

Ball Coleman Seed Counter - Software

Unmatched Seed Counting Speed & Accuracy

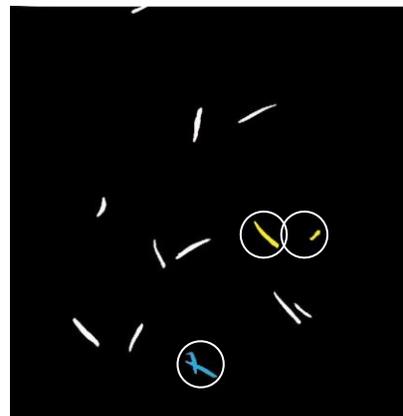
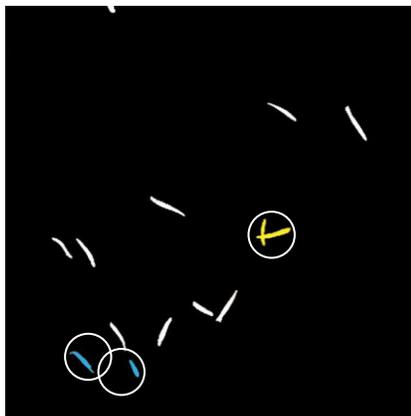
New advances in visual software and hardware have made it possible for the Ball Coleman Seed Counter to count a wide variety of seed shapes and sizes at extremely high accuracy (>99.9%) and to maintain high accuracy (>99.5%) at up to 2,000 seeds/second (120,000 seeds/minute for 1.25mm seeds).

The system utilizes a highly sensitive broad line scan camera with two perpendicular views of falling seeds that acquire at 31,000 lines per second and 1,400 pixels of resolution (2,800 total) in the horizontal direction. This results in 80um of resolution in both directions for particles (seeds) dropping at 2.5m/second. This allows for a minimum seed size of 240um in diameter (smallest dimension).

The software is programmed to count and distinguish all sizes and shapes of seed at extremely fast speeds. With the high camera resolution, small seed such as lobelia are represented as 15 pixels in area in each view, while large seed such as pumpkin appear as 12,000 pixels.

Long, narrow seeds can be difficult to count with other seed counters. "Crossed" seeds in one view can be counted correctly using the second view in the Ball Coleman Seed Counter. Proprietary algorithms allow for accurate and rapid seed counts regardless of size or shape. The pair of images below demonstrates how the software correctly counts marigold seeds that overlap in one view.

Date - Time	Count	Count/Pack Time (sec)	Weight (g)	1000 Seed Weight (g)
5/23/2013 10:07:19 AM	1002		10.2	
5/23/2013 10:06:53 AM	1001		10.2	
5/23/2013 10:06:31 AM	1004		10.3	
5/23/2013 10:06:06 AM	1005		9.2	
5/23/2013 10:05:50 AM	1001		11.4	
5/23/2013 10:05:29 AM	1002		11.0	
5/23/2013 10:05:14 AM	1000		15.6	
5/23/2013 10:04:56 AM	1000		16.8	
5/23/2013 10:04:11 AM	1000		14.5	
5/23/2013 10:03:45 AM	1000		13.9	
5/23/2013 10:03:20 AM	1004		13.2	



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The system is designed to “learn” your seed types. You enter the seed type description and select the shape of your seed: spherical, disk or rod. Select your sample size and the system will count and characterize the sample and present a histogram of the size distribution. You have the opportunity to adjust the seed counting parameters, such as minimum and maximum seed sizes (to avoid counting debris or husks) before saving the record. This seed type record will be stored and can be easily retrieved.

The software also provides the user with the ability to choose the speed at which the seed is to be counted. This ensures a steady stream of seed being counted at known accuracy rates.

The Ball Coleman Seed Counter can also be utilized for packaging. The operator can adjust the setting to control the rate at which the seed is packaged. As the target count draws near, the software will slow the feeder to drop the last remaining seeds. Once the final count has been achieved, the software will trigger the diverter to send any excess seeds to the next package.

The unique design of the Ball Coleman Seed Counter allows additional characterization of the seed samples not available with other seed counting technologies. The chart below shows the recently released Virtual Sieve capability, where the software will sort a batch of seeds into “bins” which correspond to user-defined Virtual Sieve sizes (length and width).

