



# Performance Examination - Soils

## Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>))<sup>1</sup> (ASTM D698-12e2)

Candidate Name: \_\_\_\_\_ NICET ID: \_\_\_\_\_

Apparatus	Trial 1	Trial 2
<b>Manual Rammers</b>		
Circular Face: -2.5-kg (5.5-lb), with 4 vent holes approximately 19 mm from each end		
Ram Mass 5.48: – 5.52 lb (2.472 – 2.518 kg)		
Face Diameter: 1.990 – 2.010 in. (50.55 – 51.05 mm)		
Drop Height: 11.95 – 12.05 in. (303.8 – 305.8 mm)		
<b>Mechanical Rammers</b>		
Circular Face: -2.5-kg (5.5-lb), 305 mm (12 in.) drop height		
Face Diameter: 1.990 – 2.010 in. (50.55 – 51.05 mm)		
Mechanical Rammer-Sector Face: -2.5-kg (5.5-lb), 305 mm (12 in.) drop height		
Face Dimensions radius: 2.88 – 2.92 in. (73.2 – 74.2 mm)		
<b>Metal Straightedges</b>		
Beveled Edge scraping edge beveled if thicker than 1/8 in. (3 mm) Planar total length plane to 0.005 in. (0.1 mm) Length at least 250 mm (10 in.) long		
<b>Sieves</b> 19 mm (3/4 in.) and 4.75 mm (No. 4) and 3/8 in. (9.5 mm)		
<b>Sample Extruder</b> <i>optional</i>		
<b>Compaction Base Concrete Block</b> (at least 90 kg or 200 lb) or <b>concrete floor</b>		
<b>Balances</b> Readable to 1 g, Class GP5		
<b>Drying Oven</b> At 110 ± 5°C (230 ± 9°F)		
<b>Manual Rammers</b>		
Circular Face: -4.54-kg (10-lb), with 4 vent holes approximately 19 mm from each end		
Ram Mass: 9.98 – 10.02 lb (4.527 – 4.545 kg)		
Face Diameter: 1.990 – 2.010 in. (50.55 – 51.05 mm)		
Drop Height: 17.95 – 18.05 in. (455.9 – 458.5 mm)		
<b>Mechanical Rammers</b>		
Circular Face: 4.54-kg (10-lb), 457 mm (18 in.) drop height		
Face Diameter: 1.990 – 2.010 in. (50.55 – 51.05 mm)		
Mechanical Rammer: -4.54-kg (10-lb), 457 mm (18 in.) drop height		
Face Dimensions radius: 2.88 – 2.92 in. (73.2 – 74.2 mm)		

Examiner Name: \_\_\_\_\_ Examiner Signature: \_\_\_\_\_ Date: \_\_\_\_\_



## Performance Examination - Soils

### Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>))<sup>1</sup> (ASTM D698-12e2)

Candidate Name: \_\_\_\_\_ NICET ID: \_\_\_\_\_

Apparatus (continued)	Trial 1	Trial 2
<b>4-Inch Molds</b>		
Detachable Collar detachable collar fits mold		
Internal Diameter 101.19 – 102.01 mm (3.984 – 4.016 in.)		
Height of Mold 4.566 – 4.602 in. (115.9 – 116.9 mm)		
Base Plate detachable, planar		
Diameter 100.99 - 102.21 mm (3.976 - 4.024 in.)		
Height 116.23 - 116.64 mm (4.576 - 4.592 in.)		
<b>6-Inch Molds</b>		
Internal Diameter: 151.74 – 153.06 mm (5.974 – 6.026 in.)		
Height of Mold: 4.566 – 4.602 in. (115.9 – 116.9 mm)		
Base Plate: detachable, planar		
Diameter: 151.41 - 153.39 mm (5.961 - 6.039 in.)		
Height: 116.23 - 116.64 mm (4.576 - 4.592 in.)		
<i>Alternative type molds, volumes of 1/30 or 1/13.33 ft<sup>3</sup> are acceptable if comparative tests are made against conforming cylindrical molds.</i>		
<i>Split molds and tapered molds are acceptable. Split molds must meet specs when locked. Tapered molds, internal diameter no more than 0.200 in./linear foot of mold height</i>		

Procedures	Trial 1	Trial 2
1. First sample removed from sample container after appropriate standing time (see Table 2 in standard)		
2. Mass of mold (and baseplate, if not trimming bottom) recorded		
3. Layer of soil placed in mold and soil lightly tamped with manual rammer or 2-in. diameter similar device until it is not in a fluffy or loose state (prior to compaction)		
4. Mold rests on rigid and stable foundation during compaction		
5. Circular face mechanical rammer NOT used with 6-in. mold unless the mechanical compactor is designed to distribute the blows uniformly over the surface of the specimen		
6. Soil compacted with appropriate number layers and blows for method selected		
7. Following compaction of each of first two layers, any excess soil on mold walls trimmed. Trimmed soil must be discarded.		
8. If top of soil after compaction is more than 1/4 in. above rim of mold, is sample discarded		
9. If top of soil after compaction is below rim of mold, is sample discarded		

Examiner Name: \_\_\_\_\_ Examiner Signature: \_\_\_\_\_ Date: \_\_\_\_\_



## Performance Examination - Soils

### Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>))<sup>1</sup> (ASTM D698-12e2)

Candidate Name: \_\_\_\_\_ NICET ID: \_\_\_\_\_

Procedures (continued)	Trial 1	Trial 2
10. Collar (and base plate if applicable) removed and soil trimmed to top of mold with straightedge.		
11. Any holes in top surface filled in with unused or trimmed soil		
12. Bottom of specimen trimmed (if mold volume was determined without base plate)		
13. Mold and contents weighed to nearest 5 g (0.01 lb) and wet density calculated		
14. Soil removed from mold, water content determined according to Table 1, Method B from D2216, whole sample is preferable [Min sample mass: (A): -No. 4 (100 g), (B): - <sup>3</sup> / <sub>8</sub> in. (500 g), (C): - <sup>3</sup> / <sub>4</sub> in. (2.5 kg)], samples less than 200 g must be weighed to within 0.01 g		
15. Samples placed in covered containers and allowed to stand for at least 12 hours		
16. Next prepared sample at 2% higher water content removed from container and used for testing		
17. Previously compacted soil not re-used for testing (may give an artificially higher unit weight)		
18. Steps 3 through 13 repeated for each increment of water until wet unit mass either decreases or stabilizes		
19. Water content and oven-dry unit mass calculated for each sample		
20. Unit weight to nearest 0.1 lb/ft <sup>3</sup> or 0.2 kN/m <sup>3</sup> , plotted on ordinate, water content to nearest 0.1% plotted on abscissa, and points connected with curve		
21. Water content at peak of curve taken as optimum water content		
22. Samples placed in covered containers and allowed to stand for at least 12 hours		
23. Next prepared sample at 2% higher water content removed from container and used for testing		
24. Previously compacted soil not re-used for testing (may give an artificially higher unit weight)		
25. Steps 3 through 13 repeated for each increment of water until wet unit mass either decreases or stabilizes		
26. Water content and oven-dry unit mass calculated for each sample		
27. Unit weight to nearest 0.1 lb/ft <sup>3</sup> or 0.2 kN/m <sup>3</sup> plotted on ordinate, water content to nearest 0.1% plotted on abscissa, and points connected with curve		
28. Water content at peak of curve taken as optimum water content		
29. Dry unit mass at optimum reported as maximum density, to nearest 0.1 lb/ft <sup>3</sup> (0.02 kN/m <sup>3</sup> )		
30. 100% saturation curve plotted		
31. Water-filled volume of mold, linear volume, or average of the two used in calculations		

Examiner Name: \_\_\_\_\_ Examiner Signature: \_\_\_\_\_ Date: \_\_\_\_\_



## Performance Examination - Soils

### Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>))<sup>1</sup> (ASTM D698-12e2)

Candidate Name: \_\_\_\_\_ NICET ID: \_\_\_\_\_

Procedures (continued)	Trial 1	Trial 2								
32. First sample removed from sample container after appropriate standing time (see table)										
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Classification</th> <th style="text-align: center;">Minimum Standing Time, h</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">GW, GP, SW, SP</td> <td style="text-align: center;">No requirement</td> </tr> <tr> <td style="text-align: center;">GM, SM</td> <td style="text-align: center;">3</td> </tr> <tr> <td style="text-align: center;">All other soils</td> <td style="text-align: center;">16</td> </tr> </tbody> </table>	Classification	Minimum Standing Time, h	GW, GP, SW, SP	No requirement	GM, SM	3	All other soils	16		
Classification	Minimum Standing Time, h									
GW, GP, SW, SP	No requirement									
GM, SM	3									
All other soils	16									
33. Mass of mold (and baseplate, if not trimming bottom) recorded										
34. Layer of soil placed in mold and soil lightly tamped with manual rammer or 2-in. diameter similar device until it is not in a fluffy or loose state (prior to compaction)										
35. Mold rests on rigid and stable foundation during compaction										
36. Circular face mechanical rammer NOT used with 6-in. mold unless the mechanical compactor is designed to distribute the blows uniformly over the surface of the specimen										
37. Soil compacted with appropriate number layers and blows for method selected										
38. Following compaction of each of first two layers, any excess soil on mold walls trimmed. Trimmed soil must be discarded										
39. If top of soil after compaction is more than 1/4 in. above rim of mold, is sample discarded										
40. If top of soil after compaction is below rim of mold, is sample discarded										
41. Collar (and base plate if applicable) removed and soil trimmed to top of mold with straightedge										
42. Any holes in top surface filled in with unused or trimmed soil										
43. Bottom of specimen trimmed (if mold volume was determined without base plate)										
44. Mold and contents weighed to nearest 5 g (0.01 lb) and wet density calculated										
45. Soil removed from mold, water content determined according to Table 1, Method B from D2216, whole sample is preferable [Min sample mass: (A): –No. 4 (100 g), (B): – <sup>3</sup> / <sub>8</sub> in. (500 g), (C): – <sup>3</sup> / <sub>4</sub> in. (2.5 kg)], samples less than 200 g must be weighed to within 0.01 g										
46. Next prepared sample at 2% higher water content removed from container and used for testing										
47. Previously compacted soil not re-used for testing (may give an artificially higher unit weight)										
48. Steps 3 through 13 repeated for each increment of water until wet unit mass either decreases or stabilizes										
49. Water content and oven-dry unit mass calculated for each sample										
50. Unit weight to nearest 0.1 lb/ft <sup>3</sup> or 0.2 kN/m <sup>3</sup> plotted on ordinate, water content to nearest 0.1% plotted on abscissa, and points connected with curve										
51. Water content at peak of curve taken as optimum water content										

Examiner Name: \_\_\_\_\_ Examiner Signature: \_\_\_\_\_ Date: \_\_\_\_\_



## Performance Examination - Soils

### Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>))<sup>1</sup> (ASTM D698-12e2)

Candidate Name: \_\_\_\_\_ NICET ID: \_\_\_\_\_

Procedures (continued)	Trial 1	Trial 2
52. Dry unit mass at optimum reported as maximum density, to nearest 0.1 lb/ft <sup>3</sup> (0.02 kN/m <sup>3</sup> )		
53. 100% saturation curve plotted		
54. Water-filled volume of mold, linear volume, or average of the two used in calculations		

First Attempt: Pass: \_\_\_\_\_ Fail: \_\_\_\_\_ Second Attempt: Pass: \_\_\_\_\_ Fail: \_\_\_\_\_

Exam Administration: Remote \_\_\_\_\_ In-Person \_\_\_\_\_

Comments:

---



---



---



---



---



---



---

Examiner Name: \_\_\_\_\_ Examiner Signature: \_\_\_\_\_ Date: \_\_\_\_\_