Overcoming Challenges of Manually Tracking the Performance of Your IC Consumables

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- New feature available on the recently introduced Thermo Scientific™ Dionex™ Integrion™ HPIC™ system
- Benefits of consumables tracking will be presented
- With the consumables tracking system you can:
  - Automatically track consumables without human intervention
  - Confirm installation
  - Monitor usage
  - Store and retrieve performance metrics

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- The heart of any chromatography system is the consumables
- Consumables affect overall system performance:
  - Eluent generation and purification is achieved in RFIC systems with an EGC and CR-TC
  - Separation is achieved with a guard and separator column set
  - Detection is enhanced with an eluent suppressor and carbonate removal device

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What is Consumables Tracking?

- SW identifies consumable install and maintains record of:
  - Installation
  - Usage
  - Performance Metrics
- Data is stored directly on the consumable itself
  - Ensures data is transferred with the consumable item
  - Ensures traceability of the data
- Takes the guesswork out of consumables monitoring
  - Provides information on the specifications
  - Records installation, use, and performance
  - Alerts operator when consumables are mismatched

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How Does it Work?

- Memory chip embedded on each consumable
  - Instrument controller detects presence of memory chip
  - Chip downloads stored data
- Current date and time is written to memory tag
  - Consumable age can be calculated
  - Data is not written until consumable is first used
- Instrument controller writes key performance metrics to memory tag
  - Data can be accessed by instrument and controlling SW to monitor performance

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- Comprehensive set of specification data in each device
  - Product Identification
  - Serial and Lot Number
  - Best Use-by Date
  - Column Diameters
  - Other Device Specifications
- Quality Assurance Report (QAR) results also stored
  - Thermo Scientific™ Dionex™ Chromeleon™ CDS software directly compares actual results with reported QAR data
- Easily retrieve data from front panel tablet app or by using the Chromeleon CDS software

- On first usage, a date and time stamp is written to consumable
  - Age of the consumable automatically tracked
  - Used consumable can be identified prior to operation
- System records number of injections while consumable is in use
- Usage data follows the consumable if moved between systems
  - Keeps records accurate

- Consumables Tracking System monitors key performance metrics
  - Date of First Install
  - Number of Injections
  - Key Metric Maxima
  - Last Columns Paired With
  - Key Metric Tallies
  - Eluent Types
  - Ion Count
  - Key Metric Trend Data
- Data can be stored on up to nine different consumables
  - Separator and Guard Columns
  - Concentrator and Trap Columns
  - EGC, CR-TC, Electrolytic Suppressors, Chemical Suppressors and CRD Devices

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- Consumables Tracking System checks compatibility
- Warning issued if incompatibility is detected
- Two configuration restrictions are monitored
  - Size mismatches, such as combining 4 mm and 2 mm consumables
  - Chemistry mismatches, such as anion and cation
- Chromeleon CDS software issues configuration mismatches at warning level
  - Warnings do not prevent operation of the instrument

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- Lab performs compliance testing for drinking water using EPA Method 300.1
- Lab also receives requests for cation analysis
- The IC system is converted from anion analysis to cation analysis about every two weeks
- Anion method uses a carbonate eluent
- Cation method uses a methanesulfonic acid eluent
- After switching, it usually takes a few hours to flush out the system before analysis can resume

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- Switchover from cation to anion analysis can cause issues:
  - Suppressor could be left in place after system is converted
  - Poor peak shapes compromise results
    - Cation guard left in place during anion analysis

- Dionex Integrion HPIC system
  - Initial setup configured for anion analysis
  - After two weeks of operation, system converted for cation analysis
  - System operated for 24 hours in cation mode before being converted back to anion mode
  - After conversion, a warning was noted; system detected that the CERS 500 suppressor had been paired with the AG22 and AS22 columns
  - Operator was able to remove the cation suppressor and replace it with the anion suppressor before beginning work

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- Jorge is a lab manager who manages up to four IC systems for monitoring steam water
  - He also manages up to 3 analytical chemists who operate the IC systems
- The IC systems are used primarily for anion analysis in steam water
- They cannot afford to be down for more than a few hours as it will affect down-stream processes
- The regulated method requires that consumables are tracked and replaced on a regular basis as part of routine preventative maintenance
- Jorge is very sensitive to maximizing instrument up-time, but is also concerned about the budget for replacement of consumables

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- Log-book entries may not be effective
  - Responsible chemist may not reliably update log-book
- Consumables may be switched out before needed
  - During an audit any discrepancies require an immediate change of consumable if it is not possible to determine the consumable's exact age
- Risk is that perfectly good consumables are often being replaced unnecessarily
- Jorge is concerned that he is paying for consumables without being certain that the current replacement schedule is effective

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- The lab just received a new Dionex Integrion RFIC HPIC system
- With the new consumables tracking feature, Jorge has switched to a digital log-book
  - The Dionex Integrion IC system automatically logs the installation date on each consumable without human intervention
- Logging mistakes are now eliminated and preventative maintenance can be scheduled more accurately

- Danielle runs a food testing laboratory that performs QC analysis on fruit juices and carbonated beverages

- Danielle runs one IC system for organic acid analysis

- The lab is very focused on maintaining a low cost of operation per sample while meeting its management's requirements for fast and accurate results

- Danielle is very sensitive to maximizing instrument up-time, but is also concerned about her budget for replacement of consumables

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- Consumables may be replaced unnecessarily only to find that it was a different consumable responsible for the issue
- On multiple occasions, Danielle suspected that the background conductivity was abnormally high
  - Unfortunately, she couldn't remember how long the system had been like that
  - She also couldn't remember what the conductivity was the last time the suppressor or CR-ATC was replaced
  - Sometimes when she notices this, the suppressor or CR-ATC fails soon afterward

- The lab just received a new Dionex Integrion RFIC HPIC system to replace their aging IC

- 12 months after setting up the instrument, Danielle suspected that the background conductivity was abnormally high

  - Danielle queried the background trend data and determined that the background was indeed elevated

  - She determined that the suppressor voltage spiked at the same time that the background changed

  - The CR-TC current was unchanged

- Danielle ordered a replacement suppressor

  - The replacement suppressor restored the system to full working condition within just a few hours, thus reducing down-time

Consumables Tracking – Benefits

- A level of intelligence built into the system

- Logging and monitoring of individual consumables over time

- Trend plotting of key parameters over the lifetime of a consumable

- Monitoring of the age and usage of individual consumables

- Unity Labs' Remote Services Monitoring is an add-on feature for Dionex Integrion IC systems
  - Enhances the Consumables Device Monitoring feature
- Tracks and stores instrument diagnostic data on a cloud server
  - Includes Consumables Device Monitoring parameters
  - Provides a mechanism for field service engineers to monitor key consumable parameters
- Parameters are monitored on an hourly basis
  - Data trends include a finer level of detail, making diagnostics more accurate

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- Provides data to your field service engineer
- Provides an alert service if any instrument parameter exceeds a predefined limit
- Remote Services and Monitoring is a value added feature and is included during the instrument warranty period (3 years)
  - The service is also available with Unity Lab Services "Critical Support" and "Essential Support" Service Plans for coverage beyond the warranty period

Remote Services Monitoring – Benefits

- Provides an alert service if any instrument parameter exceeds a predefined limit

- Generates trend plots of instrument parameters

- Allows a qualified Unity Lab Services technician to view instrument status

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Complete Your Analytical Workflow

- **High Purity Reagents and Chemicals**
  - NaOH, low in carbonate 50% solution
  - High purity reagents
  - High purity water

- **Laboratory Equipment**
  - Gloves and safety glasses
  - Syringe filters
  - Vials

Please join me in the **Dionex Integrion IC** system section of our booth and I will address any further comments and questions.