

Agilent Fully Demountable ICP-OES Torch

Simplifies maintenance while offering greater flexibility



Postponing torch maintenance and sample analysis because the chore is perceived to be time consuming?

Agilent innovation for creating products with ease-of-use and uncompromised performance strikes again! The fully demountable torch for the 5000 Series ICP-OES features a removable injector to simplify torch maintenance and allows quick changeover for diverse sample matrices. Why remove the entire torch when the injector is the only component standing between getting results from organic solvents to fusions? The complexity of changing of the injector when switching applications or cleaning has never been easier.

Competitive demountable torches have a complex mounting, making injector removal/replacement and torch cleaning hazardous, complicated, and time-consuming.

The Agilent fully demountable torch takes the pain out of maintenance and is available for Agilent 5000 Series ICP-OES instruments. This design provides:

- **Flexibility** – A variety of injector materials and sizes to handle difficult and diverse application demands without loss of sensitivity or added complexity.
- **Greater productivity** – Tool-free installation simplifies injector maintenance without removing the torch from the instrument.
- **No manual optimization** – No need for manual adjustment or optimization, providing consistent results before and after injector replacement regardless of number of analytes.
- **Ease of maintenance** – Removable injector provides quick change-over without the need for diagrams or multiple O-rings and seals.

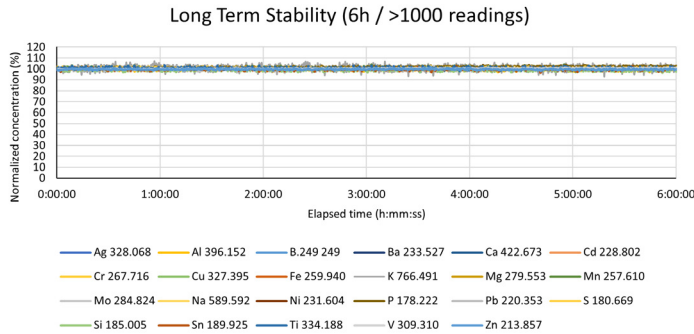


Agilent fully demountable torch

Agilent fully demountable torch disassembled and shown with an alumina (inert) injector.

The simple design allows analysts to easily remove the injector for cleaning and/or to switch injectors for another application. The removal/replacement of the injector is so simple it can even be done without removing the torch from the instrument.

Fully demountable ICP-OES torch improves laboratory workflows



We measured a used lubricant oil sample, taken from a Caterpillar wheel loader, using an Agilent 5900 SVDV ICP-OES equipped with AVS7 and the fully demountable torch and an alumina (inert) 1.4mm injector for semi-volatile applications. The robustness was proved by analyzing the used oil sample >1,000 times continuously over 6 hours, using Y as an internal standard.

The vertical torch configuration and 1.4 mm id alumina injector ensured excellent stability with < 10% variation over all the results and long-term precision < 3% RSD for all 23 analytes measured. There was no sign of carbon build-up on the alumina injector during that period, confirming that maintenance requirements are less than competitive brands.

How alumina injectors for the Fully Demountable ICP-OES torch reduce your downtime and simplify cleaning

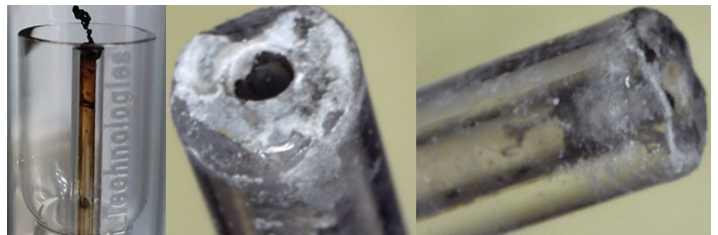
Quartz injectors are typically used for most applications, except for samples that include hydrofluoric (HF) acid, which rapidly attacks and degrades any quartz components. Quartz injectors have the advantage that they are the most economical, but one disadvantage is that degradation of the tip of the injector can occur due to devitrification, especially when analyzing organic solvents that emit high intensity UV, or matrices that are rich in alkali salts, including Li-battery materials or sea water.

As the degradation progresses, the tip of the injector loses its polished finish, enabling carbon from organic solvents or salts from high TDS samples to bind to the surface. With continued use, the build-up occur at an ever increasing rate, which means shorter run times before cleaning is required. The increased frequency of maintenance means more downtime. In the worst case, the injector will need replacement.

Replacing the quartz injector with an inert, alumina injector is beneficial for these applications where the quartz injector is rapidly degraded. The inert, alumina injector is more durable and robust with greater resistance to devitrification, even with challenging sample matrices. This means longer injector lifetime, and reduced maintenance, compared to a quartz injector.

The example below demonstrates the lifetime improvement achieved with an alumina injector, for an application where the quartz injector is normally recommended: the determination of wear metals in oil samples prepared in A-solv solvent (kerosene equivalent).

During extended analysis, carbon builds up on the tip of the quartz injector (pictured below) to the point where maintenance is required (left). Exposure to high levels of UV from the plasma, combined with routine cleaning using a blow torch to remove the carbon build-up, causes degradation of the tip due to devitrification and solarization (middle, right). Once degradation occurs, carbon build-up occurs more rapidly, leading to shorter run times, reduced maintenance intervals and increased downtime.



Carbon build-up on the injector will still occur if using an alumina injector for the same application (pictured below). After burning off the carbon using a blow torch, some inorganic residue remains on the tip of the injector (middle), which can be easily removed by soaking in dilute acid leaving a clean injector (right). The alumina injector pictured has completed 5 cleaning cycles – the same number as the quartz injector, without any degradation and no impact to performance or analysis run time.



Injector selection tips and guidance

- For long term stable analysis of organic solvents a narrower ID injector, such as the 0.8mm ID for volatiles or 1.4mm ID for semi-volatiles, is recommended to help reduce the sample loading on the plasma and reduce excessive carbon build-up
- For conventional analysis of aqueous/acidic samples, the 1.8mm ID quartz injector is ideal
- For complex matrices that have high levels of total dissolved solids or larger particulates require a wider bore 2.4mm ID injector, to reduce the chance of injector blockage
- For matrices that are rich in alkali metals, including Li-battery materials, or hydrofluoric (HF) acid digests, an inert alumina injector is required to ensure chemical compatibility and best resistance to devitrification

Where there is a choice between a quartz and an alumina injector, the quartz injector is the most economical, while the alumina injector will provide longer life and easier cleaning with most matrices.

To learn more about the recommended ICP-OES consumables, standard solution, and tools for the Lithium Battery Industry, see flyer:

Ordering information

Torch Kits	Recommended Use	Part Number
Easy-fit fully demountable DV torch with 1.4 mm ID tapered quartz injector: Includes a replaceable extended (high purity quartz) outer tube-set for organic applications with slot for radial viewing.	Semi volatile organic solvents, e.g. kerosene, Jet A1, A-solv solvent	G8020-68002
Easy-fit fully demountable RV torch with 1.4mm ID tapered quartz injector: Includes a replaceable shorter (high purity quartz) outer tube-set for organic applications (no slot) for dedicated radial viewing.	Semi volatile organic solvents, e.g. kerosene, Jet A1, A-solv solvent	G8020-68007
Easy-fit fully demountable RV torch with 0.8 mm ID tapered quartz injector: Includes a replaceable shorter (high purity quartz) outer tube-set for organic applications (no slot) for dedicated radial viewing.	Volatile organic solvents, e.g. gasoline	G8020-68001
Easy-fit fully demountable DV torch with 2.4 mm ID tapered quartz injector: Includes a replaceable extended (standard) outer tube-set with slot for radial viewing, plus a spare outer tube-set.	High TDS samples	G8020-68004
Easy-fit fully demountable DV inert torch with 1.8 mm ID alumina (inert) injector: Includes a replaceable extended (standard) outer tube-set with slot for radial viewing, plus a spare outer tube-set.	Hydrofluoric (HF) acid digests and other aggressive acids	G8020-68003
Easy-fit fully demountable DV torch with 1.8 mm ID tapered quartz injector: Includes a replaceable extended (standard) outer tube-set with slot for radial viewing, plus a spare outer tube-set.	Most sample types including aqueous/acidic digests	G8020-68005
Easy-fit fully demountable DV torch with 1.4 mm ID alumina (inert) injector. Includes a replaceable extended (high purity quartz) outer tube-set for organic applications with slot for radial viewing.	Lithium-ion battery materials, e.g. Lithium fluoride, Lithium hexafluorophosphate electrolyte; Semi volatile organic solvents e.g. kerosene, Jet A1, A-solv solvent; and hydrofluoric (HF) acid digests.	G8020-68020

Description	Part Number
Quartz Injectors	
Replacement 0.8 mm ID tapered quartz injector	G8020-60805
Replacement 1.4 mm ID tapered quartz injector	G8020-60806
Replacement 1.8 mm ID tapered quartz injector	G8020-60807
Replacement 2.4 mm ID tapered quartz injector	G8020-60808
Alumina Injectors	
Replacement 0.8mm ID alumina (inert) injector	G8020-47002
Replacement 1.4mm ID alumina (inert) injector	G8020-47003
Replacement 1.8mm ID alumina (inert) injector	G8020-47005
Replacement 2.4mm ID alumina (inert) injector	G8020-47004
Outer Tube-sets – Includes intermediate tube (integrated into assembly) with top seal	
Outer tube-set – DV configuration, for use with aqueous/acidic digests	G8010-60263
Outer tube-set – RV configuration, for use with aqueous/acidic digests	G8010-60264
Organics outer tube-set – DV configuration, for use with organic solvents	G8014-60022
Organics outer tube-set – RV configuration, for use with organic solvents	G8016-60000
Other Parts	
Top seal for 5000 Series fully and semi demountable torches, pack/3	G8014-60023
Injector locking nut for fully demountable torch for 5000 Series ICP-OES	G8020-60810

To learn more about these fully demountable torches, visit:
www.agilent.com/chem/5100torches

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This information is subject to change without notice.