Drainac Accuracy

The Drainac measures the Drain Time of the stock. It does so with a very high degree of repeatability, meaning that if you were to present the same stock to the Drainac over and over, you would get an analysis that would have a statistical variability of less than 1%.

Most customers, however, when they ask how accurate the Drainac is, are actually asking how accurate the Drainac is with respect to a CSF analysis produced by their laboratory. In other words, if the lab reads X freeness for a sample, what might the Drainac read for the same sample?

This is a more complex questions than it seems, primarily because the Drainac does not perform a CSF analysis. It performs a Drain Time analysis. To get a reading in CSF units, one must build a calibration between the native drain time measurement of the Drainac and the CSF evaluations produced by the customer's laboratory. This calibration is a mathematical relationship which is derived by comparing lab CSF evaluations of samples with the Drainac drain time readings made when the samples were collected.

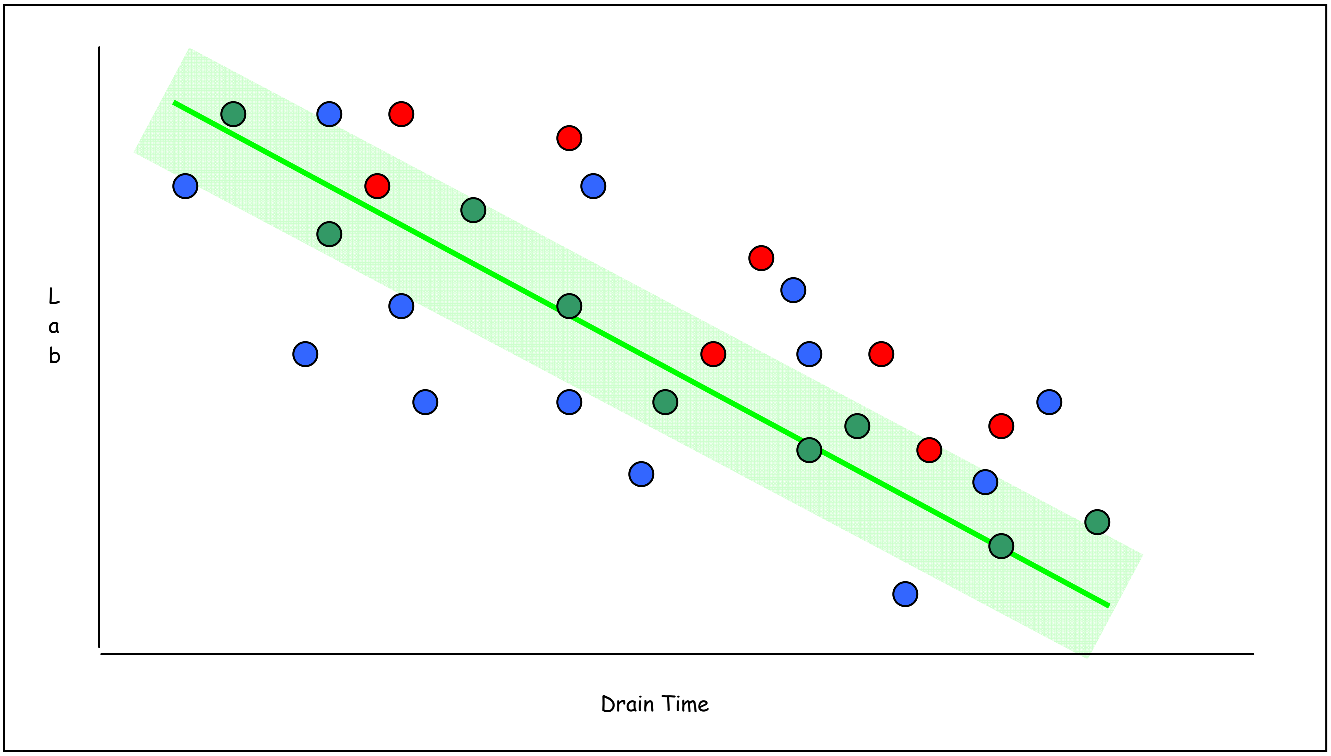
This calibration relies entirely on the accuracy of the laboratory performing the CSF freeness evaluation. The statistics of those evaluations will define the accuracy of the Drainac with respect to future lab evaluations of sample freeness.

If the lab is very good, it will have very tight statistics, i.e., a small two-sigma (2σ). In such circumstances, there should be good general agreement between the lab and the Drainac and any differences between the two will be small. If the lab is not so good, then the differences will be larger. In either case, it is important to have an estimate of the laboratory analysis statistics, specifically the 2σ of the CSF test as performed by the laboratory.

If the calibration is executed properly, and the statistics are well defined, one would expect that 95% of the time, the Drainac evaluation and the lab evaluation would agree with each other within the bounds defined by the 2σ limits of the laboratory. The residuals should have zero mean.

Of course, occasionally, they will not be in that range, but that is not cause for concern unless the deviation is systematic. Examples of systematic deviations might be evaluations whose values lie consistently outside of the 2σ range, or residuals the mean of which are consistently positive or negative.

In the case of systematic deviation, it may be necessary to recalibrate the system, or re-estimate the statistics of the lab, or both.



In the figure above, the green line represents the best fit calibration line developed by regression of laboratory and Drainac data. The shaded green area represents the 2σ limits of acceptable variation as defined by the statistics of the regression.

The green points are examples of Lab-Drainac data pairs that are mostly within the acceptable region of variation. Although one of the green data points in the example actually lies outside of the acceptable variation, the bulk of them are within the area, and one would conclude that the lab procedure, the Drainac system and the calibration are functioning properly.

The blue points are examples of Lab-Drainac data pairs whose values consistently lie outside of the area of acceptable variation. This may indicate that the original calibration statistics are no longer valid, or that something has changed, either with the lab methodology or the Drainac instrument. A review of both systems and the calibration is in order.

The red points are Lab-Drainac data pairs which are showing a consistent bias on one side of the best fit line. Even though some of the data points are still within the green shaded area, a review of the calibration, lab method and instrument are in order.