STANDARD TEST SIEVES

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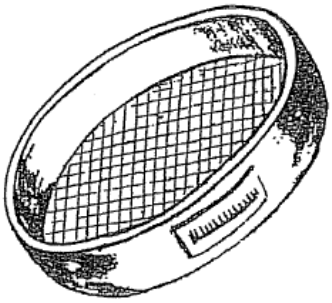

SIEVES A.S.T.M.

AMERICAN STANDARD AND TYLER

SIEVES FOR BLOCK MATERIAL SIZE ...

- 3/8 (9.5 mm)
- 4 (4.76 mm)
- 8 (2.38 mm)
- 16 (1.19 mm)
- 30 (.594 mm)
- 50 (.284 mm)
- 100 (.149 mm)
- PAN

To properly ascertain the value of a particular aggregate grading, it is necessary to conduct a sieve test. A.S.T.M. C – 136 – designation sets the standard for completing a sieve analysis of fine or coarse aggregates.

Further specifications covering the permissible variations and limits for the sieves themselves is covered in A.S.T.M. E-11

The illustration on page (1) one shows the range of sieve sizes which have been accepted for testing aggregates in the block industry. You will note sieve sizes (Starting with No. 100* and working up) increase in size by a ratio of approximately 2 to 1.

*NOTE:

(A.S.T.M. number designations and micron equivalents are as follows.)

Sieve "Number" Designation	Micron Equivalent
3/8" (9.5 Millimeter)	
No.4 (4.76 mm)	4760
No.8 (2.38 mm)	2380
No.16(1.19mm)	1190
No.30(.594mm)	590
No.50(.284mm)	297
No.100(.149mm)	149

DEFINITION OF FINENESS MODULUS

- **Fineness Modulus** is an index number, which is roughly proportional to the average size of the particles in a given aggregate; thus the coarser the aggregate the higher the fineness modulus will be.

- **Fineness Modulus is computed by:** Adding the cumulative percentages retained on each sieve PAN EXCLUDED and dividing the sum by 100.

FINENESS MODULUS (F.M.)

To more clearly illustrate typical F.M figures that one usually finds with sand, gravel, or blended (fine and coarse) aggregates we submit the following information.

1. **Sand –** Larges size retained on No. 8 Sieve (2.38 mm) – Approximate F.M. 2.75.

2. **Gravel –** Largest size retained on No. 4 Sieve (4.76mm)-Approximate F.M. 5.75.

3. **Blend (Sand & Gravel)** – Largest size retained on No. 4 Sieve (4.76 mm) Approximate F.M.3.65

4. **Crushed Limestone Sand** – Largest size retained on No. 8 Sieve (2.38 mm) Approximate F.M.2.65.

5. **Agricultural Limestone Sand** – Largest size retained on No. 16 Sieve (1.19 mm) Approximate F.M.1.80.

6. **Blend (lightweight Aggregate)** – Largest size retained on No. 4 Sieve (4.76 mm) Approximate F.M.3.95.

SIEVE ANALYSIS

1. Weight of sample as received
2. Weight of sample in oven-dry condition
3. Shaking (Sieving is Continued until not more than one percent (1%) by weight of the residue passes any one sieve during one (1) minute of shaking)
4. Weighing contents of each sieve
5. Calculate % retained on each sieve
6. Accumulate percentage
7. Fineness Modulus

SIEVE TEST PROCEDURE

Step 1. Obtain approximately 10 pounds (4.5 kilograms) of each material that is to be tested (a good representative sample). Split the sample until approximately 500 to 1000 grams (*See footnote) of material remains. Weigh and record weight opposite, "As Received Weight" on a form used for computing sieve test data.

Step 2. Test sample is then dried to a substantially constant weight at a temperature not exceeding 230 F. (110 C.) and set aside to cool. After cooling weigh sample and record weight under "Oven Dry".

Step 3. Place sample into a nest of sieves (Re: pages 1 & 2). Shaking the sample then takes place until the requirements as shown above item 3 are met. Shaking in an approved mechanical type shaker has been found to be adequate when done for six to ten minutes. Under no condition shall more than 200 grams of material be retained on any one sieve at the completion of shaking. In the event this should happen, the sample should be split again and shaking, sieving, and weighing operation performed over. (*A.S.T.M. Designation C136)

Step 4. The next step is to carefully deposit the material remaining on each sieve onto the balanced scale pan and carefully weighing and recording such weights on the sieve test form under a column headed "Grams Retained." As each sieve is emptied into the balance pan, a paintbrush (3" width brush is best) (7.6 Centimeter) can be used to clean

the sieve. Each sieve is brushed carefully to dislodge any small amount of fine material into the balance pan. After each sieve's contents has been weighed and recorded, the material from the respective sieve should be placed in an individual container (or pile) so that in the event it might be necessary to re-weigh this may be accomplished readily. A check for accuracy can be made by adding all of the grams retained on each sieve, together, which should equal the total oven dry weight of the whole representative sample. A sum of two to four grams difference in weight (higher or lower) may be the result of misjudging the exact balance point of the scale or the fact that a small part of the material has been lodged into the openings of the sieve or spilled. Should a difference of 12,15, or 20 grams more or less than the original total weight occur, then shaking and individual sieve weighing would have to be performed over.

Step 5. The percentage retained on each sieve is a simple calculation procedure and consists of dividing the grams retained on each sieve by the total dry weight grams or weight of the composite dried sample. Adding them up and obtaining an exact 100% can then prove these percentages.

Step 6. This next step is to add the percentage retained on each sieve to the percentage retained on the next higher sieve and then accumulating these totals in another column headed "Accumulative Percentages Retained" In this procedure the percentage retained in the pan is not added to the accumulative amount above it. The proof of correct addition is then obtained by checking whether the percentage retained in the pan and the last figure in the accumulative column equals 100.

***1.** ASTM-C136- designates minimum of 500 grams (4.76 mm.) dry weight for fine aggregates – i.e., material with at least 85 percent finer than a No. 4 Sieve and more than 5 percent coarser than a No. 8 Sieve.

2. Minimum of 2000 grams dry weight if 3/8" (9.5 mm) particles included in sample.

3. Minimum of 4000 grams dry weight if ½" (12.5 mm) particles included in sample.

Step 7. Fineness Modulus is then found by adding the figures in the column headed Accumulative % Retained and dividing the sum by 100. The Sample form on next page illustrates the above procedure.

Material: Sand

		As Rec'd		Oven Dry
		G 500		G 480
Screen:		**Grams Retained**	**% Retained**	**Accumulative % Retained**
½	12.7 mm			
3/8	9.5 mm			
4	4.76 mm	0	0.0	0.0
8	2.38 mm	48	10.0	10.0
16	1.19 mm	91	19.0	29.0
30	.594 mm	101	21.0	50.0
50	.284 mm	158	33.0	83.0
100		24	5.0	
				F.M. 267.0
Total:		480	100	2.67