Thermo Scientific iTEVA Software: Intuitive Software to Enhance Performance, Productivity and Versatility

Benefits in brief
- Productivity-enhancing features for fast, reliable results, day-after-day
- Performance to enable method and regulatory compliance with ease
- Versatility to expand your analytical capabilities with a full complement of sampling accessories

Introduction
Thermo Scientific iTEVA Software is a powerful, multi-tasking application that enables the simultaneous collection and processing of data from previous runs. The iTEVA Software makes routine tasks simple and along with a range of accessories, adds scalable automation and application flexibility. It is also possible to uniquely edit and automate a run as necessary - without stopping or pausing. The comprehensive on-line help function offers step-by-step guides for all aspects of use, from setting up a method, to publishing reports.

The software uses a browser-style interface and is based on standard Windows® conventions. However, unlike alternative instrument software packages iTEVA Software uses the powerful database technology, Microsoft SQL Server®. This technology enables the iTEVA Software to guarantee data integrity whilst maintaining fast storage and access facilities with far greater flexibility for data searches, queries and reports. The iTEVA Software is supported with regular and free updates to ensure compatibility with the latest operating systems. Software tutorial and updates can be conveniently accessed and downloaded from www.thermoscientific.com/iteva-software.

Ease-of-Use
The use of traditional file dialogs in conjunction with user-friendly icons, tooltips and status bar descriptions enable rapid identification of the required functions. For example, the color-coded interlock system (figure 1) provides an “at a glance” update of the system status.

Figure 1. Plasma and Interlock Status tools in iTEVA Software provide instant feedback from the Thermo Scientific iCAP 6000 Series ICP-OES.

Multi-tasking Functionality to Enhance Productivity
Thermo Scientific iTEVA Software is one of the few software packages to deliver powerful multi-tasking functionality. The iTEVA Software enables flexible, multi-tasking capability whilst analytical operations are proceeding and the active method can be examined and edited whilst acquiring data with all changes being automatically updated. Overlaying spectral data from different methods, extracting saved data and changing the autosampler session “live” are all standard options, achieved without compromising the data integrity or having to use an offline system.
Powerful Data Acquisition Modes

iTEVA Software offers the analyst three powerful data acquisition modes to address the performance requirements for all application areas effectively; Precision, Speed and the new ultra fast Sprint data acquisition mode.

**Precision** mode enables routine analysis of moderate sample loads and takes the traditional approach of measuring all selected wavelengths irrespective of their plasma view on a ‘per replicate’ basis. **Speed** mode enables analysis of larger sample loads and intelligently groups wavelengths for data acquisition in accordance with their plasma view to enhance data acquisition speed and increase sample throughput capability. The new Sprint mode enables ultra high-speed trace element screening for the most demanding high-throughput laboratory environments. This mode employs intelligent plasma view sequencing in conjunction with Cumulative Set Pattern Integration (C SPI) to achieve ultimate sample analysis speed and sample throughput capability.

**Intelligent Rinse and Stop-Ahead Autosampling**

With some analyses, it is difficult to know what to expect from the next sample. Therefore it may be necessary to add-in preventative measures such as long rinse times in order to cover all eventualities. iTEVA Software removes the uncertainty when setting the sample rinse times by using the Intelligent Rinse (IRINSE) feature. IRINSE enables the analyst to set the limit for the method elements. If this limit is exceeded, the autosampler probe then moves to the rinse station and washes until the lower limit has been met. In addition to ensuring no carry-over, IRINSE can save valuable time because if the limit is not exceeded the sample probe can move directly to the next sample without rinsing at all.

The **Autosampler Step Ahead** feature is designed to minimize the non-productive steps in an analysis (i.e. the sample flush and rinse times) by stepping-ahead to the next sample in parallel to completing the current analysis. This action is undertaken using the remaining sample in the autosampler line to complete the current analysis.

**Fully-Automated Method Development**

Creating a method is simple with the fully-automated method development feature. Simply select the required elements, enter the standard concentrations and start the analyses. The iTEVA Software **Optimize Source** routine (figure 2) enables even the most inexperienced ICP user to achieve excellent results by removing the need for experimentation and guess-work. The **Optimize Source** function performs optimization of all method parameters including pump speed, nebulizer gas flow, auxiliary gas flow, coolant gas flow, RF power and radial viewing height (where applicable). This automated routine enables the analyst to fully optimize the method parameters based on a choice of three options – Best Signal, Best Signal-to-Background Ratio or Best Detection Limit (DL).

After selecting the optimization mode, the analyst can specify any or all of the elements to be optimized in the method. For example, when performing analysis of environmental samples, the analyst can optimize specifically for Best DL and may choose to optimize specifically for just the trace elements, thus biasing the method in their favor. Furthermore, the entire routine can be run unattended as the analyst is only required to aspirate a single method solution. When the routine is complete, the new parameters can be automatically updated into the method for immediate use. This unique time-saving function allows for full method optimization in a fraction of the time that would otherwise be required when performed manually. For example EPA method 6010B was optimized for all parameters and all 29 elements in just 40 minutes!

**Review and Edit Data Whilst Analyzing**

The iTEVA Software enables the analyst to manipulate data to allow flexible background/interference correction, giving full control over the use and size of background in addition to central integration areas. This feature can prove invaluable during method development because the analyst can use their wavelength of choice, even with the presence of interferences.

The wavelength library contains over 55,000 wavelengths; therefore the choice of analytical wavelength is virtually limitless due to the continuous spectrum coverage of the CID detector. All of this can be performed whilst the instrument is acquiring data, making it extremely productive. See the example below which demonstrates how useful this flexible approach is:
Figure 3 shows the subarray for a 0.25 mg/l solution of nickel, using 221.647 nm with an interfering peak from silicon 221.667 nm on the right. This interferent is correctly identified with a single click of the Wavelength Finder and can be avoided easily using the flexible background points (which can be adjusted or deselected to avoid interferences as required). Intensity data is available for peak, background and corrected peak at any time by positioning the mouse over data points on the subarray for unique access to your entire spectrum!

**Full real-time analytical control of spectral data**

Full Spectrum Qualitative and Semi-Quant Data in 30 seconds!
The Fullframe functionality enables the analyst to determine every element (available by ICP) in a sample – in just 30 seconds! This feature is invaluable for the analysis of unknown samples and proves an excellent tool for method development as it enables the discovery of all the constituents of the sample. Fullframe offers batch and trend analyses and contamination identification with the ability to subtract one Fullframe from another – this feature is commonly used to strip spectral matrix components from samples. When a Fullframe has been performed, the analyst uses the graphical depiction (figure 4) of the Charge Injection Device (CID) to identify any or all elements using the Wavelength Finder. From here, semi-quantitative results can be produced at the click of a button with results typically within 10% of fully-quantitative analyses.

Versatile Method Development
Setting up a new method is extremely easy as the analyst is only mandated to select the required elements for analysis. The intelligent method defaults are set to aqueous analysis, with the option to pre-define new method parameters if required. Included in the method set-up is the Interfering Element Correction (IEC) routine, Internal Standard set-up and Autosampler conditions. This allows the analyst to set the method initially and have all the method development options automatically included for analyses. The iTEVA Software also enables the analyst to turn IEC and Internal Standards on/off before or after analyses to see their effect, saving on valuable method development time.

In addition to powerful method development tools, the iTEVA Software application also includes access to an on-line ‘iTEVA Method Library’. This library provides a suite of analytical method templates to address a wide range of protocol driven application areas in major markets such as Environmental, Petrochemical and Food Safety. The on-line Method Library can be conveniently accessed through www.thermoscientific.com/iteva-software as required. This unique library of analytical methods is regularly updated by an experienced team of global Thermo Scientific ICP-OES application specialists. The iCAP 6000 Series ICP-OES method templates are easily downloaded and uploaded to the instrument PC hosting the iTEVA Software to simplify method development, assists the analyst training process and ultimately improve laboratory productivity.
Autosampler Flexibility

The iTEVA Software provides flexibility with the ability to manipulate auto-sessions “live” (figure 5). These unique time-saving features enable the analyst to add/delete/edit or change the priority of a sample/QC whilst the session is running. Intelligent autosampler features come as standard with the iCAP 6000 Series ICP-OES. For example, the automatic shutdown routine initiates “nudge mode” on the peristaltic pump to save the pump tubing and sets the optical purge gas flow to “trickle” to reduce gas consumption and associated running costs.

Publish and Export Custom Reports in Seconds!

The iTEVA Software is fully LIMS compatible and can be configured to enable live data export to a LIMS on a sample-by-sample basis as required. In addition, LIMS can also be used to upload sample lists directly into iTEVA Software and to further improve productivity with automated analyses. For custom reporting, iTEVA Software offers an integrated program called Publisher, which uses Crystal Report® templates to produce trend charts and sample reports. These can then be printed or exported in many different formats to suit your requirements. Creating a new report couldn’t be simpler and the intuitive browser window allows the analyst to view per-sample or per-element at the click of a button!

Intuitive data handling solution

Thermo Scientific iTEVA Security Software for Audit Trail Compliance

The iTEVA Security Software is designed for the needs of FDA 21 CFR, Part 11 compliant laboratories. The iTEVA Security Software provides the analyst all of the necessary functionality to assist and facilitate full compliance. This includes full audit trails for samples, methods and automated analyses in addition to the use of electronic signatures, event logs and user access control.

Data integrity assured with fully visible audit trails

Conclusion

Thermo Scientific iTEVA Software is a powerful application with flexible features providing analysts the complete access to real-time, on-line multi-tasking capability. Analysts can take full advantage of a range of features to enhance productivity, method development and to automate analyses. These powerful features provide full support for integrated accessory operation and built-in online report generation capability.