

# Agilent OpenLAB CDS: Increase Lab Productivity with Powerful, Flexible Reporting Tailored to Meet Business Needs

## Technical Note

How much time can your lab save by using OpenLAB CDS reporting? If you analyze approximately 500 samples per month at 10 minutes per sample including data review time, manual data entry takes about 1000 hours per year or about 25, 40-hour weeks—half of an analysts' time. Using OpenLAB CDS rather than Excel, reporting time can be reduced by half to 5 minutes per sample for time savings of 500 hours or 12.5 weeks per year.

### The Challenge

Chromatography data system (CDS) users cite reporting as their number one pain point. Most labs want reports tailored to meet their particular analytical and business needs—reports that include results from multiple analytical techniques such as GC, LC, GC/MS and LC/MS, as well as custom calculations, specific layouts, fonts, and company logos. Exporting or manually transcribing data to other software is often the only way labs can create these reports. However, moving data to other software is not only time consuming; it can introduce errors and gaps in a lab's data integrity strategy. In addition, reporting can be complicated due to the challenges associated with report template creation, report size, and cost of printing. Together, these factors create a compelling reason for a powerful and flexible CDS reporting tool.



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## The OpenLAB CDS solution

Unlike other CDS software, OpenLAB CDS provides advanced reporting capabilities that enable you to produce professional looking reports tailored to your needs faster, more efficiently, and with higher quality than ever before. Figure 1 shows just what you can accomplish using the reporting features in OpenLAB CDS.

Reports are reviewed using actual data sets, and key data within lengthy reports is quickly found—all without printing. When reports are generated, all of the necessary information is reported using the least amount of space and pages. Together these capabilities dramatically reduce the waste and cost of unneeded printouts.

Perform statistical analyses, flag out-of-spec data, chart trends to speed decision making, and generate a simple report file for import into your LIMS—all without moving data out of OpenLAB CDS. By minimizing data transcription and export, OpenLAB CDS enhances the security and quality of results.

In addition, OpenLAB CDS includes report templates that can be tailored to create professional looking reports that include your company logo, and selected fonts, font sizes, and font colors. There is no limit to the information that can be displayed and the way in which it is presented.

Let's take a closer look at what makes OpenLAB CDS the smart choice for all your reporting needs.

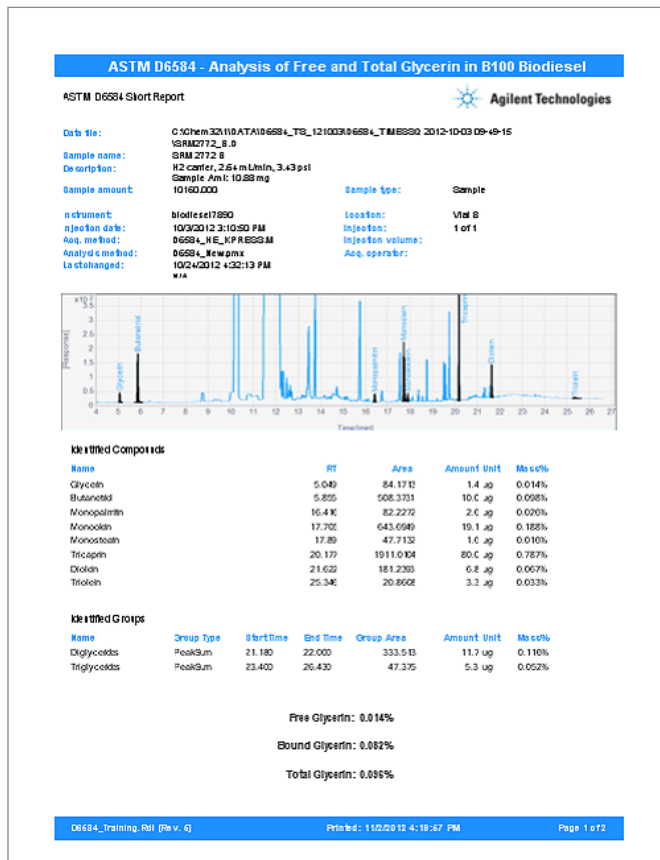


Figure 1: Report what you need, when you need it, in an attractive, readable format that reflects the value of your work. This example shows a custom fatty acid methyl ester report with chromatograms scaled to show peaks of interest. Custom calculations are used to report compounds and compound classes by weight and weight % and normalized results according to ASTM.

## Immediately preview reports

To increase lab efficiency, reports can be immediately previewed in OpenLAB CDS using actual data sets. To review and report only identified peaks, simply select the "Identified peaks" checkbox, and the report preview is updated automatically and displayed (Figure 2). Using other CDS software, you would have to manually delete unwanted peaks from the result file by cutting, copying, and pasting in a spreadsheet. Now, you can save time and avoid errors by removing unknown peaks directly in OpenLAB CDS.

## Quickly find the data you need

The table of contents overview allows you to quickly find and review key data in lengthy reports, prior to or without printing. As shown in Figure 3, the table of contents can be used to rapidly check relative standard deviation (RSD) values to determine whether or not samples need to be rerun.

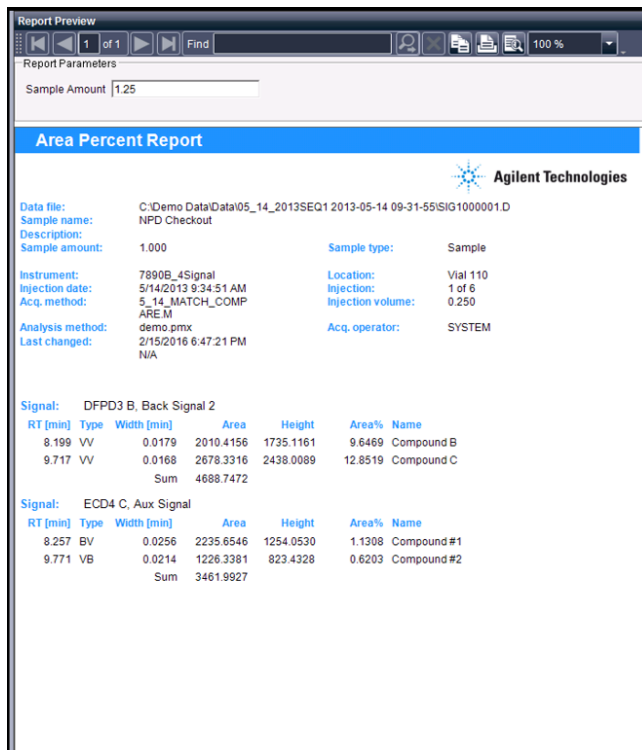


Figure 2. Area Percent Report preview customized to display only identified peaks.

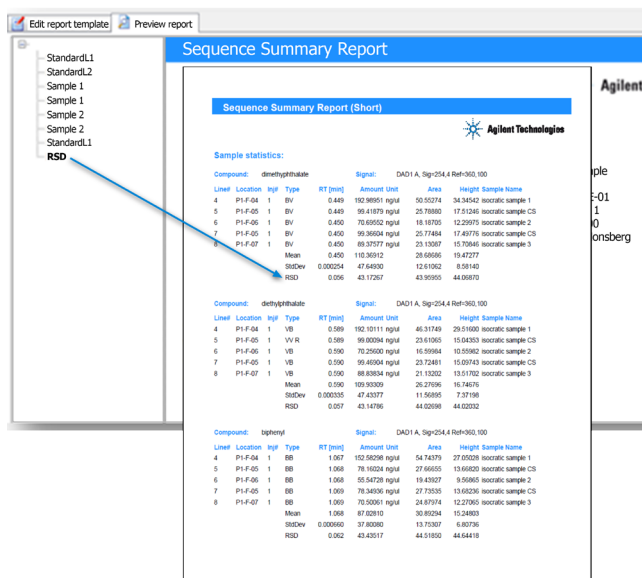


Figure 3. Quickly find and review specific data using the table of contents overview. Clicking on the RSD folder in the table of contents immediately takes you to the report page containing the RSD values.

## Speed decision-making: report and chart trends across sequences

Labs often report, chart, and review data obtained from multiple sequences. OpenLAB CDS cross-sequence reporting is designed to make this process easier and without using additional spreadsheet or quality control software. Sequences run a day, weeks, or months, apart, and from different instruments, can be included in a cross-sequence report. Figure 4 shows an example of a tabular report that groups selected compounds of interest across eight sequences. In Figure 5, a cross sequence report is used to chart a lab-wide trend. Upper and lower control limits can be selected interactively and outliers flagged automatically.

Report Preview

1 of 1 Find

### Cross Sequence Summary Report

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Name	Amount [ppm]	RT [min]	Area	Height
Compound A	591.552	3.963	591.5515	531.1581
Compound A	483.875	3.964	483.8753	443.0648
Compound A	213.240	3.966	213.2398	184.0030
Compound A	299.302	3.967	299.3024	270.5235
Compound B	7.57885	5.356	7.5789	6.3792
Compound B	4.69284	5.384	4.6928	3.9953
Compound B	5.81145	5.387	5.8114	3.8154
Compound B	7.16936	5.389	7.1694	4.7644
Compound C	673.854	5.950	673.8537	582.6578
Compound C	1884.54	5.951	1884.5417	1310.5732
Compound C	1544.83	5.951	1544.8344	1167.6635
Compound C	946.152	5.953	946.1524	806.9598
Compound D	2010.42	8.199	2010.4156	1735.1161

Figure 4. Report across sequences quickly. In this example, the compounds of interest are grouped for easy review.

Reference (average area): 309.8

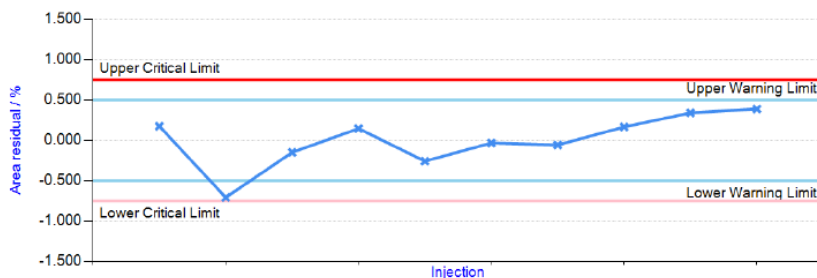


Figure 5. Chart trends across sequences. Here a cross sequence report is used to flag outlier, and upper and lower control limits.

## Save time, improve data integrity: perform calculations in OpenLAB CDS

Labs often provide data and results to production, R&D, and others in a report that includes statistical analyses or other calculations. Typically, these groups want just the information they need, as fast as possible, to make decisions like “Can the product ship?” or “Does the product contain impurities or other unexpected compounds?” With built-in summary calculations such as RSD, Average, Min, and Max, OpenLAB CDS streamlines this process by eliminating errors and wasted time exporting data to other software, transcribing data manually, and performing manual calculations. Shown in Figure 6, adding a calculation to a report only requires checking a box. Because OpenLAB CDS allows you to keep data within the CDS when producing sophisticated reports, data are more easily secured.

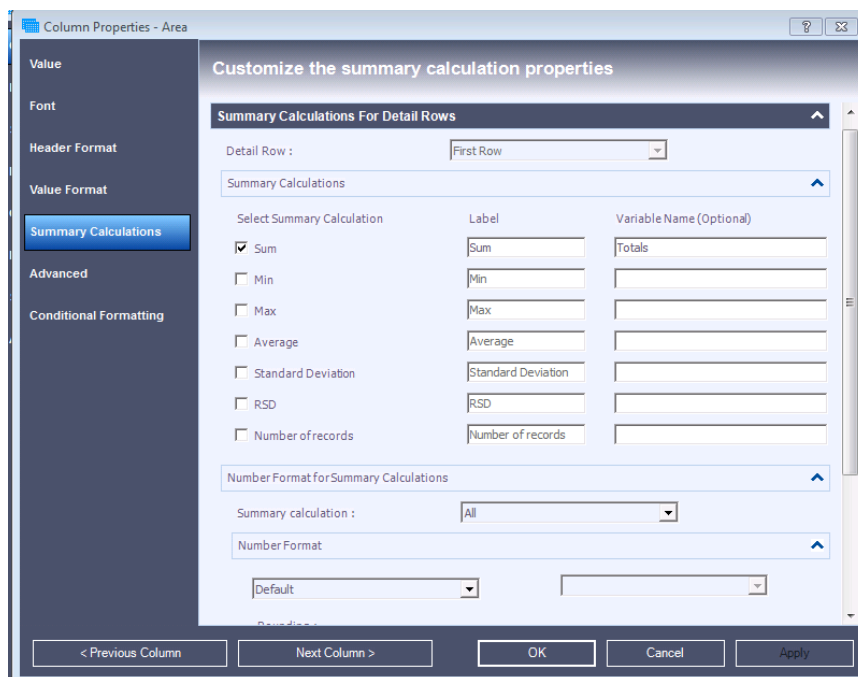


Figure 6. Select calculations to apply using check boxes.

## Reduce waste and cost associated with unneeded report pages

Labs only want to report or print the information needed to support their objectives. Printing unneeded pages is wasteful and an opportunity to control cost. In addition, some labs simply want to “green” their operations to save natural resources. OpenLAB CDS provides a solution. In the past, a 169-page sequence summary report might only have two pages of information the lab needed. Using OpenLAB CDS, it’s easy to create the appropriate two-page report by deleting unnecessary items from the sequence summary report template.

Further, to get all the columns of needed information on a report, labs often print in landscape mode. However, some do not want to print a landscape report because it can be difficult to read and file. As a result, these labs print two pages in portrait mode instead. OpenLAB CDS allows use of double-row report tables, so all necessary information is reported in the least amount of space. Double-row tables are easy to create using check-box selections. Figure 7 shows an example of a double row report that includes area and height, signal description, and response factor.

## Avoid transcription errors: move results directly to LIMS

Many labs need to move data to a LIMS and do so in an error-prone manual fashion. Using OpenLAB CDS, you can create a simple text format report file for direct import into your LIMS (Figure 8). Starting with a report template, you simply choose the report table that provides the necessary information. If a required field is not included the template, you can easily add it. In addition to text (.txt) format, the final report can be saved in Excel (.xls, .csv), PDF (.pdf), or Word doc (.doc) format.

Single Injection Report						
Name	RT [min]	Area	Height	Area %	Height %	Amount [ng/ul]
		Signal Desc.	RF			
c10	4.374	2269.9009	1367.9119	13.92	14.16	98.903
		FID1 A,	0.04357			
c11	4.935	2272.0645	1385.1278	13.94	14.13	98.416
		FID1 A,	0.04332			
c12	5.448	2376.7705	1464.0107	14.58	15.15	98.062
		FID1 A,	0.04126			
c13	5.924	2352.6052	1390.4696	14.43	14.39	98.184
		FID1 A,	0.04173			
c14	6.37	2346.7683	1383.3612	14.40	14.32	97.81
		FID1 A,	0.04168			
c15	6.792	2366.4912	1345.9601	14.52	13.93	97.659
		FID1 A,	0.04127			
c16	7.19	2317.2615	1345.5991	14.21	13.93	97.757
		FID1 A,	0.04219			

Figure 7. Fit more information on a page. Double-row table with area and height, as well as signal description and response factor.

Report Preview						
Name	RT [min]	Area	Height	RF	Amount [ppm]	
Compound A	3.963	591.5515	531.1581	1.00000	591.552	
Compound A	3.964	483.8753	443.0648	1.00000	483.875	
Compound A	3.966	213.2398	184.0030	1.00000	213.240	
Compound A	3.967	299.3024	270.5235	1.00000	299.302	
Compound B	5.356	7.5789	6.3792	1.00000	7.579	
Compound B	5.384	4.6928	3.9953	1.00000	4.693	
Compound B	5.387	5.8114	3.8154	1.00000	5.811	
Compound B	5.389	7.1694	4.7644	1.00000	7.169	
Compound C	5.950	673.8537	582.6578	1.00000	673.854	
Compound C	5.951	1884.5417	1310.5732	1.00000	1884.542	
Compound C	5.951	1544.8344	1167.6635	1.00000	1544.834	
Compound C	5.953	946.1524	806.9598	1.00000	946.152	

Figure 8. Create a simple report file for LIMS import. This report preview shows the sample name, compound amount, retention time, area, and height.

## Meet your reporting needs: customize OpenLAB CDS templates

When producing reports, labs are interested in flexibility in the kinds of information that can be displayed and the way in which it is presented. OpenLAB CDS report templates extract selected information and display it in polished reports that support your decision-making (Figure 10). The software includes more than 20 predefined templates that can be used out-of-the box, or easily customized to meet specific needs using “drag and drop” actions. Changes to report templates are fully audit trailed, so you can feel more confident that your results have not been compromised.

OpenLAB CDS has all the reporting features common to spreadsheets including the ability to lock items from modification to protect calculations, apply business logic for Pass/Fail decision making, use plugins to execute custom code during report creation, and apply custom calculations and conditional formatting. For example, assume you want to report results and confirm that they are within specifications. Using OpenLAB CDS Report Parameters, custom calculations, and conditional formatting, this can be achieved in just a few minutes (Figure 10).

Lastly, you can also add custom logos and headers, and different fonts, font sizes, and colors to reports. Chromatographic images can be scaled for easier viewing. Unlike spreadsheets, there are no limits to the layouts that can be created.

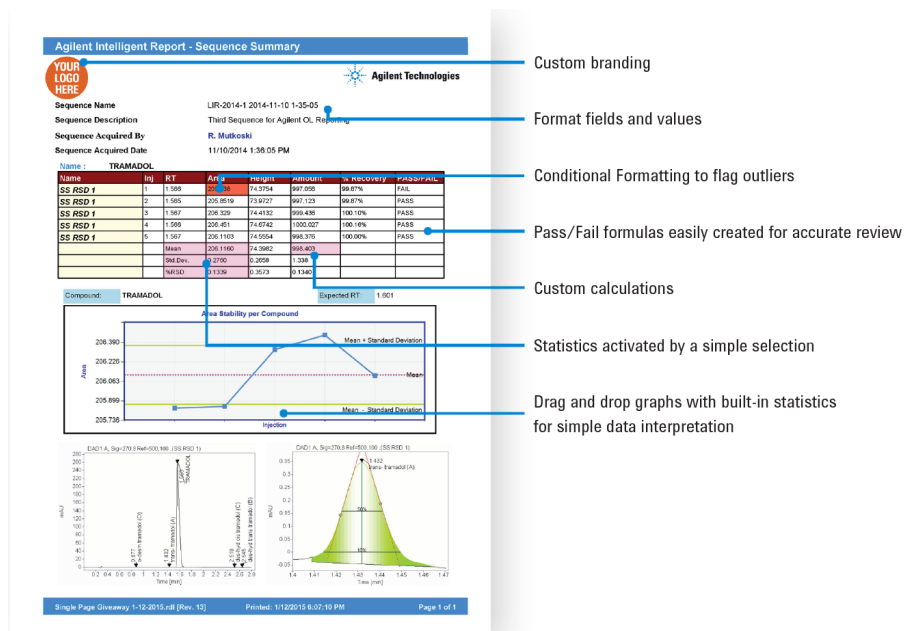


Figure 9. Create professional looking reports that support your work. Using OpenLAB CDS, there are no limits to the report layouts you can create.

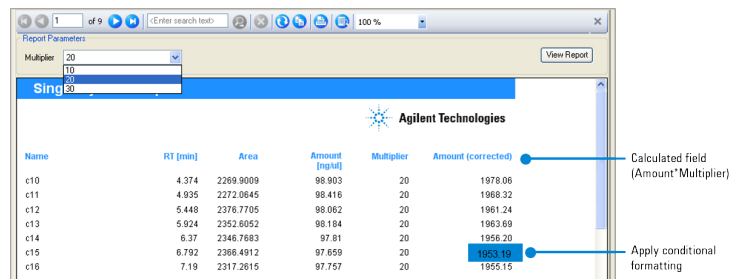


Figure 10. Calculate corrected sample amounts and flag outliers using a multiplier and conditional formatting. This example shows “Amount” calculation--sample amount times the factor of 2.5 divided by 100--is set using the OpenLAB CDS Expression Editor. The multiplier value was used to calculate the “Amount (corrected).” Conditional formatting was used to enter a limit value that highlights in blue any value in the Amount (corrected) column that is less than 1955.

## Conclusion

OpenLAB CDS enables you to produce the exact report you need, quickly and efficiently, without moving data to other software. Because the newest version of OpenLAB CDS allows you to use one software package for your LC, GC, LC/MS, and GC/MS single quadrupole systems, you can integrate reporting of the results obtained from all of these systems.

Custom calculation capabilities let you keep key data within the system, so you eliminate errors and loss of data integrity caused by exporting or manually transcribing data to other software. OpenLAB CDS also speeds data review and decision-making by flagging unusual results and charting trends across sequences and over time. Ultimately your lab saves time, reduces operating costs, and increases return on investment by reducing waste and unnecessary printouts.

With OpenLAB CDS, there are no limits to the layouts you can create. Templates and intuitive drag-and-drop report creation make it remarkably easy to generate even complex reports that reflect the quality of your work.

[www.agilent.com/OpenLAB](http://www.agilent.com/OpenLAB)

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