

# Agilent ICP-MS IntelliQuant Software

For greater sample insight and  
confidence in results

## Agilent ICP-MS IntelliQuant:

- Gives insight about your samples to get the right answer the first time
- Provides information about what's in unknown samples to assist with method development
- Assists in troubleshooting sample preparation and handling
- Automatically calibrates and takes only 2 seconds per sample
- Identifies possible unknown interferences

## What is IntelliQuant?

ICP-MS is a powerful and flexible technique offering high sensitivity and selectivity. However, ICP-MS is often thought of as complicated for the novice user during method development and also for ongoing routine analysis. It is important to have confidence in the results, but understanding how to interpret the data can be daunting.

IntelliQuant is a software function built into the MassHunter software for Agilent ICP-MS and ICP-QQQ instruments (version 4.6 and later). IntelliQuant helps the user by analyzing the sample data and providing simple and intuitive insights. It uses a full mass-spectrum taken automatically for every sample, and only takes 2 seconds measurement time to let you know everything about your samples. When combined with Helium Collision Mode, IntelliQuant provides the best data quality possible. This data is then used to provide vital sample insight giving you real confidence in your results, including:

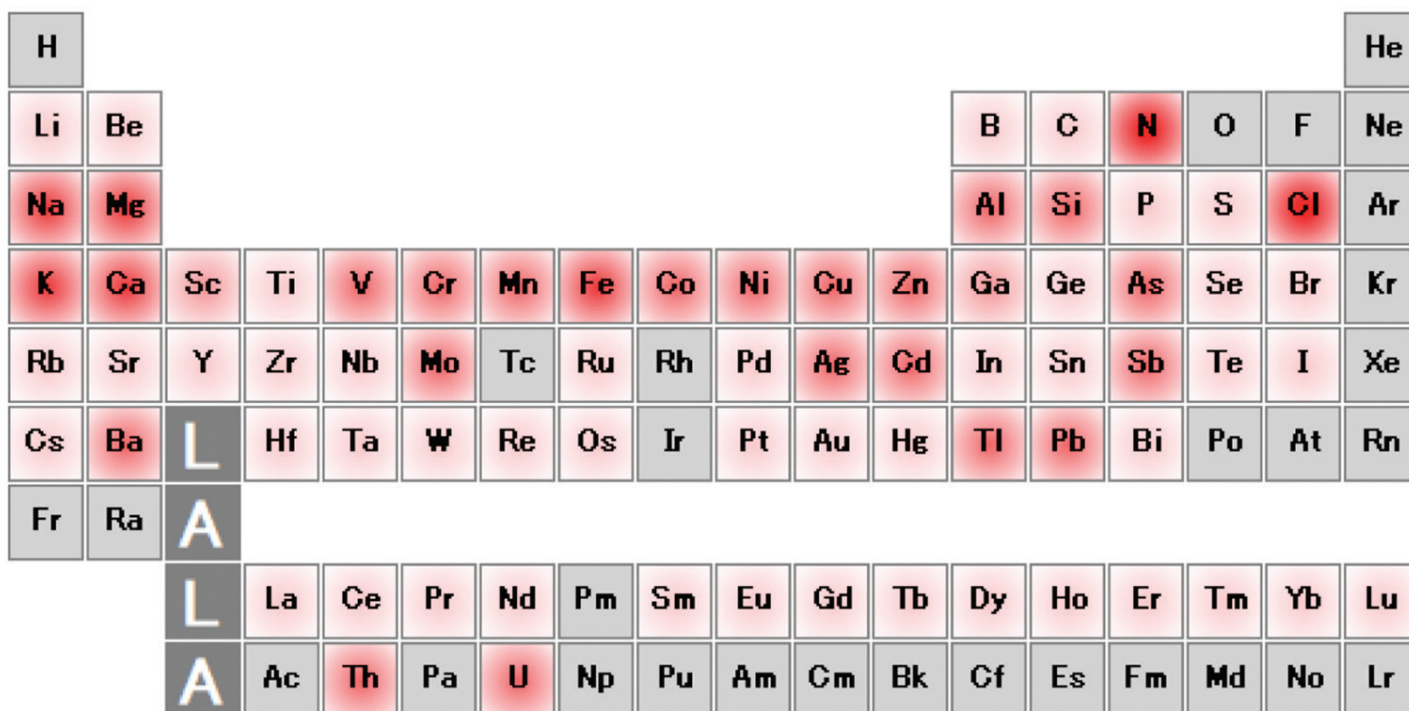
- The elemental composition of each sample based on the periodic table
- An estimation of the total solids for each sample
- Information about possible interferences and incorrect sample preparation.

## Comprehensive insight into your samples

IntelliQuant will improve confidence in your results by providing semiquantitative data about every measurable element in a sample—including those elements not in the calibration solutions. This data is useful when faced with a completely unknown sample, when tracking down contamination issues, or when troubleshooting data quality issues such as failed QC samples.

IntelliQuant can use any spectrum data collected using the QuickScan function (including QuickScan data from previous versions of ICP-MS MassHunter).

## More sample insight with data visualization



**Figure 1.** Periodic table smart view of a wastewater sample. The color intensity indicates the relative concentrations of elements within the sample i.e. the darker the red, the higher the concentration of that element.

IntelliQuant assesses the mass spectrum for each sample, and uses a database of ionization efficiencies and isotopic information, to calculate the semiquantitative concentration of all measurable elements in the sample. The results are displayed as an easy to understand periodic table display. The periodic table smart view is colored to show the relative concentrations of each element in the sample—including elements that are not in the quantitative method. Internal standards and “nonmeasurable” elements such as the gases and radioisotopes are not included.

The periodic table smart view is a useful tool for:

- A quick and simple overview of the relative concentration of all elements within the sample
- Finding sample preparation issues—for example, the lack of Cl in the results could indicate that HCl was not added before preparation.

### Automatic calibration

IntelliQuant automatically calibrates the instrument response, so there’s no additional standards or method setup to prepare. It selects the appropriate calibration and internal standard solutions from your quantitative measurements and automatically applies these solutions to the IntelliQuant analysis—no user input is needed.

### Use IntelliQuant to optimize methods

As shown in Figure 1, IntelliQuant can graphically display the relative concentrations of all elements in a sample. This information can be used, for example, during method development to determine dilution factors and guide the calibration range to use for each element.

## Identifying possible interferences

For every element of interest, IntelliQuant looks at the whole mass spectrum to determine whether there are possible interferences from the sample matrix. QC samples do not necessarily mimic an unknown matrix and cannot identify the specific problems which may occur in each sample. IntelliQuant acts like a QC on every sample, helping you identify possible issues with data quality without needing to be an expert.

H																					He
Li	Be											B	C	N	O	F	Ne				
Na	Mg											Al	Si	P	S	Cl	Ar				
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr				
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe				
Cs	Ba	L	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn				
Fr	Ra	A																			
		L	La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu				
		A	Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr				

**Figure 2.** IntelliQuant can identify potential analyte interferences by screening the full mass spectrum and calculating possible interferences. This information is then displayed as an easy to understand color-coded highlight on the periodic table smart view. In this example, the yellow shading indicates possible oxide interferences and the pink indicates possible argide interferences. Other interference types are similarly color-coded.

## Identify sample preparation mistakes

Failure to add the correct acid during sample preparation can lead to inadequate digestion or poor elemental stability, causing incorrect results. IntelliQuant can be used to identify sample preparation issues as it can determine elements such as the chloride in HCl.

As shown in Figure 3, IntelliQuant has identified that Cl is present in a relatively low concentration in a surface water sample. This was likely due to HCl not being added during sample preparation. The results for mercury and tin are erroneously low due to this error. Chloride is not a typical analyte in routine measurements by ICP-MS and this mistake could have been easily overlooked.

H																					He
Li	Be											B	C	N	O	F	Ne				
Na	Mg											Al	Si	P	S	Cl	Ar				
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr				
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe				
Cs	Ba	L	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn				
Fr	Ra	A																			
		L	La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu				
		A	Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr				

**Figure 3.** This surface water sample was incorrectly prepared. Cl is clearly at low concentration, indicating that HCl was not added during sample preparation, resulting in lower than expected results for Hg and Sn.

## Determine the level of solids in a sample

IntelliQuant includes a total matrix solids calculation, providing an overview of the level of solids in each sample. The calculation does not include the gas or 'acid elements', such as Cl, in the calculations, ensuring a more accurate result. Knowledge of the solids content in a sample allows suitable dilutions and the adjustment of method parameters. Knowing the matrix solids content is also useful when troubleshooting erroneously low results—which may be due to matrix effects.

This information is subject to change without notice.

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