Using Cgrain Value™ for Size Measurements

Current size measurement methods

The current standard method for size measurement uses sieving equipment with slotted holes. This technique is limited in that its analysis of the sample depends on the sieve sizes chosen, normally 3 sizes. No measurement of the length of the seed is obtained, and only the thinnest side of the seed is measured.

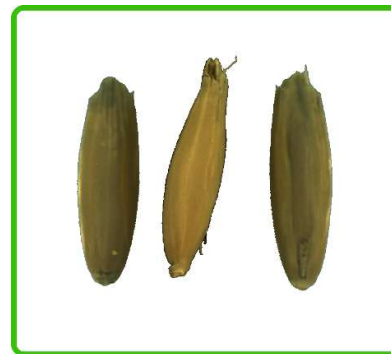Figure 1 shows the oat kernel orientated so that the thinnest side is shown in the side view.

Cgrain Value™ measures the size of each seed from its respective images. A size distribution is calculated showing the length, thickness and width of the seeds in the sample. Perpendicular to the length, the smallest and the largest widths are measured, called thickness and width respectively. From this, the volume is obtained from the three views present in every image. This makes it a better tool to determine the size parameters and quality of grain when compared to standard sieving methods. The method is currently used for malting barley and gluten-free oats production.

Figure 2 shows the thinnest side of the kernel measured in the middle view.

Cgrain's– patented mirror design

Using Cgrain's patented unique mirror arrangement, where almost 100% of the kernel surface can be analysed, accurate measurements are obtained for the length, the widest and the thinnest sides of the image. This, combined with a resolution of >100,000 pixels, provides a very powerful tool for automated size measurements ensuring a high degree of accuracy.

Corrections for rotation of the seed can be done to measure both the thinnest and thickest sides of the whole sample.

In conventional flat-bed systems with image analysis, only the length and one measurement of the width of the seed is obtained. This measurement of the width is often a measurement of the widest side, and relies on the seeds being laid on a horizontal surface.

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Results depending on what's needed

Results can be presented as a distribution of the whole sample in a diagram, as well as a table showing the averages for the measured parameters
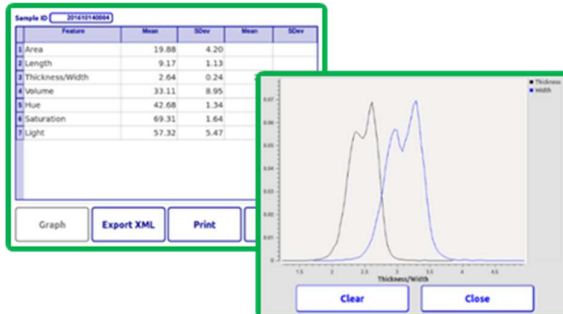
Or as calculated sieving percentage representing different levels, as in a sieving experiment, sown in the picture below

Reference: Oat sample	Seed Count: 13361	Weight: 500.00 g	
Filtered As	**Count**	**Percentage**	**Weight**
TKW	1000		37.42
Sieving >2.0	13293	99.74	498.69
Sieving >2.2	12923	98.04	490.22
Sieving >2.8	3489	33.07	165.34
Other	98	0.29	1.43
Weed	0	0	0
Foreign sum	53	0.46	2.28
Naked Oats	907	5.09	25.47
Oats	12303	94.16	470.82

View	Print	Stats.	Export XML	Finish

Large scale tests have been done on oats and barley with very good correlations between Cgrain Value™ and sieving.

Many quality defects analysed at once

Other quality parameters for grain can be analysed at the same time when using Cgrain Value.

• Foreign seeds • Weed seeds • Broken kernels • Green seeds • Pink kernels • Size distribution/Sieving analysis

Specifications

Dimensions (WxDxH): 600x400x370 mm
Weight: 38 kg
Power usage: 110-160 W incl internal monitor
Analysis principle: RGB imaging
Interface: 3 USB-ports, RJ45 Network
Analysis speed   8-12 kernels/second
Sample size: 25-500 grams
Sample particle size: 1- 5 mm width

Installation requirements

Voltage supply: 100-240V AC, frequency 50-60 Hz,

                                          Class 1, protective earth
Mechanical environment: Stable during use