Routine Analysis of AQC

The most effective way of monitoring an Instrument’s performance is to regularly use control samples with independently verified or known results. Once placed in instrument runs at regular intervals they can be used to flag discrete changes in instrument performance leading to over or under reporting of result values. While simple flagging against a target value is straightforward, the tools used to identify trends use specific statistical calculations and chart types. Ideally analysts want to be able to do perform this statistical analysis and chart data:

- As soon as each instrument run is complete, so that the AQC can be correctly evaluated before releasing all results
- On the instrument workstation so there is no need to export and carry the AQC results to a separate workstation
- Easily without having to navigate functions not relevant to the AQC analysis
- Record all data as well as any decisions taken during the interpretation for auditing and for further analysis.

In order to address these requirements CSols have developed a new dedicated software tool for AQC analysis called AqcTools.

**AqcTools design**

AqcTools is designed to work either as a stand alone application for all types of instrument data or alternatively in combination with CSols Links for LIMS instrument interfacing software.

Whether used in a shared (enterprise) or dedicated configuration AqcTools has two components.

- A graphical user interface for easy navigation and access to functions like data entry, analysis and charting

![Figure 1: A Shewhart Chart using AqcTools](image)

- A dedicated database (using Microsoft SQLServer) to store all current and historical data. Historical results are obviously essential to perform the statistical analyses required and this convenient store provides compact and efficient storage, as well as convenience and accessibility compared to large numbers of spreadsheets or separate databases.

**Helping the Analyst**

AqcTools provides the following functions to guide users quickly through the statistical analysis required. Different uses of the software would be as follows:

- **Figure 1:** A Shewhart Chart using AqcTools
Manual data entry
The software provides a dialog requesting for information about the AQC type, component and where duplicates are used further results. **AqcTools** supports the following AQC types :-
- Normal
- Difference
- Duplicate.
- Spike
- Log Difference
- Spike Ratio

Automatic data entry
The software will also provide for the automatic input of data from CSols **Links for LIMS**. In this setting the AQC type and raw data is supplied electronically by the program, so that no manual data input is required.

![Figure 2 - Launching AqcTools from Links for LIMS](image)

**Charting options**
Both the popular Shewhart and standard type chart are available in **AqcTools** to present data showing action and control limits. In addition there are a number of presentation options :-
- X axis options include display of run names, date, batch, method and instrument
- Y axis can be used to display individual or mean results.
- Chart elements can include, the AQC name and type, current and released limits including SD, %SD, and Mean and exceedance references

**Calculations**
**AqcTools** performs a wide range of calculations and rules checking these include :-
- SD, %SD, mean, Upper and lower action and warning limits
- Manually configured, Westgaard and Western Electric Zones rules

![Figure 3 – Calculating limits](image)

**Summary**
**AqcTools** provides a convenient, cost effective and dedicated mechanism for analysts to perform those AQC statistical manipulations required by regulatory authorities. When combined with **Links for LIMS**, analysts get very timely feedback on those subtle changes that are effecting result quality so that poor quality results are not released for use.

For further information or a demonstration of **Links for LIMS** please feel free to contact CSols.

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