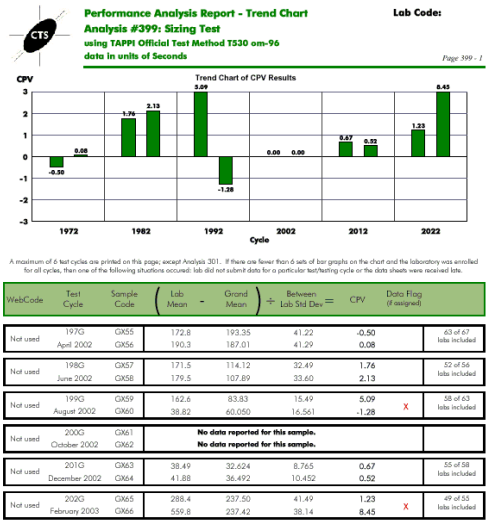
Guide to Interpreting Individual Reports in the Paper Program (page 1 of 6)

Your individual report is called the **Performance Analysis Report;** it is designed to serve as the primary tool for evaluating your results for each test. The Performance Analysis Report is a two-sided document. The front of the report is your **Trend Chart [Figure 1a]** that includes data for up to 6 cycles (except for Analysis 301- Box Compression that includes 3 cycles).

Figure 1a



Performance Analysis Report - Trend Chart
Analysis #399: Sizing Test
using TAPPI Official Test Method T530 om-96
data in units of Seconds

Lab Code:

Trend Chart of CPV Results

CPV

Cycle

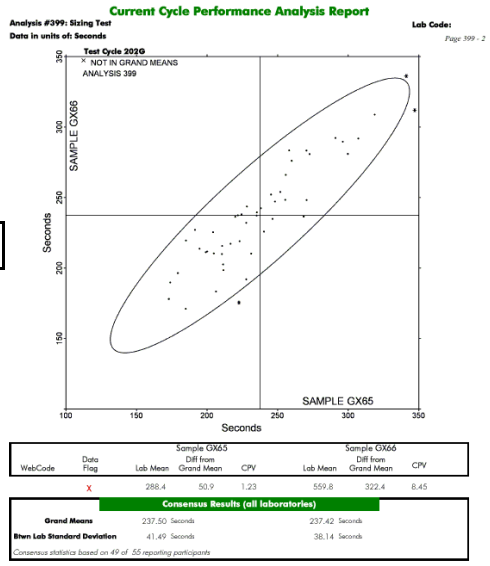
WebCode	Test Cycle	Sample Code	Lab Mean	Grand Mean	Between Lab Std Dev	CPV	Data Flag (if assigned)	
Not used	197G April 2002	GX55 GX56	172.8 190.3	193.35 187.01	41.22 41.29	-0.50 0.08		63 of 67 labs included
Not used	198G June 2002	GX57 GX58	171.5 179.5	114.12 107.89	32.49 33.60	1.76 2.13		52 of 56 labs included
Not used	199G August 2002	GX59 GX60	162.6 38.82	83.83 60.050	15.49 16.561	5.09 -1.28	X	58 of 63 labs included
Not used	200G October 2002	GX61 GX62	No data reported for this sample. No data reported for this sample.					
Not used	201G December 2002	GX63 GX64	38.49 41.88	32.624 36.492	8.765 10.452	0.67 0.52		55 of 58 labs included
Not used	202G February 2003	GX65 GX66	288.4 559.8	237.50 237.42	41.49 38.14	1.23 8.45	X	49 of 55 labs included

Action Item ! Your performance for this cycle was assigned an X Data Flag. Analyst Comment: Extreme data for Sample GX66.

The data table below the bar chart lists the CPVs shown in the bar chart and also provides supporting information. The data table for color analyses consists only of current data. If your results have been flagged in the two-sample analysis and excluded from the statistics, an **Action Item** will be posted below the data, and analyst comments on the flag will appear. The Action Item should serve as notice of a problem that requires immediate attention. Other types of data flags are discussed in the Key to Individual Reports.

The **Current Cycle [Figure 1b]** Performance Analysis Report follows the Trend Chart. This report contains all of the information about your laboratory that was formerly supplied in the printed group report, including the two-sample plot showing the control ellipse. Your laboratory's data point is located at the intersection of the Lab Means for each sample. The cross hairs in the plot represent the Grand Means for each sample and the control ellipse is a graphical representation of our bi-variate analysis technique. Your laboratory's results will be indicated by a small circle.

Figure 1b



Current Cycle Performance Analysis Report
Analysis #399: Sizing Test
Data in units of: Seconds
Lab Code:

Test Cycle 202G
NOT IN GRAND MEANS
ANALYSIS 399

SAMPLE GX66

SAMPLE GX65

Seconds

WebCode	Data Flag	Sample GX65 Lab Mean	Sample GX65 Diff from Grand Mean	Sample GX65 CPV	Sample GX66 Lab Mean	Sample GX66 Diff from Grand Mean	Sample GX66 CPV
	X	288.4	50.9	1.23	559.8	322.4	8.45

Consensus Results (all laboratories)

Grand Means	237.50 Seconds	237.42 Seconds
Btwn Lab Standard Deviation	41.49 Seconds	38.14 Seconds

Consensus statistics based on 49 of 55 reporting participants

The interlaboratory program is designed to evaluate much more that just your measurement performance on each sample individually. The design of the program allows laboratories to evaluate the consistency of their measurement system and to compare results over time.

CTS uses the CPV ratio to allow for evaluation of measurement performance over time. Because small differences in sample/property means and variation are not of critical importance when using the CPV to evaluate performance, laboratory results can be compared from cycle to cycle, even though the samples used may be different. When comparing data among test cycles, remember that such comparisons may be limited if there have been changes to equipment, test procedures, or technicians. Despite the limitations, labs that choose to maintain a continuous approach to the interlaboratory program should find that the Trend Charts provide more than just historical data; the ***Trend Charts should have diagnostic and/or predictive value***. The examples on the following pages illustrate how the information presented in the Performance Analysis Report could be interpreted.

Because similar materials are chosen for both samples, there should be a correlation of measurement performance between the two samples. CTS uses a bi-variate analysis technique (represented by the ellipse) to judge measurement performance on both samples simultaneously. Quite often measurement performance that differs from the group can be classified as either a ***systematic*** difference (means for both samples are similarly offset from the group means) or a ***consistency*** difference (measurements for both samples were not as correlated as other laboratories). If your results received a Data Flag, the Action Item may include our characterization of the error as a systematic or consistency variation.

Keeping in mind the limitations discussed on the preceding page, the following examples show how the results presented in the Trend Chart portion of the Performance Analysis Report can be interpreted.

Consistency

The grammage results [Figure 2a] are consistent from round to round showing only normal and acceptable flutter about the Grand Means, with all CPVs between -1.00 and +1.00. This should give the lab greater confidence in its grammage measurements.

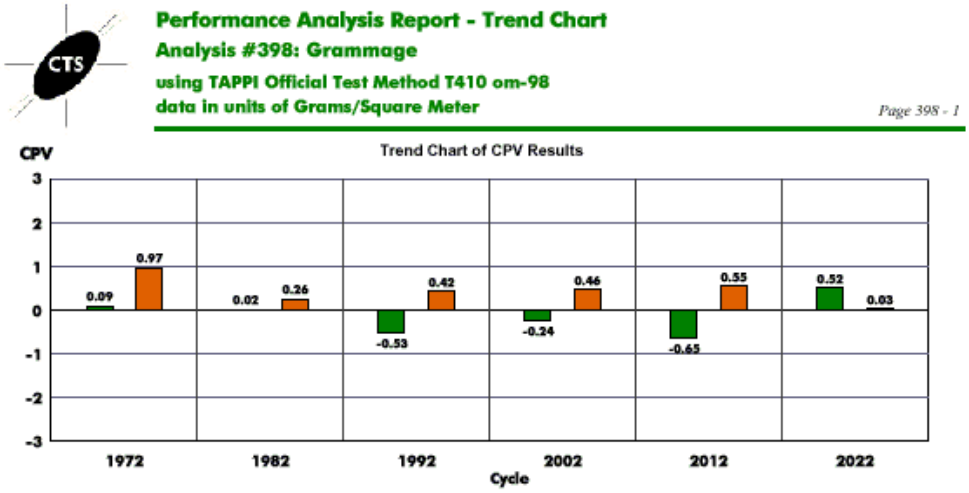


Figure 2a

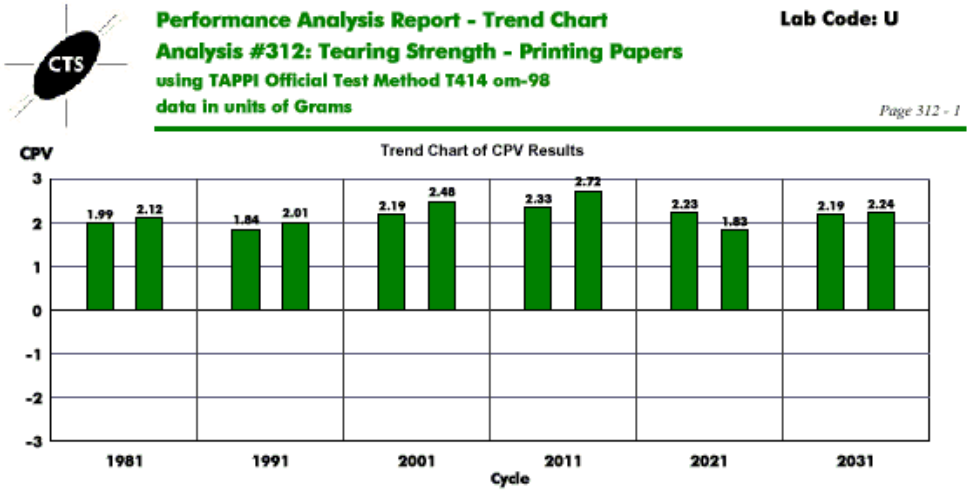


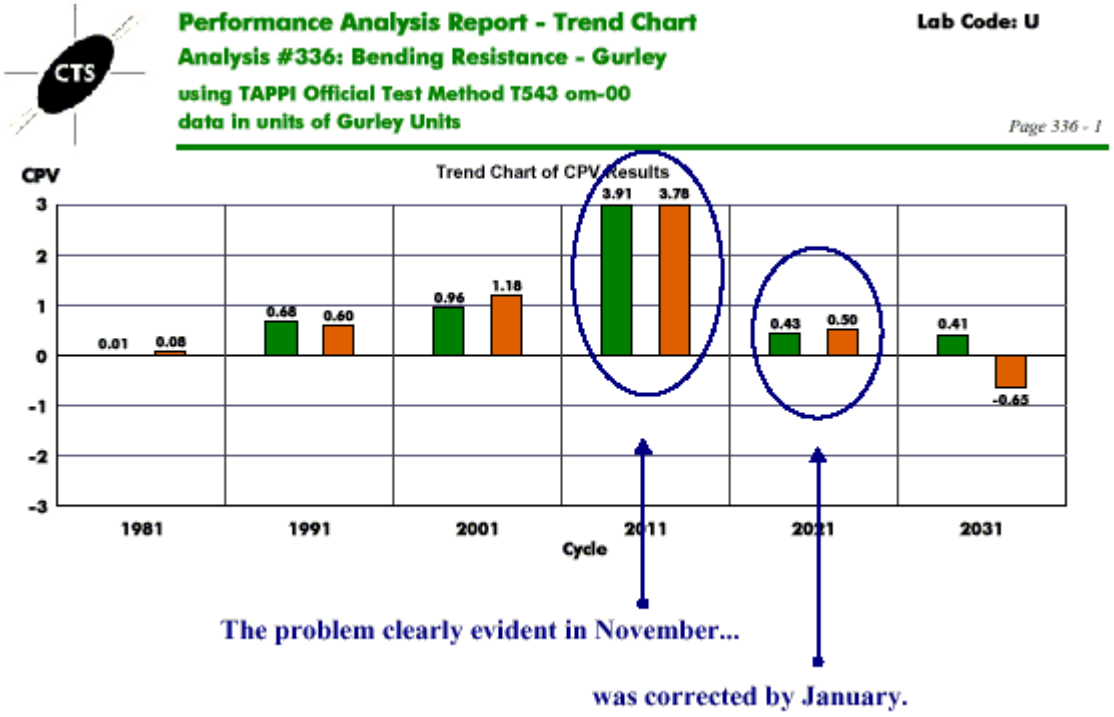
Figure 2b

More Consistency

Figure 2b shows results with a different type of consistency. The tear strength results from this laboratory are consistently higher than the Grand Mean, but have not been assigned a Data Flag. Depending on the laboratory's interpretation of the results, action may be taken to bring the testing in closer agreement with the consensus.

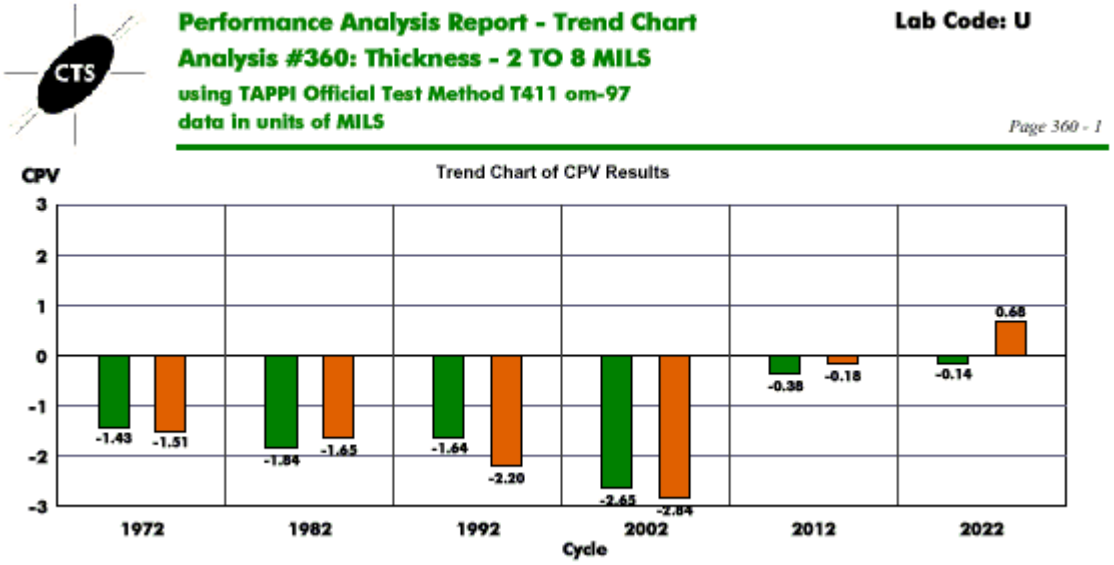
Sudden blip

The trend chart can reveal a one-time deviation from usual performance. These deviations happen, even to the best of labs, and cannot be predicted; they may or may not result in exclusion from group statistics. Was there a change in instruments? Improper calibration? A departure from procedures? New technician?



Alert to trouble

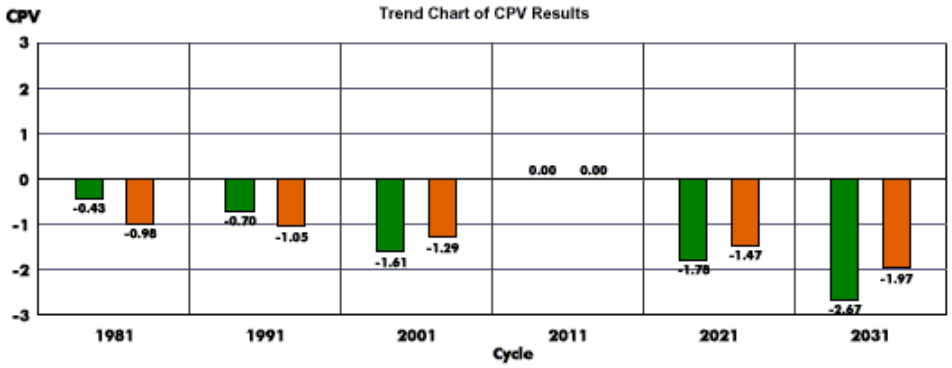
Consistency is good. A bar graph that is growing consistently longer is not. This lab was alerted to an impending problem by the Trend Chart showing caliper results that were trending increasingly lower than the consensus values, even though an "X" Data Flag was not assigned. The trend chart reflects changes effected by the lab to yield caliper results that now agree quite well with the Grand Means.



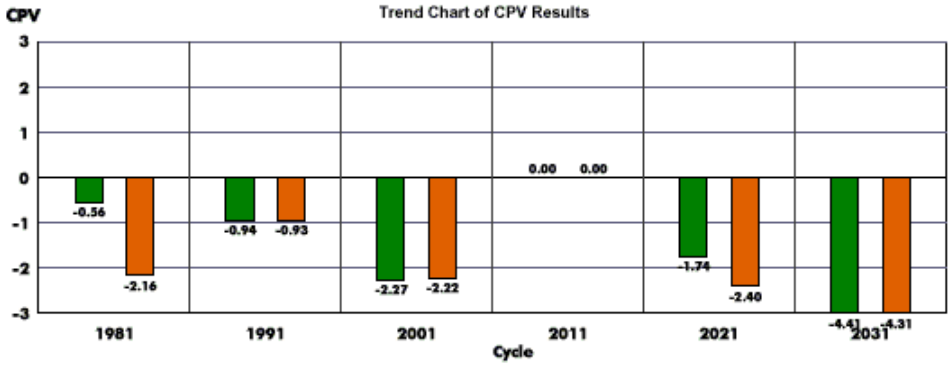
Trending in Linked Properties

Although each analysis is presented on its own page, it is important to remember that the tests are not completely independent. All of the testing in a laboratory is linked by factors such as training, maintenance and conditioning; analyses that use the same instrument or examine linked properties are even more closely related. Tensile and Color are examples of the close linkage between some analyses. The trend toward lower results seen in Tensile Strength is further confirmed by T.E.A. results.

Tensile



T.E.A.

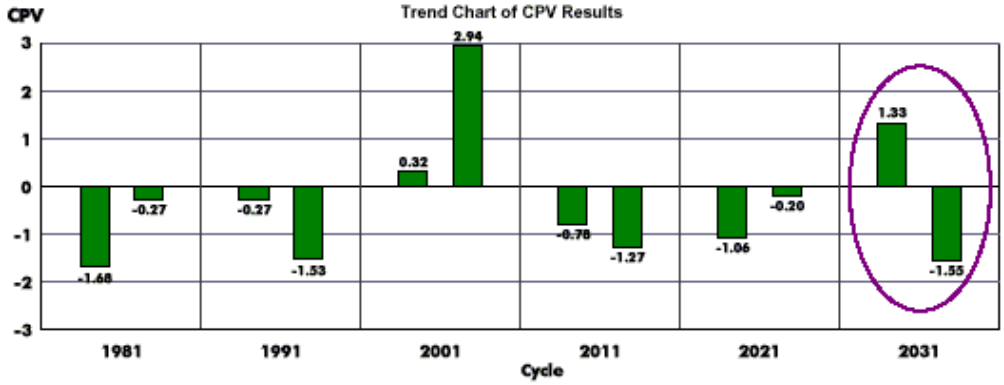


The Current Cycle portion of the Performance Analysis Report shows your lab's data for that cycle and the consensus data against which you are compared. All of this data is information that was previously supplied in the printed reports and is now published on our website as the Summary Report. Use the Web Code printed on the front of the Performance Analysis Report to locate yourself in the Summary Report on the website.

The Performance Analysis Report - Current Cycle presents the two-sample plot and control ellipse for each analysis. Knowing that lab means for the first sample set form the x-axis and lab means for the second sample set form the y-axis, you can easily find the point on the plot that represents your lab. However, if one or both of your lab means is extremely high or low, you may "fall off the plot".

You will notice a correlation between your bar graphs for the cycle and your position on the plot. For example, if both bars are above or below the zero-line, you will find your lab in the upper right or lower left quadrant, respectively. If your lab falls in the lower right or upper left quadrant of the plot, your bars go in opposite directions.

When considering your lab's position on the plot relative to the control ellipse, remember that, generally speaking, if a lab's plotted point falls on the major axis of the ellipse, the lab is consistent in its measurements between the two samples but exhibits an offset from the grand mean (systematic error). If a plotted point falls to the side of the ellipse, it indicates possible differences in the way that the lab tested the two samples or differences in sample behavior (inconsistency in testing). The two-sample plot enables you to see which sample, if either, is out of control and to ascertain the nature of the out-of-control situation.

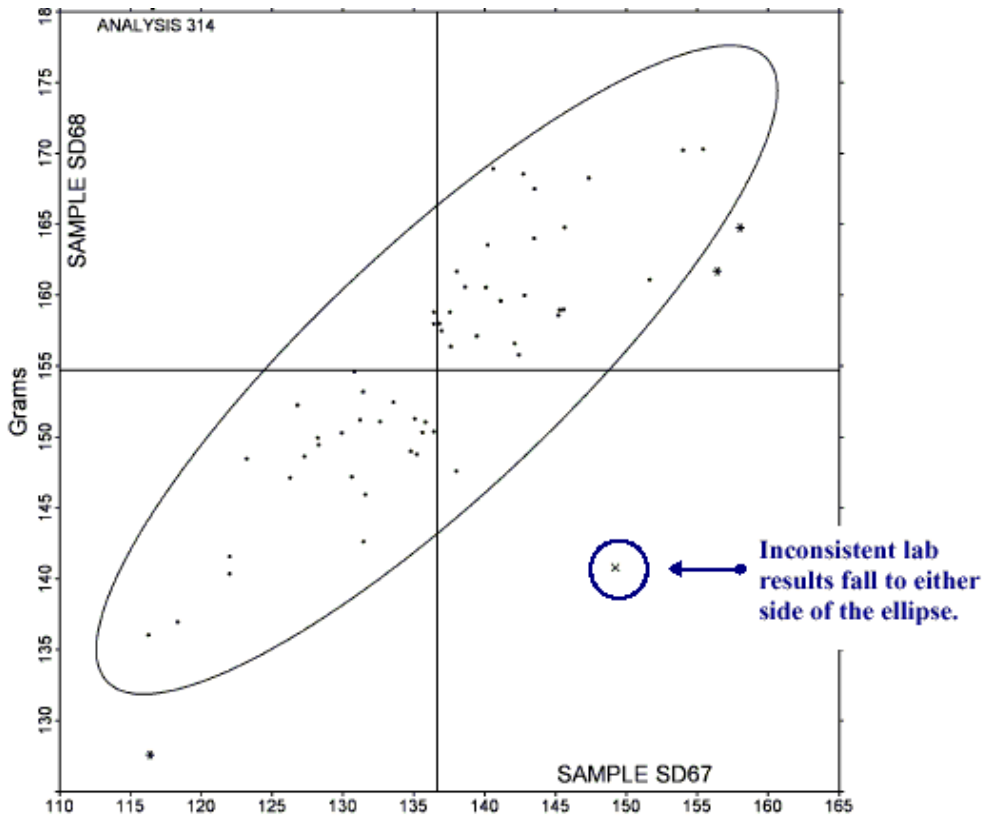


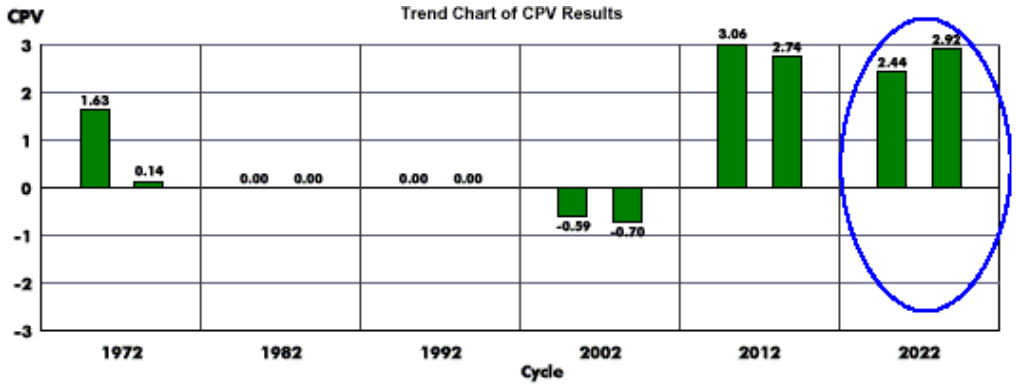
Not used	202S January 2003	SD65 SD66	107.6 105.6	117.24 107.33	9.12 8.74	-1.06 -0.20		52 of 52 labs included
	203S March 2003	SD67 SD68	149.2 140.8	136.61 154.74	9.46 9.00	1.33 -1.55	X	56 of 59 labs included

Action Item ! Your performance for this cycle was assigned an X Data Flag. Analyst Comment: Inconsistent in testing between samples (data may be transposed between samples).

Inconsistency in testing

Inconsistencies that do not involve extreme data may be the most difficult error for labs to understand and to identify a cause. A lab's first instinct often is to conclude that 'each lab mean does not exceed a reasonable limit, so there is no problem'. But because the samples provided are similar to each other, there is an expectation that there should be a correlation between the measurement results for the two samples. This correlation is clearly shown by the control ellipse. The test results for all labs are compared against each other, thereby computing an "acceptable" level of inconsistency and illustrated in part by the width of the control ellipse. A lab flagged for *Inconsistency in testing* has exceeded what the other labs have determined is a reasonable correlation between the means for the samples.





Not used	201G December 2002	GU63 GU64	47.50 46.30	40.160 40.192	2.400 2.227	3.06 2.74	*	36 of 36 labs included
Not used	202G February 2003	GU65 GU66	44.84 45.72	39.809 39.905	2.061 1.992	2.44 2.92	*	31 of 31 labs included

Systematic variations

Bias is an unavoidable fact of life in laboratory testing. The best illustration of bias is the control ellipse on the two sample plot. If a particular analysis/sample combination did not show bias, the control ellipse would become a circle. Differences in procedures, conditions, instrumentation and sample preparation all contribute to the bias of a laboratory. When these differences become too large a laboratory may receive a Data Flag for a *Systematic Error*. When the test results for both samples are both high or low compared to the group, a laboratory has a fixed set of factors to focus on to identify a cause. Furthermore, since additional testing on similar samples should produce similarly high or low results, it is easier to determine that a systematic error has been successfully corrected.