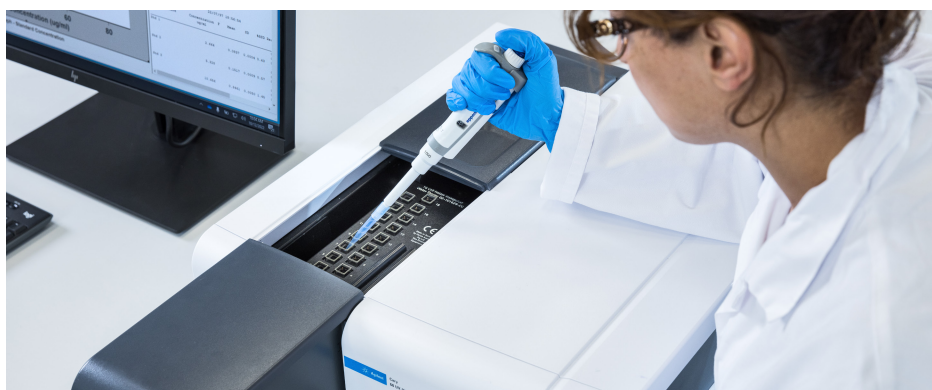# Improved Lab Efficiency with the Agilent 18-Cell Changer Accessory

Evaluation of an Agilent Cary 60 UV-Vis spectrophotometer workflow using the 18-cell changer accessory

Introduction

In laboratory settings, time is of the essence. The speed at which any experiment can be conducted is important, and any advantages that can improve speed are critical. It is equally important that analytical workflows are optimized for maximum instrument use and minimal operator interaction.

The Agilent Cary 60 UV-Vis spectrophotometer is a flexible, powerful, and reliable UV-Vis system, ideal for routine analysis. To further improve workflow efficiency, the Cary 60 UV-Vis can be equipped with the Agilent 18-cell changer accessory. The 18-cell changer can measure up to 18 cuvettes in sequence, without any user interaction.

This technical overview compares a Cary 60 UV-Vis workflow using the 18-cell changer accessory versus a single-cell holder accessory to evaluate differences in terms of analysis time, data quality, user interaction, ease of use, and efficiency.

Experimental

To compare the efficiency and effectiveness of a Cary 60 UV-Vis workflow using a single-cell holder versus using the 18-cell changer accessory, 18 solutions of cobalt chloride ($CoCl_2$) in water (five standard solutions and 13 sample solutions) were measured using the Concentration Module in the Agilent Cary WinUV software. The time taken to complete the experiment was recorded for the single-cell holder, which was operated manually, and the 18-cell changer.
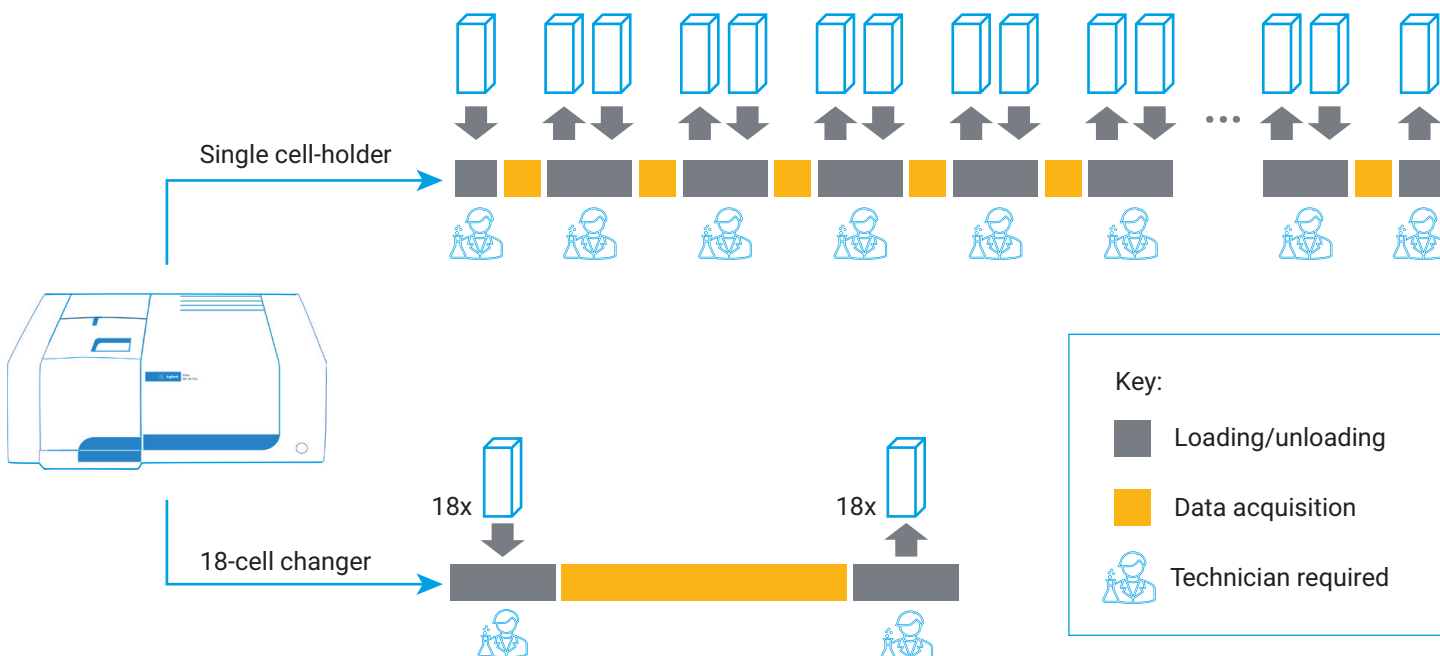
Single-cell holder workflow

Each sample was manually placed in the single-cell holder by a technician. When the reading was taken, the cell was removed from the single-cell holder and replaced with the next cell (Figure 1). After the five standards were measured, the software automatically generated a calibration curve and applied the calibration curve to the 13 measured unknown samples (Figure 3).

### Agilent 18-cell changer workflow

When starting the analysis, the software prompted the user with a Cell Loading Guide (Figure 2). After all 18 cells were loaded, the software automatically measured the standard solutions, generated the calibration curve, and measured the samples while applying the calibration curve, without any user interaction (Figures 1 and 3).
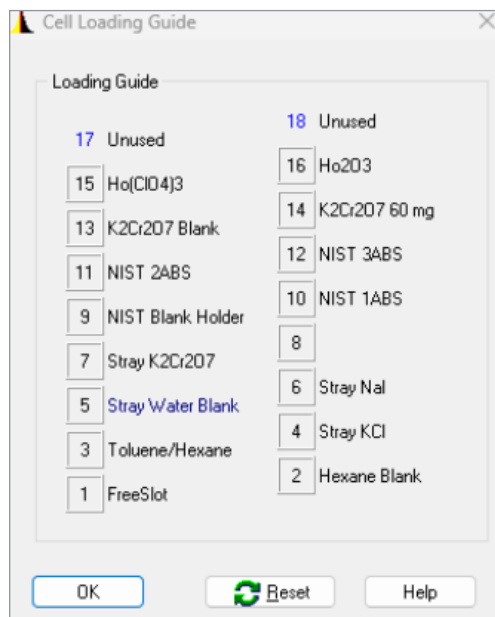
Figure 2. The Agilent 18-cell changer Cell Loading Guide within the Agilent Cary WinUV software.
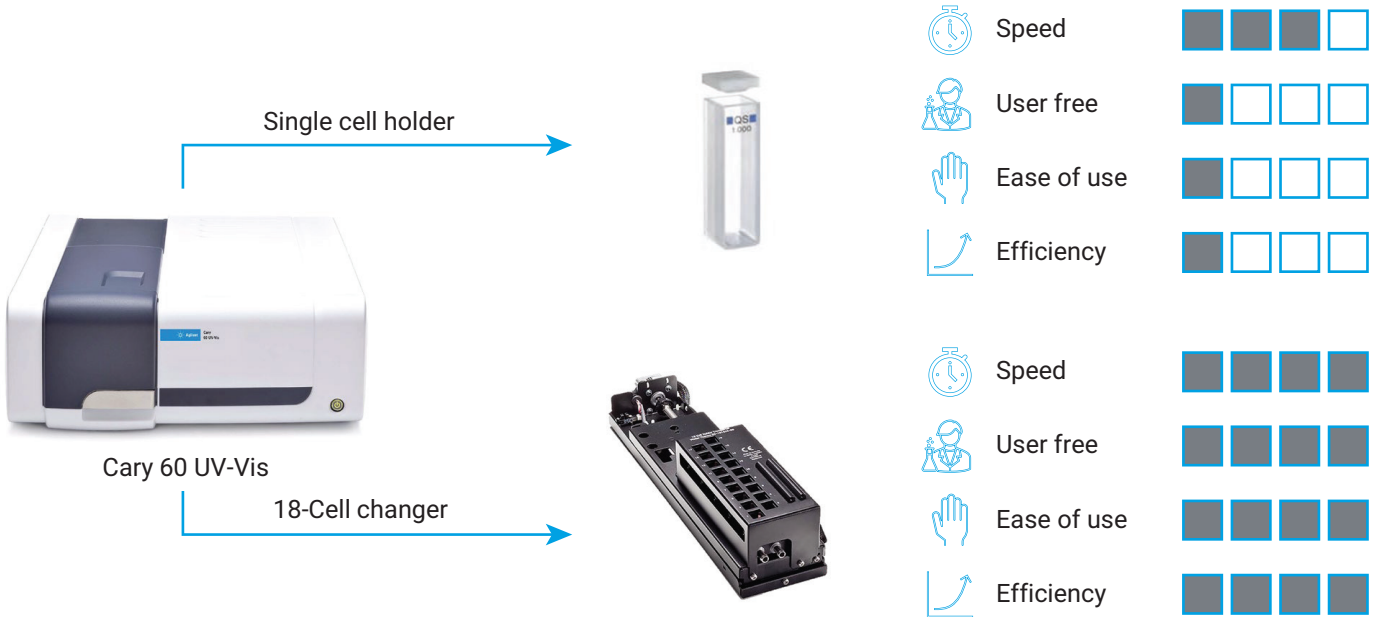
Figure 1. Workflow illustration of the single-cell holder versus the Agilent 18-cell changer accessory.
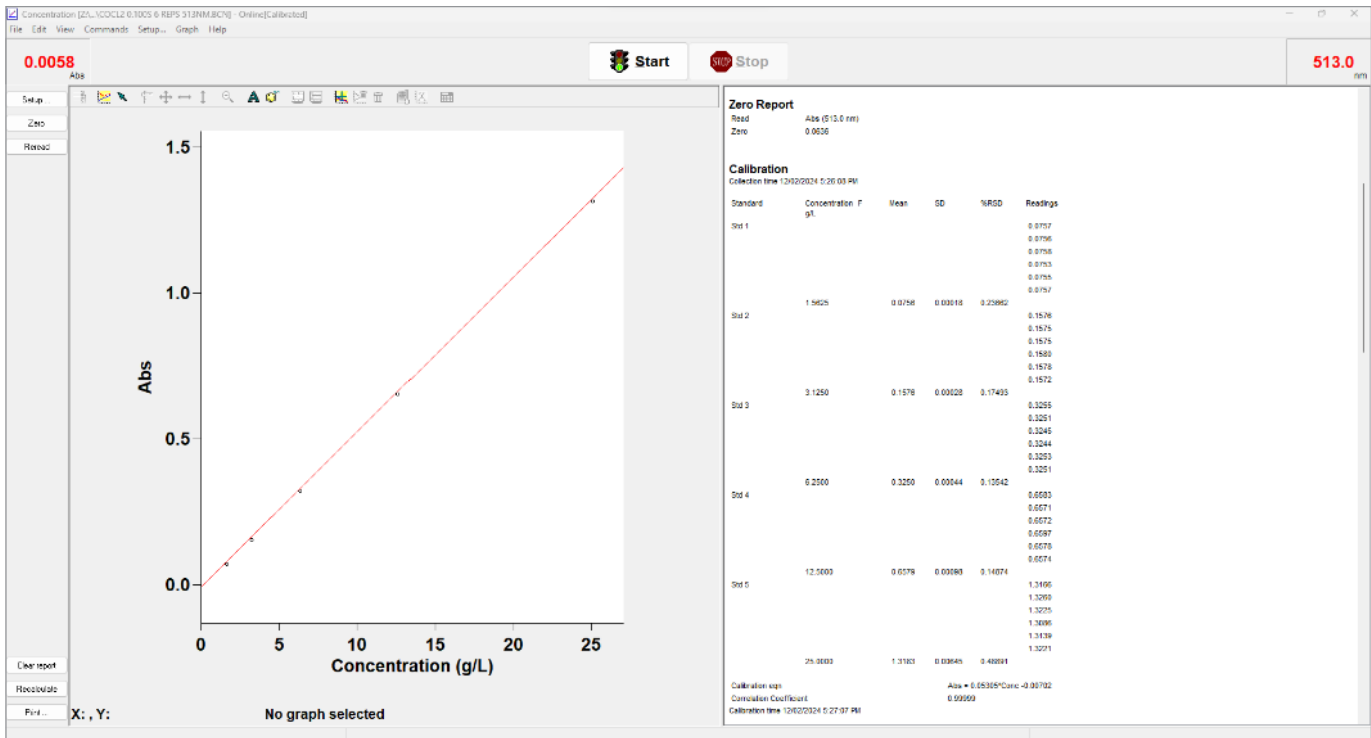
Figure 3. A screenshot of the Agilent Cary WinUV software concentration application, showing the automatically generated calibration curve (left), and measured samples in replicates (right).

Workflow comparison

The comparison of the workflows using the single-cell holder and 18-cell changer accessory revealed differences in terms of speed, user interaction, ease of use, and efficiency, as displayed in Figure 4.

Figure 4. Evaluation of the single-cell holder and Agilent 18-cell changer workflows in terms of speed, user interaction, ease of use, and efficiency.

Analysis time and data quality

When comparing the workflows of the single-cell holder and 18-cell changer, the 18-cell changer required 27% less time to perform the analysis. The recorded time was composed of the inserting or removing the samples into their respective holders and the time taken for the analysis to be completed (0.1 seconds signal averaging time, six replicate measurements per sample).

The linearity of the calibration curves (Figure 5) was exceptionally good, with R^2 values of 0.9999. These values highlight that, despite dramatically improving efficiency, the 18-cell changer does not compromise on data quality.

User interaction: efficiency, ease of use, and productivity

The biggest advantage of the 18-cell changer is its minimal requirement for user interaction (Figure 1). Using the 18-cell changer, the 18 cells were simply placed inside the holder and the technician was not required to change the cells until the end of the experiment. Contrastingly, the standard single-cell holder required frequent manual changing of cells and undivided attention to the experiment. The automation capability of the 18-cell changer freed up time and allowed the technician to pursue alternate activities, such as preparing a new batch of samples, working on documentation, or reviewing the incoming results on the screen, ultimately improving lab productivity and efficiency.

Potential for error

The automation capability of the 18-cell changer also reduces the potential for user error that the single-cell holder can inadvertently introduce through manual operation. Manually transporting cuvettes from a rack of samples to the cell holder, which is often performed under time pressure, introduces the potential for mistakes such as dropping, confusing, or misplacing samples. It was demonstrated that the standard single-cell holder required the cuvettes to be placed and removed into the holder 18 times; whereas, the cuvettes were loaded into the 18-cell changer just once. The minimized manual interaction with the 18-cell changer significantly reduced the occurrence of errors.
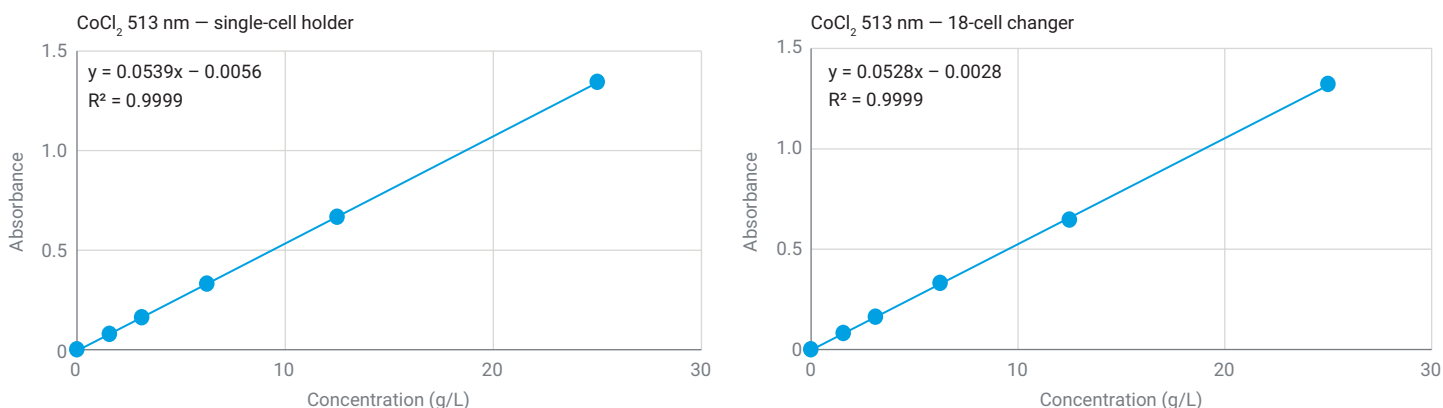

CoCl$_2$ 513 nm — single-cell holder

$y = 0.0539x - 0.0056$
$R^2 = 0.9999$

CoCl$_2$ 513 nm — 18-cell changer

$y = 0.0528x - 0.0028$
$R^2 = 0.9999$

Figure 5. Calibration curves generated using the standard single-cell holder and the Agilent 18-cell changer accessory, using the same CoCl$_2$ standards.

Conclusion

In summary, the Agilent 18-cell changer accessory for the Agilent Cary 60 UV-Vis spectrophotometer provides a range of benefits to laboratories and technicians alike. Compared to a single-cell holder, it dramatically increases efficiency by reducing the time taken to complete experiments and limiting the need for operator interaction, all without compromising the quality of results.

Further information

- Cary 60 UV-Vis Spectrophotometer
- Cary WinUV Software for UV-Vis Applications
- UV-Vis Spectroscopy & Spectrophotometer FAQ

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