

# Pressure Head and Good Operation

## Introduction

Your Drainac™ has been designed to measure the drainage time of your furnish with a high degree of repeatability. This repeatability is a function of several factors, but perhaps the most important of these are the various pressure settings of the instrument. To understand why pressure settings are so important, it is first necessary to understand what is happening when a freeness measurement is made.

## Manual CSF Testers and Decreasing Pressure Head

Most people are familiar with the old manual apparatus for measuring freeness. These bronze instruments are mounted on the lab walls of nearly every mill in North America and have been used to measure freeness for decades. In this test, stock is poured into the top chamber of the device. The depth of this stock sample represents the starting pressure head which will force the sample through the tester. The depth is typically only about four inches, which gives a starting pressure head of only 0.15 PSI. When the instrument is opened, the stock sample flows through the instrument. As the sample drains, the pressure head drops off to zero as the level in the upper chamber decreases.

This decreasing pressure head amplifies the impact of certain factors on the manual freeness measurement. These factors include sample consistency, temperature, cleanliness of the apparatus and technician error. While some effort is made to compensate or correct for these errors, the manual method has a large degree of uncertainty and operators have historically treated the results with some skepticism.

## Drainac's Constant Pressure Head

Drainac™ overcomes this uncertainty by creating a substantially larger pressure head and maintaining it at constant levels throughout the analysis. Whereas a manual CSF tester might have an initial pressure head of only 0.15 PSI, Drainac™ maintains a pressure head of about 5 PSI – more than 30 times greater. This large pressure head renders drainage variations due to the various factors significant to the manual test negligible to the Drainac™.

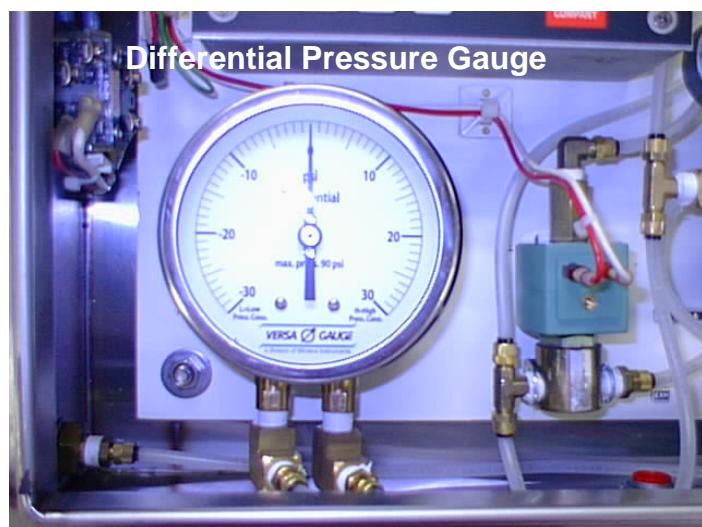
## Intake Pressure Settings

The primary operational parameter of the Drainac™ is the intake pressure setting. This pressure setting controls how much negative pressure – relative to the stock line - is applied to the process during the intake phase of the analysis. During the initial startup of your Drainac™, a TECO field engineer selected an intake pressure setting such that an analysis of your nominal stock would be completed in 20 to 30 seconds. Typically this pressure setting is about -5 PSI, as indicated on the Drainac™ Differential Pressure Meter located in the Electronics Cabinet. In some cases, the pressure

may be somewhat reduced from -5 PSI in order to accommodate fast or foamy furnishes. The pressure setting should never be below -2 PSI.

Unless your furnish changes, it is usually not necessary to adjust this pressure setting. If the furnish has changed, you may need to adjust the setting using the pressure regulators according to the procedure in your Drainac™ Instruction Manual.

Once set, you should not change the intake pressure setting. Drainac's calibrations are developed once the intake pressure has been set. Changing this pressure setting will render the current calibration invalid and will require recalibration of the Drainac™.



### **Exhaust Pressure Settings**

Exhaust pressure settings are set to positive pressure with respect to the stock line. This pressure is applied to eject the stock sample from the analysis chamber after an analysis has been completed. This pressure is typically set to +10 PSI, as indicated on the Drainac Differential Pressure Meter located in the Electronics Cabinet. This pressure is set so as to overcome stock line pressure resistance. Exhaust and flush times are set so that the sample is ejected completely back into the process line, preparing the chamber for the analysis of the next fresh stock sample.

Take care to ensure that the sample and post-analysis flush water is completely ejected before the system takes the next sample. Incomplete sample ejection will render subsequent freeness analysis invalid.

### **Mill Air Quality and Pressure Requirements**

Drainac requires clean, dry, instrument-quality supply of air in order to operate properly. Air supply pressure must be a minimum of 10 PSI higher than the maximum expected stock line pressure. Inadequate pressure will cause the instrument to malfunction. Wet air, or air with suspended particulates, will ultimately cause damage to the Drainac and void the warranty.

TECO can optionally provide highly-efficient, point-of-use air dryer and filtration systems for a nominal cost if an adequate air supply is unavailable.