

APPENDIX D – SILT ANALYSIS TEST PROCEDURE

40 CFR 52.128 Rule for unpaved parking lots, unpaved roads and vacant lots.

40 CFR 52.128(b)(16)(i)(B)

Silt loading (weight of silt per unit area) is less than 0.33 ounces per square foot as determined by the test method in section I.B of Appendix A of this section OR where silt loading is greater than or equal to 0.33 ounces per square foot and silt content does not exceed six (6) percent for unpaved road surfaces or eight (8) percent for unpaved parking lot surfaces as determined by the test method in section I.B of Appendix A of this section.

40 CFR 52.128 Appendix A I.B, Silt Content.

Conduct the following test method to determine the silt loading and silt content of unpaved road and unpaved parking lot surfaces.

(i) Collect a sample of loose surface material from an area 30 cm by 30 cm (1 foot by 1 foot) in size to a depth of approximately 1 cm or until a hard subsurface is reached, whichever occurs first. Use a brush and dustpan or other similar device. Collect the sample from a routinely traveled portion of the surface that receives a preponderance of vehicle traffic, i.e. as commonly evidenced by tire tracks. Conduct sweeping slowly so that fine surface material is not released into the air. Only collect samples from surfaces that are not wet or damp due to precipitation or dew.

(ii) Obtain a shallow, lightweight container and a scale with readings in half-ounce increments or less. Place the scale on a level surface and zero it with the weight of the empty container. Transfer the entire sample collected to the container, minimizing escape of particles into the air. Weigh the sample and record its weight.

(iii) Obtain and stack a set of sieves with the following openings: 4 mm, 2 mm, 1 mm, 0.5 mm, and 0.25 mm. Place the sieves in order according to size openings beginning with the largest size opening at the top. Place a collector pan underneath the bottom (0.25 mm) sieve. Pour the entire sample into the top sieve, minimizing escape of particles into the air by positioning the sieve/collector pan unit in an enclosed or wind barricaded area. Cover the sieve/collector pan unit with a lid. Shake the covered sieve/collector pan unit vigorously for a period of at least one (1) minute in both the horizontal and vertical planes. Remove the lid from the sieve/collector pan unit and disassemble each sieve separately beginning with the largest sieve. As each sieve is removed, examine it for a complete separation of material in order to ensure that all material has been sifted to the finest sieve through which it can pass. If not, reassemble and cover the sieve/collector pan unit and shake it for period of at least one (1) minute. After disassembling the sieve/collector pan unit, transfer the material that is captured in the collector pan into the lightweight container originally used to collect and weigh the sample. Minimize escape of particles into the air when transferring the material into the container. Weigh the container with the material from the collector pan and record its weight. Multiply the resulting weight by 0.38 if the source is an unpaved road or by 0.55 if the source is an unpaved parking lot to estimate silt

loading. Divide by the total sample weight and multiply by 100 to arrive at the percent silt content.

(iv) As an alternative to conducting the procedure described above in section I.B.(ii) and section I.B.(iii) of this appendix, the sample (collected according to section I.B.(i) of this appendix) may be taken to an independent testing laboratory or engineering facility for silt loading (e.g. net weight < 200 mesh) and silt content analysis according to the following test method from "Procedures For Laboratory Analysis Of Surface/Bulk Dust Loading Samples", (Fifth Edition, Volume I, Appendix C.2.3 "Silt Analysis", 1995), AP-42, Office of Air Quality Planning & Standards, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina.

1. Objective - Several open dust emission factors have been found to be correlated with the silt content (< 200 mesh) of the material being disturbed. The basic procedure for silt content determination is mechanical, dry sieving. For sources other than paved roads, the same sample that was oven-dried to determine moisture content is then mechanically sieved.

2.1 Procedure - Select the appropriate 20-cm (8-in.) diameter, 5-cm (2-in.) deep sieve sizes. Recommended U. S. Standard Series sizes are 3/8 in., No. 4, No. 40, No. 100, No. 140, No. 200, and a pan. Comparable Tyler Series sizes can also be used. The No. 20 and the No. 200 are mandatory. The others can be varied if the recommended sieves are not available, or if buildup on one particulate sieve during sieving indicates that an intermediate sieve should be inserted.

2.2 Obtain a mechanical sieving device, such as a vibratory shaker or a Roto-Tap without the tapping function.

2.3 Clean the sieves with compressed air and/or a soft brush. Any material lodged in the sieve openings or adhering to the sides of the sieve should be removed, without handling the screen roughly, if possible.

2.4 Obtain a scale (capacity of at least 1600 grams [g] or 3.5 lb) and record the make, capacity, smallest division, date of last calibration, and accuracy. (See Figure A. Example silt analysis form, below)

2.5 Weigh the sieves and pan to determine tare weights. Check the zero before every weighing. Record the weights.

2.6 After nesting the sieves in decreasing order of size, and with pan at the bottom, dump dried laboratory sample (preferably immediately after moisture analysis) into the top sieve. The sample should weigh between 400 and 1600 g (0.9 and 3.5 lb). This amount will vary for finely textured materials, and 100 to 300 g may be sufficient when 90% of the sample passes a No. 8 (2.36 mm) sieve. Brush any fine material adhering to the sides of the container into the top sieve and cover the top sieve with a special lid normally purchased with the pan.

2.7 Place nested sieves into the mechanical sieving device and sieve for 10 minutes (min). Remove pan containing minus No. 200 and weigh. Repeat the sieving at 10-min intervals until the difference between two successive pan sample weighings (with the pan tare weight subtracted) is less than 3.0%. Do not sieve longer than 40 min.

2.8 Weigh each sieve and its contents and record the weight. Check the zero before every weighing.

2.9 Collect the laboratory sample. Place the sample in a separate container if further analysis is expected.

2.10 Calculate the percent of mass less than the 200 mesh screen (75 micrometers [μm]). This is the silt content.

Figure A. Example silt analysis form

Dated: _____
 By: _____
 Sample No: _____ Sample Weight (after drying) _____
 Material: _____
 Pan + Sample: _____
 Pan: _____
 Split Sample Balance: _____
 Dry Sample: _____
 Make _____ Capacity: _____
 Smallest Division _____
 Final Weight _____
 $\% \text{ Silt} = [\text{Net Weight } < 200 \text{ Mesh}] / [\text{Total Net Weight} \times 100] = \text{ _____\%}$

Sieving

Time: Start:	Weight (Pan Only)

Initial (Tare):	
10 min:	
20 min:	
30 min:	
40 min:	

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Screen	Tare weight (screen)	Final weight (screen + sample)	Net weight (sample)	%
3/8 in.....				
4 mesh.....				
10 mesh.....				
20 mesh.....				
40 mesh.....				
100 mesh.....				
140 mesh.....				
200 mesh.....				
Pan.....				

(v) The silt loading and percent silt content for any given unpaved road surface or unpaved parking lot surface shall be based on the average of at least three (3) samples that are representative of routinely-traveled portions of the road or parking lot surface. In order to simplify the sieve test procedures in section I.B.(ii) and section I.B.(iii) of this appendix, the three samples may be combined as long as all material is sifted to the finest sieve through which it can pass, each sample weighs within 1 ounce of the other two samples, and the combined weight of the samples and unit area from which they were collected is calculated and recorded accurately.