PROCEDURES FOR THREE-SIEVE PARTICLE SIZE ANALYSIS

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Equipment Required

- Three 8" diameter, 1" depth brass frame and cloth sieves: US #12 (1700µm), #30 (600µm), and #50 (300µm) (as seen in Figure 1)
- Brass sieve cover and 1" receiver pan for 8" diameter sieves (as seen in Figure 1)
- Two balls and three carnucle brushes (as seen in Figure 1)
- Scale capable of accurately weighing within one-tenth of a gram
- Brush (to clean sieves)
- Compressed air (to clean sieves)

Procedures

1) Set up sieves by placing one ball and one carnucle in sieve #30, one ball and two carnucles in sieve #50, and no balls or carnucles in sieve #12 or the pan.
2) Weigh the empty sieves with balls and carnucles, and record the empty weights of each.
3) Stack the sieves on top of the pan in increasing numerical order so #12 is on top and #50 is on top of the pan.
4) Weigh 50g of an accurate representation of the sample to be tested and pour it into the top sieve (#12). Securely place the cover on the sieve stack.
5) Shake vigorously from side to side by hand for 90 seconds.
6) Weigh the sieves with balls, carnucles, and sample collected on each sieve, and record the gross weight.
7) Enter the initial weights of sieves into the 'Empty' column of each sieve number and the final weights into the 'Gross' column of each sieve number in the yellow portions of the Microsoft Excel Worksheet. This will automatically compute the net sample acquired by each sieve and calculate the particle size of the sample. It will also plot this particle size on the monitoring graph to easily track variations in particle size.
8) Thoroughly clean the sieves before running another sample. The best method of cleaning sieves is with a sieve brush and compressed air to blow particles through sieve openings.

Ordering Information

Fisher Scientific
Phone 1-800-766-7000

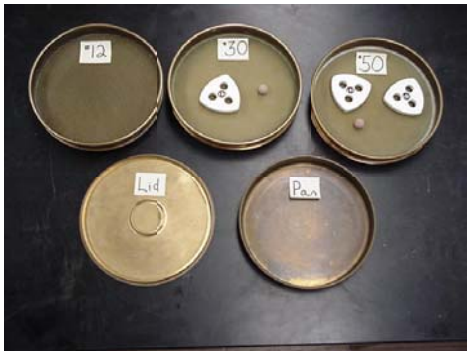
Item Description	Catalog #	App. Price
#12 Sieve	04-881-5H	$60.00
#30 Sieve	04-881-5P	$60.00
#50 Sieve	04-881-5T	$60.00
Sieve Cover	04-886A	$20.00
Receiver Pan	04-886C	$20.00

Cole-Parmer
Phone 1-800-323-4340

Item Description	Catalog #	Price
Sieve Brush (Round)	EW-59986-96	$15.95

Kansas State University
Phone 785-532-1277

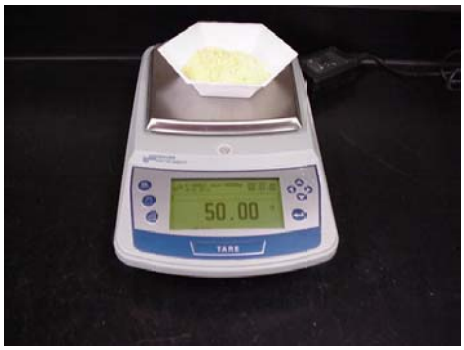
Item Description	Price
Balls	$0.20/ball
Carnucles	$6.00/carnucle



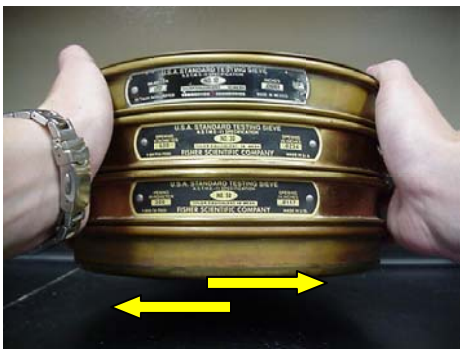
Step 1: Prepare sieves with appropriate number of balls and carnucle brushes.

Step 2: Weigh each empty sieve along with its ball and carnucle(s).

Step 3: Stack sieves in proper order.

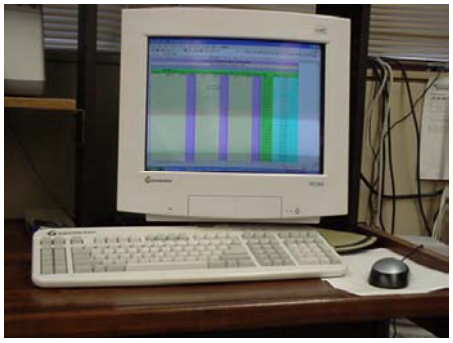


Step 4: Weigh 50g of sample & pour into stack, placing lid on top.



Step 5: Shake sample side to side for 90 seconds.

Step 6: Weigh each sieve with its ball, carnucle(s), and sample collected.



Step 7: Enter data into Excel Worksheet.

Step 8: Clean sieves thoroughly before running the next sample.

Example

Sample #1, conducted 6/29/05

The empty sieves weighed:

#12: 357.09g
#30: 361.13g
#50: 346.34g

After shaking, the sieves weighed:

#12: 365.42g
#30: 384.40g
#50: 353.01g

These weights were entered into the yellow portions of the Microsoft Excel Worksheet to determine the particle size as follows:

Enter Information in yellow cells

	Weight, g										
Sample	#12 Gross	#12 Empty	#12 Net	#30 Gross	#30 Empty	#30 Net	#50 Gross	#50 Empty	#50 Net	Date	Particle Size, microns
1	365.4	357.1	8.3	385.4	361.1	24.3	353.0	346.3	6.7	6/29/2005	708

The net weights (purple) of each sieve are automatically computed, which then are used to calculate the particle size (blue) automatically which is 708.

For Information on obtaining the spreadsheet or any questions of comments please contact Cassie Benz (785) 532-1277 (Benz@ksu.edu) or Bob Goodband (785) 532-1228 (Goodband@ksu.edu).

No endorsement or recommendation of suppliers listed is intended, alternative equipment manufacturers will provide satisfactory results.