacts from the novel Coronavirus

On behalf of Agilent Spectroscopy Team

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Santa Clara, CA



Recommended Shutdown Procedures – Short Term

ICP-OES

1. Rinse the sample Intro System with dilute acid/DI water
2. Drain the liquid
3. Turn off Plasma
4. Unclamp the pressure bars and remove peristaltic pump tubings from the pump
5. Turn off Chiller



Recommended Shutdown Procedures – Long Term

ICP-OES

6. Turn off Argon gas
7. Shut down the PC
8. Switch off the instrument power
9. Turn off Exhaust
10. Turn off Autosampler
11. Empty the waste container to prevent rust from acid fume
12. Cover the instrument (if possible – to prevent dust build-up)



Restarting the ICP-OES

If the instrument has been in long term storage:

At least 1 day before:

1. Remove covers and wipe down instrument to remove any dust build-up
2. Restore the mains power and switch the instrument back on again
3. Open the argon gas cylinder and ensure the supply is connected to the instrument (enable argon purge of the optics)



Don't turn the chiller on

Instrument

Instrument monitor shows visual status of key instrument functions and highlights potential issues or faults

- Status
- Configuration
- Calibration
- Tests
- Dashboard
- Maintenance
- Ignition
- Plasma
- Optics
- Pump
- Camera
- Water Cooling
- Plasma Torch Door
- Torch Loader
- Preoptics
- Gas Module
- RF
- Electronics
- Switching Valve
- Argon
- IsoMist



Model: Agilent 5900 SVDV ICP-OES
Serial number: MY1948CP05

Service Only

Gas Flow (L/min)		
	Set	Actual
Plasma	0.00	1.11
Nebulizer	0.00	0.04
Make-up	0.00	0.03
Auxiliary	0.00	0.07
O ₂ injection	☐	
Purges		
Polychromator		
Boost	☒	
Snout	☐	
Cone		
RF		
RF power (kW)		0.00
Optics		
Beam selector position		Radial
Viewing height		0
Shutter		
Peltier (°C)		27.6
Polychromator (°C)		25.5
Pump		
Pump speed (rpm):	0	
IsoMist		
Powered	☐	

Restarting the ICP-OES

On the day of analysis:

1. Clean all the sample introduction components
2. Clean pre-optics windows (ICP-OES)
3. Turn the chiller on
4. Fit new peristaltic pump tubing
5. Ignite plasma, warm-up system and complete a performance test to verify everything is working

ICP-OES – Performance Testing

You can run the instrument performance and check instrument status anytime by running automated instrument tests

Status

Configuration

Calibration

Tests

Dashboard

Ignition

Plasma

Optics

Pump

Camera

Water Cooling

Plasma Torch Door

Torch Loader

Preoptics

Gas Module

RF

Electronics

Switching Valve

Argon

IsoMist



Instrument

Connect ▾ Plasma ▾ Pump ▾

Status

Configuration

Calibration

Tests

Dashboard

Ignition

Test	Result
☒ Subsystem Communications Test	
☒ Air Flow	
☒ Water Flow	
☒ Gas Flows	
☒ RF Generator	
☒ Camera Test	
☒ Optics Test	
☒ Instrument Performance	
☐ Advanced Valve System Test	

Run Tests

Stop

Report Summary

Instrument Model	Agilent 5100/5110 SVDV ICP-OES
Instrument ID	G8010A/G8014A
Instrument Serial Number	AU15280108
Software Version	7.3.0.8799
Firmware Version	3354
Tested By	Ross 2
Test Completed On	9/27/2016 4:41:32 PM

Result Summary

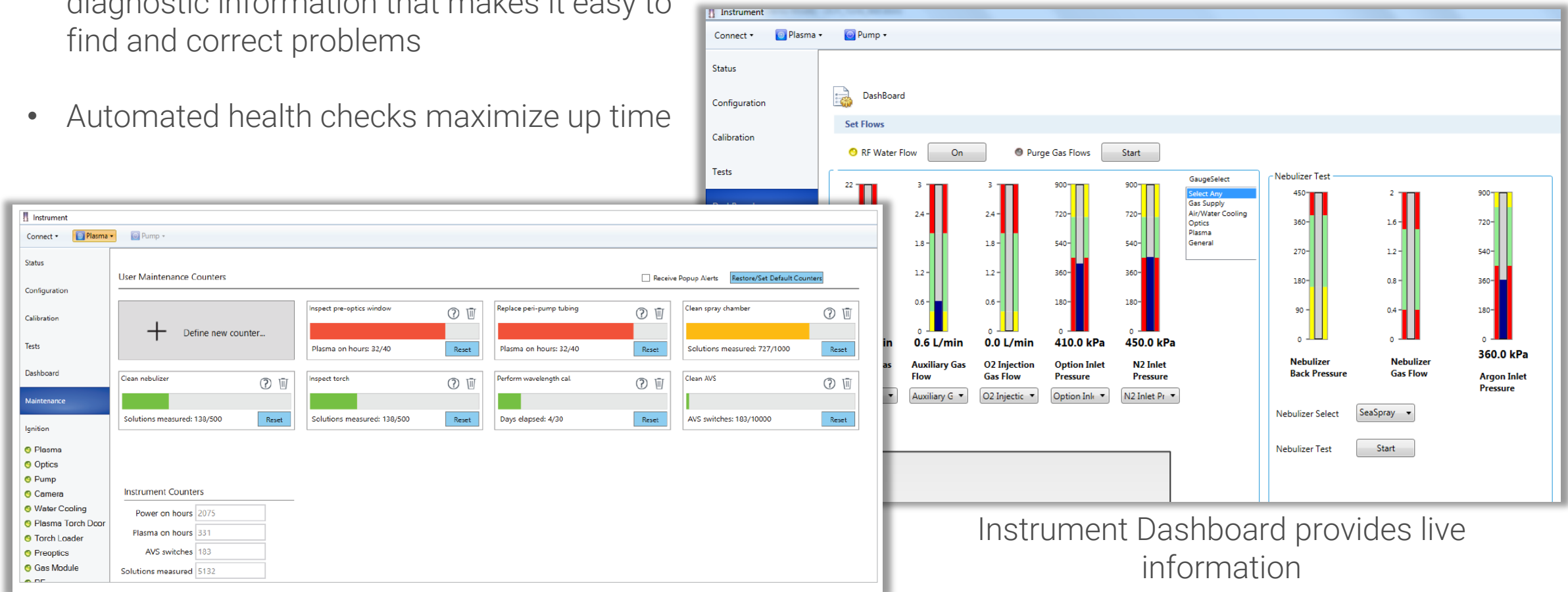
Subsystem Communications Test	Pass
Air Flow Test	Pass
Water Flow Test	Pass
Gas Flows Test	Pass
RF Generator Test	Pass
Camera Test	Pass
Optics Test	Pass
Advanced Valve System Test	Skipped
Resolution Test	Pass
Sensitivity Test	Pass
Precision Test	Pass

Keep Your Instrument Happy and Healthy

System Diagnostics



- Sensors throughout the instrument deliver diagnostic information that makes it easy to find and correct problems
- Automated health checks maximize up time



Instrument Dashboard provides live information

Early Maintenance Feedback

Cleaning the Torch (5000 Series ICP)

3 easy steps to cleaning the torch

(see the torch cleaning instructions in the on-line Help for more details):

1. Soak in 50% aqua regia for 1 hour
2. Thoroughly flush inside & outside using de-ionized water
3. Blow clean compressed air or nitrogen through the three gas supply ports

CAUTION

Ensure torch is dry before re-installation

Do not sonicate!



Agilent torch cleaning stand
p/n G8010-68021

Cleaning the Glass Nebulizer

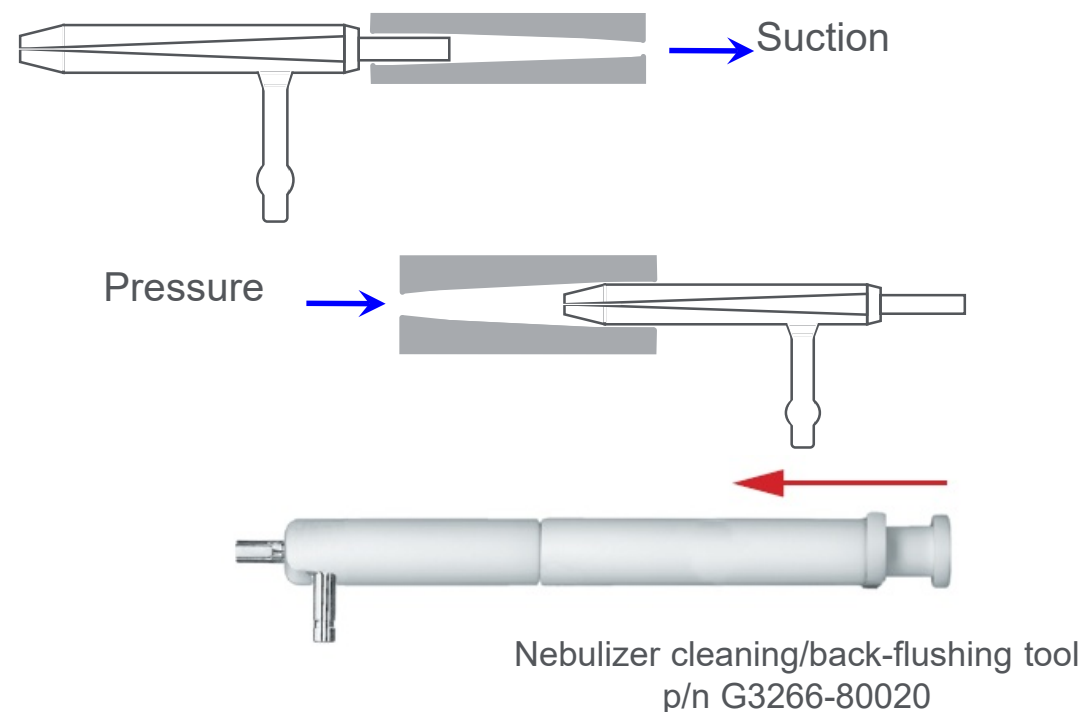
Never sonicate or attempt to inspect with wire.

For salt deposits:

- Soak the nebulizer overnight in a beaker of 25% Fluka RBS-25 detergent. Rinse with pure water.

For “stubborn” deposits:

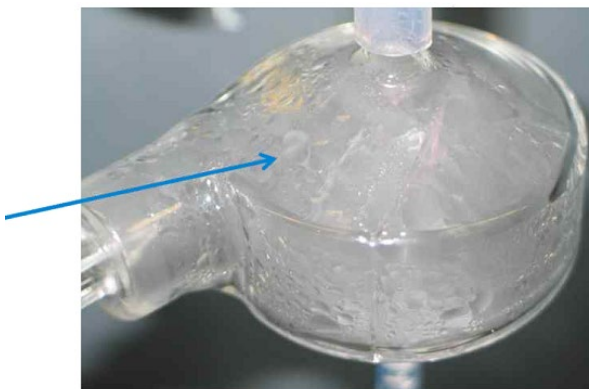
- Soak the nebulizer overnight in concentrated nitric acid. Use a pipette to ensure there are no air bubbles in the capillary. Rinse with pure water.



<https://www.agilent.com/en/products/lab-supplies/nebulizertips>

Cleaning the Spray Chamber

Beading in the
spray chamber



Remedy:

- Aspirate dilute RBS-25 solution
- Clean the spray chamber using acid



Top 5 Tips to Ensure a Successful Restart of Your ICP



Clean/verify
nebulizer
performance



Check/clean
pre-optics



Clean your
sample
introduction
system



Fit new peri
pump tubing



Run an
Instrument
Calibration
Test



Preparing Your Lab for a Potential Shut-down – Essential Preparation and Maintenance

Craig Jones
ICP-MS Applications Scientist



Lindsey Whitecotton
ICP-OES Supplies Product Manager



Eric Vanclay
Spectroscopy Supplies Marketing Manager



March 2020



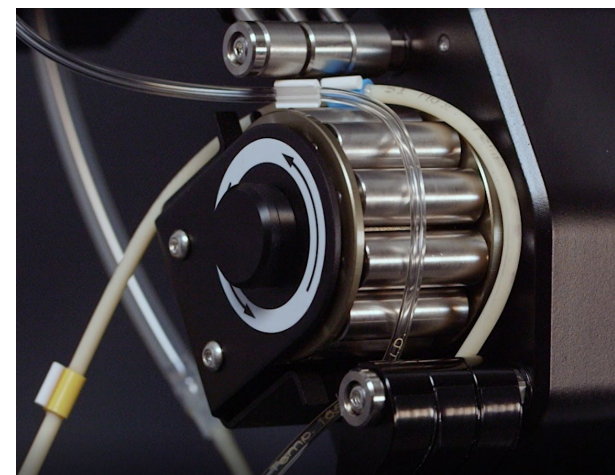
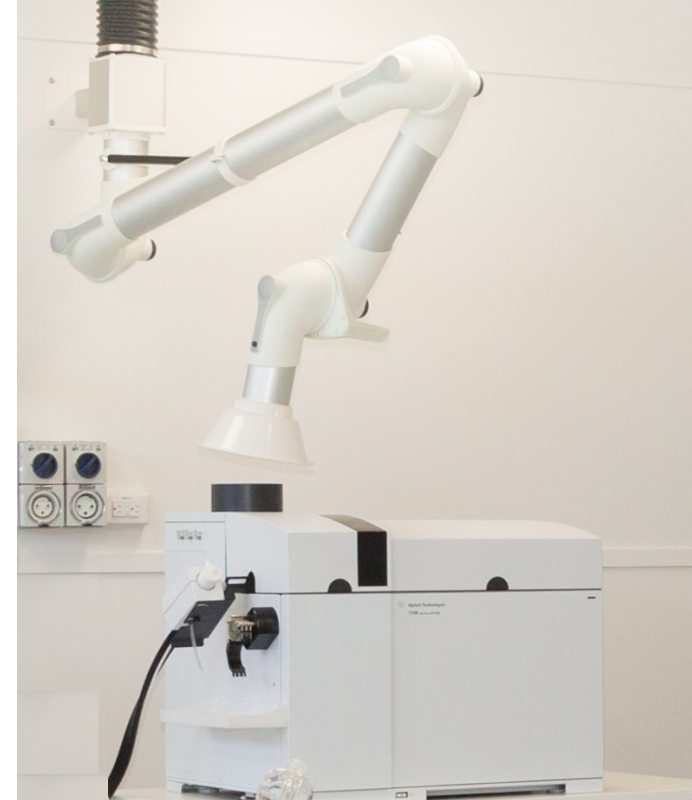
Recommended Shut-down Procedures – ICP-MS

To shut-down the instrument:

1. Switch the water chiller off
2. Turn off the argon gas (and any reaction/cell gas) supplies at the cylinder
3. Leave the instrument ON – but shut down the controlling PC
4. Leave the vacuum system (rough pump) ON (maintain vacuum in the quadrupole)
5. Rinse all sample lines with water and wash all sample introduction components (including interface cones)
6. Drain all waste vessels (and ensure any acid rinse or other solutions are all sealed/closed)
7. Remove peri pump tubing from the pump and leave pressure bars open
8. Leave exhaust/fume extraction ON

For long term storage – perform these additional actions:

1. Switch OFF the vacuum system (rough pump)
2. Switch exhaust/fume extraction off
3. Switch the mains supply to the instrument OFF
4. Cover the instrument (if possible – to prevent dust build-up)



Restarting the ICP-MS Instrument Again

If the instrument has been in long term storage:

ICP-MS –At least 1 day before:

1. Restore the mains power and switch the instrument back on again
2. Restart the vacuum system (enable quadrupole to pump down)

Then the next day:

1. Remove covers and wipe down instrument to remove any dust build-up
2. Reclean all the sample introduction components (remove any dust build-up)
3. Clean interface cones (ICP-MS)
4. Fit new peristaltic pump tubing
5. Ignite plasma, warm-up system and complete a performance test to verify everything is working

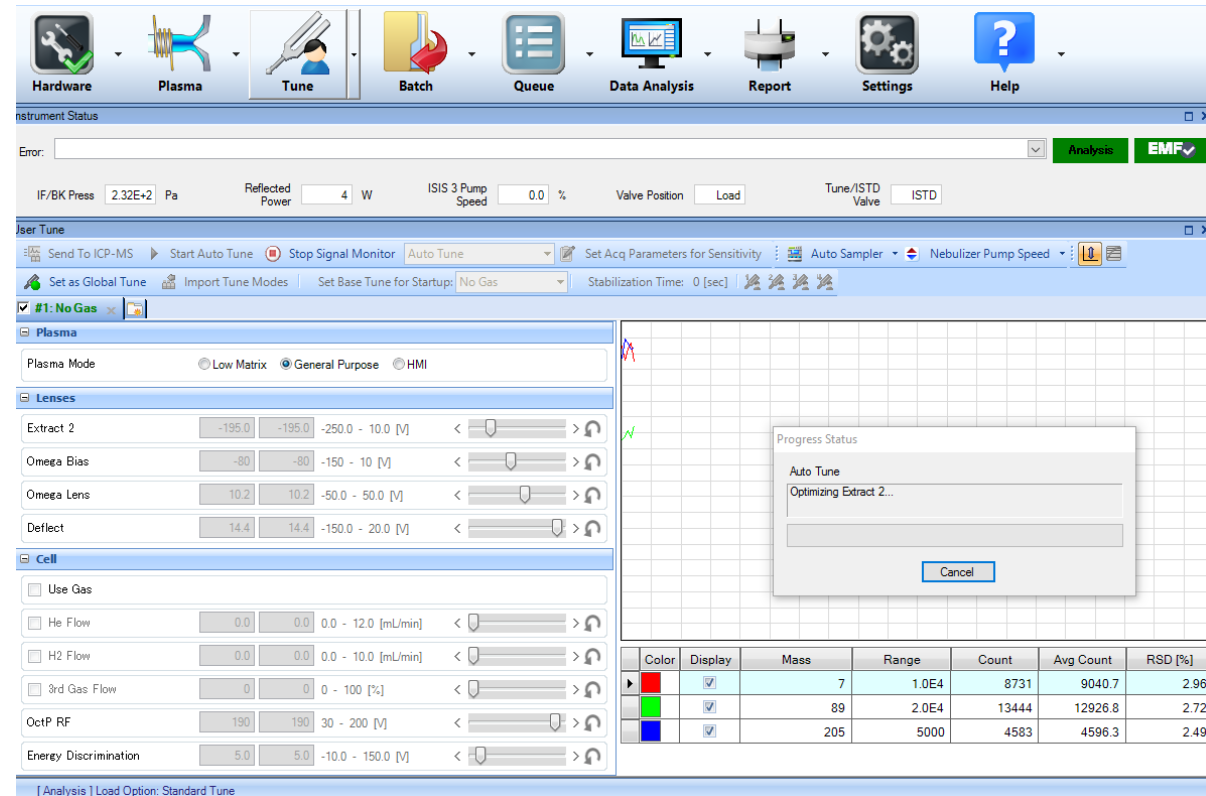
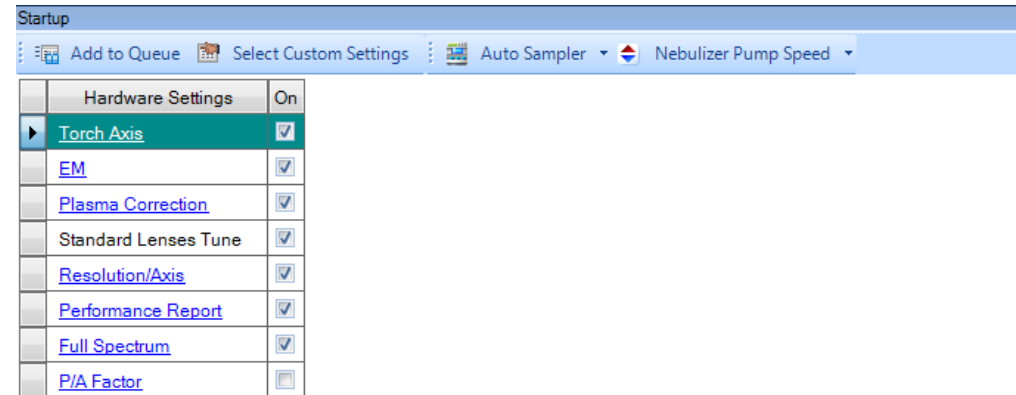
ICP-MS – Performance Testing

Startup provides a simple, user-configured schedule so you can check system optimization and performance

- Automatically generate a Performance Report
- Provides a continuing record of system performance

One-click expert AutoTune for simple optimization

- Ensures consistent performance from day to day
- Independent of operator experience



Cleaning the Glass Nebulizer

Never sonicate or attempt to inspect with wire.

For normal cleaning:

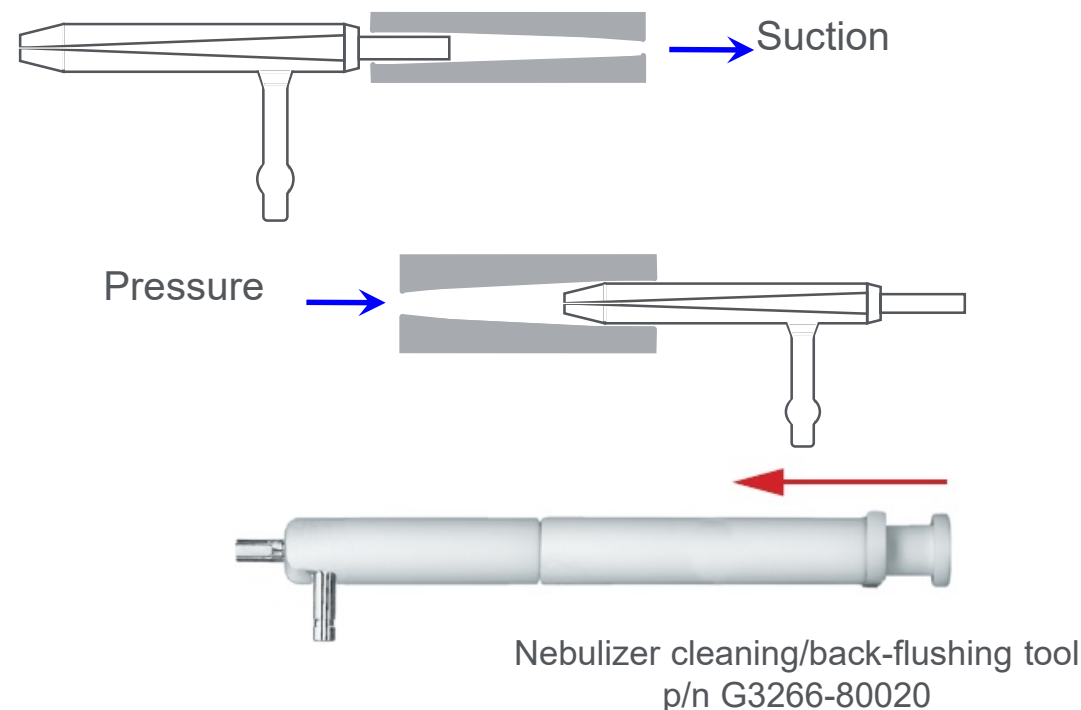
- Back-flush with methanol through the tip using a dedicated nebulizer cleaning/back-flushing tool; **or**
- Reverse pump the nebulizer with the tip in solvent; **or**
- Apply suction from the wide end of the capillary using a vacuum aspirator; **or**
- Apply high pressure inspect air via a tubing snugly fitted over the nebulizer tip (use with caution!); **or**
- Soak in a 5% nitric acid bath for ~10 mins.

For salt deposits:

- Soak the nebulizer overnight in a beaker of 25% Fluka RBS-25 detergent. Rinse with pure water.

For “stubborn” deposits:

- Soak the nebulizer overnight in concentrated nitric acid. Use a pipette to ensure there are no air bubbles in the capillary. Rinse with pure water.



<https://www.agilent.com/en/products/lab-supplies/nebulizertips>

Cleaning the ICP-MS Spray Chamber

Spray chamber

Routine cleaning:

- Soak the end cap and spray chamber in 5% nitric acid or Citranox for >30 mins
- Rinse, dry and refit

If you see precision problems or droplet formation on the walls of the spray chamber (beading):

- Soak overnight in a 25% detergent solution
 - Best to leave it soaking for 24 hours
 - Use any laboratory detergent e.g. Fluka RBS25, Triton X-100, Decon 90 etc.



Cleaning the ICP-MS Torch

Visually check the torch, bonnet and shield when removing the torch

- Replace if deformed or chipped

Do not sonicate!

For routine cleaning:

- Soak in >5% nitric acid for ~30 mins

For more stubborn stains:

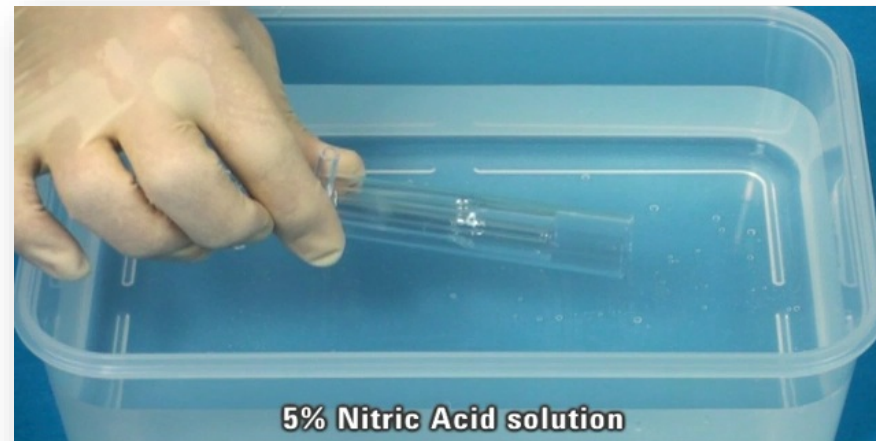
- Soak in bleach (e.g. Chlorox ©) overnight
- Soak in aqua regia (1:3 HNO_3 :HCl)

For salt deposits:

- Rinse with water to remove deposits
- Soak the torch overnight in a beaker of 25% Fluka RBS-25 detergent

Rinse and allow to dry

Caution! Reinstall only when dry



Torch damage due to incomplete drying

Cleaning the ICP-MS Interface Cones – the Right Way

Routine Cleaning:

Simple clean with pure water

- Dip a cotton swab (pn 9300-2574) in pure water and clean both sides of the cone
- Rinse with pure water
- Ultrasonicate the cones in pure water for >5 mins (typ. 20 mins)
- Repeat as required (aim for water to stay clean)



Only if performance is still not satisfactory, clean with a 2% Citranox solution (pn 5188-5359) (NOT MORE THAN 2%)

- Ultrasonicate in a 2% Citranox solution for max. 2-3 mins
- Rinse with pure water
- Ultrasonicate in pure water for >5 mins

<http://www.agilent.com/en-us/promotions/icp-ms-resource>

Cleaning the ICP-MS Interface Cones

ONLY For more severe contamination:

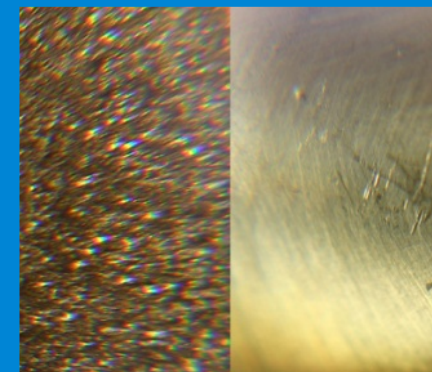
Clean with a 2% nitric acid solution

- Dip a cotton swab in 2% HNO_3 and clean both sides of the cone
(DO NOT SOAK IN ACID)
- Rinse with pure water
- Ultrasonicate in pure water for 2 - 3 mins
- Rinse with pure water
- Ultrasonicate again in pure water for an additional 2 - 3 mins

<http://www.agilent.com/en-us/promotions/icp-ms-resource>

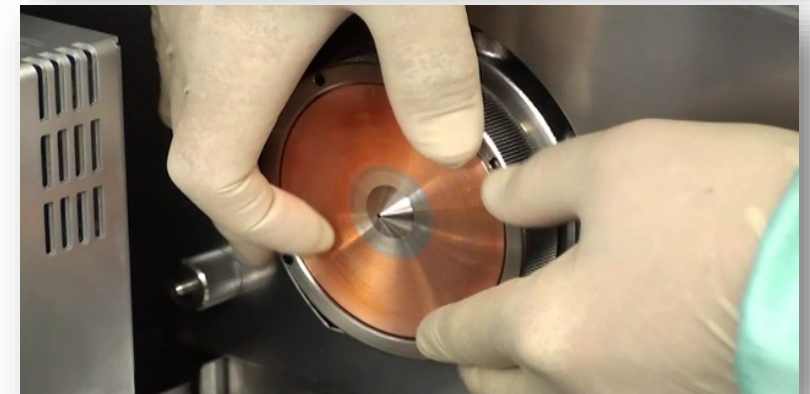
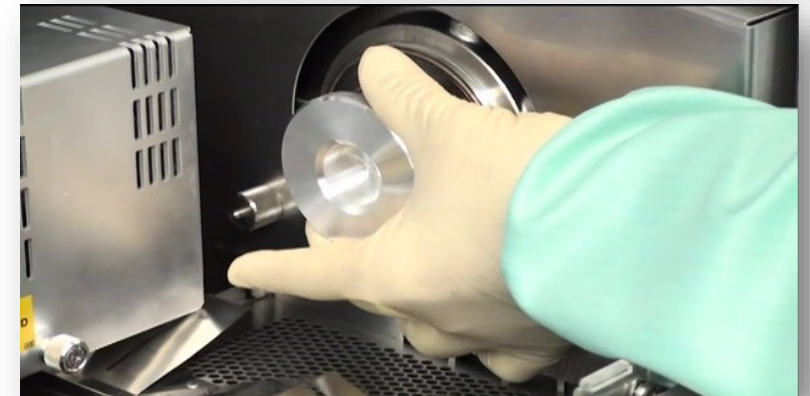
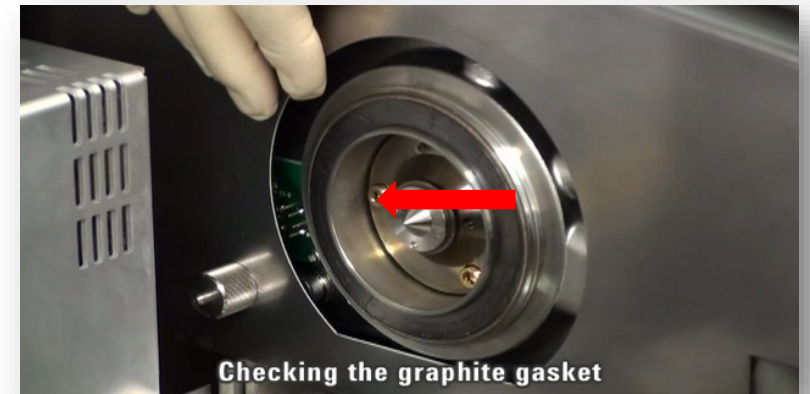


Pitted nickel cone from effect of HNO_3 soak (left side) and clean machined metal on right.



Re-installing the Cleaned Cones

- Check the condition of the graphite gasket and replace if necessary
- Refit the skimmer cone using the removal tool
- Refit the sample cone and tighten by hand
- Check the vacuum levels to confirm correct installation
 - Interface pressure: 500 Pa (~4 torr, 0.005 atm)
 - Analyzer pressure: 0.002 Pa ($\sim 1.5 \times 10^{-5}$ torr, 2×10^{-8} atm)



Conditioning Interface Cones

Condition new or cleaned cones prior to use

- Reduces drift due to initial deposition of sample matrix on the clean cone surface
- A thin insulating layer on the surface of the cone can lead to improved sensitivity (BEC) in your analysis

Default Recommendation

- Aspirate 50 ppm Ca in 1% HNO₃ for 10 minutes
- Follow with a 1% HNO₃ rinse solution for 10 mins

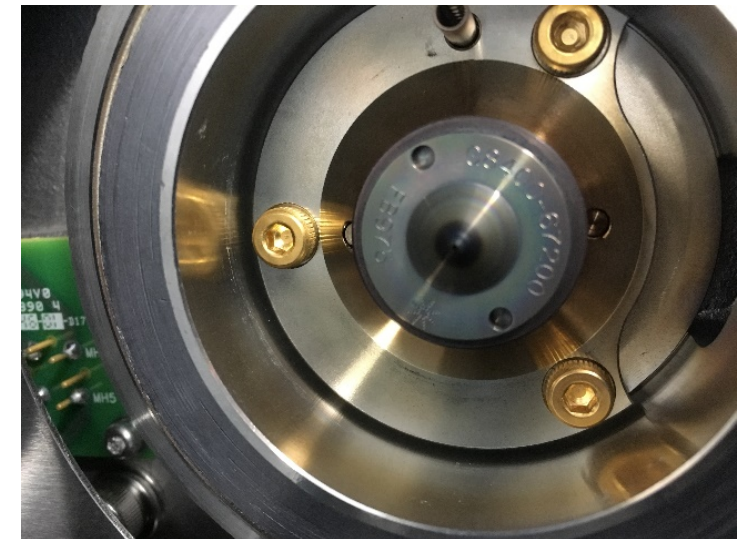
Practical Recommendation

- Aspirate your highest matrix sample for ~15 mins (warm up) and then your blank / rinse solution for 10 mins.

Environmental Laboratories

- Aspirate 6020 Interference Check solution A ([5188-6526](https://www.agilent.com/chem/6020)) diluted 10 times by volume with Ultrapure Water for 30 mins
- General Purpose auto tuning, no gas mode
- Follow with a 5% HNO₃ rinse solution for 10 mins

Make use of the instrument warm up time!



Top 5 Tips to Ensure a Successful Restart of Your ICP



Clean/verify nebulizer performance



Check/clean pre-optics or interface cones



Clean your sample introduction system



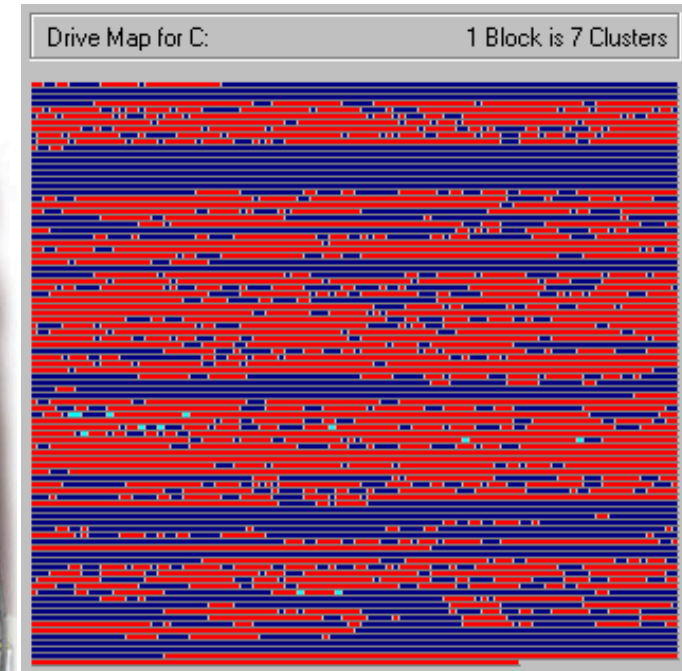
Fit new peristaltic pump tubing



Run a performance report



Don't forget your WorkStation !!!



Fragmentation occurs during the normal operation of windows this can eventually slow disc access down

- Use a defragmentation utility to reorder files and remove fragmentation

Opportunity to 'Tidy Up' your Workstation

Archive old data and remove from PC

Run Disk Clean Up

Defrag the PC

If DB system, backup DBs. Detach unused DBs and archive.

If running on Windows 7, take opportunity to replace with Windows 10 PCs and update/reload software.

Update to latest versions of Patches and Software, often can be done by end-user.

(Contact your Agilent representative, to set up remote assistance, if necessary)

For Supplies Issues, Contact Agilent Supplies Technical Support



1-800-227-9770 option 3, option 3:

Option 1 for GC and GC/MS columns and supplies

Option 2 for LC and LC/MS columns and supplies

Option 3 for sample preparation, filtration, and QuEChERS

Option 4 for spectroscopy supplies

Option 5 for chemical standards

Available in the USA and Canada 8–5, all time zones



gc-column-support@agilent.com

lc-column-support@agilent.com

spp-support@agilent.com

spectro-supplies-support@agilent.com

chem-standards-support@agilent.com

Other Agilent Resources to Assist!

<https://www.agilent.com/en/promotions/spectro-resource-hub>

Find All Your Supplies for Single-Element Analysis with Our Interactive Periodic Table



Easily find high-quality standards to comply with EPA 200.8 regulations

Accurately detecting heavy metals and other elements in environmental, food, and elemental analysis samples depends on having high-quality reference materials. Agilent ULTRA standards are rigorously tested and manufactured using ISO 17025 and 17034 accreditations.

To read a full description—plus ordering information—simply click the element you're looking for.

☐ Solid (g/cm ³ , 20 °C)	☐ Liquid (g/mL, 20 °C)
☐ Gas (g/L, 0 °C, 1 atm)	☐ Artificially created
☐ Single-element standards available from Agilent	☐ Not commercially available

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1 H																	2 He
3 Li	4 Be											5 B	6 C	7 N	8 O	9 F	10 Ne
11 Na	12 Mg											13 Al	14 Si	15 P	16 S	17 Cl	18 Ar
19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr
37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe
55 Cs	56 Ba		57 La	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu
87 Fr	88 Ra		89 Ac	90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr

Use Agilent's Interactive Periodic Table to help locate the right certified reference materials and supplies.

Click on an element for information on storage, stability and matrix compatibility

Find quality ISO 17025 and 17034 accredited chemical standards and certified reference materials.

<https://explore.agilent.com/periodic-table-standards>

Atomic spectroscopy resource hub

Get More from Your Atomic Spectroscopy Instrument



Access how-to videos, troubleshooting tips, and other resources in seconds

What steps should we take to prevent nebulizer blockage? What should we do to achieve the best performance when using hollow cathode lamps? What's the best way to clean sampler and skimmer cones?

Our new atomic spectroscopy resources hub helps you answer these questions—and others—when time is short. It keeps you up to date with the best practices for maintaining your instruments, minimizing downtime, and making your analysis workflow more efficient.

Here, you'll find access to information that can help you:

- Properly maintain every atomic spectroscopy instrument in your lab.

Here are three maintenance guides you can use right now

We've put together our best tips for optimizing your atomic spectroscopy instruments, and making sure that your methods are robust and reliable.

[Download AAS Guide](#)

[Download ICP-OES Guide](#)

[Download ICP-MS Guide](#)

Getting started is easy. Simply select your technique:

AAS Resources

[Access now](#)

ICP-OES Resources

[Access now](#)

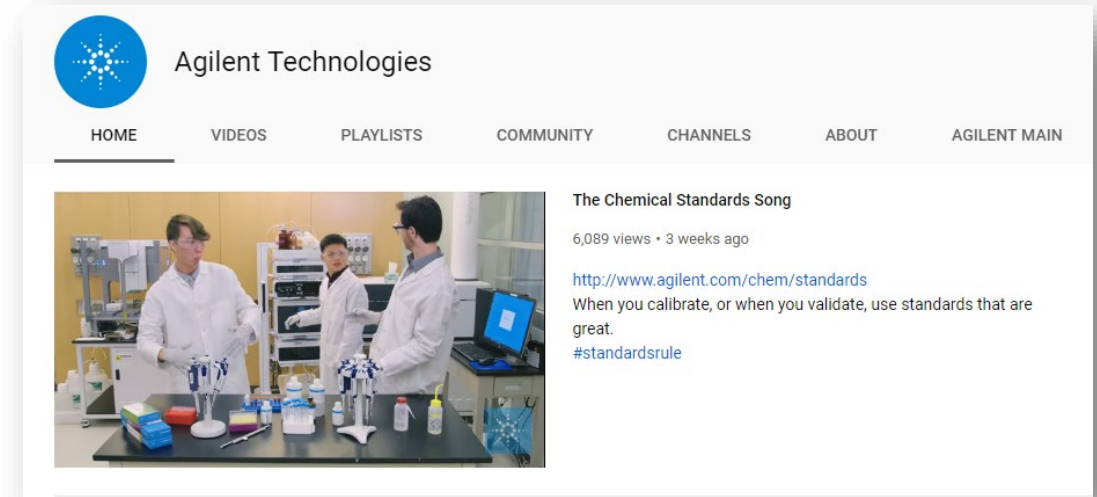
ICP-MS Resources

[Access now](#)

Resources for Support

HPLC and LC columns support

- Collection of LC resources:
https://community.agilent.com/docs/DOC-1852-lc-insights-to-go#jive_content_id_LC_Troubleshooting
- LC Troubleshooting Poster:
<https://www.agilent.com/en/promotions/lc-troubleshooting>
- Agilent support resources:
<https://community.agilent.com/community/resources>
- Agilent University: <http://www.agilent.com/crosslab/university>
- Agilent resource center:
<http://www.agilent.com/chem/agilentresources>
- InfinityLab Supplies Catalog ([5991-8031EN](https://www.agilent.com/chem/infinitylab-supplies))
- Your local FSE and Specialists
- Youtube – [Agilent Channel](https://www.youtube.com/agilent)



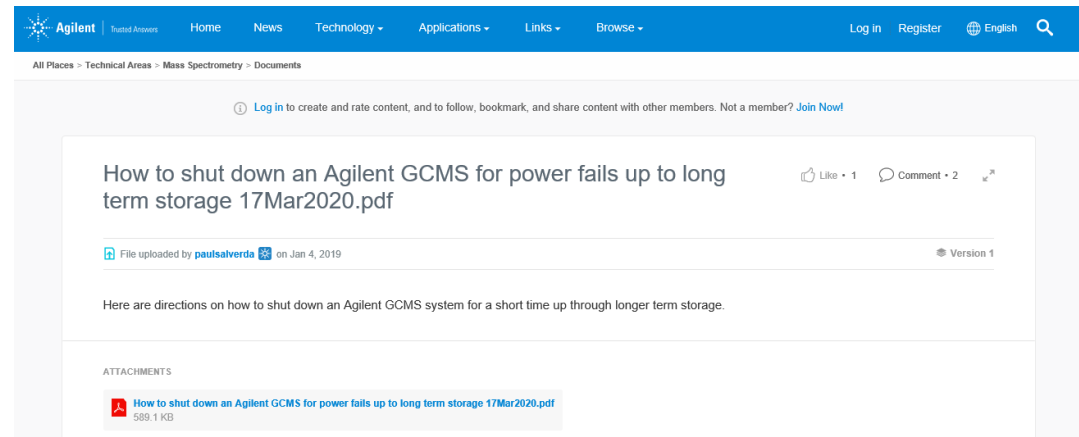
gc-column-support@agilent.com
lc-column-support@agilent.com
spp-support@agilent.com
spectro-supplies-support@agilent.com



Resources for Support

Detailed shutdown guides for GCMS on [Agilent Community](https://community.agilent.com)

Includes step-by-step procedure, part numbers, and additional info on preparing, moving, and storing systems.



<https://community.agilent.com/docs/DOC-5382-how-to-shut-down-an-agilent-gcms-for-power-fails-up-to-long-term-storagepdf>

Additional online e-seminars and educational material

Agilent Atomic Webinar Series

Solutions for your Atomic Spectroscopy Needs



<https://www.agilent.com/en/training-events/eseminars/atomic-spectroscopy>

Spectroscopy Digital Workshops & Bootcamps

A Virtual Series Designed to Bring the Agilent Lab to You.



[Register here](#)

Whether you are away from your lab or are limiting access to your lab, Agilent can support you with remote, digital solutions.



Get individualized assistance. Our remote service engineers are available by **phone or video conference** to answer your questions – including support on compliance issues or performing risk assessments. [Contact us](#) or explore [online resources](#) to do-it-yourself.



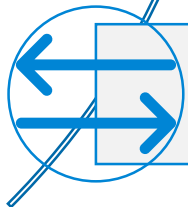
Connect, collaborate, and share insights. Quickly ask and find answers to your questions **live and online**. Build connections and access instrument resources in the [Agilent Community](#).



Learn at any time, any place, any pace. Explore hundreds of **online courses** - many of which are free - from [Agilent University](#). Use Learning Paths for guided resources on a specific instrument, or get ePass for unlimited access to all online content.



Check-in with your Agilent instruments remotely. Receive real-time status alerts with critical instrument information with [Smart Alerts](#) for your Agilent LC, GC and GC/MS instruments. The Remote Assist feature also provides priority response service for faster uptime. No professional installation needed!



Keep your lab up and running. With over 400 instrument modules in stock and ready to ship, utilize our [Instrument Exchange Services](#) to replace defective modules. Or if you need to retain your instrument, use the [Return to Agilent](#) Program to ship us your defective unit. **We'll repair it and return your instrument back to you.**

Contact Agilent Chemistries and Supplies Technical Support



1-800-227-9770 Option 3, Option 3:

Option 1 for GC/GCMS Columns and Supplies

Option 2 for LC/LCMS Columns and Supplies

Option 3 for Sample Preparation, Filtration and QuEChERS

Option 4 for Spectroscopy Supplies

Option 5 for Chemical Standards

800 Phone lines available 8-5 in all US time zones

[Phone Tree](#)
[Navigation](#)
[Assistance](#)



gc-column-support@Agilent.com

lc-column-support@agilent.com

spp-support@agilent.com

spectro-supplies-support@agilent.com

chem-standards-support@agilent.com

In Summary



We at Agilent understand the restrictions and hardship many of you are going through because we're experiencing them as well



Given all that we are going through, Agilent remains a stable and continuing resource to meet and exceed your analytical measurement needs

We are open for business and here to help



Any questions?

All unanswered chat questions will be followed up post-event.
Slides will be distributed to the email address you registered with.