# What to do about Foam

## Introduction

Your Drainac™ has been designed to measure the drainage time of your furnish with a high degree of repeatability. Occasionally, the measurement can become noisy because the stock develops a tendency to foam. Fortunately, the Drainac can be adjusted to ignore foam. This article presents the procedure to adjust the probe sensitivity & switch point settings so as to eliminate noise as a consequence of foaming.

## Why Foam can be a Problem

The Drainac assesses the freeness of a stock sample by measuring the amount of time it takes for a particular filtrate to fill a known volume in the analysis chamber. The level of the filtrate in the chamber is detected by probes which monitor electrical resistance at different heights within the chamber. When a probe is exposed, the measured resistance is very high. When the probe is immersed in filtrate, the resistance is very low.

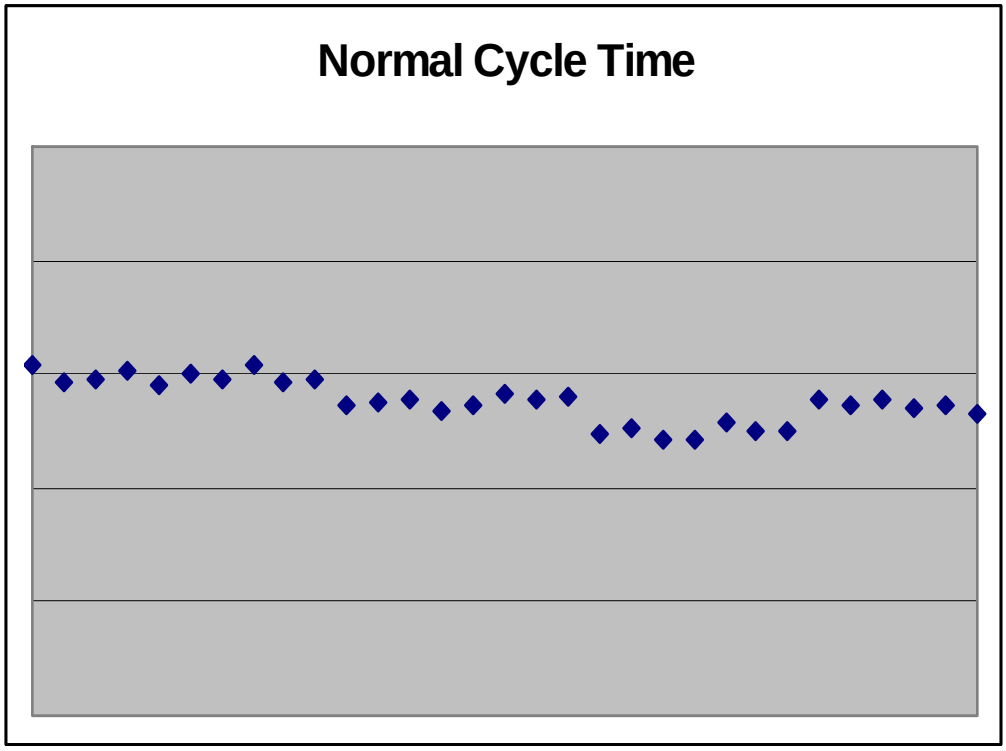



Figure 1: Normal Cycle Times

The system constantly monitors the resistance of the probes and determines whether or not a probe is immersed by comparing the resistance of the probe to an operational value called the Probe Switch Point ($P_{sw}$). Values higher than $P_{sw}$ indicate the probe is exposed and values lower than $P_{sw}$ indicate the probe is immersed.

Normally, the resistances seen by the probes are extreme and very easy to distinguish. In this case, the cycle times produced by the instrument tend to be stable with little variation (Figure 1).

In the case when foam is present, the resistance measured by the probe takes on an intermediate value and may be misinterpreted by the system as immersion when in actuality, the probe is still exposed. Because foam can have varying thickness, the system may start or stop its measurement timer inconsistently and the freeness measurement can become noisy as a consequence (Figure 2).

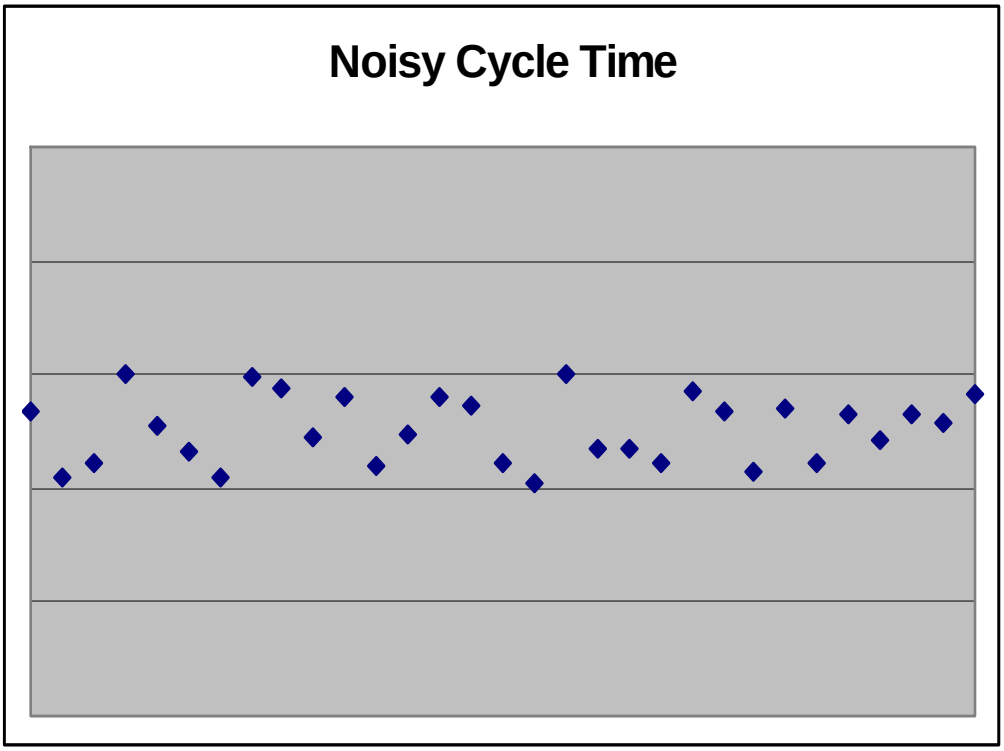



Figure 2: Noisy Cycle Time Measurements due to Foam

## Fixing the Problem

To correct for foaming, the Drainac system operating parameters must be adjusted so that the intermediate resistance values of the foam do not trigger a timing event. There are two parameters to adjust: the Probe Sensitivity ($P_{sen}$) and the Probe Switch Point ($P_{sw}$).

The Probe Sensitivity is a gain factor the system uses to amplify the resistance the probe sees. Under normal conditions, $P_{sen}$ is set to a nominally low value. With this setting, the probe resistance will have sufficient separation between immersed and exposed conditions such that the level can be recognized properly (Figure 3).

In the case of foam, however, this nominally low value of $P_{sen}$ will require some adjustment so as to adequately separate foam and immersed states. As can be seen in Figure 4, the foam takes on intermediate values which span the switch point. This will trigger timing events prematurely.

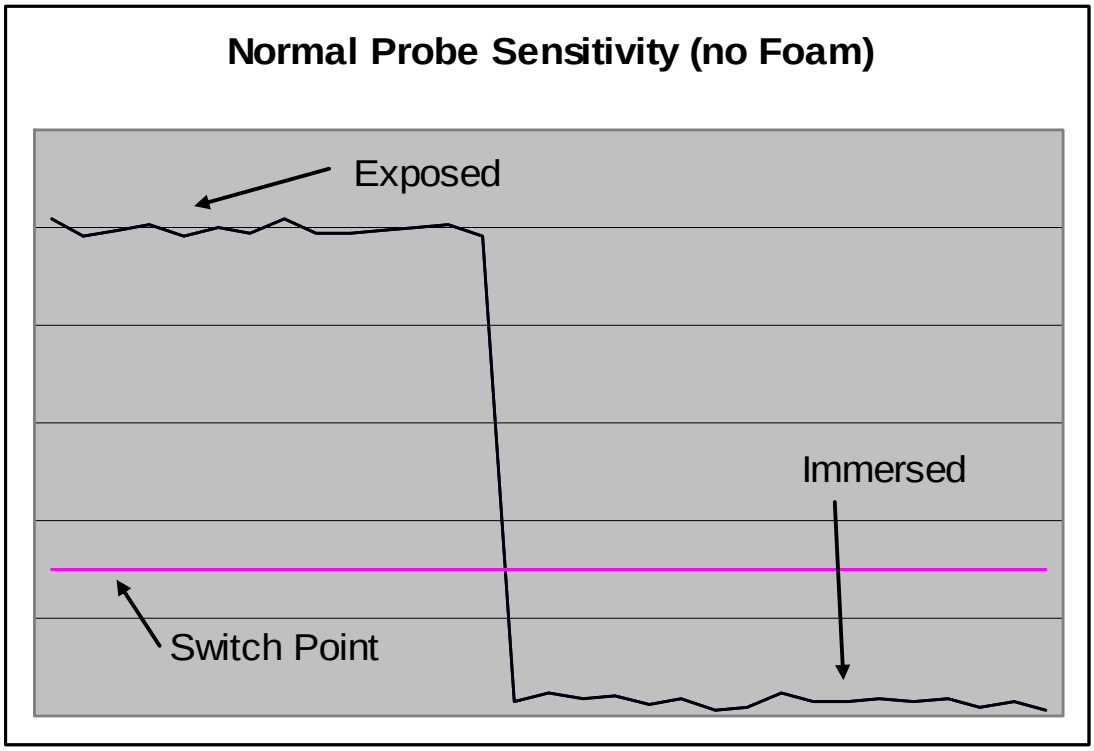
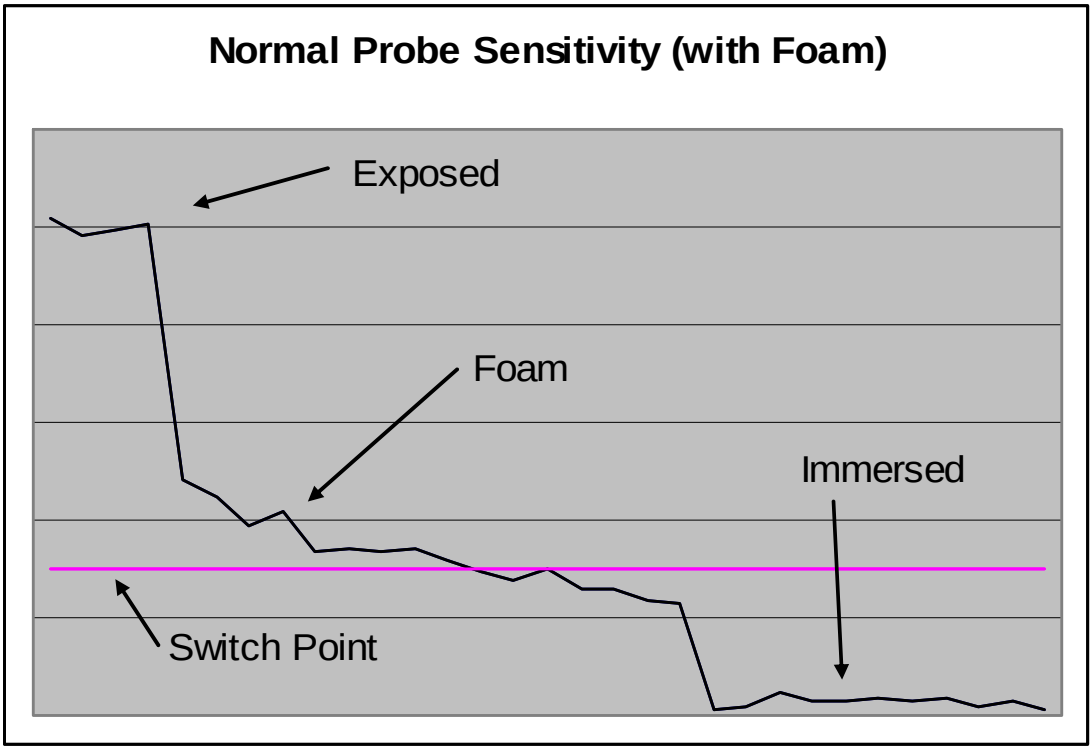



Figure 3: Probe Resistance with Normal $P_{sen}$ and no Foam Present




Figures 4: Probe Resistance with Normal $P_{sen}$ and Foam

It will be necessary to increase $P_{sen}$ to amplify the measured resistance of the foam such that sufficient separation will exist between foam and immersed states. Figure 5 illustrates the shift in resistance as a consequence of increasing the sensitivity factor. As can be seen, there is now a sufficient difference between the foam and immersed states.

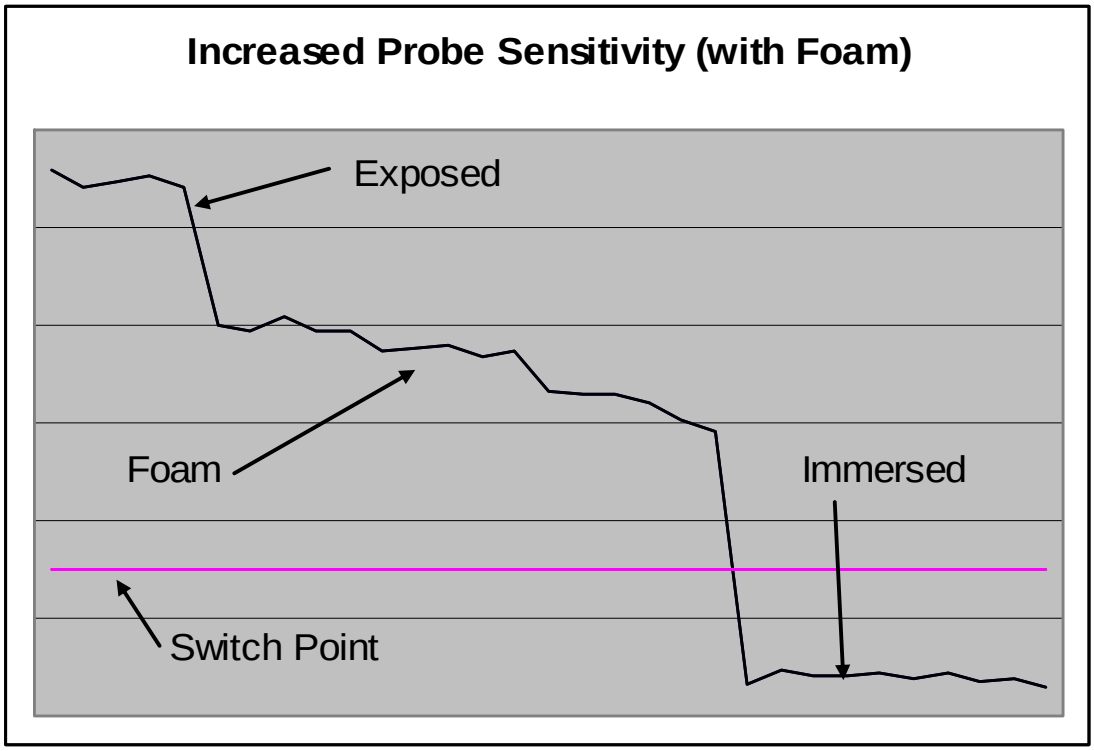



Figure 5: Probe Resistance with Increased Probe Sensitivity Setting

Once the sensitivity has been successfully adjusted, it will also be necessary to adjust the Probe Switch Point as well so that the resistance states of the probe are properly interpreted. Choose a switch point level in between the immersed and foam states of the probe (Figure 5).

## Monitoring Probe Resistance and Adjusting Probe Settings

Probe resistance can be monitored in Probe Parameter page of the Config menu. While in Cycle mode, press the CONFIG button on the front face of the Drainac electronics display and use the arrows to select the Probe Parameter screen. The resistance for the upper or lower probe is reported at the bottom of the screen.

Begin by monitoring the Lower Probe resistance and take note of the values of the resistance as the Drainac performs an analysis. You will see the resistances start out high and then drop as the foam touches the probe. Note down the resistance as it stabilizes. The resistance of the foam may be low in which case you will need to increase the Probe Sensitivity. Continue to increase the sensitivity until you can see a difference between foam and immersed states. Select a sensitivity that produces a foam resistance at least 3 or 4 times that of the immersed state. Then select a switch point which is about midway between the foam and immersed states. Adjust the Upper Probe settings to the same values as the Lower Probe.

Your Drainac is now adjusted to compensate for foamy stock. You should notice that both the Cycle Time and Freeness measurements are more stable than before.