Performance Examination - Soils

Standard Method of Test for Particle Size Analysis of Soils (AASHTO T 88-13)

Candidate Name: _____ **NICET ID:** _____

Apparatus	Trial 1	Trial 2
Stirring Apparatus *one of the following:* A mechanical stirrer, rotation at least 10,000 rpm: Stir ring paddle similar to those in Fig. 1 and dispersion cup similar to those in Fig. 2 of the standard Cup has six long rods and six short rods opposed, in good condition Air-jet dispersion device Iowa State Device		
Hydrometer (conforming to ASTM E100) Type 151H Type 152H Scale graduations from 0.995 to 1.038 Scale graduations from -5 to 60 g/L Scale length from 1.000 to 1.031 is 8.2 8.4 cm Scale length from 0 to 50 g/L is 8.2 – 8.4 cm Bulb diameter 3.00 – 3.20 cm Bulb diameter 3.05 – 3.20 cm Length from 1.000 to bulb tip 24.5. 0.1 cm Length from 0 g/L to bulb tip 24.5. 0.1 cm		
Sedimentation Cylinders 1000-ml capacity, made of glass 1000-ml mark at 360 ± 20 mm (14 ± 1.0 in.) from bottom on the inside Approximately 460 mm (18 in.) in height and 60 mm (2½ in.) in diameter		
Thermometer Readable to 0.5 °C (1 °F)		
Sieves *one of the two sets listed below***:** AASHTO: 3 in., 2 in., one in., ⅜ in., Nos. 4, 10, 40, and 200 ASTM: 3 in., 2 in., 1 ½in., 1 in., ¾ in., ⅜ in., Nos. 4, 10, 20, 40, 60, 140, and 200 AASHTO & ASTM: 3 in., 1 ½ in., ¾ in., ⅜ in., Nos. 4, 8, 16, 30, 50, 100, and 200		
Water Bath or Constant Temperature Room		
Beaker 250 to 500-ml capacity, made of glass		
Dispersing Agent A solution of sodium hexametaphosphate in distilled or demineralized water, 40 g/L Solution less than a month old or adjusted to pH of 8 or 9 with sodium carbonate Date of preparation marked on a bottle containing a solution Distilled or demineralized water		
Stirring Rod Any non-porous device suitable for stirring the sample without loss of material		
Containers Resistant to corrosion, disintegration, and weight change with close-fitting lids		
Oven Maintains 110 ± 5 °C (230 ± 9 °F)		
Balance Readable to 0.1% of sample mass		

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Procedures	Trial 1	Trial 2
Sample Preparation		
1. Samples prepared by R 58 or T 146 (allows drying apparatus, not exceeding 60 °C (140 °F))		
2. Coarse material separated on 4.75-mm (No.4) and 2.00-mm (No.10), or 425-µm (No.40) sieve		
3. Hygroscopic and hydrometer samples weighed to 0.01 g, coarse sieve analysis material to 0.1%		
4. Hygroscopic moisture sample weighs at least 10 g, dried to constant mass at 110 ± 5 °C (230 ± 9 °F) and weighed		
Coarse Sieve Analysis		
1. Sieve analysis performed on material retained on 2.00-mm (No. 10) sieve (or another separation sieve)		
2. Sieving continued until no more than 1% of the material on sieve passes during 60 seconds of continuous sieving		
Hydrometer Analysis		
1. Composite correction for hydrometer reading determined for each hydrometer used for testing		
2. Test sample weighs approximately 100 g (sandy) or 50 g (clay or silt)		
3. The sample placed in a beaker, 125 ml of dispersing agent added, and stirred with glass rod		
4. Sample soaked at least 12 hours in the dispersing agent		
5. Sample washed into dispersion cup with distilled or demineralized water until the cup is more than half full		
6. Mechanical dispersion: Dispersed for 60 seconds or Air dispersion: 7 kPa (1 psi) before filling, the volume of mixture no more than 250 ml.		
7. Dispersed at 140 kPa (20 psi) for 1, 5, 10, or 15 minutes, based on plasticity index of soil		
8. Mixture transferred to the cylinder, suspension made up to 1000 ml with distilled or demineralized water and allowed to obtain uniform temperature		
9. Cylinder and contents turned upside down and back for approximately 60 turns in 60 seconds		
10. Hydrometer readings were taken at 2, 5, 15, 30, 60, 250, and 1440 minutes (24 hours)		
11. Hydrometer slowly placed in suspension about 25 or 30 seconds before a reading		
12. Hydrometer floats freely and does not touch the wall of the cylinder		
13. Hydrometer read at the top of meniscus to nearest 0.5 g/L or to nearest 0.0005 specs rav.		

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Procedures (continued)	Trial 1	Trial 2
14. Hydrometer removed from suspension between readings and placed in a graduate of clean water with a spinning motion		
15. A thermometer placed in suspension and temperature recorded after each hydrometer reading		
Fine Sieve Analysis		
1. After final hydrometer reading, specimen washed over 75-µm (No. 200) sieve		
2. Excess water decanted from the washed sample only through the 75-µm sieve		
3. Material retained on 75-µm sieve oven-dried at 110 ± 5 °C (230 ± 9 °F)		
4. Sieve analysis performed on plus 75-µm material using at least the No.40 & No.200 sieves		
Calculations		
1. Calculations performed by the test method		

First Attempt: Pass: _____ Fail: _____ **Second Attempt:** Pass: _____ Fail: _____

Comments:

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Examiner Name: _____ **Examiner Signature**: _____ **Date:** _____