

Summary

The Savillex PFA inert kit for the PE NexION 300 Series ICP-MS instruments features a Scott-type spray chamber offering excellent sensitivity, stability and washout. Designed and manufactured in house by Savillex from the highest purity grade PFA resin, the Savillex PFA inert kit has the lowest blank contribution of any sample introduction system. The true double pass spray chamber design filters out larger droplets, making the kit equally suited to high matrix applications (such as geological) as well as semiconductor use. In combination with one of the Savillex C-Flow PFA concentric nebulizers, this PFA inert kit can handle every type of liquid sample that can be analyzed by ICP-MS.



*Savillex PFA Inert Kit for
PerkinElmer NexION 300 Series ICP-MS*

Savillex Inert Kits - Background

Traditionally, inert (PFA) sample introduction systems used in ICP-MS have not performed as well as standard quartz systems. The design of PFA systems is restricted by limitations in fluoropolymer molding and manufacturing capabilities. Increased plasma loading and poorer signal stability due to the use of single pass spray chamber designs, and unreliability over long runs due to droplet build up have all been observed. As a result, PFA sample introduction kits are typically used only when necessary – i.e. with HF-containing samples. In contrast, Savillex manufactures PFA sample introduction systems that can be used for all applications, so analysts don't have to change between systems depending on sample type. By applying its unique expertise in PFA molding and secondary finishing, Savillex has overcome the traditional limitations of PFA sample introduction systems. Savillex's PFA inert kit for the NexION 300 Series ICP-MS has similar signal stability, sensitivity and long term reliability to the standard system featuring a quartz cyclonic spray chamber.

Technical Features

The kit comprises of a PFA double pass Scott-type spray chamber and PFA injector holder, fitted to a semi-demountable quartz torch. The spray chamber is a 35 mm outer diameter with a removable PFA inner tube located precisely by three fins at each end. Unlike single pass PFA spray chambers, the spray chamber is a true double pass design, which reduces signal fluctuations, improves RSDs and lowers detection limits. The double pass design also removes all sample aerosol droplets greater than 10 μm diameter. Removing larger droplets is key to preventing plasma overloading, increasing plasma robustness and reducing oxide levels. While PFA kits have traditionally been used for semicon applications, this kit can be applied equally to non-semicon high matrix sample types. The end cap is O-ring free and features a 6 mm nebulizer port and a make up gas port. A schematic diagram of the inert kit is shown on the next page.

Another important contributor to the performance of the kit is the connector design. In order to eliminate droplet build up in this area, careful attention has been paid to the design of the aerosol flow path. The chamber side arm has a wide inner diameter (ID), and the injector holder is tapered at the connection to the chamber side arm. The injector holder connection is O-ring free and is a push fit, and the ID matches precisely the ID of the side arm. Because the aerosol flow path is perfectly smooth with no ledges or steps, droplet formation is eliminated (see diagram - to the right) and washout is improved. The semi demountable quartz torch fits onto the injector holder with an O-ring seal, which gives a more secure and more easily removed connection than O-ring free torch mounts. Since no sample liquid or aerosol comes into contact with the torch O-ring, there is no risk of increased background contribution. Injectors are available in either sapphire (1.8 mm ID) or platinum (2 mm ID).

Designed, molded and manufactured in house by SavilleX from the highest purity grades of PFA resin, the PFA inert kit has the lowest blank contribution of any sample introduction system. The kit is designed to be used with the SavilleX range of C-Flow PFA nebulizers, but can be used with any 6 mm OD nebulizer and also the SavilleX X-Flow cross flow nebulizer, which gives the ultimate in TDS tolerance and is the best choice for biomedical matrices.

Applications

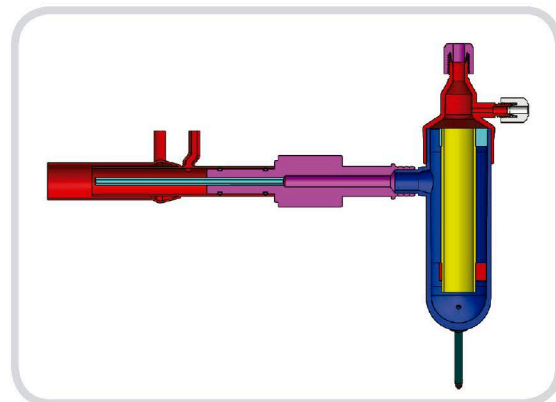
For semiconductor applications, select the appropriate SavilleX C-Flow concentric nebulizer depending upon sample type and sample volume. Use the C200 for process chemicals and the C50 for VPD applications, where sample volume is limited. The C50 is also the best choice for high/difficult matrix applications such as phosphoric acid analysis and digested photovoltaic (PV) silicon, where lower uptake rates allow the sample matrix to be dissociated more effectively and help prevent interface deposition. In all semiconductor applications, the C-Flow nebulizer is used in free aspiration mode to avoid possible contamination from peri-pump tubing. The C-Flow is available with or without integrated autosampler probes.

Because the SavilleX inert kit is a true double pass design and capable of handling high matrix sample types, it is also ideally suited to non-semicon applications such as geological and clinical. For these applications, the C400d or C400e demountable C-Flow nebulizers are the best choice.

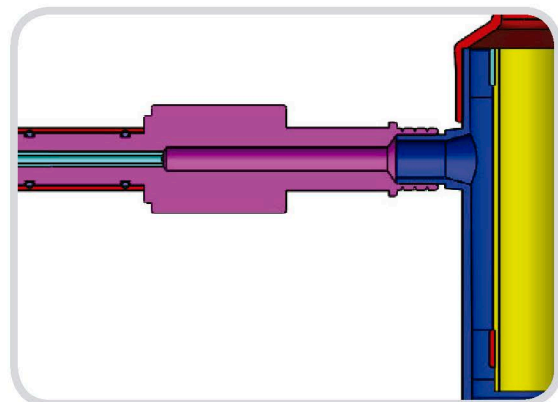
Inert Kit Features

The SavilleX PFA inert kit is the highest performing sample introduction system available for ICP-MS. When used with one of SavilleX's C-Flow nebulizers, it has the following features:

- Available for all NexION 300 Series ICP-MS models
- High sensitivity
- True double pass design gives excellent signal stability and low RSDs
- True double pass design filters out all droplets >10 µm diameter: less plasma loading and low oxides (more robust plasma)
- Smooth aerosol flow path prevents droplet build up in connector and promotes fast washout
- Highest purity PFA resin used - no measureable background contribution
- C-Flow nebulizers free aspirate – can be used for aggressive organics that attack pump tubing
- Very high TDS and particulate tolerance
- Capable of microvolume sample uptake rates (with C35, C50, C100 or C200)
- Compatible with every sample type – inorganic and organic – that could be analyzed by ICP-MS



SavilleX PFA Inert Kit for PerkinElmer NexION 300 Series ICP-MS



Close Up of Connector to Injector Holder Showing Smooth Flow Path