Calibrating your Drainac™

Part I

Introduction

Your Drainac has been designed to measure the drainage time of your furnish with a high degree of repeatability. This drain time measurement is the native measurement of the Drainac analyzer and is linear with respect to freeness. Many mills, however, prefer that the freeness measurement be reported in other units such as CSF. The Drainac can be calibrated to convert the drain time measurement into any unit of interest.

There are several steps in building a calibration. Theses steps include setting the Drainac's intake pressure, collecting and analyzing process and instrument response data, selecting a calibration method, deriving the calibration parameters and finally, entering the calibration into the instrument.

Drainac Intake Pressure Setting

The primary operational parameter of the Drainac is the intake pressure setting. This pressure setting controls how much negative pressure is applied to the process during the intake phase of the analysis. During the initial startup of your Drainac, a TECO field engineer selected a intake pressure setting such that an analysis of your nominal stock would be completed in 20 to 30 seconds.

Unless your furnish has changed, it is usually not necessary to change this pressure setting. If the furnish has changed, you may need to adjust the pressure setting according to the procedure in your Drainac manual. Note: Once set, you should not change the intake pressure setting. <u>Changing the setting will render the current calibration invalid and require recalibration</u>.

Collecting Process and Drainac Data

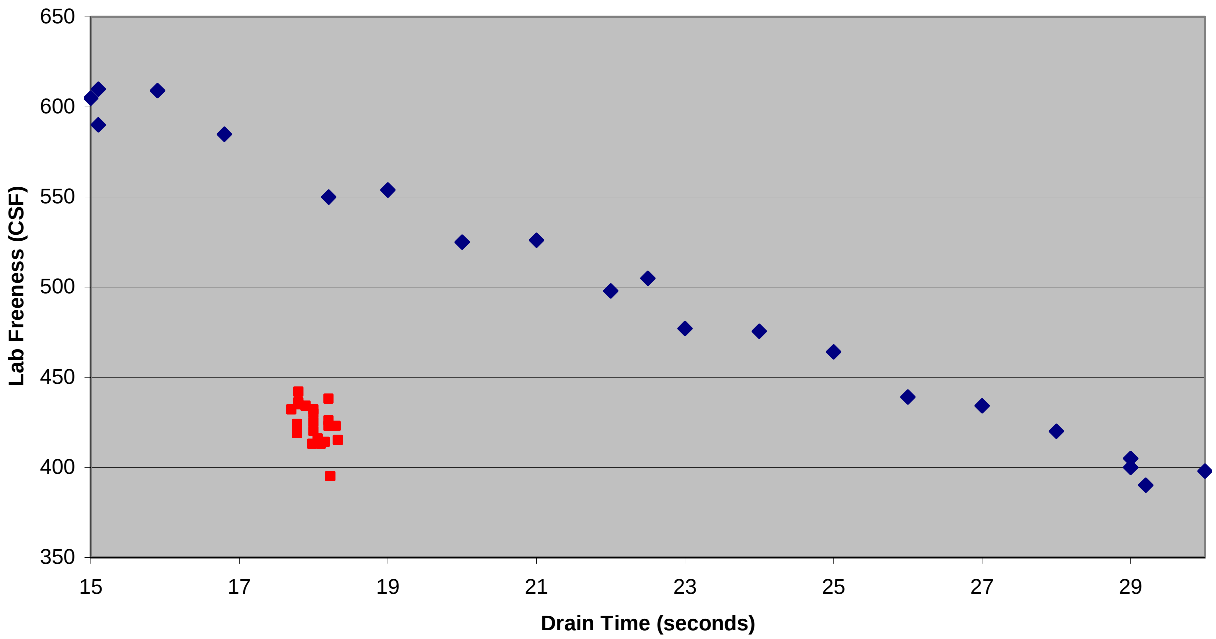
Once the operational parameters of the Drainac are set, it will be necessary to collect both process and Drainac data in order to build the calibration. Periodically collect furnish samples and perform manual lab evaluations of freeness. Record the Drainac response time when collecting the sample. Repeat this procedure to build a collection of data points.

Try to collect samples with a large range of freeness variation. Ideally, collect samples with a minimum of 200 CSF variation. Avoid collecting samples during startups as stock characteristics are likely not to have stabilized. A good time to collect samples is during a machine break as these are times when the furnish is close to nominal conditions and the operators can be persuaded to increase or decrease refiner loads to give wide ranges in freeness.

Analyzing Process and Drainac Data

Once you have collected a number of data points – the more the better – you can analyze the data to build a calibration. Use a program like Excel to plot the data. See figure 1 for examples of two different but typical situations.

Figure 1 - Lab Freeness vs Drainac Drain Time



The blue data is an example of samples taken from a stock line with a lot of variation in freeness. The red data is typical of a stock with little freeness variation. Although there is the same number of samples in both data sets, the red data fundamentally represents a single operating point whereas the blue data represents an operating trend.

Selecting a Calibration Approach

If your data set looks more like the red data set you should use the **Single Point Calibration** approach. This approach is used when a large range of data is unavailable or when only very few data points have been collected. In practice, most systems are set up using this approach. In single-point calibrations, the Drainac is set up as a freeness deviation meter. Using this method, deviations in freeness from a set point are significant. You will not, however, be able to make absolute measurements of freeness with any degree of accuracy. This method is appropriate to implement freeness-based closed-loop refiner control.

If your data set looks more like the blue data, then you can use the **Dual Point Calibration** approach. The approach is applicable when larger ranges of data are available. In this approach, the Drainac is set up to generate absolute measurements of freeness. This approach is valid for closed-loop refiner control and also other applications where exact measurements of freeness relative to an external standard are desired or required, e.g., to satisfy ISO certification standards.