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Standard Test Methods and Practices for Emulsified Asphalts[1]

This standard is issued under the fixed designation D244; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope

1.1 These test methods and practices, given under the headings titled Composition, Consistency, Stability, and Examination of Residue, cover the examination of asphalt emulsions composed principally of a semisolid or liquid asphaltic base, water, and an emulsifying agent. The test methods cover the following tests and practices:

Test	Sections
Composition:	
Water Content	4 – 10
Residue and Oil Distillate by Distillation	See Test Method D6997
Residue by Evaporation	See Test Method D6934
Particle Charge of Cationic Emulsified Asphalts	See Test Method D7402
Consistency:	
Viscosity (Saybolt Furol)	See Test Method D7496
Stability:	
Demulsibility	See Test Method D6936
Settlement	See Test Method D6930
Cement Mixing	See Test Method D6935
Sieve Test	See Test Method D6933
Aggregate Coating	See Practice D6998
Miscibility with Water	See Test Method D6999
Freezing	See Practice D6929
Coating Ability and Water Resistance	11 – 18
Storage Stability of Asphalt Emulsion	See Test Method D6930
Examination of Residue	19 – 26
Identification Test for Rapid Setting Cationic Emulsified Asphalt	27 – 34
Identification of Cationic Slow Set Emulsions	See Test Method D7402
Field Coating Test on Emulsified Asphalts	35 – 40
Emulsified Asphalt/Job Aggregate Coating Test	41 – 46
Density of Emulsified Asphalt	See Test Method D6937
Residue by Low-Temperature Vacuum Distillation	See Test Method D7403

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

C778 Specification for Sand
D5 Test Method for Penetration of Bituminous Materials
D70 Test Method for Density of Semi-Solid Bituminous Materials (Pycnometer Method)
D86 Test Method for Distillation of Petroleum Products at Atmospheric Pressure
D113 Test Method for Ductility of Bituminous Materials
D128 Test Methods for Analysis of Lubricating Grease
D139 Test Method for Float Test for Bituminous Materials
D140 Practice for Sampling Bituminous Materials
D977 Specification for Emulsified Asphalt
D2042 Test Method for Solubility of Asphalt Materials in Trichloroethylene
D2397 Specification for Cationic Emulsified Asphalt
D3289 Test Method for Density of Semi-Solid and Solid Bituminous Materials (Nickel Crucible Method)
D6929 Practice for Freezing of Emulsified Asphalts
D6930 Test Method for Settlement and Storage Stability of Emulsified Asphalts
D6933 Test Method for Oversized Particles in Emulsified Asphalts (Sieve Test)

[1] These test methods and practices are under the jurisdiction of ASTM Committee D04 on Road and Paving Materials and are the direct responsibility of Subcommittee D04.42 on Emulsified Asphalt Test.

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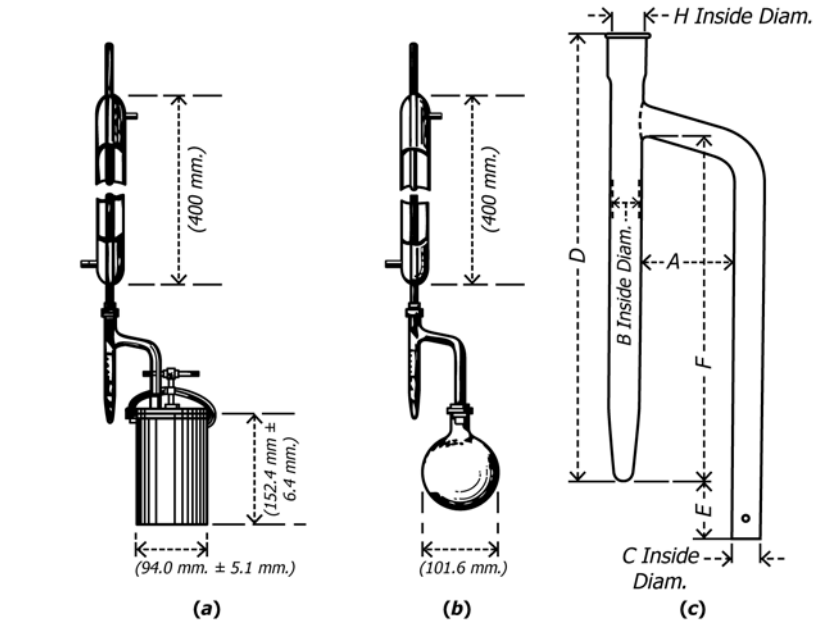
[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.



A = 45 to 55 mm
B = 14 to 16 mm
C = 12 to 16 mm
D = 235 to 255 mm
E = 25 to 38 mm
F = 186 to 194 mm
H = 18 to 19 mm

FIG. 1 Apparatus for Determining Water Content

D6934 Test Method for Residue by Evaporation of Emulsified Asphalt
D6935 Test Method for Determining Cement Mixing of Emulsified Asphalt
D6936 Test Method for Determining Demulsibility of Emulsified Asphalt
D6937 Test Method for Determining Density of Emulsified Asphalt
D6997 Test Method for Distillation of Emulsified Asphalt
D6998 Practice for Evaluating Aggregate Coating using Emulsified Asphalts
D6999 Practice for Miscibility of Emulsified Asphalts
D7402 Practice for Identifying Cationic Emulsified Asphalts
D7403 Test Method for Determination of Residue of Emulsified Asphalt by Low Temperature Vacuum Distillation
D7496 Test Method for Viscosity of Emulsified Asphalt by Saybolt Furol Viscometer
E1 Specification for ASTM Liquid-in-Glass Thermometers
E11 Specification for Woven Wire Test Sieve Cloth and Test Sieves
E145 Specification for Gravity-Convection and Forced-Ventilation Ovens

3. Sample Conditioning for Testing

3.1 All emulsions with viscosity requirements of 50°C should be heated to 50 ± 3°C in the original sample container in a 71°C water bath or oven. The container should be vented to relieve pressure. After the sample reaches 50 ± 3°C, stir the sample to achieve homogeneity.

COMPOSITION

WATER CONTENT

4. Scope

4.1 This test method covers the procedure for determining the water content of an emulsified asphalt by reflux distillation using a water trap.

5. Significance and Use

5.1 This test method measures the amount of water present in the emulsified asphalt, as distinguished from either bitumen or petroleum solvent.

6. Apparatus and Materials

6.1 *Metal Still*—The metal still (Fig. 1*(a)*) shall be a vertical cylindrical vessel, preferably of copper, having a faced flange at the top to which the head is tightly attached by means of a clamp. The head shall be made of metal, preferably brass or copper, and shall be provided with a tubulation 25.4 mm (1 in.) in inside diameter.

6.2 *Glass Still*—The glass still (Fig. 1*(b)*) shall be a short-neck, round-bottom flask, made of well-annealed glass, and having an approximate capacity of 500 mL.

6.3 *Heat Source*—The heat source used with the metal still shall be a ring gas burner of 100-mm (4-in.) inside diameter or an electric mantle heater. The heat source for the glass still shall be either an ordinary gas burner or an electric heater.

6.4 *Condenser*—The condenser shall be a water-cooled reflux glass-tube type, having a jacket not less than 400 mm in length, with an inner tube 9.5 to 12.7 mm in outside diameter. The end of the condenser shall be ground to an angle of 30 ± 5° from the vertical axis of the condenser.

6.5 *Trap*—The trap shall be made of annealed glass constructed in accordance with Fig. 1*(c)* and shall be graduated in 0.10-mL divisions from 0 to 2 mL, and in 0.20-mL divisions from 2 to 25 mL.

6.6 *Solvent*—Xylol or other petroleum distillate conforming to the following distillation requirements: 98 % distills between 120 and 250°C. This distillation shall be conducted in accordance with Test Method D86.

7. Sample

7.1 Obtain a representative sample of the material for test using standard procedures as specified in Practice D140.

NOTE 1—The difficulties in obtaining representative samples for this determination are unusually great, so that the importance of sampling cannot be too strongly emphasized.

8. Procedure

8.1 When the material to be tested contains less than 25 % water, place 100 ± 0.1 g of sample in the still. When the material contains more than 25 % water, use a 50 ± 0.1-g sample. Thoroughly mix the sample to be tested with 200 mL of solvent by swirling, taking proper care to avoid any loss of material.

8.2 Connect the still, trap, and condenser by means of tight-fitting corks as shown in Fig. 1*(a)* or *(b)*. Adjust the end of the condenser in the trap to a position which will allow the end to be submerged to a depth of not more than 1 mm below the surface of the liquid in the trap after distillation conditions have been established. When using the metal still, insert a heavy paper gasket, moistened with the solvent, between the lid and flange before attaching the clamp.

8.3 When the ring burner is used with the metal still, place it about 76.2 mm above the bottom of the still at the beginning of the distillation, and gradually lower it as the distillation proceeds. Regulate the heat so that the condensate falls from the end of the condenser at a rate of from 2 to 5 drops per second. Continue the distillation at the specified rate until no water is visible on any part of the apparatus and a constant volume of water is obtained in the trap. Remove any persistent ring of condensed water in the condenser tube by increasing the rate of distillation for a few minutes.

9. Calculation and Report

9.1 Calculate the water content as follows:

$$\text{Water content, \%} = (A/B) \times 100 \quad (1)$$

where:

A = volume of water in trap, mL, and
B = original weight of sample, g.

9.2 Report the result as "... water weight percent, ASTM D244."

10. Precision and Bias

10.1 The following criteria should be used for judging the acceptability of results (95 % probability):

10.1.1 Duplicate results by the same operator should not be considered suspect unless they differ by more than the following amount:

Water Content, weight %	Repeatability, weight %
30 to 50	0.8

10.1.2 The results submitted by each of two laboratories should not be considered suspect unless they differ by more than the following amount:

Water Content, weight %	Reproducibility, weight %
30 to 50	2.0

COATING ABILITY AND WATER RESISTANCE

11. Scope

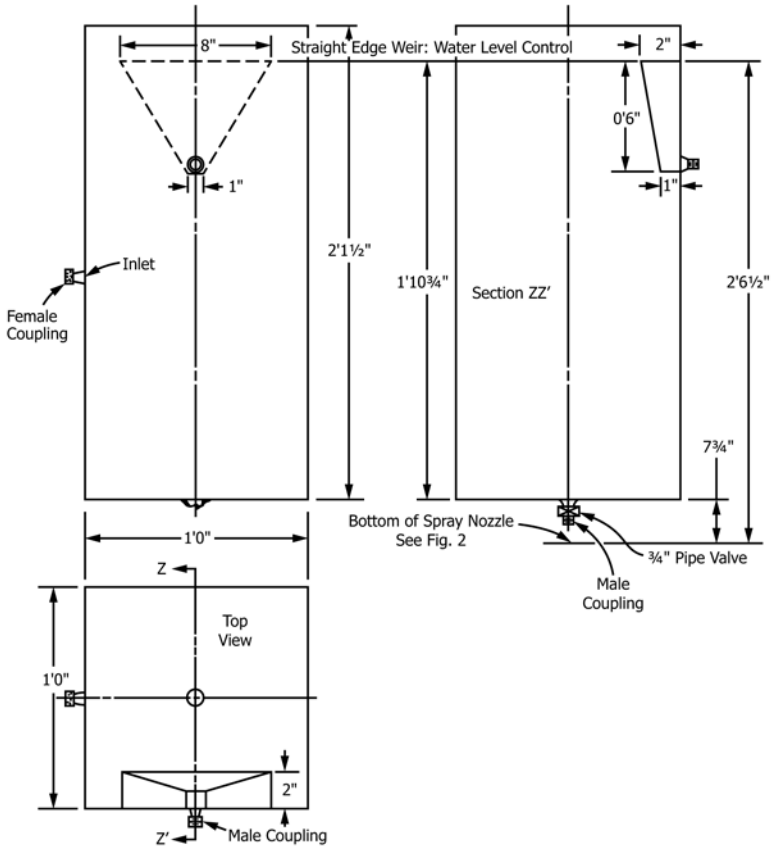
11.1 This test method is intended to aid in the identification of asphalt emulsions suitable for mixing with coarse graded calcareous aggregates. It can be applied to other aggregates. (See Note 2).

12. Significance and Use

12.1 This test method covers the determination of the ability of an asphalt emulsion to (*1*) coat an aggregate thoroughly, (*2*) withstand a mixing action while remaining as a film on the aggregate, and (*3*) resist the washing action of water after completion of the mixing.

13. Apparatus

13.1 *Mixing Pan*—A white-enameled kitchen saucepan with handle, of approximately 3-L capacity.



1 in = 25.4 mm
2 in. = 50.8 mm
6 in. = 152.4 mm
7¾ in = 196.9 mm
8 in. = 230.2 mm
1 ft = 304.8 mm
1 ft 10¾ in. = 577.9 mm
2 ft 1½ in. = 647.7 mm
2 ft 6½ in. = 774.7 mm

NOTE 1—Use galvanized steel sheeting for the tank. All joints and fitting attachments shall be soldered and shall be watertight. All couplings shall be standard brass garden hose fittings. The 19-mm pipe valve shall be placed as close as possible to the bottom of the tank, allowing space to shut off the valve. The tank shall be placed on a suitable stand, so that the distance from the bottom of the spray head to the top of the test sample is 0.914 m ± 25.4 mm.

FIG. 2 Constant-Head Flow Tank

13.2 *Mixing Blade*—A putty knife with a 31.8 by 88.9-mm steel blade with rounded corners. A 254.0-mm kitchen mixing spoon may be used as an alternative.

13.3 *Sieves*—Standard 19.0-mm and 4.75-mm sieves conforming to Specification E11.

13.4 *Constant-Head Water-Spraying Apparatus*—An apparatus for applying tap water in a spray under a constant head of 774.7 mm (Figs. 2 and 3). The water shall issue from the apparatus in a low-velocity spray.

13.5 *Thermometer*—An ASTM Low Softening Point Thermometer 15F (or 15C), having a range from –2 to 80°C and conforming to the requirements in Specification E1.

13.6 *Balance,* capable of weighing 1000 g to within ±0.1 g.

13.7 *Pipet,* of 10-mL capacity.

14. Materials

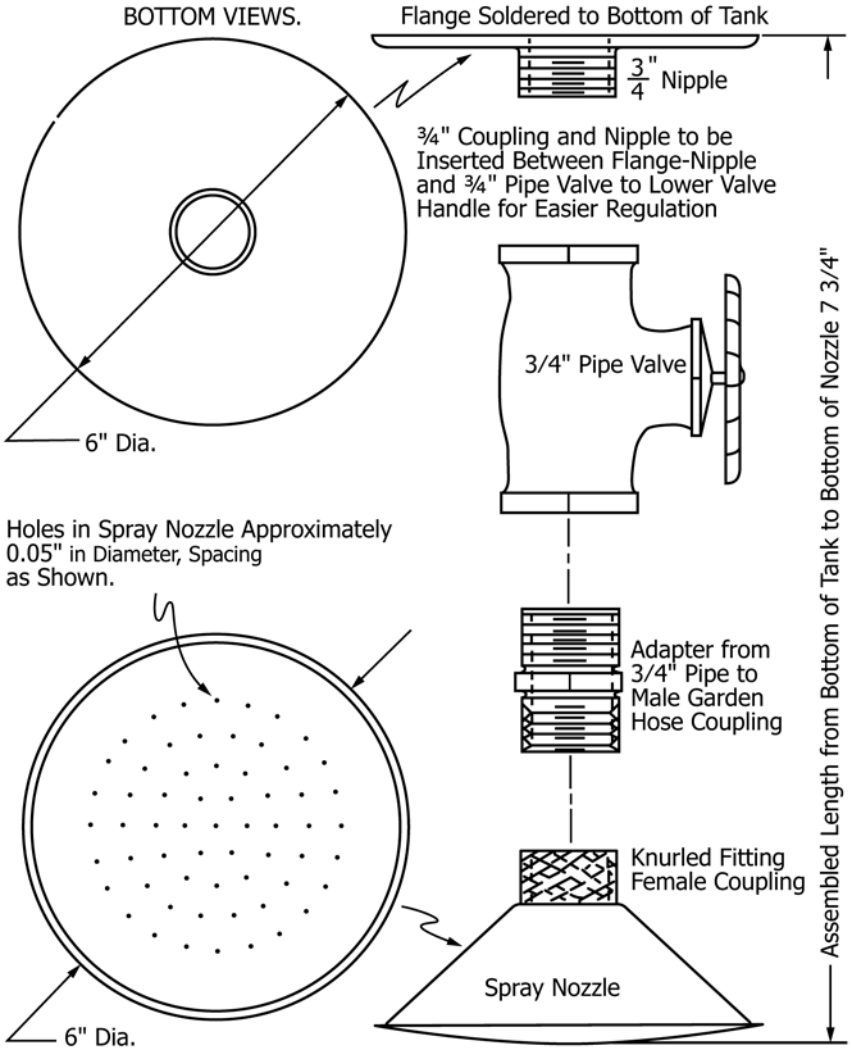
14.1 *Aggregate*—Standard reference aggregate[3] shall be a laboratory-washed and air-dried limestone aggregate graded to pass the 19.0-mm sieve and be retained on the 4.75-mm sieve.

NOTE 2—Aggregates other than limestone may be used provided calcium carbonate is omitted throughout the test method. Laboratory washing and air-drying of such aggregates shall also be omitted.

14.2 *Calcium Carbonate*—Chemically pure, precipitated calcium carbonate ($CaCO_3$) shall be used as a dust to be mixed with the standard reference aggregate.

14.3 *Water*—Tap water of not over 250 ppm $CaCO_3$ hardness for spraying over the sample.

[3] Limestone from the Monon Stone Co. of Monon, IN, has been found suitable as reference aggregate.



NOTE 1—A Speakman, Model 235S, all brass, fixed shower head has been found acceptable.
NOTE 2—Existing 101.6-mm diameter shower heads may continue to be used.
NOTE 3—0.05 in. = 1.3 mm
6 in. = 152.4 mm
7¾ in. = 196.9 mm

FIG. 3 Spray Nozzle Assembly

15. Sample

15.1 The sample shall be representative of the asphalt emulsion to be tested.

16. Procedure for Tests with Dry Aggregate

16.1 Carry out the test at 23.9 ± 5.5°C.

16.2 Weigh 461 g of the air-dried, graded reference aggregate in the mixing pan.

16.3 Weigh 4.0 g of $CaCO_3$ dust in the mixing pan and mix with the 461 g of aggregate for approximately 1 min by means of a mixing blade to obtain a uniform film of dust on the aggregate particles.

NOTE 3—The total weight of aggregate and dust shall equal 465 g. If no calcium carbonate is included, the weight of aggregate alone shall be 465 g.

16.4 Weigh 35 g of the asphalt emulsion into the aggregate in the pan and mix vigorously with the mixing blade for 5 min using a tossing action created by a back-and-forth motion in an elliptical path of the mixing blade or spoon. At the end of the mixing period, tilt the pan and permit any excess emulsion not on the aggregate to drain from the pan.

16.5 Remove approximately one half of the mixture from the pan and place it on absorbent paper and evaluate the coating.

16.6 Immediately spray the mixture remaining in the pan with tap water from the constant-head water spraying apparatus to cover the mixture. The distance from the sprayhead to the sample shall be 305 ± 75 mm. Then carefully pour off the water. Continue spraying and pouring off the water until the overflow water runs clear. Carefully drain off the water in the

pan. Scoop the mixture from the mixing pan on to absorbent paper for evaluation of coating retention in the washing test.

16.7 Evaluate the mixture immediately by visual estimation as to the total aggregate surface area that is coated with asphalt.

16.8 Repeat the evaluation by visual estimation of the coating of aggregate surface area by asphalt after the mixture has been surface air-dried in the laboratory at room temperature. A fan may be used for drying if desired.

17. Procedure for Tests with Wet Aggregate

17.1 Proceed in accordance with 16.1 – 16.3.

17.2 Pipet 9.3 mL of water to the aggregate and $CaCO_3$ dust mixture into the mixing pan and mix thoroughly to obtain uniform wetting.

17.3 Continue in accordance with 16.4 – 16.8.

18. Interpretation of Results

18.1 Evaluate and report the following information for tests with both dry and wet aggregate:

18.1.1 At the end of the mixing period, record the coating of the total aggregate surface area by the asphalt emulsion as good, fair, or poor, where a rating of "good" means fully coated by the asphalt emulsion exclusive of pinholes and sharp edges of the aggregate, a rating of "fair" coating applies to the condition of an excess of coated area over uncoated area, and a rating of "poor" applies to the condition of an excess of uncoated area over coated area.

18.1.2 After spraying with water, record the coating of the total aggregate surface area by the asphalt as good, fair, or poor.

18.1.3 After air-drying in the laboratory, record the coating of the total aggregate surface area by the asphalt as good, fair, or poor.

18.1.4 Comments about the results of the test may be included in the evaluation.

EXAMINATION OF RESIDUE

19. Scope

19.1 Tests for specific gravity, ash content, solubility in trichloroethylene, penetration, ductility and float test are suggested for examination of the emulsified asphalt residue obtained by distillation or evaporation (see Test Method D6934 and Test Method D6997).

20. Significance and Use

20.1 The suggested procedures are used to characterize and evaluate the properties of emulsified asphalt residues.

21. Specific Gravity

21.1 Determine the specific gravity on a representative portion of the residue in accordance with Test Method D70 or Test Method D3289.

22. Ash Content

22.1 Determine the ash on a representative portion of the residue in accordance with the rapid routine test method of ash determination, as described in Section 7 of Test Methods D128.

23. Solubility in Trichloroethylene

23.1 Determine the solubility in trichloroethylene on a representative portion of the residue in accordance with Test Method D2042.

24. Penetration

24.1 Determine the penetration on a representative portion of the residue in accordance with Test Method D5.

24.2 *Precision*—The following criteria should be used for judging the acceptability of results (95 % probability):

24.2.1 Duplicate results by the same operator should not be considered suspect unless they differ by more than the following amount:

Penetration of Residue, range	Repeatability, points
80 to 200	15

24.2.2 The results submitted by each of two laboratories should not be considered suspect unless they differ by more than the following amount:

Penetration of Residue, range	Reproducibility, points
80 to 200	30

25. Ductility

25.1 Determine the ductility on a representative portion of the residue in accordance with Test Method D113.

26. Float Test

26.1 Determine the float test on a representative portion of the residue in accordance with Test Method D139 except revise 6.2 of Test Method D139 as follows: Pour the residue into the collar at or near 260°C preferably, directly from the still. If the residue has been allowed to cool below 260°C, reheat it to 260°C with stirring and pour into the collar.

PRACTICE FOR THE IDENTIFICATION TEST FOR RAPID-SETTING CATIONIC EMULSIFIED ASPHALT

27. Scope

27.1 This practice covers a procedure for identifying rapid-setting cationic emulsified asphalts. Their inability to coat a specific silica sand distinguishes them from medium and slow setting cationic grades.

28. Significance and Use

28.1 This practice is based upon the rapid asphalt deposition properties of rapid setting cationic emulsified asphalt as a function of sand surface area and surface charge. The test method differs from the usual coating test because the material passes the requirement when it fails to coat the specified silica sand.

28.2 Impurities in the silica sand often prevent the emulsion from passing the test. Washing the sand to remove impurities prior to test is required. Impurities affecting test results are normally due to the presence of iron (Fe+++) and organic dewatering agents that can alter sand surface charge.

29. Apparatus

29.1 *Mixing Container*—Glass beaker or stainless steel beaker or bowl, 1000 mL capacity.

29.2 *Washing Container*—Beaker made from borosilicate glass, 1000 mL capacity.

29.3 *Stainless Steel Spatula or Glass Rod.*

29.4 *Oven*—Convection or forced-draft, capable of maintaining 120 to 150°C.

29.5 *Balance*—Capable of weighing 500± 0.1 g.

29.6 *Drying Pan*—Stainless steel or glass, 150-mm by 225-mm or larger.

29.7 *Graduated Cylinder*—Made from borosilicate glass, 500-mL capacity.

29.8 *Thermometer*—ASTM No. 67C or as specified in Table 1 of Specification E1.

29.9 *Eye Protection*—Suitable safety glasses or other appropriate eye protection.

29.10 *Hand Protection*—Suitably acid and alcohol resistant.

30. Materials

30.1 *Silica Sand,* F-95, whole grain.

30.2 *Hydrochloric Acid,* reagent, 36.5 % to 38.0 %.

30.3 *Isopropyl Alcohol,* reagent, 100 %.

30.4 *Distilled Water.*

TYPICAL GRADATION

Millimetres	0.850	0.425	0.300	0.212	0.150	0.106	0.075	0.053
% Passing	100	99	97	89	56	17	2	T

31. Emulsified Asphalt (Emulsion) Sample

31.1 Obtain a representative sample of the rapid-setting cationic emulsified asphalt for test.

32. Sand Preparation

32.1 Prepare 400 mL of 5 % hydrochloric acid, by volume, in isopropyl alcohol by mixing 20 mL hydrochloric acid into a blend of 80 mL distilled water and 300 mL isopropyl alcohol in a 500 mL graduated cylinder.

32.2 Weigh 500 g of the F-95 silica sand into a 1000 mL beaker. Add 400 mL of the 5 % hydrochloric acid in isopropyl alcohol/water mixture into the beaker containing the silica sand and stir for 5 min with a stainless steel spatula or a glass rod.

32.3 Decant the acid/alcohol/water mixture carefully without loss of sand.

32.4 Wash sand with at least 400 mL of hot distilled water, 50° to 70°C stir for approximately 1 min. Decant water without loss of sand. Repeat water washing the sand two more times.

32.5 Scrape washed sand onto drying pan avoiding as much loss of sand as is possible and spread sand over the surface of the drying pan. Place pan with sand in an oven and dry the sand at a temperature of 120 to 150°C to constant mass.

32.6 Allow sand to cool and transfer dry sand to a suitable container. Mix sand for approximately 30 s to obtain uniformity.

33. Procedure

33.1 Test at 25 ± 5°C.

33.2 Weigh 465 g of the washed silica sand blend into a 1000 mL beaker. Add 35 g of the emulsified asphalt to be tested and mix vigorously with a spatula for approximately 2 min using a combined stirring and kneading action. At the end of the mixing period, tilt the beaker and allow any excess emulsified asphalt, which is not on the sand, to drain from the beaker.

33.3 Place the completed mix on absorbent paper. Visually estimate the amount of uncoated and coated area in the mixture. See Note 4.

34. Interpretation of Results

34.1 From the visual estimation of the amount of uncoated area and coated area in the mixture, record the coating of the total sand surface area by the asphalt emulsion. An excess of uncoated area over the coated area shall be considered as a passing rating for identification of rapid-setting cationic emulsified asphalt.

NOTE 4—Visual estimation is less accurate at moderate levels of coating than at the two extremes. If results are inconclusive, the washing and mixing procedure should be repeated.

PRACTICE FOR DETERMINING FIELD COATING OF EMULSIFIED ASPHALTS

35. Scope

35.1 This is a quick field test method to ascertain the compatibility of an emulsified asphalt with the job aggregate.

36. Summary of Practice

36.1 A measured amount of the job aggregate is hand-mixed with a measured amount of the emulsified asphalt supplied to the job. The ability of the emulsified asphalt to remain as a coating during a 5-min mixing cycle is observed. The resistance offered by the coating to wash-off is determined by repeated filling with water and emptying a container of the coated aggregate.

37. Significance and Use

37.1 The practice is proposed for use at the project site to determine (*1*) the ability of an emulsified asphalt to coat the job aggregate, (*2*) the ability of the emulsified asphalt to withstand mixing, and (*3*) the water resistance of the emulsified asphalt coated aggregate.

38. Apparatus

38.1 *Metal Containers,* ½-L capacity (friction-top pint cans).

38.2 *Metal Porcelain Saucepan,* (2½ to 3-L), equipped with a handle.

38.3 *Dispensing Graduate,* 50-mL capacity, preferably plastic.

38.4 *Serving Spoon,* long-handled.

39. Procedure

39.1 Derim the ½-L can.

39.2 Fill the can level with the job aggregate, deleting any sizes above 19 mm.

39.3 Measure out 50 mL of emulsified asphalt.

39.4 Dump the aggregate (39.2) and the emulsified asphalt (39.3) into the porcelain saucepan.

39.5 Hand mix vigorously for 5 min with the long-handled spoon.

39.6 Observe (*1*) whether the stone is fully coated with the emulsified asphalt and rate the coating as good, fair or poor—a rating of good means fully coated by the emulsified asphalt exclusive of pinholes and sharp edges of the aggregate, a rating of fair applies to the condition of an excess of coated area over uncoated area, and a rating of poor applies to the condition of an excess of uncoated area over coated area; and (*2*) the presence, if any, of free water, which denotes breakdown of the emulsified asphalt.

39.7 Refill the ½-L can with the coated stone.

39.8 Set the can of coated stone upright in the porcelain saucepan.

39.9 Fill the can with water and pour off. Repeat this step five times.

39.10 Dump the contents of the can onto newspapers. Repeat the observations made in 39.6 and record.

40. Report

40.1 Report the observations made in 39.6 and 39.10 as the results from this practice.

EMULSIFIED ASPHALT/JOB AGGREGATE COATING PRACTICE

41. Scope

41.1 This practice may be used to identify the adequacy of slow setting grade of emulsified asphalt to mix with and coat a dense and fine-graded job aggregate. It is a laboratory practice of screening emulsified asphalt candidates for mixing with and coating job aggregates and is not to be construed as a mix design test method.

42. Summary of Practice

42.1 A weighed amount of dry job aggregate is hand-mixed with a weighed amount of water for prewetting the aggregate. The wetted aggregate is then hand-mixed with a weighed amount of emulsified asphalt of known asphalt-cement content until maximum coating of the job aggregate is obtained. (Mix time is usually 15 to 120 s.) The adequacy of emulsified asphalt for mixing with job aggregate is determined by using various amounts of water and emulsified asphalt until a maximum coating of the job aggregate is obtained. This coating is rated as good, fair, or poor.

43. Significance and Use

43.1 The conditions of the practice are designed to identify the adequacy of emulsified asphalt, slow-setting grade (CSS-D 2397 and SS-D 977) for mixing with and coating dense-graded aggregate and fine-graded aggregate.

44. Apparatus

44.1 *Containers*—A 1000-mL glass beaker, a 1.0-L friction-top metal can, or 1000-mL stainless steel beaker or bowl.

44.2 *Mixing Tool*—A steel spatula or its equivalent, having a blade approximately 200 mm in length.

44.3 *Balance,* capable of weighing 1000 g to within ±0.1 g.

45. Procedure

45.1 Weigh 300 g of dry job aggregate into the container and add water basis dry weight of aggregate. Immediately begin to mix vigorously for 1 min or until all aggregate surfaces subjectively appear to be wetted (as a guide, 2 to 8 % water for dense-graded aggregate and 4 to 12 % water for fine-graded aggregate). The natural moisture in a job aggregate may be used in the test if predetermined. Additional water may then be added, if necessary, to obtain the desired level of water to be used for prewetting the aggregate.

45.2 Add the emulsion and immediately begin to mix vigorously, scraping sides and bottom of container, for 15 to

120 s or until maximum coating has been attained (as a guide, basis dry mass of aggregate, 3 to 7 % Asphalt Cement (A/C) residue for dense aggregate and 4 to 8 % A/C residue for fine aggregate). Example: 8 % emulsion at 60 % solids would be equivalent to 4.8 % asphalt cement residue in the mix.

45.3 If mix appears to be too dry and insufficiently coated repeat 45.1 and 45.2, using an increased amount of water or emulsified asphalt, or both. If mix appears to be too wet from excessive water or emulsified asphalt, or both, repeat 45.1 and 45.2, using less water or emulsified asphalt, or both.

45.4 For each job aggregate mix observe and record the amount of aggregate prewetting water and asphalt cement residue from the emulsified asphalt and note the one mix which provides the best aggregate coating.

45.5 Rate the best coating as good, fair, or poor using the ratings as defined in Section 18.

46. Report

46.1 Report the observations made in 45.2 and 45.3 relating to amount of aggregate prewetting water and residual asphalt needed for best obtainable aggregate coating.

46.2 Report the maximum coating achieved as good, fair, or poor in accordance with Section 18.