ICP-Optical Emission Spectroscopy

Syngistix for ICP Software



Smart Software for Every Workflow

Designed to optimize your workflows and the performance of the Avio[®] Max ICP-OES instruments, Syngistix[™] for ICP software boasts a number of smart features that improve laboratory efficiencies with workflows that walk you through every step of your analysis – from initial instrument setup to final results – for consistent, efficient, reliable operation. Flexible and easy to use, the smart software offers immediate benefits whether you're running the instruments, running the laboratory, or running the business.

Optimize your daily routine with Smart Workflows

From the start of your day to the end of your overnight analysis, Syngistix software provides a number of features to streamline your workflow. Scheduler starts your day, even before you enter the lab, by performing an auto-start and warm-up of the instrument based on a user-defined schedule. Similarly, auto-shutdown can be easily scheduled based on analysis completion. Plus, with a host of cost-saving features – such as Tubing Saver that increases the longevity of the tubing – savings on consumables as well as time are inevitable.

Key Benefits

- Optimize your daily routine with Smart Workflows
- Reduce method development time with Smart Methods
- Minimize downtime and optimize your results with Smart Monitoring
- Quickly interpret your results with Smart
 Data
- Breeze through 21 CFR Part 11 audits with Smart Compliance features



_ Shuc	No and of automated and win
e	At end of automated analysis
	✓ Including terminations caused by error
(O Immediately on OK
(O 4/19/2021 □▼ 1:09:14 PM ★
(Weekly schedule Set
V	Nash before shutdown
	● Single for 1 🐳 minutes O Multiple Set
⊠т	Furn off plasma and pump
P	Put spectrometer into standby
Star	t-up
(4/19/2021 2:09:14 PM
0	Weekly schedule Set
	furn on plasma and pump
Spec	ctrometer purge
Он	tigh

Figure 1. Automatically turn off or on the plasma, pump, wash and purge with Scheduler.

For added efficiencies, you can quick start your sample run with Express Analysis from a single spot: turn on the plasma, select the folder to save data and click Analyze to begin your analysis. While the Sample Information File (SIF) provides automatic calculation of the results as the analysis progresses based on predefined preparation weights and volumes, the Data Viewer feature clearly defines all sample information: sample location, passing/failing samples, QCs and internal standards, and much more.



Figure 2. Easy setup with Express Analysis quick-start capability.

You can also multitask with Syngistix Offline, which allows you to run multiple software sessions so you can simultaneously create or alter methods, enter sample information, and review or reprocess data, all without interrupting the active analysis.

Reduce method development time with Smart Methods

For speed and productivity, Syngistix software's Method Editor is organized into intuitive workflows - spectrometer, sampler, processing, calibration, checks and QC - and has preset measurement times selected which can also be modified by the user. A built-in Wavelength Table suggests analytical emission lines and other data to help identify potential interferences and simplify method development. Plus, features like SmartRinse™ reduce rinse time and eliminate carryover for accurate analysis, allowing you to customize rinse times based on individual wavelength concentrations in each sample. Also, PlasmaCam[™] and Continuous Graphics simplify method development by offering continuous viewing of the plasma and continuous real-time analyte signal – the remote diagnostic capabilities of PlasmaCam help maximum uptime, while Continuous Graphics provides a unique timeversus-intensity plot that allows real-time monitoring of the analyte signal to optimize instrument parameters. Plus, you can eliminate much of the method development work by utilizing one of the many pre-defined methods accessible via the Create New Method window.



Figure 3. PlasmaCam settings can be adjusted to show the bullet within the plasma or the plasma tail more clearly.

Other advanced smart method features based on instrument model include:

Avio 550/560 Max Fully Simultaneous ICP-OES:

Universal Data Acquisition gives you the option of collecting all the spectral data for every sample regardless of the elements being determined. This provides the flexibility to retroactively determine the concentrations of elements not in the original method or at alternate wavelengths, saving precious time and resources.

Low, Normal or High Resolution mode provides the option of fixed or variable, by-analyte selection of the resolution that works best for your analytes or overall analysis. Low resolution mode provides higher intensities for the analytes, while high resolution mode delivers the best separation when resolving the analyte of interest from interferences is key. **High Precision ICP-OES (HP-ICP-OES)** compensates for all sources of noise by measuring the internal standard at exactly the same time as the analyte: the user sets the read and integration times of the analyte(s) and internal standard(s) to exactly the same value for true simultaneous measurements. Therefore, any variables which affect the analyte signal also affect the internal standard signal at the exact same time, so that the internal standard perfectly compensates for these variations. The result: precisions with RSDs of 0.1% or less.

Avio 220 Max Hybrid Simultaneous ICP-OES:

Attenuation mode provides the ability to selectively reduce analyte signal, allowing high and low concentrations to be measured in the same sample preparation. This extends the dynamic range of ICP-OES without affecting the ability to measure analytes present at lower or higher concentrations, reducing the signal by \approx 90%. Because the Avio 220 Max is a hybrid simultaneous instrument, it can attenuate the signal for a specified analyte while not affecting others, thereby providing effortless dilution, allowing both high and low concentration analytes to be measured in the same method and with the same sample preparation, eliminating the multiple dilutions usually needed to measure all analyte concentrations in the same sample.

Minimize downtime and optimize your results with Smart Monitoring

Syngistix software provides numerous real-time indicators to minimize instrument downtime and maximize the accuracy of results. The Status panel displays information on key instrument components in real time to monitor the entire system at a glance, ensuring optimal performance, along with quick links to guide the user to the needed controls. Also, the nebulizer back pressure is continuously monitored during an analysis – if backpressure of the nebulizer exceeds that of the user-defined upper limit, it performs one of three actions – "Alarm & Pause", "Alarm & Continue" or "Stop" the analysis – alerting users to possible nebulizer blockage, therefore reducing reruns. An alarm can be set as a sound, text or email, as established by the user in Notifications.

h L and

Other notifications in the form of a sound, text or email can also be set to alert the user when the plasma has been extinguished, or in the case of a hardware error, a failure of a check or pause in the analysis. Any check with an automated action set to alarm will trigger this feature upon failure of the check criteria. The checks include:

Quality Control (QC) check provides automatic scheduling at the start of the analysis or at an interval set by the user. The user can also set a number of automated QC failure actions to fit his/her SOP. Real-time indicators of failure are provided in the Data Viewer and/or Results windows.

Internal Standard (IS) check reanalyzes automatically for samples with a user-defined IS recovery above the upper limit and below the lower limit, with added actions of "Stop", "Alarm & Pause", "Next Method" and "Continue" to fit his/her SOP. Real-time indicators of out-of-limit IS results are provided in the Data Viewer and/or Results windows for quick reference.

Sample Limits check provides an indicator of user-defined sample concentrations that range above the upper limit and below the lower limit in the Data Viewer (colored cell) and/or Results windows (line of text in remarks), allowing for real-time identification of out-of-range results.



Figure 5. Selectable actions upon failure of one of the checks include "Stop", "Alarm & Pause", "Next Method" and recalibrate, reslope or rezero and continue.

2

Event	Play Sound	Select Sound Effect	Email/Text	Select Email/Text Addresses
End of analysis		<default sound=""></default>		Jane.Doe@workplace.com
QC failure		<default sound=""></default>		Jane.Doe@workplace.com
QC paused		<default sound=""></default>		Jane.Doe@workplace.com
Hardware error		<default sound=""></default>		Jane.Doe@workplace.com
Plasma extinguished		<default sound=""></default>		Jane.Doe@workplace.com
End of optimization procedure		<default sound=""></default>		Jane.Doe@workplace.com
Internal standard failure		<default sound=""></default>		Jane.Doe@workplace.com
Nebulizer back pressure failure		<default sound=""></default>		Jane.Doe@workplace.com



Figure 6. The Data Viewer window also provides a place to quickly review replicate data (shown in rows just below the mean sample data), calibrations with residual calculations for each standard, autosampler locations and outside sample limits indicators.

Quickly interpret your results with Smart Data

From data visualization to reporting, Syngistix software provides a number of powerful tools to optimize your data and results without having to rerun the analyses.

Data Viewer provides real-time updates of detection limits and background equivalent concentrations during a run, in a cross-tab format. Single or multi-view calibrations can be displayed, delivering the information you need to make faster decisions and generate more reliable data, while charting of IS and QC standards allows for easy outlier or failure identification.

Examine Spectra makes interference correction simple and reliable by letting you view spectra, correct wavelengths, change background correction points, and build Multicomponent Spectral Fitting (MSF) or Inter-Element Correction (IEC) models with an integrated guided workflow that allows you to create models from stored data – both original and reprocessed.

Data Reprocessing lets you adjust everything from background correction points to your calibration curve (wavelengths if Universal Data Acquisition is used on the Avio 550/560 Max ICP-OES) after data collection to optimize the measurement of a particular sample without having to rerun it.

Data Manager makes transferring and exporting of data from Syngistix software to applications like Microsoft[®] Excel, TIBCO Spotfire[®] or your LIMS a fast, simple process so you can quickly and efficiently organize, manage, display and share information virtually any way you want. QC Charting/Reporting within Data Manager helps you quickly and easily prepare quality control charts for any sample, including limit ranges, means or expected values.

Breeze through 21 CFR Part 11 audits with Smart Compliance features

In highly regulated industries, data integrity is crucial. Audit trails and electronic signatures are highly scrutinized during regulatory inspections. Being able to produce an audit trail and apply electronic signatures demonstrates that the data life cycle is intact. Syngistix Enhanced Security™ software, an extension of the Syngistix software platform, offers a full range of smart compliance features designed to optimize data integrity and help today's laboratories cope with the regulations mandated by government agencies or quality protocols.

Data Review mode provides side-by-side sample information of results, spectra, calibration and approval status, as well as the ability to review and add e-signature and comments. Layout of sections of the screen are customizable to enable a quicker review process.



Figure 7. Data Review mode in ES Tools.

Method mode allows the user to view the method report, audit trail, signatures and comments, While the File Change view provides information quickly and easily that can be used to determine the differences between methods, method versions, SIFs, MSFs and IECs.

A. 1				ES Taoh			- 0	×
ES Tools								
-	1.0	-						
🖻 💾 🛅	S `	V G	a o o ,	/ 📑 🚍				
Data Methods Even	d File	Fiter Relves	ah Review Approve Reject Comm	ent Export Print				
Log	Changes	Options		* *				
Rec	OPU DERELIUM		Signing Options	Actions				
File Change Re	view		Total records: 19				Show Differences	11
Name	Version	Status	Signed By	Timestamp		Reason	Comment	-
8-USPOroup1-2A-new cal 5 Rejected		Rejected	PKI: (PKD) 6/13/2018 11:08:36 AM			Calibr	ation Inconnect	
USPGreup1-2A-n	+- 5	Rejected	PR (PR)	6/13/2018 11:01:30 AM		Caller	ation incorrect	
USPGroup1-2A-n	0_ 4	Original	PKI (PKD	6/13/2018 11:05:32 AM		Chang	ped limits on internal start	dards
USPGroup1-2A-n	4. 3	Original	PH0, <ph0></ph0>	6/13/2018 11:04:39 AM				
USPOreup1-2A-n	e. 2	Original	PRC (PRD)	6/13/2018 11:03:30 AM		Added	d Scasinternal Standard	
USPGroup1-2A-m	H- 1	Original	PKI, CPKD	6/13/2018 10:12:08 AM				-
USPOmen1-24	1	Annerward	PRC (PRD	6/13/2018 10:11:38 AM	To Announ			
			1.100 01.00		10740-010			
								•
				2				
Differences:USI	rGroup1-	2A-new ca	i.5 : USPGroup1-2A-new cal	1				2
	Section		Parameter	US	PGroup1-2A new cal.5	USPGr	oup1-3A-new cal.1	
1 Process Page-Inte	Process Page-Internal Standards		Internal std for analyte As 193.696	yte As 193.696 Std Y 371.029. Conc 1		Std Sc 361.383. Conc	1	
Process Page-Internal Standards		Internal std for analyte Hg 194.168	Std Y 371.029, C	Std Y 371.029. Conc 1		1		
3 Process Page-Internal Standards		Internal std for analyte Cd 214.440	Std Y 371.029, C	8td Y 371.029, Conc 1		1		
4 Process Page-Internal Standards		Internal std for analyte Pb 220.353	Std Y 371.029, Conc 1		Std Sc 361.383. Conc	1		
5 Process Page-Internal Standards		Internal std for analyte Ni 231.604	Std Y 371.029, Conc 1		Std Sc 361.383, Conc	1		
6 Process Page-Internal Standards		Internal std for analyte Co 238.892	Std Y 371.029. Conc 1		Std Sc 361.383. Conc	1		
7 Process Page-Internal Standards		Internal std for analyte V 309.310	Std Y 371.029. Conc 1		Std Sc 361.383, Conc	Std Sc 361.383, Conc 1		
B Process Page-Internal Standards Check		Check min for analyte Y 371 029	80		85			
Process Page-Internal Standards Check		Check max for analyte Y 371.029	120		115			
0 Spectrometer Page-Define Analytes		Added Analyte Name Sc 351 383. Analyte # 9, Wavele		3. Aralyte # 9, Wavelength 351	1.383			
1 Sampler Page-Autosampler		Analyte added	Name=Sc 361.383, Concentration=not set					
12 Sampler Page-Autosampler		Added SmartRinse analyte	Name=Sc 361.38	D. Concentration mot set				
13 Process Page-Internal Standards Check		Perform internal standards check	ro		yes			
14 Calibration Page-Equation and Units		Calib Units for analyte ICP Continuous	As 193.696		upt			
5 Calibration Page-B	15 Calibration Page-Equation and Units		Calib Units for analyte ICP Continuous	Ho 194 168		Jou		
Calibration Page 6								
Campager aver	Equation and U	Inits	Callb Units for analyte ICP Continuous	Cd 214.440		uot		
17 Calibration Page-E	Equation and U Equation and U	Inits Inits	Callo Units for analyte ICP Continuous Callo Units for analyte ICP Continuous	Cd 214.440 Pb 220.353		uot. uot.		

Figure 8. File Changes in ES Tools.

Auditing tools include event log, login history, method versioning, review/approve functionality without the option to self-approve along with sample and batch reports with e-signature information. The Event Log is a comprehensive view that lets you see the details associated with the samples and can be printed, exported and archived.

User permissions define analyst accessibility to provide a controlled environment. A simple tool bar is provided which allows the Administrator to set up Users & Groups permissions, assign Data Folders, customize electronic signatures, and set notifications with just a few clicks.

🔜 User Setup					_	×
File Setup	Help					
Users & Groups	Data Folders	Eectronic Signatures	Email Setup	Notifications	Settings	

Figure 9. User Setup tool bar.

Data integrity offers secure database file structure and electronic records, including the "Verify Checksums" option that checks all records within the database to make sure they are valid and alerts the user if any of the files were created or altered outside of the Enhanced Security environment.

In combination with the Avio Max Series of ICP-OES instruments, Syngistix for ICP software improves efficiencies in the lab by mirroring the progression of your workflow, guiding users through each step for greater control and confidence. Flexible and easy to use, this complete package offers immediate benefits during instrument warmup, method development, analysis and data collection, reducing the overall turnaround time of your results.

PerkinElmer, Inc. 940 Winter Street Waltham, MA 02451 USA P: (800) 762-4000 or (+1) 203-925-4602 www.perkinelmer.com



For a complete listing of our global offices, visit www.perkinelmer.com/ContactUs

Copyright ©2021 PerkinElmer, Inc. All rights reserved. PerkinElmer® is a registered trademark of PerkinElmer, Inc. All other trademarks are the property of their respective owners.

PKI