

Pulse Brew and Pre-infusion

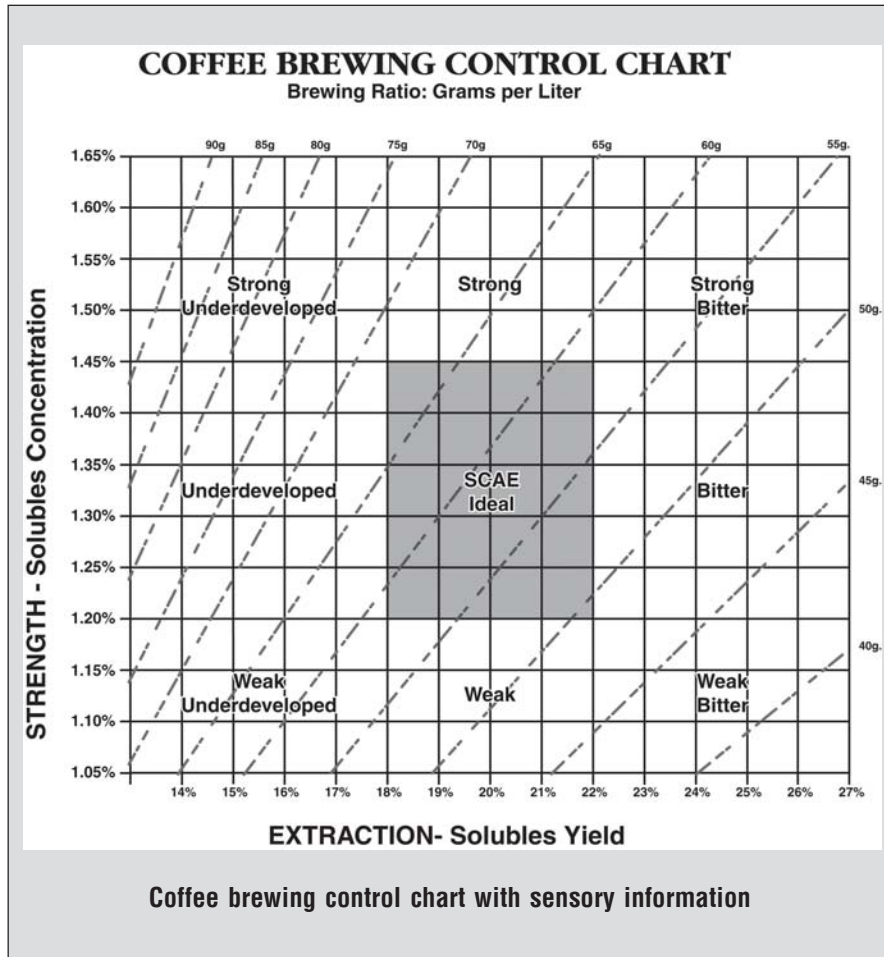
New Tools for Filter Drip Brewing

By Randy D. Pope

There will always be more questions than answers when discussing any subject, and coffee brewing is no exception. Everyone you talk to has an opinion about how a properly brewed cup is prepared. Differences in the brew caused by the method used in the separation of the grounds and finished beverage can alter your taste experience as well as the strength and extraction analysis. These variations alone create debate as to which delivers the perfect cup experience. Since the 1960s, the most accepted method of separation has been paper filtration for filter-drip coffee. I would venture to say the majority of today's coffee drinkers in the United States haven't tasted coffee that has been brewed by any other method.

Many methods, two standards

Throughout my time spent learning about coffee brewing (something I hope never ends), there have been only two recognized sets of standards to determine a properly brewed cup of filter coffee. The majority of this work was done in the 1950s through the early



Beverages are analyzed for soluble concentration (strength) to determine the percentage of the beverage that was the soluble material from coffee. The most enjoyable beverages had 1.20-1.45 % of coffee soluble material.

Extraction (yield) from the grounds was also analyzed. Extraction of less than 18 % of the brewing material was determined to be underdeveloped and coffee was wasted due to under-extraction. If a coffee was more than 22 %, undesirable bitter flavors were removed. The desirable extraction limits were determined to be within a range of 18- 22 % of the original weight used in the brew.

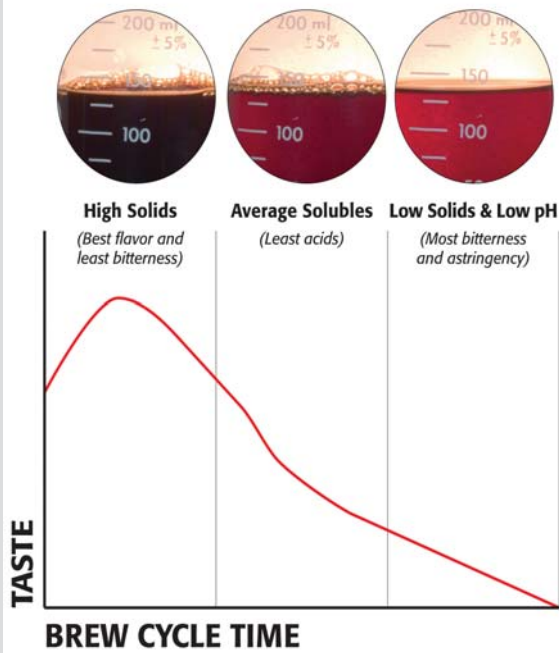
Grind analysis chart



GRIND	TIME (WATER CONTACT WITH THE COFFEE GROUNDS)
FINE	1-4 MINUTES
FILTER	4-6 MINUTES
COARSE	6-8 MINUTES

The grind size and bed depth of the ground coffee are the factors that determine water contact time. Recognized times are listed in the chart below. These times apply regardless of the volume brewed.

The Brewing Process



Grind analysis chart

The water temperature required to efficiently extract the desired soluble materials and aromatics from the ground coffee should be delivered within a range of 92°C - 96°C throughout the brew cycle.

Water quality is critical to the perfect brew. Ideal water is good-tasting, odorless and has no visible impurities. A total concentration of dissolved minerals in water below 300 mg/l should deliver a quality brew. A pH measurement of 7.0 or neutral is desired. A range of +/- 1.0 is acceptable.

1970s. These standards set a recipe or formula for water to coffee ratio that can deliver a balance of strength and extraction and are achieved through a brewing method that combines time and temperature. All of which have recognized tolerances. With all the advances in the world of coffee technology, it's time to take a fresh look at how a properly brewed cup is determined.

First let's look at existing brewing standards. These standards were developed by the Coffee Brewing Institute Inc. (CBI) an affiliate of both the National Coffee Association and the Pan American Coffee Bureau. When the CBI was formed in 1952, it marked the first time a scientific study of coffee beverage was conducted in the United States.

In 1964, the now-defunct Coffee Brewing Institute was replaced with the Coffee Brewing Center (CBC). The CBC focused its work in the foodservice sector, promoting the brewing standards created by the CBI. The CBC developed the original Golden Cup Award program to promote proper brewing techniques at the

restaurant level and to provide training to the foodservice trade. The CBC closed in 1975.

Meanwhile, across the Atlantic, the European Coffee Brewing Association was established in 1971 by the Norwegian Coffee Association. The association's mission has been to improve the technical qualities of the brewing equipment, and to inform, train and educate professional and consumers to properly brew their coffee.

Thankfully these concepts are back in the mainstream conscience of today's roasters, manufacturers and consumers.

The Speciality Coffee Association of Europe (SCAE) and the Specialty Coffee Association of America (SCAA) have programs promoting quality brewing.

The SCAE Gold Cup program and the SCAA Golden Cup programs are designed to provide education to all involved in the coffee trade.

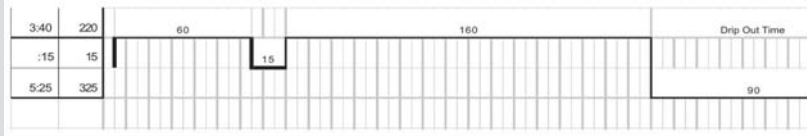
The crucial three:

time, temperature, water quality

The three most important variables required to extract the desirable materials from the ground coffee are time, temperature and water quality. Time of water-contact with the coffee is the controlling factor to remove the amount of extraction desired. The smaller the grind sizes the shorter the time required for a brew cycle.

The advertisement for SIGRI COFFEE features a central image of a yellow and black bird perched on a branch, overlooking a river that winds through a lush, green landscape. The background of the entire ad is a textured, light-colored surface. In the top right corner, there is a logo for SIGRI COFFEE with a stylized coffee cup icon. The brand name 'SIGRI COFFEE' is written in large, elegant, gold-colored script across the middle. At the bottom right, contact information is provided: 'Carpenter Estates, P.O. Box 94, Mt. Hagen 281, Papua New Guinea. Tel: 675-5422700 Fax: 675-5421616 Email: sales@wrcarpenters.com.pg'. Below this, it says 'Produce of Papua New Guinea' and 'www.wrcarpenters.com.pg'.

Pre-Infusion



Pre-infusion graph

A multitude of factors can affect coffee brewing: terrain, climate, processing, or roasting, to name a few. Experimenting with pre-infusion can open up a whole new flavor profile in the cup. I have found that very fresh-roasted and ground coffees respond well to pre-infusion. The initial phase of brew water assists in the release of the carbon dioxide gasses in the coffee cell structure. Followed by the adjustable pause, the cells have time to release some of the gasses and allow water to more easily penetrate the inner cell structure during the remaining water cycle.

Pulse brew is another method for extending the water contact time with the ground coffee. Pulse brew routines consist of an initial on time followed by a series of off-and-on periods that dispense brew water over the grounds.

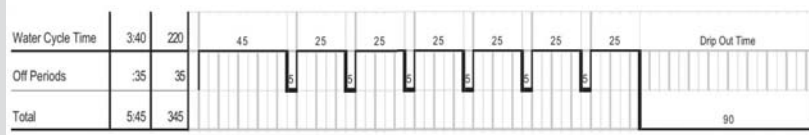
basket design. Today's equipment far surpasses what we previously had available for brewing coffee.

The majority of lower volume brewers (two liters or less) may have the least amount of adjustment available to the end user. Although most have a precise temperature and volume controller, only those introduced recently offer control over delivery time for the water. The latest technologies of pulse brew and pre-infusion provide the roaster or end user the option of controlling the water cycle time, which affects the total brew cycle time. You may ask yourself, why do I need this feature? One answer is that these features allow you to control the water cycle time and use a different grind size. Now you can choose a coarser grind and program the brewing equipment to accommodate with a longer water cycle time. These features can provide a new experience in the cup to enjoy.

As brew water comes in contact with ground coffee, the first wetting phase of the brew cycle begins. At this point in the brewing process, the coffee grounds begin to absorb the water into the cell structure of the broken bean. This prepares the grounds for the extraction phase by saturating the inner and outer surfaces of the coffee cells.

Pre-infusion gives you control over the initial volume of brew water dispensed over the ground coffee. This feature dispenses the amount of brew water specified over the grounds, pauses so that the cell surfaces have a chance to be saturated, then dispenses the remainder of the brew water. A simple analogy would be a comparison of the pre-soak cycle for laundry. The goals are the same: to remove the material that is bound up in the fabric/ cells of the material by controlling the initial volume to completely saturate the material, allowing time for absorption, then continuing the remainder of the cycle.

Pulse Brew



Pulse brew chart

Pulse brew assists in flavor-matching coffees brewed in a multi-volume brewer. Ideally a brew funnel is sized to one volume. Today, customers look for flexibility in the equipment, brewing larger quantities at peak demand and smaller quantities during slower periods to reduce waste. As a result, they brew fresh coffee more often. Brew funnels are generally sized to accommodate the larger brew volumes. When the smaller weight/volumes are placed in the funnels the bed-depth of the grounds is too shallow for good brewing. Without the advantage of programming a pulse brew routine to elongate the water contact with the grounds, the quality of the beverage suffers.

Without experimentation there is no innovation. Learning to use the tools provided by the equipment manufacturers will enhance your coffee program.

Better beans, better brewers

In the past five years, I've seen great improvements in the quality of specialty grade beans as well as dramatic changes in coffee roasting

technology. Brewing technology has also made great strides in temperature consistency and delivery systems of the water as well as filtration and funnel

Randy D. Pope is BUNN Beverage Technology Center director