STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION

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The purpose of this manual change transmittal is to announce updates and corrections to the Caltrans *Construction Manual*. The following section or sections have been updated to reflect new policy and supersede the corresponding section of the *Construction Manual* as previously published. Updated sections are available at <https://dot.ca.gov/programs/construction/construction-manual> and are indicated by the date listed in the right-hand column on that page. Changes are identified by change lines in the left margin of this document.

# Section 6-1, “Sample Types and Frequencies”

Updates sample size requirements in Table 6-1.14, “Materials Acceptance Sampling and Testing Requirements: Concrete Pavement,” for the modulus of rupture test to require three 6x6x20 in. beams for each test. Also updates Table 6-1.14 to add a new modulus of rupture test for verifying that the concrete pavement can be opened to traffic.

Chapter 6 Sampling and Testing

# [Section 1 Sample Types and Frequencies](#_bookmark0) [6-101 General](#_bookmark1)

[6-101A References](#_bookmark2)

* 1. [**Types of Sampling and Testing**](#_bookmark3)[6-102A Preliminary Samples and Tests](#_bookmark4) [6-102B Initial Samples and Tests](#_bookmark5)

[Table 6-1.1. Time Required for Source Testing](#_bookmark6) [6-102B (1) Unprocessed Soils and Aggregates](#_bookmark7)

[6-102B (1a) Stone from Ledges and Quarries](#_bookmark8)

[6-102B (1b) Material Sites of Sand, Gravel, or Soil](#_bookmark9) [6-102B (2) Processed Aggregates](#_bookmark10)

[6-102C Acceptance Samples and Tests](#_bookmark11)

[Table 6-1.2. Time Required for Materials Acceptance Tests (1 of 4)](#_bookmark12) [Table 6-1.2. Time Required for Materials Acceptance Tests (2 of 4)](#_bookmark13) [Table 6-1.2. Time Required for Materials Acceptance Tests (3 of 4)](#_bookmark14) [Table 6-1.2. Time Required for Materials Acceptance Tests (4 of 4)](#_bookmark15) [Table 6-1.3. Time Required for Products Acceptance Tests](#_bookmark16)

[6-102D Dispute Resolution Samples](#_bookmark17)

[6-102E Investigation Samples and Tests](#_bookmark18) [6-102F Research Samples and Tests](#_bookmark19)

# [Field Sampled Material Identification for Testing](#_bookmark20)

[Example 6-1.1. Sample Cylinder Label](#_bookmark21) [Example 6-1.2. Sample Cylinder Label](#_bookmark22)

* 1. [**Shipping of Field Samples**](#_bookmark23)[**6-105 Acceptance Records**](#_bookmark24)
  2. [**Project Materials Certification**](#_bookmark25)
  3. [**Materials Acceptance Sampling and Testing**](#_bookmark26)

[Table 6-1.4. Materials Acceptance Sampling and Testing Requirements:](#_bookmark27) [Earthwork (*Standard Specifications* Section 19) (1 of 3)](#_bookmark27)

[Table 6-1.4. Materials Acceptance Sampling and Testing Requirements:](#_bookmark28) [Earthwork (*Standard Specifications* Section 19) (2 of 3)](#_bookmark28)

[Table 6-1.4. Materials Acceptance Sampling and Testing Requirements:](#_bookmark29) [Earthwork (*Standard Specifications* Section 19) (3 of 3)](#_bookmark29)

[Table 6-1.5. Materials Acceptance Sampling and Testing Requirements:](#_bookmark30) [Stabilized Soils (*Standard Specifications* Section 24) (1 of 2)](#_bookmark30)

[Table 6-1.5. Materials Acceptance Sampling and Testing Requirements:](#_bookmark31) [Stabilized Soils (*Standard Specifications* Section 24) (2 of 2)](#_bookmark31)

[Table 6-1.6. Materials Acceptance Sampling and Testing Requirements:](#_bookmark32) [Aggregate Subbases (*Standard Specifications* Section 25)](#_bookmark32)

[Table 6-1.7. Materials Acceptance Sampling and Testing Requirements:](#_bookmark33) [Aggregate Bases (*Standard Specifications* Section 26)](#_bookmark33)

[Table 6-1.8. Materials Acceptance Sampling and Testing Requirements:](#_bookmark34) [Cement Treated Bases (*Standard Specifications* Section 27) (1](#_bookmark34) [of 3)](#_bookmark34)

[Table 6-1.8. Materials Acceptance Sampling and Testing Requirements:](#_bookmark35) [Cement Treated Bases (*Standard Specifications* Section 27) (2](#_bookmark35) [of 3)](#_bookmark35)

[Table 6-1.8. Materials Acceptance Sampling and Testing Requirements:](#_bookmark36) [Cement Treated Bases (*Standard Specifications* Section 27) (3](#_bookmark36) [of 3)](#_bookmark36)

[Table 6-1.9. Materials Acceptance Sampling and Testing Requirements:](#_bookmark37) [Concrete Bases (*Standard Specifications* Section 28) Lean](#_bookmark37) [Concrete Base](#_bookmark37)

[Table 6-1.10. Materials Acceptance Sampling and Testing Requirements:](#_bookmark38) [Treated Permeable Bases (*Standard Specifications* Section 29)](#_bookmark38) [Asphalt Treated Permeable Base (ATPB) (1 of 4)](#_bookmark38)

[Table 6-1.10. Materials Acceptance Sampling and Testing Requirements:](#_bookmark39) [Treated Permeable Bases (*Standard Specifications* Section 29)](#_bookmark39) [Asphalt Treated Permeable Base (ATPB) (2 of 4)](#_bookmark39)

[Table 6-1.10. Materials Acceptance Sampling and Testing Requirements:](#_bookmark40) [Treated Permeable Bases (*Standard Specifications* Section 29)](#_bookmark40) [Asphalt Treated Permeable Base (ATPB) (3 of 4)](#_bookmark40)

[Table 6-1.10. Materials Acceptance Sampling and Testing Requirements:](#_bookmark41) [Treated Permeable Bases (*Standard Specifications* Section 29)](#_bookmark41) [Asphalt Treated Permeable Base (ATPB) (4 of 4)](#_bookmark41)

[Table 6-1.11. Materials Acceptance Sampling and Testing Requirements:](#_bookmark42) [Reclaimed Pavement (*Standard Specifications* Section 30)](#_bookmark42)

[Table 6-1.12. Materials Acceptance Sampling and Testing Requirements: Seal](#_bookmark43) [Coats (*Standard Specifications* Section 37) (1 of 8)](#_bookmark43)

[Table 6-1.12. Materials Acceptance Sampling and Testing Requirements: Seal](#_bookmark44) [Coats (*Standard Specifications* Section 37) (2 of 8)](#_bookmark44)

[Table 6-1.12. Materials Acceptance Sampling and Testing Requirements: Seal](#_bookmark45) [Coats (*Standard Specifications* Section 37) (3 of 8)](#_bookmark45)

[Table 6-1.12. Materials Acceptance Sampling and Testing Requirements: Seal](#_bookmark46) [Coats (*Standard Specifications* Section 37) (4 of 8)](#_bookmark46)

[Table 6-1.12. Materials Acceptance Sampling and Testing Requirements: Seal](#_bookmark47) [Coats (*Standard Specifications* Section 37) (5 of 8)](#_bookmark47)

[Table 6-1.12. Materials Acceptance Sampling and Testing Requirements: Seal](#_bookmark48) [Coats (*Standard Specifications* Section 37) (6 of 8)](#_bookmark48)

[Table 6-1.12. Materials Acceptance Sampling and Testing Requirements: Seal](#_bookmark49) [Coats (*Standard Specifications* Section 37) (7 of 8)](#_bookmark49)

[Table 6-1.12. Materials Acceptance Sampling and Testing Requirements: Seal](#_bookmark50) [Coats (*Standard Specifications* Section 37) (8 of 8)](#_bookmark50)

[Asphalt Concrete (*Standard Specifications* Section 39) (1 of 13)](#_bookmark51) [Table 6-1.13. Materials Acceptance Sampling and Testing Requirements:](#_bookmark52)

[Asphalt Concrete (*Standard Specifications* Section 39) (2 of 13)](#_bookmark52)

[Table 6-1.13. Materials Acceptance Sampling and Testing Requirements:](#_bookmark53) [Asphalt Concrete (*Standard Specifications* Section 39) (3 of 13)](#_bookmark53)

[Table 6-1.13. Materials Acceptance Sampling and Testing Requirements:](#_bookmark54) [Asphalt Concrete (*Standard Specifications* Section 39) (4 of 13)](#_bookmark54)

[Table 6-1.13. Materials Acceptance Sampling and Testing Requirements:](#_bookmark55) [Asphalt Concrete (*Standard Specifications* Section 39) (5 of 13)](#_bookmark55)

[Table 6-1.13. Materials Acceptance Sampling and Testing Requirements:](#_bookmark56) [Asphalt Concrete (*Standard Specifications* Section 39) (6 of 13)](#_bookmark56)

[Table 6-1.13. Materials Acceptance Sampling and Testing Requirements:](#_bookmark57) [Asphalt Concrete (*Standard Specifications* Section 39) (7 of 13)](#_bookmark57)

[Table 6-1.13. Materials Acceptance Sampling and Testing Requirements:](#_bookmark58) [Asphalt Concrete (*Standard Specifications* Section 39) (8 of 13)](#_bookmark58)

[Table 6-1.13. Materials Acceptance Sampling and Testing Requirements:](#_bookmark59) [Asphalt Concrete (*Standard Specifications* Section 39) (9 of 13)](#_bookmark59)

[Table 6-1.13. Materials Acceptance Sampling and Testing Requirements:](#_bookmark60) [Asphalt Concrete (*Standard Specifications* Section 39) (10 of](#_bookmark60) [13)](#_bookmark60)

[Table 6-1.13. Materials Acceptance Sampling and Testing Requirements:](#_bookmark61) [Asphalt Concrete (*Standard Specifications* Section 39) (11 of](#_bookmark61) [13)](#_bookmark61)

[Table 6-1.13. Materials Acceptance Sampling and Testing Requirements:](#_bookmark62) [Asphalt Concrete (*Standard Specifications* Section 39) (12 of](#_bookmark62) [13)](#_bookmark62)

[Table 6-1.13. Materials Acceptance Sampling and Testing Requirements:](#_bookmark63) [Asphalt Concrete (*Standard Specifications* Section 39) (13 of](#_bookmark63) [13)](#_bookmark63)

[Table 6-1.14. Materials Acceptance Sampling and Testing Requirements:](#_bookmark64) [Concrete Pavement (*Standard Specifications* Section 40) (1 of](#_bookmark64) [2) See Table 6-1.17 for concrete materials](#_bookmark64)

[Table 6-1.14. Materials Acceptance Sampling and Testing Requirements:](#_bookmark65) [Concrete Pavement (*Standard Specifications* Section 40) (2 of](#_bookmark65) [2) See Table 6-1.17 for concrete materials](#_bookmark65)

[Table 6-1.15. Materials Acceptance Sampling and Testing Requirements:](#_bookmark66) [Existing Concrete Pavement (*Standard Specifications* Section](#_bookmark66) [41)](#_bookmark66)

[Table 6-1.16. Materials Acceptance Sampling and Testing Requirements:](#_bookmark67) [Concrete Structures (*Standard Specifications* Section 51) See](#_bookmark67) [Table 6-1.17 for concrete materials](#_bookmark67)

[Concrete (*Standard Specifications* Section 90) (1 of 9)](#_bookmark68) [Concrete, Except Minor Concrete and Rapid Strength Concrete](#_bookmark68)

[Table 6-1.17. Materials Acceptance Sampling and Testing Requirements:](#_bookmark69) [Concrete (*Standard Specifications* Section 90) (2 of 9)](#_bookmark69) [Concrete, Except Minor Concrete and Rapid Strength Concrete](#_bookmark69)

[Table 6-1.17. Materials Acceptance Sampling and Testing Requirements:](#_bookmark70) [Concrete (*Standard Specifications* Section 90) (3 of 9)](#_bookmark70) [Concrete, Except Minor Concrete and Rapid Strength Concrete](#_bookmark70)

[Table 6-1.17. Materials Acceptance Sampling and Testing Requirements:](#_bookmark71) [Concrete (Standard Specifications Section 90) (4 of 9)](#_bookmark71) [Concrete, Except Minor Concrete and Rapid Strength Concrete](#_bookmark71)

[Table 6-1.17. Materials Acceptance Sampling and Testing Requirements:](#_bookmark72) [Concrete (*Standard Specifications* Section 90) (5 of 9)](#_bookmark72) [Concrete, Except Minor Concrete and Rapid Strength Concrete](#_bookmark72)

[Table 6-1.17. Materials Acceptance Sampling and Testing Requirements:](#_bookmark73) [Concrete (*Standard Specifications* Section 90) (6 of 9)](#_bookmark73) [Concrete, Except Minor Concrete and Rapid Strength Concrete](#_bookmark73)

[Table 6-1.17. Materials Acceptance Sampling and Testing Requirements:](#_bookmark74) [Concrete (*Standard Specifications* Section 90) (7 of 9)](#_bookmark74) [Concrete, Except Minor Concrete and Rapid Strength Concrete](#_bookmark74)

[Table 6-1.17. Materials Acceptance Sampling and Testing Requirements:](#_bookmark75) [Concrete (*Standard Specifications* Section 90) (8 of 9)](#_bookmark75) [Concrete, Except Minor Concrete and Rapid Strength Concrete](#_bookmark75)

[Table 6-1.17. Materials Acceptance Sampling and Testing Requirements:](#_bookmark76) [Concrete (*Standard Specifications* Section 90) (9 of 9) Minor](#_bookmark76) [Concrete](#_bookmark76)

[Table 6-1.18. Materials Acceptance Sampling and Testing Requirements:](#_bookmark77) [Miscellaneous Materials (1 of 5)](#_bookmark77)

[Table 6-1.18. Materials Acceptance Sampling and Testing Requirements:](#_bookmark78) [Miscellaneous Materials (2 of 5)](#_bookmark78)

[Table 6-1.18. Materials Acceptance Sampling and Testing Requirements:](#_bookmark79) [Miscellaneous Materials (3 of 5)](#_bookmark79)

[Table 6-1.18. Materials Acceptance Sampling and Testing Requirements:](#_bookmark80) [Miscellaneous Materials (4 of 5)](#_bookmark80)

[Table 6-1.18. Materials Acceptance Sampling and Testing Requirements:](#_bookmark81) [Miscellaneous Materials (5 of 5)](#_bookmark81)

Chapter 6 Sampling and Testing

**Section 1 Sample Types and Frequencies**

# General

Sampling and testing materials and products must be in accordance with contract specifications. Sampling and testing are of equal importance for assuring materials and products meet acceptance specifications.

Caltrans representatives must be familiar with materials handling and processing methods to assure representative samples are obtained. Caltrans representatives should be sufficiently knowledgeable about test methods to ensure compatibility between sample and test procedure.

Samples for acceptance must be taken in accordance with California Test 125, “Methods of Test for Sampling Highway Materials and Products Used in the Roadway Structural Sections,” or sampling requirements in specifications. For California Tests, Caltrans representatives must be qualified testers in accordance with the *Independent Assurance Manual.*

It is the resident engineer’s responsibility to assure the safety of the Caltrans representative. In accordance with *Material Plant Quality Program* or California Test 109*,* “Method for Testing of Material Production Plants,” the district weights and measures coordinator inspects material plants for safety in areas that the Caltrans representative will enter.

In certain situations, to assure the Caltrans representative’s safety, the contractor will take acceptance samples for Caltrans. The Caltrans representative must witness the contractor taking acceptance samples. The Caltrans representative must determine when the sample is taken and observe that the sample is taken in accordance with California Test 125, or sampling requirements in specifications. The Caltrans representative must take possession of the sample from the contractor and transport it to a Caltrans office or the testing laboratory. The Caltrans representative must properly fill out form TL-0101 “Sample Identification Card.”

The resident engineer is responsible for the chain of custody for material acceptance samples. Material acceptance samples and dispute resolution samples must be in Caltrans’ possession from the sampling point. Adequate sample storage facilities must be arranged for at construction field offices or other Caltrans facilities. The chain of custody for material samples is an important part of the Caltrans quality assurance program.

6-101A References

* *Independent Assurance Manual*, Division of Engineering Services, Materials Engineering and Testing Services (METS), Caltrans:

<https://dot.ca.gov/programs/engineering-services/manuals>

* + California Test Methods, METS, Caltrans, available at: <https://dot.ca.gov/programs/engineering-services/california-test-methods>
  + American Association of State Highway and Transportation Officials (AASHTO), American Society for Testing and Materials International (ASTM), and other test methods are available at the IHS Standards Expert intranet website, which can be accessed from a link on the METS website:

<http://des.onramp.dot.ca.gov/materials-engineering-and-testing-services-mets>

* + *Material Plant Quality Program*, Division of Construction, Caltrans, available at: <https://dot.ca.gov/programs/construction/material-plant-quality-program>

# Types of Sampling and Testing

The following are the types of sampling and testing used by Caltrans.

6-102A Preliminary Samples and Tests

Preliminary samples and tests are made prior to award of a contract. Construction personnel rarely perform preliminary sampling and testing. The district materials engineer is responsible for preliminary sampling and testing. Such tests are used for design purposes, and to provide data for the materials information package for prospective bidders.

6-102B Initial Samples and Tests

Initial samples and tests are performed on materials proposed for use in the project. These initial tests determine whether proposed materials sources, local materials, or products meet the specifications.

Construction personnel may sample potential sources. For soils and aggregate tests, send samples to the district materials laboratory. Tests may be performed by the district materials laboratory or METS, depending on their respective capabilities.

Sampling and testing potential local materials is not mandatory unless specified. Charge the contractor for the cost of sampling and testing potential local materials sources in accordance with Section 6, “Control of Materials,” of the *Standard Specifications*.

The normal time required for testing initial source samples of potential local materials sources is shown in Table 6-1.1.

Table 6-1.1. Time Required for Source Testing

|  |  |
| --- | --- |
| **Material** | **Time** |
| Aggregates for hot mix asphalt | 2 weeks |
| Aggregates for cement treatment | 4 weeks |
| Aggregates for concrete mixture | 4 weeks |
| Aggregates for concrete pavement | 60 days |

|  |  |
| --- | --- |
| **Material** | **Time** |
| Screenings for seal coats | 2 weeks |
| Soils (R-Value) | 3 weeks |
| Untreated base materials | 3 weeks |

* 1. *B (1) Unprocessed Soils and Aggregates*

The discussion on unprocessed soils and aggregates is primarily applicable to preliminary and initial sampling, although the same precautions apply when sampling for specification compliance.

6-102B (1a) Stone from Ledges and Quarries

Inspect the ledge or quarry face to determine any variations in strata, or in portions of the ledge. Observe and record differences in color and structure. Obtain separate samples of unweathered stone from all strata that appear to vary in color and structure.

6-102B (1b) Material Sites of Sand, Gravel, or Soil

Select samples representing the different materials available in the deposit. If the deposit is worked as an open face or pit, take the samples by channeling the face so that they will represent material that visual inspection indicates may be used. It is necessary, especially in small deposits, to excavate test holes some distance in back of, and parallel to, the face to determine the extent of the supply. The number and depth of these test holes depend on the quantity of material to be used from the deposit. Obtain samples from open test pits by channeling a face of the test pit in the same manner as sampling a face of a materials site. Do not include material in the sample that will be stripped from the pit as overburden. Obtain separate samples from the face of the bank and from the test holes. If visual inspection indicates that there is considerable variation in the material, obtain separate samples at different depths.

Use test holes to sample deposits that have no open faces. When sampling material sites, select depth and spacing of test holes considering the probable method of operating the pit. In general, dozers will combine the material laterally. A shovel will remove the material vertically. Test results in a “spotty” pit may be misleading to the extent that operations may be too expensive to make the required grading.

If possible, use a dozer or shovel to open up the pit before sampling rather than depending on test holes.

*6-102B (2) Processed Aggregates*

Sample processed aggregates from locations such as stockpiles, transportation units, conveyors, or windrows in accordance with California Test 125, “Methods of Test for Sampling Highway Materials and Products Used in the Roadway Structural Sections.”

6-102C Acceptance Samples and Tests

Acceptance tests are generally performed on materials that will be incorporated into the work. Some acceptance tests are performed on materials already incorporated into

the work. Acceptance sampling and testing should begin as soon as the material is delivered or in place.

Sample materials at the locations specified in the *Standard Specifications*, the special provisions, or as required by California Test 125. If the sampling location is not specified, sample at the location indicated in the materials acceptance sampling and testing requirements tables in Section 6-107, “Materials Acceptance Sampling and Testing” of this manual. Regardless of location, sample randomly and within the frequency specified to obtain representative samples of the material used in the work.

On Form TL-0101, “Sample Identification Card,” use the “Priority” designation for the first few acceptance samples of each construction material. Use “Priority” for verification tests for acceptance. Use the “Priority” designation for all samples if the material being supplied is of questionable quality or if the construction means and methods or source of materials changes. For “Priority” tests, indicate if there is a preference for telephoned, faxed, or emailed test results on Form TL-0101, “Sample Identification Card,” along with the telephone number of the person who is to receive them.

For “Priority” and “Normal” processing times for acceptance tests of materials, refer to Table 6-1.2, “Time Required for Materials Acceptance Tests,” of this manual.

The minimum time required for acceptance tests of products is shown in Table 6-1.2, of this manual.

Make sure acceptance samples are shipped or transported to testing laboratories within the following timeframes:

1. Within 1 business day from sampling for projects within 50 miles of the testing laboratory
2. Within 2 business days from sampling for projects more than 50 miles from the testing laboratory

The above timeframes are not applicable where specific sampling or test method requirements preclude doing so, for example, curing of specimens prior to transport.

Assure that proper chain of custody is maintained throughout the process, including delivery to and receipt from commercial shipping services.

Use Form CEM-3701, “Test Result Summary,” to summarize acceptance test frequency and test results on each material. Use this form to record sampling and testing related dates and monitor timeliness of acceptance testing. Compare timeliness of material testing turnaround against Table 6-1.2, and verify that corrective actions are taken and documented where repeated deficiencies are detected.

Notify contractor of all acceptance test results within 2 business days of receipt from laboratory. Advise the contractor that all test results are available for their inspection, and provide copies of these test results upon their request. Maintain copies of the test results within the project files for ready accessibility.

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| --- | --- | --- | --- | --- | --- |
| **Material and Test** | **Sample to Lab** (Note 1) (business days) | **Lab Time Priority** (Note 2) (business days) | **Lab Time Normal** (Note 2) (business days) | **Reporting to Contractor** (Note 3) (business  days) | **Total** (business days) |
| **SOILS** | | | | | |
| Gradation (CT 202) | 1 to 2 | 1 | 3 | 2 | 4 to 7 |
| Sand Equivalent (CT 217) | 1 to 2 | 1 | 3 | 2 | 4 to 7 |
| Relative Compaction (CT 231/216) | 1 to 2 | 1 | 2 | 2 | 4 to 6 |
| Plasticity Index (Geosynthetic Reinforced Embankment) | 1 to 2 | 3 | 7 | 2 | 6 to 11 |
| pH (Geosynthetic Reinforced Embankment) | 1 to 2 | 2 | 3 | 2 | 5 to 7 |
| Percentage Crushed Particles (Shoulder Backing – CT 205) | 1 to 2 | 2 | 5 | 2 | 5 to 9 |
| Durability Index (Shoulder Backing – CT 229) | 1 to 2 | 2 | 5 | 2 | 5 to 9 |
| R-value (Imported Borrow – CT 301) | 1 to 2 | 4 | 6 | 2 | 7 to 10 |
| **SUBBASES AND BASES** | | | | | |
| Relative Compaction (CT 231/216) | 1 to 2 | 1 | 2 | 2 | 4 to 6 |
| Gradation (CT 202) | 1 to 2 | 1 | 3 | 2 | 4 to 7 |
| Sand Equivalent (CT 217) | 1 to 2 | 1 | 3 | 2 | 4 to 7 |
| R-value (CT 301) | 1 to 2 | 4 | 6 | 2 | 7 to 10 |
| Durability Index (CT 229) | 1 to 2 | 2 | 5 | 2 | 5 to 9 |
| Compressive Strength (CTB aggregate – CT 312) | - | Age based | Age based | 2 | Age +2 |
| Compressive Strength (LCB–ASTM C39) | - | Age based | Age based | 2 | Age +2 |
| Compressive Strength (LCB – rapid setting – CT 521) | - | Age based | Age based | 2 | Age +2 |
| Modulus of Rupture (Concrete base – CT 523) | - | Age based | Age based | 2 | Age +2 |
| Modulus of Rupture (Rapid strength concrete base – CT 524) | - | Age based | Age based | 2 | Age +2 |
| Percentage of Crushed Particles (CT 205) | 1 to 2 | 2 | 5 | 2 | 5 to 9 |
| Los Angeles Rattler (CT 211) | 1 to 2 | 2 | 4 | 2 | 5 to 8 |
| Cleanness Value (CT 227) | 1 to 2 | 2 | 3 | 2 | 5 to 7 |
| Film Stripping (CT 302) | 1 to 2 | 2 | 7 | 2 | 5 to 11 |
| Asphalt Content (ATPB – CT 382) | 1 to 2 | 1 | 5 | 2 | 4 to 9 |
| Soundness (CTPB – CT 214) | 1 to 2 | 8 | 10 | 2 | 11 to 14 |
| **SEAL COATS** | | | | | |
| Los Angeles Rattler (CT 211) | 1 to 2 | 2 | 4 | 2 | 5 to 8 |
| Percentage of Crushed Particles (CT 205) | 1 to 2 | 2 | 5 | 2 | 5 to 9 |
| Film Stripping (CT 302) | 1 to 2 | 2 | 7 | 2 | 5 to 11 |
| Gradation (CT 202) | 1 to 2 | 1 | 3 | 2 | 4 to 7 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Material and Test** | **Sample to Lab** (Note 1) (business days) | **Lab Time Priority** (Note 2) (business days) | **Lab Time Normal** (Note 2) (business days) | **Reporting to Contractor** (Note 3) (business  days) | **Total** (business days) |
| **SEAL COATS (Cont.)** | | | | | |
| Gradation (ASTM C136) | 1 to 2 | 1 | 3 | 2 | 4 to 7 |
| Cleanness Value (CT 227) | 1 to 2 | 2 | 3 | 2 | 5 to 7 |
| Durability Index (CT 229) | 1 to 2 | 2 | 5 | 2 | 5 to 9 |
| Sand Equivalent (CT 217) | 1 to 2 | 1 | 3 | 2 | 4 to 7 |
| Viscosity (AASHTO T 59) | 1 to 2 | 3 | 15 | 2 | 6 to 19 |
| Viscosity (ASTM D7741) | 1 to 2 | 3 | 15 | 2 | 6 to 19 |
| Viscosity (ASTM D445) | 1 to 2 | 3 | 15 | 2 | 6 to 19 |
| Flash Point (ASTM D92) | 1 to 2 | 3 | 15 | 2 | 6 to 19 |
| Aromatics (ASTM D2007) | 1 to 2 | 7 | 15 | 2 | 10 to 19 |
| Cone Penetration (ASTM D217) | 1 to 2 | 3 | 15 | 2 | 6 to 19 |
| Resilience (ASTM D5329) | 1 to 2 | 3 | 15 | 2 | 6 to 19 |
| Settlement (AASHTO T 59) | 1 to 2 | 7 | 30 | 2 | 10 to 34 |
| Sieve Test (AASHTO T 59) | 1 to 2 | 3 | 15 | 2 | 6 to 19 |
| Demulsibility (AASHTO T 59) | 1 to 2 | 3 | 15 | 2 | 6 to 19 |
| Torsional Recovery (CT 332) | 1 to 2 | 3 | 15 | 2 | 6 to 19 |
| Penetration (AASHTO T 49) | 1 to 2 | 3 | 15 | 2 | 6 to 19 |
| Ring and Ball Softening Point Temperature (AASHTO T 53) | 1 to 2 | 3 | 15 | 2 | 6 to 19 |
| Field Softening Point (ASTM D36) | 1 to 2 | 3 | 15 | 2 | 6 to 19 |
| Elastic Recovery (AASHTO T 301) | 1 to 2 | 4 | 15 | 2 | 7 to 19 |
| Ductility (AASHTO T 51) | 1 to 2 | 4 | 15 | 2 | 7 to 19 |
| BBR (AASHTO T 313) | 1 to 2 | 5 | 8 | 2 | 8 to 12 |
| **HMA** | | | | | |
| Gradation (AASHTO T 27) | 1 to 2 | 1 | 3 | 2 | 4 to 7 |
| Sand Equivalent (AASHTO T 176) | 1 to 2 | 1 | 3 | 2 | 4 to 7 |
| Los Angeles Rattler (AASHTO T 96) | 1 to 2 | 2 | 4 | 2 | 5 to 8 |
| Percent of Crushed Particles (Coarse) (AASHTO T 335) | 1 to 2 | 2 | 5 | 2 | 5 to 9 |
| Percent of Crushed Particles (Fine) (AASHTO T 335) | 1 to 2 | 2 | 5 | 2 | 5 to 9 |
| Flat and Elongated Particles (ASTM D4791) | 1 to 2 | 2 | 4 | 2 | 5 to 8 |
| Fine Aggregate Angularity (AASHTO T 304, Method A) | 1 to 2 | 2 | 4 | 2 | 5 to 8 |
| **Asphalt Binder** |  |  |  |  |  |
| Flash Point (AASHTO T 48) | 1 to 2 | 3 | 15 | 2 | 6 to 19 |
| Solubility (AASHTO T 44) | 1 to 2 | 3 | 15 | 2 | 6 to 19 |
| Viscosity (AASHTO T 316) | 1 to 2 | 3 | 15 | 2 | 6 to 19 |

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| --- | --- | --- | --- | --- | --- |
| **Material and Test** | **Sample to Lab** (Note 1) (business days) | **Lab Time Priority** (Note 2) (business days) | **Lab Time Normal** (Note 2) (business days) | **Reporting to Contractor** (Note 3) (business  days) | **Total** (business days) |
| **HMA (Cont.)** | | | | | |
| Dynamic Shear – Original Phase (AASHTO T 315) | 1 to 2 | 3 | 15 | 2 | 6 to 19 |
| Dynamic Shear – RTFO Phase (AASHTO T 315) | 1 to 2 | 4 | 15 | 2 | 7 to 19 |
| Dynamic Shear – PAV Phase (AASHTO T 315) | 1 to 2 | 5 | 15 | 2 | 8 to 19 |
| RTFO Test (AASHTO T 240) | 1 to 2 | 3 | 15 | 2 | 6 to 19 |
| Ductility (AASHTO T 51) | 1 to 2 | 3 | 15 | 2 | 6 to 19 |
| Elastic Recovery (AASHTO T 301) | 1 to 2 | 3 | 15 | 2 | 6 to 19 |
| PAV (AASHTO R 28) | 1 to 2 | 4 | 15 | 2 | 7 to 19 |
| Creep and Stiffness (AASHTO T 313) | 1 to 2 | 5 | 15 | 2 | 8 to 19 |
| Binder Recovery (AASHTO T164 / ASTM D1856) | 1 to 2 | 2 | 15 | 2 | 5 to 19 |
| Binder Recovery (AASHTO R 59) | 1 to 2 | 4 | 15 | 2 | 7 to 19 |
| **Asphalt Rubber Binder** | | | | | |
| Cone Penetration (ASTM D217) | 1 to 2 | 4 | 15 | 2 | 7 to 19 |
| Resilience (ASTM D5329) | 1 to 2 | 4 | 15 | 2 | 7 to 19 |
| Softening Point (ASTM D36) | 1 to 2 | 3 | 15 | 2 | 6 to 19 |
| Viscosity (ASTM D7741) | 1 to 2 | 3 | 15 | 2 | 6 to 19 |
| Asphalt Modifier Properties (ASTM D445, ASTM D92, ASTM D2007) | 1 to 2 | 3 | 15 | 2 | 6 to 19 |
| Crumb Rubber Modifier (CRM)  properties (CT 208, CT 385, ASTM D297) | 1 to 2 | 7 | 30 | 2 | 10 to 34 |
| **Hot Mix Asphalt Mix** | | | | | |
| Moisture Content (AASHTO T 329) | 1 to 2 | 2 | 5 | 2 | 5 to 9 |
| Asphalt Binder Content (AASHTO T 308, Method A) | 1 to 2 | 2 | 5 | 2 | 5 to 9 |
| Hamburg Wheel Track (AASHTO T 324 [Modified]) | 1 to 2 | 7 | 30 | 2 | 10 to 34 |
| Bulk Specific Gravity (AASHTO T 275) | 1 to 2 | 2 | 7 | 2 | 5 to 11 |
| Maximum Theoretical Density (AASHTO T 209) | 1 to 2 | 2 | 7 | 2 | 5 to 11 |
| Field Softening Point (ASTM D36) | 1 to 2 | 3 | 15 | 2 | 6 to 19 |
| Elastic Recovery (AASHTO T 301) | 1 to 2 | 4 | 15 | 2 | 7 to 19 |
| Ductility (AASHTO T 51) | 1 to 2 | 4 | 15 | 2 | 7 to 19 |
| BBR (AASHTO T 313) | 1 to 2 | 5 | 8 | 2 | 8 to 12 |

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| --- | --- | --- | --- | --- | --- | --- |
| **Material and Test** | **Sample to Lab**  (Note 1)  (business days) | **Lab Time Priority** (Note 2)  (business days) | | **Lab Time Normal** (Note 2)  (business days) | **Reporting to Contractor** (Note 3)  (business days) | **Total** (business days) |
| **CONCRETE PAVEMENT** | | | | | | |
| Los Angeles Rattler (CT 211) | 1 to 2 | 2 | | 4 | 2 | 5 to 8 |
| Cleanness Value (CT 227) | 1 to 2 | 2 | | 3 | 2 | 5 to 7 |
| Gradation (CT 202) | 1 to 2 | 1 | | 3 | 2 | 4 to 7 |
| Sand Equivalent (CT 217) | 1 to 2 | 1 | | 3 | 2 | 4 to 7 |
| Modulus of Rupture (CT 523) | - | Age based | | Age based | 2 | Age +2 |
| Thickness (CT 531) | 2 | 2 | | 7 | 2 | 6 to 11 |
| Dowel bar alignment and concrete consolidation | 2 | 2 | | 5 | 2 | 6 to 9 |
| Tie bar alignment and concrete consolidation | 2 | 2 | | 5 | 2 | 6 to 9 |
| Coefficient of Friction (CT 342) | 7\* | 2 | | 5 | 2 | 11 to 14 |
| Inertial Profiler (AASHTO R 56 & R 57) | 7\* | 3 | | 7 | 2 | 12 to 16 |
| **CONCRETE STRUCTURES** | | | | | | |
| Los Angeles Rattler (CT 211) | 1 to 2 | 2 | 4 | | 2 | 5 to 8 |
| Cleanness Value (CT 227) | 1 to 2 | 2 | 3 | | 2 | 5 to 7 |
| Gradation (CT 202) | 1 to 2 | 1 | 3 | | 2 | 4 to 7 |
| Sand Equivalent (CT 217) | 1 to 2 | 1 | 3 | | 2 | 4 to 7 |
| Compressive Strength (CT 521) | - | Age based | Age based | | 2 | Age +2 |
| **CONCRETE** | | | | | | |
| Gradation (CT 202) | 1 to 2 | 1 | 3 | | 2 | 4 to 7 |
| Cement (Various) | 1 to 2 | 35 | 60 | | 2 | 38 to 64 |
| Supplementary Cementitious Materials (Various) | 1 to 2 | 35 | 60 | | 2 | 38 to 64 |
| Shrinkage (AASHTO T 160) | 1 to 2 | 42 | 60 | | 2 | 45 to 64 |

Notes:

1. Time to testing laboratory begins from time of sampling and includes any required field curing time and time required for transport to the testing laboratory.
2. Time in laboratory begins from time laboratory receives the sample and includes any required laboratory curing time prior to testing and time required to prioritize samples. This time also includes the lab manager’s review of test results and the time to notify the resident engineer.
3. Reporting time is the time from when the test is provided to the resident engineer to when the contractor is notified of the test results.

\* Days to schedule lab for testing

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| **Product** | **Minimum Time**  **(Business Days)** |
| Coating tests | 3 |
| Expansion joint material | 3 |
| Fencing, all types | 2 |
| Guide posts | 3 |
| Geosynthetic fabrics | 3 |
| Geosynthetic fabrics (UV testing) | 45 |
| Metal guardrail | 7 |
| Pavement markers | 4 |
| Prestressing steel | 10 |
| Reinforcing steel and wire | 2 |
| Rubber (accompanied by manufacturer test report) | 3 |
| Rubber (without test report) | 14 |
| Structural steel | 10 |
| Type B joint seal | 7 |

6-102D Dispute Resolution Samples

Code of Federal Regulations, Title 23, Section 637.207 (23 CFR 637.207), “Quality Assurance Program,” paragraph (a)(1)(iii), states, “If the results from the quality control sampling and testing are used in the acceptance program, the STD (state transportation department) shall establish a dispute resolution system. The dispute resolution system shall address the resolution of discrepancies occurring between the verification sampling and testing and the quality control sampling and testing.” When specified, the engineer must split acceptance test samples and store the split samples in case of a disputed test result. Caltrans requires split samples to be stored in a facility under state control in case they are needed for dispute resolution.

6-102E Investigation Samples and Tests

Specific materials or quality problems such as pavement failures, difficulty in achieving percent of maximum theoretical density, or inconsistent test results may require special samples and tests. When materials problems are encountered, contact the district materials engineer. The district materials engineer may request help from METS and the Division of Construction. METS will request all acceptance test results and contractor quality control test results along with material-specific additional samples and tests in order to conduct a forensic investigation.

6-102F Research Samples and Tests

Pilot projects usually have special requirements for sampling and testing of materials.

Projects developed around research needs usually require larger samples and more frequent testing than what is required by Caltrans’ acceptance testing minimum

frequencies. The unit that requested the research project will provide oversight for all of the special sampling and testing requirements.

# Field Sampled Material Identification for Testing

Samples must be properly identified so the testing laboratory can function efficiently and report results to the project in a timely manner. In addition, accuracy in identifying where the material was placed in the project can be very useful if the material must be rejected by the engineer and then removed by the contractor.

For requesting faster processing of samples, use the “priority” designation as discussed in Section 6-102C, “Acceptance Samples and Tests,” of this manual.

For field material samples, except for concrete cylinder compressive strength, use Form TL-0101, “Sample Identification Card.” For concrete cylinder compressive strength, use Form TL-0502, “Field Sample of Portland Cement Concrete Sample Card.”

In general, prepare Form TL-0101 as follows:

* Fill in every blank space with complete information, including the quantity and lot of material sampled.
* The “Location of Source” must clearly indicate the place (that is, behind paver, stockpile, cold feed belt) where the sample was taken.
* Indicate “Normal” for laboratory processing of sample or “Priority” if test result is needed quickly.
* If the sample was taken at the request of the contractor from local deposits as a potential source in accordance with Section 6-1.03, “Local Materials,” of the *Standard Specifications,* note this under “Remarks.” Request that the district materials laboratory provides the cost of testing so that Caltrans can be reimbursed by the contractor.
* To protect the sample identification card against moisture or stains, place it in a plastic bag or shipping label protector and tape it to the sample container.
* Distribute copies as shown on the form on the same day the sample is shipped.
* Prepare Form TL-0101 in accordance with the following details based on the type of material:
  + Aggregate sources must be in compliance with or not subject to the State Mining and Reclamation Act (SMARA). Verify that sources of aggregates are indicated and include the SMARA listing number. For additional information, refer to Section 7-103H (2), “Surface Mining and Reclamation Act,” of this manual.
  + For hot mix asphalt (HMA) sample be sure to:
    1. Identify the HMA plant producing the material.
    2. Identify the job mix formula (JMF) producer identification number.
    3. Include the type of mix and aggregate grading specified.
    4. Under “Remarks,” include the grade and source of the asphalt binder.
    5. Under “Remarks,” include the percentage of asphalt binder designated in the JMF.
* For asphalt binder sample be sure to:
  1. Identify the HMA plant using the material.
  2. Identify the source of asphalt binder.

A list of approved asphalt suppliers is available at:

https://dot.ca.gov/programs/engineering-services/asphalt-supplier- certification-program

For nonapproved suppliers identify the refinery and shipment number for each truckload.

* For tack coat or asphalt emulsion samples be sure to:
  1. Identify the source of the asphalt binder or asphaltic emulsion.
  2. Under “Remarks” include the dilution rate (50/50 or 60/40) for asphaltic emulsions or enter “Not Diluted.”
* If the specification has requirements based on the use of the material, include the intended use under “Remarks.” This is especially important for electrical conductors, as the applicable specifications depend on where and how the conductor is used.
* Prepare Form TL-0502, “Field Sample of Portland Cement Concrete Sample Card,” for each pair of cylinders shipped in the same carton as follows:
  + Fill in every blank space with complete information.
  + Indicate sources of aggregates and include the SMARA listing number. Aggregate sources must be in compliance with or not subject to SMARA. For additional information, refer to Section 7-103H (2), “Surface Mining and Reclamation Act,” of this manual. Indicate in the space for water the total weight of water used per cubic yard of cementitious material in the mix based on actual weight (not design weight).
  + Under “Remarks,” indicate the specified concrete strength.
  + Under “Remarks,” indicate if the unit weight of the hardened concrete cylinders is required. The testing laboratory will not furnish unit weight data unless it is specifically requested.
  + To protect the sample card against moisture or stains, place it in a plastic bag or shipping label protector, and tape it to the sample container.
  + Distribute copies as shown on the form on the same day the sample is shipped.

A uniform system for marking cylinders is used. This system consists of the contract number and the sample number. The sample number consists of a series of digits separated by dashes (-) to indicate: method of storage for curing; age at which cylinders are to be tested; the cylinder number of the pair, or group of five, that is to be tested; and project coding. Use a flow pen to mark the cylinders.

Following are examples of the cylinder marking system.

Example 6-1.1. Sample Cylinder Label Contract No. 03-100844

Sample No. 1-28-1/5\_ \_ \_ \_ \_ Date Cast

For sample shown in Example 6-1.1:

* The first digit indicates method 1 storage for curing.
* The second two digits indicate that the cylinder is to be tested at 28 days.
* The 1/5 set indicates that it is the No. 1 cylinder of 5 cylinders. The No. 2 cylinder would be marked 2/5, and so on, for the remaining cylinders of the group.
* The last four spaces are reserved for any project coding consisting of numbers, letters, or a combination.

Note if only one sample card was made for two cylinders, the third symbol on the card would be 1,2/5.

Example 6-1.2. Sample Cylinder Label Contract No. 03-100844

Sample No. 2-14-2/2\_ \_ \_ \_ Date Cast

For sample shown in Example 6-1.2:

* The first digit indicates method 2 storage for curing.
* The second two digits indicate that the cylinder is to be tested at 14 days.
* The 2/2 set indicates that it is the No. 2 cylinder of a group of 2 cylinders.
* The last four spaces are reserved for any project coding consisting of numbers, letters or a combination.

Note if one sample card is made for the two cylinders, the third symbol on the card would be 1,2/2.

# Shipping of Field Samples

Based on turnaround time needed to receive a test result, ship samples from the job site to the laboratory using the most economical mode of transportation available consistent with the time element involved. Do not accumulate samples at the project site to save transportation costs.

Concrete cylinders are shipped to the laboratory in accordance with California Test 540, “Method of Test for Making, Handling, and Storing Concrete Compressive Test Specimens in the Field.” Cylinders are shipped without removing the mold and are packed in cardboard containers available at the district warehouse. Each carton holds two cylinders.

If the district laboratory is equipped to test concrete cylinders, they should be shipped there. Otherwise cylinders may be delivered either to the Southern Regional Lab at 13970 Victoria Street, Fontana, CA 92336, or METS at 5900 Folsom Boulevard, Sacramento, CA 95819, whichever is more convenient. Ship concrete cylinders within the time limits specified in California Test 540 or the test result cannot be used as an acceptance test.

Shipping costs to district materials laboratories, the Southern Regional Lab, or METS, are to be prepaid.

# Acceptance Records

Keep records of all samples and tests in the project files as permanent job records. Monitor acceptance testing frequency, results, and timelines by using Form CEM- 3701, “Test Result Summary.” Corrective action or retesting of failing tests must be noted in the “Remarks” column of the form.

Documentation of the reason materials represented by failing tests were incorporated into the project must be included in the project files. For more information on procedures to follow in the case of failing tests, refer to Section 3-6, “Control of Materials,” of this manual.

It is not necessary to secure separate samples for each project when two or more projects receive materials from the same source. File a copy of the test report with each project.

# Project Materials Certification

When construction work on the project is complete, prepare Form CEM-6302, “Final Materials Certification.” Use the form to certify that, other than for the exceptions listed on the form, the results of tests performed on acceptance samples show that the materials used in the work controlled by sampling and testing conform to the approved plans and specifications.

If exceptions exist, check the exceptions box and note all nonconforming materials on the form. The following are examples of nonconforming materials that must be noted as exceptions:

* Materials accepted by applying a specified pay factor or deficiency adjustment, such as for hot mix asphalt, concrete pavement, or rapid-strength concrete.
* Materials out of “operating range” but within “contract compliance” for which a specified payment deduction was made.
* Materials not in compliance with the as-bid contract plans or specifications for which a change order was approved to accept the material.
* Materials that require certificates of compliance but one or more have not been submitted.

Sign the form and put the original in the project files. Send a copy to district construction and, if the project is subject to Federal Highway Administration (FHWA) construction oversight activities, send another copy to the FHWA California division

administrator. The name and address of the FHWA California division administrator is available at:

<https://www.fhwa.dot.gov/cadiv/directory.cfm>

# Materials Acceptance Sampling and Testing

Sampling and testing materials and products must be in accordance with contract specifications. Sampling and testing are of equal importance for assuring materials and products meet acceptance specifications.

The tables that make up Table 6-1.4 contain Caltrans’ minimum sampling and testing requirements for materials acceptance. The frequency of sampling and testing indicated in the tables is to be used under normal conditions. Materials that are marginal in meeting the specifications should be sampled and tested on a more frequent basis. Request “Priority” testing for samples taken on potentially marginal materials.

When shown in the tables that testing frequencies may be adjusted, document any adjustment through a “Memo to File.” Place the “Memo to File” in the appropriate part of Category 37, “Initial Tests and Acceptance Tests,” of the project files.

Adherence to the sample size requirements shown in the tables will prevent unnecessary delays and expense of obtaining supplementary samples to complete tests.

Refer to Section 6-105 “Acceptance Records,” of this manual for documenting acceptance tests results. For more information on procedures to follow in the case of failing tests, refer to Section 3-6, “Control of Materials,” of this manual.

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| **Test** | **Test Method** | **Sample Size & Container Size** | **Sampling Location** (Note 1) | **Acceptance Test Frequency** | **Remarks** |
| **STRUCTURE BACKFILL (Section 19-3.02C)** | | | | | |
| Sieve Analysis | California Test 202 | 50 lb | Materials site or stockpile | 1 every 3,000 tons or 2,000 cu yd | If uniform material is within specification limits, test frequency may be decreased to 1 per day |
| Sand Equivalent | California Test 217 | 50 lb | Materials site or stockpile | 1 every 3,000 tons or 2,000 cu yd | If uniform material is within specification limits, test frequency may be decreased to 1 per day |
| Relative Compaction | California Test 231 | Sample for California Test 216 | Project site in accordance with California Test 231 | 1 every 2,000 sq yd and test compaction at every 8 in. of thickness | Relative compaction test is required at each location structure backfill is placed |
| Maximum Wet Density | California Test 216 | 35 lb | Relative compaction test site locations | 1 every relative compaction test | Wet common- composite test maximum value may be used in accordance with California Test 231 |
| **PERVIOUS BACKFILL MATERIAL (Section 19-3.02D)** | | | | | |
| Sieve Analysis | California Test 202 | 50 lb | Stockpile | 1 every 3,000 tons or 2,000 cu yd | If uniform material within specification limits, test frequency may be decreased to 1 per day |
| **COMPACTION (Section 19-5)** | | | | | |
| R-Value | California Test 301 | 50 lb | Project site | Test to verify R- value if differing site conditions are encountered | If R-value testing in the materials report is incomplete because of preproject conditions, then test to verify design R-value |
| Relative Compaction | California Test 231 | Sample for California Test 216 | California Test 216 | 1 every 2,000 sq yd |  |
| Maximum Wet Density | California Test 216 | 35 lb | Relative compaction  test site locations | 1 every relative compaction test |  |

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| **Test** | **Test Method** | **Sample Size & Container Size** | **Sampling Location** (See Note 1) | **Acceptance Test Frequency** | **Remarks** |
| **EMBANKMENT CONSTRUCTION (Section 19-6)** | | | | | |
| Relative Compaction | California Test 231 | Sample for California Test 216 | Project site in accordance with California Test 231 | 1 every 2,000 sq yd and test compaction at every 8 in. of thickness |  |
| Maximum Wet Density | California Test 216 | 35 lb | Relative compaction test site locations | 1 every relative compaction test | Wet common- composite test maximum value may be used in accordance with California Test 231 |
| **GEOSYNTHETIC REINFORCED EMBANKMENT (Section 19-6.02B)** | | | | | |
| Plasticity Index | California Test 204 | 50 lb | Materials site or stockpile | 1 per source prior to use |  |
| pH | California Test 643 | 50 lb | Materials site or stockpile | 1 per source prior to use |  |
| Sieve Analysis | California Test 202 | 50 lb | Stockpile | Prior to use, 1 every 3,000  tons or 2,000 cu yd | If material is uniform and well within specification limits, the test frequency may be decreased to 1 per day |
| **BORROW MATERIAL (Section 19-7)** | | | | | |
| R-Value | California Test 301 | 50 lb | Import borrow source | 1 per source | Test for R-value only when an R-value is specified for import borrow in the special provisions; if material at import borrow source is not uniform, increase testing frequency |

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| **Test** | **Test Method** | **Sample Size & Container Size** | **Sampling Location**  (Note 1) | **Acceptance Test Frequency** | **Remarks** |
| **SHOULDER BACKING (Section 19-9)** | | | | | |
| Crushed Particles | California Test 205 | 50 lb | Materials site or stockpile | 1 per project prior to use |  |
| Durability | California Test 229 | 50 lb | Materials site or stockpile | 1 per project prior to use |  |
| Unit Weight | California Test 212  Rodding Method | 50 lb | Materials site or stockpile | 1 per project prior to use |  |
| Sieve Analysis | California Test 202 | 50 lb | Materials site or stockpile | 1 every 3,000  tons or 2,000 cu yd | If uniform material is within specification limits, test frequency may be decreased to 1 per day |
| Sand Equivalent | California Test 217 | 50 lb | Materials site or stockpile | 1 every 3,000  tons or 2,000 cu yd | If uniform material is within specification limits, test frequency may be decreased to 1 per day |

Note:

1. Refer to California Test 125 for sampling procedures.

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| --- | --- | --- | --- | --- | --- |
| **Test** | **Test Method** | **Sample Size & Container Size** | **Sampling Location** (Note 1) | **Acceptance Test Frequency** | **Remarks** |
| **LIME (Section 24-2.02)** | | | | | |
| Various properties | See *Standard Specifications* Section 24-2.02 | One 10-lb sample for each type and source of lime; use a 2-qt airtight container | Initial sample provided by contractor; subsequent sampling from mid-point of delivery | Each 100 tons of lime, 2 per day maximum | Must be on an Authorized Material List and certificate of compliance must accompany each shipment; recommend 1 acceptance test per 5 samples of lime |
| **LIME TREATMENT** | | | | | |
| **DETERMINATION OF LIME APPLICATION RATE (Section 24-2.01D)** | | | | | |
| Unconfined Compressive Strength | California Test 373 | 100 lb | Native soils; test each type of material to be treated | Prior to soil stabilization work and if source of lime changes | To determine appropriate lime content |
| Optimum Moisture Content | California Test 373 | 100 lb | Native soils; test each type of material to be treated | Prior to soil stabilization work |  |
| **VERIFICATION OF LIME APPLICATION RATE AND STABILIZED SOIL MIXTURE (Section 24-2.01D)** | | | | | |
| Lime Application (Dry Form) | Calibrated tray method or equal | Building paper or pan of known area | Surface receiving lime | Each 40,000 sq ft,  2 per day minimum | To determine if application rate is within ± 5% of ordered application rate |
| Lime Application (Slurry Form) | Volumetric measurement that is then reduced to lime weight | Deter- mined over known area | Slurry holding tank | Each 40,000 sq ft,  2 per day minimum | To determine if application rate is within ± 5% of ordered application rate |
| Uniformity of Mixed Stabilized Soil | Phenolphthalein alcohol indicator solution spray | N/A | Representative areas | Each day at five separate locations | Taken after completion of initial mixing |

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| **Test** | **Test Method** | **Sample Size & Container Size** | **Sampling Location** (Note 1) | **Acceptance Test Frequency** | **Remarks** |
| **VERIFICATION OF LIME APPLICATION RATE AND STABILIZED SOIL MIXTURE (Section 24-2.01D)** | | | | | |
| Moisture Content of Mixed Stabilized Soil | California Test 226 | 0.25 lb each sample | Representa- tive areas at mid depth | Each day at five separate locations to verify contractor’s quality control tests | Taken during mellowing period |
| Gradation of Mixed Stabilized Soil | California Test 202 | 25 lb | Representa- tive areas | 1 every 4,000 sq yd, 1 per day minimums | Taken prior to compaction |
| **MIXED STABILIZED SOIL (Sections 24-2.01 and 24-2.03)** | | | | | |
| Relative Compaction | California Test 231 | Sample for California Test 216 | Project site in accordance with California Test 231 | 1 every 2,000 sq yd and test compaction at every 6 in. of thickness |  |
| Maximum Wet Density | California Test 216 | 35 lb | Relative compaction test site locations | 1 every relative compaction test | Wet common- composite test maximum value may be used in accordance with California Test 231 |
| Dimensions | Measurement | N/A | Random locations in place after compaction | As necessary for verification of stabilized soil thickness and surface grades |  |
| **CURING SEAL-ASPHALTIC EMULSION (Section 24-1.02C)** | | | | | |
| Various properties based on asphaltic emulsion type used | Based on asphaltic emulsion type used; see *Standard Specifications* Section 94 | 1/2-gal plastic jug with screw- on lid | Sampling line leading to the spray bar | 1 each shipment | Each shipment must be accompanied by a certificate of compliance; recommend 1 random test from samples taken |

Note:

1. Refer to California Test 125 for sampling procedures.

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| **Test** | **Test Method** | **Sample Size & Container Size** | **Sampling Location**  (Note 1) | **Acceptance Test Frequency** | **Remarks** |
| **AGGREGATE SUBBASE** | | | | | |
| Gradation (Sieve Analysis) | California Test 202 | 50 lb | Windrow or roadway | Every 3,000  tons or 2,000 cu yd (See Note 2) | If uniform material is within specification limits, frequency may be decreased to 1 test per day |
| Sand Equivalent | California Test 217 | 50 lb | Windrow or roadway | Every 3,000  tons or 2,000 cu yd (See Note 2) | If uniform material within specification limits, frequency may be decreased to 1 test per day |
| R-Value | California Test 301 | 50 lb | Windrow or roadway | Every 3,000  tons or 2,000 cu yd | R-value testing may be reduced to 1 acceptance test per project when test records demonstrate that comparable material from the same source meets minimum R-value requirements |
| Relative Compaction | California Test 231 | Sample for California Test 216 | Roadway in accordance with California Test 231 | Every 2,000 sq yd |  |
| Maximum Wet Density | California Test 216 | 35 lb | Relative compaction test site locations | Every 2,000 sq yd | Wet common- composite test maximum value may be used in accordance with California Test 231 |
| Dimensions | N/A | N/A | Random locations | As necessary for acceptance | Verify thickness of aggregate subbase |

Notes:

* 1. Refer to California Test 125 for sampling procedures.
  2. If material is outside the specification limits, sample and test representative material every 500 cu yd so that deductions may be taken for noncompliant material.

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| **T****est** | **Test Method** | **Sample Size & Container Size** | **Sampling Location** (Note 1) | **Acceptance Test Frequency** | **Remarks** |
| **AGGREGATE BASES** | | | | | |
| Gradation (Sieve Analysis) | California Test 202 | 50 lb | Windrow or roadway | Every 3,000 tons or 2,000 cu yd (See Note 2) | If uniform material is within specification limits, frequency may be decreased to 1 test per day |
| Sand Equivalent | California Test 217 | 50 lb | Windrow or roadway | Every 3,000 tons or 2,000 cu yd (See Note 2) | If uniform material is within specification limits, frequency may be decreased to 1 test per day |
| R-Value | California Test 301 | 50 lb | Windrow or roadway | Every 3,000 tons or 2,000 cu yd | R-value testing may reduced to 1 acceptance test per project when test records demonstrate that comparable material from the same source meets minimum R-value requirements |
| Durability Index | California Test 229 | 50 lb | Windrow or roadway | 1 per project | Durability test not required for Class 3 aggregate base |
| Moisture | California Test 226 | 25 lb | Materials site or stockpile | 2 daily when aggregate base is paid for by weight |  |
| Relative Compaction | California Test 231 | Sample for California Test 216 | Roadway in accordance with California Test 231 | Every 2,000 sq yd |  |
| Maximum Wet Density | California Test 216 | 35 lb | Relative compaction test site locations | Every 2,000 sq yd | Wet common-composite test maximum value may be used in accordance with California Test 231 |
| Dimensions | N/A | N/A | Random locations | As necessary for acceptance | Verify thickness of aggregate base |

Notes:

1. Refer to California Test 125 for sampling procedures.
2. If material is outside the specification limits, sample and test representative material every 500 cu yd so that deductions may be taken for noncompliant material.

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| **Test** | **Test Method** | **Sample Size & Container Size** | **Sampling Location** (Note 1) | **Acceptance Test Frequency** | **Remarks** |
| **CEMENT TREATED BASE Class A or Class B** | | | | | |
| **AGGREGATE** | | | | | |
| Gradation (Sieve Analysis) | California Test 202, California Test 105 | 40 lb | Plant, truck, windrow, or roadway | 1 every 3,000  tons or 2,000 cu yd, minimum 1 per day of production |  |
| Sand Equivalent | California Test 217 | 40 lb | Plant, truck, windrow, or roadway | 1 every 3,000  tons or 2,000 cu yd, minimum 1 per day of production |  |
| **AGGREGATE Class B** | | | | | |
| R-Value (with and without cement) | California Test 301 | 100 lb for aggregate qualificati on | Windrow or roadway | Before production |  |
| **CEMENT Type II Portland Cement** | | | | | |
| Various properties must comply with *Standard Specifications* Section 90- 1.02B(2) | See *Standard Specifications* Section 90- 1.02B(2) | 8 lb | Cement treated base plant or cement spreader | 1 each 100 tons of cement, 2 per day maximum | Recommend 1 acceptance test per project for cement from approved suppliers and certificate of compliance with each shipment |
| **WATER** | | | | | |
| Chlorides | California Test 422 | Clean 2-qt plastic jug with lined, sealed lid | 1 per source; at point of use |  | Water supplies for domestic use do not need to be tested |

Table 6-1.8. Materials Acceptance Sampling and Testing Requirements: Cement Treated Bases (*Standard Specifications* Section 27) (2 of 3)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Test** | **Test Method** | **Sample Size & Container Size** | **Sampling Location** (Note 1) | **Acceptance Test Frequency** | **Remarks** |
| **WATER (Cont.)** | | | | | |
| Sulfates | California Test 417 | Clean 2-qt plastic jug with lined, sealed lid | 1 per source; at point of use |  | Water supplies for domestic use do not need to be tested |
| **COMPLETED MIX Class A** | | | | | |
| Compressive Strength | California Test 312 | See California Test 312, Part II | Windrow or roadway before compaction | 1 per day | If first 3 days of production test records demonstrate materials are in compliance, recommend test every 5 days of production |
| **COMPLETED MIX Class B** | | | | | |
| R-Value | California Test 301 | 50 lb | Windrow or roadway before compaction | 1 every 3,000  tons or 2,000 cu yd | Recommend R- value testing be reduced to 1 every 10,000 cu yd when test records demonstrate that material from the same source, and having comparable grading and sand equivalent values, meets the minimum R-value requirements |

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| --- | --- | --- | --- | --- | --- |
| **Test** | **Test Method** | **Sample Size & Container Size** | **Sampling Location**  (Note 1) | **Acceptance Test Frequency** | **Remarks** |
| **COMPLETED MIX Class A and Class B** | | | | | |
| Cement Content | California Test 338 | See California Test 338, Part I | Windrow or roadway prior to compaction | 1 every  1,500 tons  or 1,000 cu yd, minimum 1 per day of production |  |
| Optimum Moisture | California Test 312 | See California Test 312 | Windrow or roadway | Prior to production |  |
| Moisture Content | California Test 226 | 10 lb in sealed container | Roadway prior to compaction | 2 daily |  |
| Relative Compaction | California Test 312 or  231 | Sample for California Test 216 | Roadway in accordance with California Test 231 | 1 every  2,000 sq yd |  |
| Maximum Wet Density | California Test 216,  California Test 312 | 35 lb | Relative compaction test site locations | 1 every  2,000 sq yd | Wet common- composite test maximum value may be used in accordance with California Test 231 |
| Dimensions | N/A | N/A | Random locations | As necessary for acceptance | Verify thickness of cement treated base |

Note:

1. Refer to California Test 125 for sampling procedures.

Table 6-1.9. Materials Acceptance Sampling and Testing Requirements: Concrete Bases (*Standard Specifications* Section 28)

Lean Concrete Base

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Test** | **Test Method** | **Sample Size & Container Size** | **Sampling Location**  (Note 1) | **Acceptance Test Frequency** | **Remarks** |
| **LEAN CONCRETE BASES** | | | | | |
| Compressive strength (7- days) | ASTM C39 | 2 cylinders - 6x12 inches | Concrete truck discharge chute | 1,000 cu yd or 1 day's production if less than 1,000 cu yd |  |
| **RAPID STRENGTH CONCRETE BASE** | | | | | |
| Modulus of rupture (7- days) | California Test 524 | 3 beams - 6x6x20 inches | Concrete truck discharge chute | 1 per 500 cu yd or 1 day’s production if less than 500 cu yd. |  |
| **LEAN CONCRETE BASE RAPID SETTING** | | | | | |
| Compressive strength (7- days) | California Test 521 | 2 cylinders - 6x12 inches | Concrete truck discharge chute | 1 per 500 cu yd or 1 day’s production if less than 500 cu yd. |  |
| **CONCRETE BASE** | | | | | |
| Modulus of rupture (7- days) | California Test 523 | 2 beams of 6x6x32 in. for centerpoint loading or 6x6x20 in. for third-point loading | Concrete truck discharge chute | 1,000 cu yd or 1 day's production if less than 1,000 cu yd |  |
| Dimensions | N/A | N/A | Random locations | As necessary for acceptance | Verify thickness of base |

Note:

1. Refer to California Test 125 for sampling procedures.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Test** | **Test Method** | **Sample Size & Container Size** | **Sampling Location** (Note 1) | **Acceptance Test Frequency** | **Remarks** |
| **AGGREGATE** | | | | | |
| Percentage Crushed Particles | California Test 205 | Combined two 40-lb canvas bags (See Note 2) or  Batch 160 lb (proportioned per bin  percentages) | Plant | Prior to production and minimum 1 random for  every 50,000 tons or less of paving |  |
| Los Angeles Rattler  (at 500 revolutions) | California Test 211 | Combined two 40-lb canvas bags (See Note 2) or  Batch 160 lb (proportioned per bin percentages) | Plant | Prior to production and minimum 1 random for  every 50,000 tons or less of paving |  |
| Film Stripping | California Test 302 | Combined two 40-lb canvas bags (See Note 2) or  Batch 160 lb (proportioned per bin percentages) | Plant | Prior to production and minimum 1 random for  every 50,000 tons or less of paving |  |
| Gradation (Sieve Analysis) | California Test 202 | Combined two 20-lb canvas bags (See Note 3) or  Batch 40 lb (proportioned per bin percentages) | Plant | 1 for every 4 hours of production |  |

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| --- | --- | --- | --- | --- | --- |
| **Test** | **Test Method** | **Sample Size & Container Size** | **Sampling Location** (Note 1) | **Acceptance Test Frequency** | **Remarks** |
| **AGGREGATE (Cont.)** | | | | | |
| Cleanness Value | California Test 227 | Combined two 20-lb canvas bags (See Note 3) or  Batch 40 lb (proportioned per bin percentages) | Plant | 1 for every 4 hours of production | Recommend 1 acceptance test per day if 3 consecutive results exceed 62 |
| **ASPHALT** | | | | | |
| Various properties based on asphalt type used; see *Standard Specification* Section 92 | Based on asphalt type used; see *Standard Specifications* Section 92 | 1-qt can | Asphalt feed line connecting plant storage tanks | 1 per day | Certificate of compliance required for each shipment; if asphalt binder source is not on approved list, sample and test asphalt before use |
| **COMPLETED MIX** | | | | | |
| Asphalt Content | California Test 382 | 40 lb in metal containers | Plant, truck, windrow, or roadbed | 1 for every 4 hours of production |  |
| **AGGREGATE** | | | | | |
| Los Angeles Rattler  (loss at 500 revolutions) | California Test 211 | 50 lb | Plant | Prior to production and minimum 1 random for  every 25,000 cu yd |  |
| Soundness | California Test 214 | 50 lb | Plant |  |  |
| Sieve Analysis (Gradation) | California Test 202 | 40 lb | Plant | 1 for every 4 hours of production; (See Note 4) |  |

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| --- | --- | --- | --- | --- | --- |
| **Test** | **Test Method** | **Sample Size & Container Size** | **Sampling Location**  (See Note 1) | **Acceptance Test Frequency** | **Remarks** |
| **AGGREGATE (Cont.)** | | | | | |
| Cleanness Value | California Test 227 |  |  |  |  |
| **CEMENT** | | | | | |
| Cement, various properties; must comply with *Standard Specifications* Section 90- 1.02B(2) | Must comply with *Standard Specifications* Section 90- 1.02B(2) | 8 lb | Concrete plant | 1 for each  100 tons, 2 per day max | Recommend 1 acceptance test per project for cement from approved suppliers with certificate of compliance |
| **WATER** | | | | | |
| Chlorides | California Test 422 | Clean 2-qt plastic jug with lined, sealed lid At point of use; see Remarks | 1 per source; |  | Water supplies for domestic use do not need to be tested |
| Sulfates | California Test 417 | Clean 2-qt plastic jug with lined, sealed lid At point of use; see Remarks | 1 per source; |  | Water supplies for domestic use do not need to be tested |
| Setting Time | ASTM C 191  or  ASTM C 266 | Contact METS for required quantity of water sample | At point of use | 1 per source | Water supplies for domestic use do not need to be tested |
| Mortar Compressive Strength | ASTM C109 | Contact METS for required quantity of water sample | At point of use | 1 per source | Water supplies for domestic use do not need to be tested |
| Coloring Agents | Must comply with *Standard Specifications* Section 90- 1.02D | Contact METS for required quantity of water sample | At point of use | 1 per source | Water supplies for domestic use do not need to be tested |

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| --- | --- | --- | --- | --- | --- |
| **Test** | **Test Method** | **Sample Size & Container Size** | **Sampling Location**  (Note 1) | **Acceptance Test Frequency** | **Remarks** |
| **WATER** | | | | | |
| Alkalis | Must comply with *Standard Specifications* Section 90- 1.02D | Contact METS for required quantity of water sample | At point of use | 1 per source | Water supplies for domestic use do not need to be tested |
| Specific Gravity | Must comply with *Standard Specifications* Section 90- 1.02D | Contact METS for required quantity of water sample | At point of use | 1 per source | Water supplies for domestic use do not need to be tested |

Notes:

1. Refer to California Test 125 for sampling procedures.
2. Store one 40-lb canvas bag for dispute resolution.
3. Store one 20-lb. canvas bag for dispute resolution.
4. If test records determine that aggregate gradation or cleanness value is close to specification limit or outside the specification limits, sample and test concrete every 300 cu yd so that deductions may be taken for noncompliant material.

Table 6-1.11. Materials Acceptance Sampling and Testing Requirements: Reclaimed Pavement (*Standard Specifications* Section 30)

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| --- | --- | --- | --- | --- | --- |
| **Test** | **Test Method** | **Sample Size & Container Size** | **Sampling Location** (Note 1) | **Acceptance Test Frequency** | **Remarks** |
| **PULVERIZED ROADBED (Section 30-2)** | | | | | |
| Thickness | Thickness- Field Measurement | Field Measurement | Random location | 3 per lot |  |
| Relative Compaction (% min) | California Test 231 | Sample for California Test 216 | In accordance with California Test 231 | 1 every  2,000 sq yd and test compaction at every 6 in. of thickness |  |
| **FULL DEPTH RECLAMATION–FOAMED ASPHALT (Section 30-3)** | | | | | |
| Relative Compaction (% min) | California Test 231 | Sample for California Test 216 | In accordance with California Test 231 | 1 every  2,000 sq yd and test compaction at every 6 in. of thickness |  |
| Thickness | Thickness | California Test 531.  4- or 6-in.- diameter core, full thickness | 3 random location per lot | See Section 4-4004 of  this manual |  |
| **FULL DEPTH RECLAMATION—Cement (Section 30-4)** | | | | | |
| Thickness | Thickness- Core thickness measurement | California Test 531,  4- or 6-in.- diameter core, full thickness | 3 random locations per lot | See Section 4-4004 of  this manual |  |
| Cement application rate | Calibrated tray or equal | Building paper or pan of known area | Surface receiving cement | Each 40,000 sq ft, 2 per day minimum | To determine if application rate is within ± 5% of mix  design rate |
| Relative Compaction (% min) | California Test 231 | Sample for California Test 216 | In accordance with California Test 231 | 1 every  2,000 sq yd and test compaction at every 6 in.  of thickness |  |

Notes:

1. Refer to California Test 125 for sampling procedures.

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| --- | --- | --- | --- | --- | --- |
| **Test** | **Test Method** | **Sample Size & Container Size** | **Sampling Location** (Note 1) | **Acceptance Test Frequency** | **Remarks** |
| **ASPHALTIC EMULSION AND ASPHALTIC EMULSION FOR FLUSH COAT** | | | | | |
| Various properties in accordance with Section 37 of *Standard Specifications* | See Section 37-  2.02A(4)(b)(ii)  of *Standard Specifications* | 1/2-gal plastic jug with screw- on lid | Transport tanker | Each shipment | Certificate of compliance required with each shipment |
| Asphaltic emulsion spread rate | CT 339 | Per test method | Full width of boot truck | Once per project |  |
| **POLYMER MODIFIED ASPHALTIC EMULSION** | | | | | |
| Viscosity | AASHTO T 59 | 1-qt wide- mouth plastic jar with screw- on lid | Transport tanker | Each shipment | Certificate of compliance required with each shipment |
| Sieve Test | AASHTO T 59 | 1-qt wide- mouth plastic jar with screw- on lid | Transport tanker | Each shipment | Certificate of compliance required with each shipment |
| Demulsibility | AASHTO T 59 | 1-qt wide- mouth plastic jar with screw- on lid | Transport tanker | Each shipment | Certificate of compliance required with each shipment |
| Torsional Recovery | California Test 332 | 1-qt wide- mouth plastic jar with screw- on lid | Transport tanker | Each shipment | Certificate of compliance required with each shipment |
| Penetration | AASHTO T 49 | 1-qt wide- mouth plastic jar with screw- on lid | Transport tanker | Each shipment | Certificate of compliance required with each shipment |
| Ring and Ball | AASHTO T 53 | 1-qt wide- mouth plastic jar with screw- on lid | Transport tanker | Each shipment | Certificate of compliance required with each shipment |

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| --- | --- | --- | --- | --- | --- |
| **Test** | **Test Method** | **Sample Size & Container Size** | **Sampling Location** (Note 1) | **Acceptance Test Frequency** | **Remarks** |
| **ASPHALT MODIFIER FOR ASPHALT RUBBER BINDER** | | | | | |
| Viscosity | ASTM D445 | 1-qt round wide-mouth can with friction top lid or 1-qt rectangular can with screw-on lid | Sample port on tanker truck | 1 random per project |  |
| Flash Point | ASTM D92 | 1-qt round wide-mouth can with friction top lid or 1-qt rectangular can with screw-on lid | Sample port on tanker truck | 1 random per project |  |
| Molecular Analysis | ASTM D2007 | 1-qt round wide-mouth can with friction top lid or 1-qt rectangular can with screw-on lid | Sample port on tanker truck | 1 random per project |  |
| **CRUMB RUBBER MODIFIER FOR ASPHALT RUBBER BINDER** | | | | | |
| Wire in CRM (max %) | CT 385 | CRM scrap tire:  Two 2.5 lb in gallon zip-lock bags  CRM high natural:  Two 2.5 lb in gallon zip-lock bags | CRM bulk bag | Minimum 1 random per project |  |

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| --- | --- | --- | --- | --- | --- |
| **Test** | **Test Method** | **Sample Size & Container Size** | **Sampling Location** (Note 1) | **Acceptance Test Frequency** | **Remarks** |
| **CRUMB RUBBER MODIFIER FOR ASPHALT RUBBER BINDER** | | | | | |
| Fabric in CRM (max %) | CT 385 | CRM scrap tire:  Two 2.5 lb in gallon zip-lock bags  CRM high natural:  Two 2.5 lb in gallon zip-lock bags | CRM bulk bag | Minimum 1 random per project |  |
| CRM particle length | --- | CRM scrap tire:  Two 2.5 lb in gallon zip-lock bags  CRM high natural:  Two 2.5 lb in gallon zip-lock bags | CRM bulk bag | Minimum 1 random per project |  |
| CRM specific gravity | CT 208 |  |  |  |  |
| Natural rubber content in high nature CRM (%) | ASTM D297 |  |  |  |  |
| **ASPHALT RUBBER BINDER OR MODIFIED ASPHALT BINDER** | | | | | |
| Cone Penetration |  | 1-qt round wide-mouth can with friction top lid | Asphalt feed line connecting to the HMA plant | Production start-up evaluation and 1 random per 5 samples | Certificate of compliance required with each shipment |

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| --- | --- | --- | --- | --- | --- |
| **Test** | **Test Method** | **Sample Size & Container Size** | **Sampling Location** (Note 1) | **Acceptance Test Frequency** | **Remarks** |
| **ASPHALT RUBBER BINDER OR MODIFIED ASPHALT BINDER (CONT.)** | | | | | |
| Resilience |  | 1-qt round wide-mouth can with friction top lid | Asphalt feed line connecting to the HMA plant | Production start-up evaluation and 1 random per 5 samples | Certificate of compliance required with each shipment |
| Softening point |  | 1-qt round wide-mouth can with friction top lid | Asphalt feed line connecting to the HMA plant | Production start-up evaluation and 1 random per 5 samples | Certificate of compliance required with each shipment |
| Asphalt Rubber Binder Viscosity | ASTM D7741 | Five 1-qt round wide- mouth cans with friction top lids | Asphalt storage tank | The greater of 1 every 5 lots or once a day | For safety, engineer may witness contractor perform test |
| Base Asphalt Binder Properties | See *Standard Specification* Section 92 | Five 1-qt round wide- mouth cans with friction top lids | Asphalt storage tank | The greater of 1 every 5 lots or once a day | Certificate of compliance required for each shipment; if asphalt binder source is not on approved list, test before use |
| **SCREENINGS/AGGREGATE FOR CHIP SEALS** | | | | | |
| LA Rattler | California Test 211 | 50 lb in canvas bags or 5-gal buckets | Stockpile | Once per project |  |
| % Crushed Particles | AASHTO T 335 | 50 lb in canvas bags or 5-gal buckets | Stockpile | Once per project |  |

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| --- | --- | --- | --- | --- | --- |
| **Test** | **Test Method** | **Sample Size & Container Size** | **Sampling Location** (Note 1) | **Acceptance Test Frequency** | **Remarks** |
| **SCREENINGS/AGGREGATE FOR CHIP SEALS** | | | | | |
| Film Stripping | California Test 302 | 50 lb in canvas bags or 5- gal buckets | Stockpile | Once per project |  |
| Sieve Analysis | California Test 202 | 30 lb | Stockpile | Twice daily |  |
| Cleanness Value | California Test 227 | 30 lb | Stockpile | Once daily |  |
| **SAND FOR FLUSH COAT** | | | | | |
| Sieve Analysis | California Test 202 | 25 lb | Stockpile | Once per project |  |
| **CRACK TREATMENTS** | | | | | |
| Crack Treatment Material | | | | | |
| Softening point | ASTM D36 | 2 each 3-lb minimum samples in silicone release boxes | From crack treatment material dispensing wand | Once per project | Indicate the specified type of crack treatment material on the TL-0101 |
| Cone penetration | ASTM D5329 | 2 each 3-lb minimum samples in silicone release boxes | From crack treatment material dispensing wand | Once per project | Indicate the specified type of crack treatment material on the TL-0101 |
| Resilience | ASTM D5329 | 2 each 3-lb minimum samples in silicone release boxes | From crack treatment material dispensing wand | Once per project | Indicate the specified type of crack treatment material on the TL-0101 |

Table 6-1.12. Materials Acceptance Sampling and Testing Requirements: Seal Coats (*Standard Specifications* Section 37) (6 of 8)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Test** | **Test Method** | **Sample Size & Container Size** | **Sampling Location** (Note 1) | **Acceptance Test Frequency** | **Remarks** |
| **CRACK TREATMENTS (Cont.)** | | | | | |
| Crack Treatment Material | | | | | |
| Tensile adhesion | ASTM D5329 | 2 each 3-lb minimum samples in silicone release boxes | From crack treatment material dispensing wand | Once per project | Indicate the specified type of material on the TL-0101 |
| Asphalt compatibility | ASTM D5329 | 2 each 3-lb minimum samples in silicone release boxes | From crack treatment material dispensing wand | Once per project | Indicate the specified type of material on the TL-0101 |
| Flexibility | ASTM D3111 | 2 each 3-lb minimum samples in silicone release boxes | From crack treatment material dispensing wand | Once per project | Indicate the specified type of material on the TL-0101 |
| Specific gravity | ASTM D70 | 2 each 3-lb minimum samples in silicone release boxes | From crack treatment material dispensing wand | Once per project | Indicate the specified type of material on the TL-0101 |
| Sieve test | See note in Section 37-  6.01D(3)  “Depart- ment Accep- tance” of the *Standard Specifi- cations* | 2 each 3-lb minimum samples in silicone release boxes | From crack treatment material dispensing wand | Once per project | Indicate the specified type of material on the TL-0101 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Test** | **Test Method** | **Sample Size & Container Size** | **Sampling Location**  (Note 1) | **Acceptance Test Frequency** | **Remarks** |
| **SAND FOR CRACK TREATMENT** | | | | | |
| Sieve Analysis | California Test 202 | 25 lb | Stockpile | Once per project |  |
| **SLURRY SEAL AGGREGATE** | | | | | |
| Los Angeles Rattler  (loss at 500 revolutions) | California Test 211 | 50 lb | Stockpile | Once per project |  |
| Percentage of Crushed Particles | California Test 205 | 50 lb | Stockpile | Once per project |  |
| Film Stripping | California Test 302 | 50 lb | Stockpile | Once per project |  |
| Durability Index | California Test 229 | 50 lb | Stockpile | Once per project |  |
| Sieve Analysis | California Test 202, California Test 105 | 30 lb | Stockpile | Once daily |  |
| Sand Equivalent | California Test 217 | 30 lb | Stockpile | Once daily |  |
| **MICRO-SURFACING AGGREGATES** | | | | | |
| Los Angeles Rattler  (loss at 500 revolutions) | California Test 211 | 50 lb | Stockpile | Once per project |  |
| Percentage of Crushed Particles | California Test 205 | 50 lb | Stockpile | Once per project |  |
| Durability Index | California Test 302 | 50 lb | Stockpile | Once per project |  |

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| --- | --- | --- | --- | --- | --- |
| **Test** | **Test Method** | **Sample Size & Container Size** | **Sampling Location**  (Note 1) | **Acceptance Test Frequency** | **Remarks** |
| **MICRO-SURFACING AGGREGATES (Cont.)** | | | | | |
| Sieve Analysis | California Test 202 | 30 lb | Stockpile | Once daily |  |
| Sand Equivalent | California Test 217 | 30 lb | Stockpile | Once daily |  |

Note:

1. Refer to California Test 125 for sampling procedures.

Table 6-1.13. Materials Acceptance Sampling and Testing Requirements: Asphalt Concrete (*Standard Specifications* Section 39) (1 of 13)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Test** | **Test Method** | **Sample Size & Container Type** | **Sampling Location**  (Note 1) | **Sampling Frequency** | **Acceptance Test Frequency** | **Remarks** |
| **AGGREGATE: All Types of HMA** | | | | | | |
| Gradation (Sieve Analysis)  (see See Note 2) | AASHTO T 27,  California Test 105, California Test 384 | Combined six 20-lb canvas bags  (see See Note 3)  or  Batch 30 lb (proportioned per bin percentages) | HMA plant | 1 for each  750 tons,  1 per day minimum | Production start-up evaluation. Minimum 1 per day of paving |  |
| Sand Equivalent | AASHTO T 176 | Combined six 20-lb canvas bags  (See Note 3)  or  Batch 30 lb (proportioned per bin percentages) | HMA plant or before lime treatment | 1 for each  750 tons,  1 per day minimum | Production start-up evaluation. Minimum 1 per day of paving | Not required for OGFC (open graded friction course) |
| Percent Crushed Particles (Coarse) | AASHTO T 335 | Combined six 20-lb canvas bags  (See Note 3)  or  Batch 30 lb (proportioned per bin percentages) | HMA plant or before lime treatment | 1 for each  750 tons,  1 per day minimum | Production start-up evaluation, and minimum 1 random for  every 25,000 tons or less of paving |  |
| Percent Crushed Particles (Fine) | AASHTO T 335 | Combined six 20-lb canvas bags  (See Note 3)  or  Batch 30 lb (proportioned per bin percentages) | HMA plant or before lime treatment | 1 for each  750 tons,  1 per day minimum | Production start-up evaluation, and minimum 1 random for  every 25,000 tons or less of paving |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **T****est** | **Test Method** | **Sample Size & Container Type** | **Sampling Location**  (Note 1) | **Sampling Frequency** | **Acceptance Test Frequency** | **Remarks** |
| **AGGREGATE: All Types of HMA (Cont.)** | | | | | | |
| LA Rattler (500  Revolutions) | AASHTO T 96 | Combined six 20-lb canvas bags  (See Note 3)  or  Batch 30 lb (proportioned per bin percentages) | HMA plant or before lime treatment | 1 for each  750 tons,  1 per day minimum | Production start-up evaluation, and minimum 1 random for  every 50,000 tons or less of paving |  |
| LA Rattler (100  Revolutions) | AASHTO T 96 | Combined six 20-lb canvas bags  (See Note 3) or  Batch 30 lb (proportioned per bin percentages) | HMA plant or before lime treatment | 1 for each  750 tons,  1 per day minimum | Production start-up evaluation, and minimum 1 random for  every 50,000 tons or less of paving |  |
| Fine Aggregate Angularity | AASHTO T 304,  Method A | Combined six 20-lb canvas bags  (See Note 3) or  Batch 30 lb (proportioned per bin percentages) | HMA plant or before lime treatment | 1 for each  750 tons,  1 per day minimum | Production start-up evaluation, and minimum 1 random for  every 50,000 tons or less of paving | Not required for OGFC or Minor HMA |
| Flat and Elongated Particles | ASTM D4791 | Combined six 20-lb canvas bags  (See Note 3) or  Batch 30 lb (proportioned per bin percentages) | HMA plant or before lime treatment | 1 for each  750 tons,  1 per day minimum | Production start-up evaluation, and minimum 1 random for  every 50,000 tons or less of paving | Not required for Minor HMA |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **T****est** | | **Test Method** | **Sample Size & Container Type** | | **Sampling Location**  (Note 1) | | **Sampling Frequency** | **Acceptance Test Frequency** | **Remarks** |
| **ASPHALT BINDER** | | | | | | | | | |
| Various properties based on asphalt type used (see *Standard Specifications* Section 92) | | See *Standard Specifi- cations* Section 92 | 1-qt round wide- mouth can with friction top lid | | | Asphalt feed line connec- ting the plant storage tanks | 1 per day of HMA production | 1 random for  every 5 samples | Certificate of compliance required for each shipment; if asphalt binder source is not on approved list, sample and test asphalt before use |
| **ASPHALT RUBBER BINDER** | | | | | | | | | |
| Asphalt Rubber Binder  Properties | See *Standard Specifications* Section 39- 2.03A(4)(e)(ii) | | | 1-qt round wide- mouth can with friction top lid | Asphalt rubber feed line from the HMA plant | | 1 every lot | Production start-up evaluation and 1 random  per 5 samples | Certificate of compliance required for each lot |
| Asphalt Rubber Binder  Viscosity | ASTM D7741 | | | 1-qt round wide- mouth can with friction top lid | Asphalt rubber feed line connec- ting to the HMA plant | | 1 every lot | 1 every lot | For safety, engineer may witness contractor perform test |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **T****est** | **Test Method** | **Sample Size & Container Type** | **Sampling Location**  (Note 1) | **Sampling Frequency** | **Acceptance Test Frequency** | **Remarks** |
| **ASPHALT RUBBER BINDER (Cont.)** | | | | | | |
| Base Asphalt Binder Properties | See *Standard Specifications* Section 92 | 1-qt round wide- mouth can with friction top lid | Asphalt storage tank | Each shipment | Production start-up evaluation and 1 random  per 5 samples | Certificate of compliance required for each shipment; if asphalt binder source is not on approved list, sample and test asphalt before use |
| Asphalt Modifier Properties | ASTM D445 ASTM D92 ASTM D2007 | 1-qt round wide- mouth can with friction top lid. or 1-qt rectangular can with screw-on lid | Sample port on tanker truck | Each shipment | 1 random per project |  |
| Crumb Rubber Modifier (CRM)  Properties | California Test 208, California  Test 385, ASTM D297 | CRM scrap tire: Two 2.5 lb in gallon zip-lock bags;  CRM high natural: Two 2.5 lb in gallon zip-lock bags | CRM bulk bag | Each shipment | 1 random per project |  |

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| --- | --- | --- | --- | --- | --- | --- |
| **Test** | **Test Method** | **Sample Size & Container Type** | **Sampling Location**  (Note 1) | **Sampling Frequency** | **Acceptance Test Frequency** | **Remarks** |
| **HOT MIX ASPHALT: Type A** | | | | | | |
| Moisture Content | AASHTO T 329 | 10 lb, sealed metal container | Loose mix from behind the paver  (See Note 4) | Production start-up evaluation, and minimum 1 per project | Production start- up evaluation, and minimum 1 per project during paving | Test within 1 hour of sampling |
| Asphalt Binder Content | AASHTO T 308,  Method A | 60 lb (See Note 5)  (8x8x3=8  boxes, 8x8x4=6  boxes, 8½x8½x4  ½=4 boxes) (See Note 5) | Loose mix from behind the paver (See Note 4) | 1 for each  750 tons,  1 per day minimum | Production start- up evaluation; minimum 1 per day of paving |  |
| Maximum Theoretical  Density | AASHTO T 209 | 60 lb (See Note 5)  (8x8x3=8  boxes, 8x8x4=6  boxes, 8½x8½x4  ½=4 boxes) (See Note 5) | Loose mix from behind the paver (See Note 4) | 1 for each  750 tons,  1 per day minimum | Production start- up evaluation. 1 random test per day of paving |  |

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| **Test** | **Test Method** | **Sample Size & Container Type** | **Sampling Location**  (See Note 1) | **Sampling Frequency** | **Acceptance Test Frequency** | **Remarks** |
| **HOT MIX ASPHALT: Type A (Cont.)** | | | | | | |
| Air Void Content | AASHTO T 269 | 100 lb (See Note 5) (8x8x3=12  boxes, 8x8x4=10  boxes, 8½x8½x4  ½=8 boxes) | Loose mix from behind the paver (See Note 4) | Production start-up evaluation, 1  every 25,000 tons of paving | Production start- up evaluation, and minimum 1 random for every 25,000 tons of paving |  |
| Voids in Mineral Aggregate | SP-2  Asphalt Mixture Volumetrics | 100 lb (See Note 5) (8x8x3=12  boxes, 8x8x4=10  boxes, 8½x8½x4  ½=8 boxes) | Loose mix from behind the paver (See Note 4) | Production start-up evaluation, 1  every 25,000 tons of paving | Production start- up evaluation, and minimum 1 random for every 25,000 tons of paving |  |
| Dust Proportion | SP-2  Asphalt Mixture Volumetrics | 100 lb (See Note 5) (8x8x3=12  boxes, 8x8x4=10  boxes, 8½x8½x4  ½=8 boxes) | Loose mix from behind the paver (See Note 4) | Production start-up evaluation, 1  every 25,000 tons of paving | Production start- up evaluation, and minimum 1 random for every 25,000 tons of paving |  |

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| **Test** | **Test Method** | **Sample Size & Container Type** | **Sampling Location**  (Note 1) | **Sampling Frequency** | **Acceptance Test Frequency** | **Remarks** |
| **HOT MIX ASPHALT: Type A (Cont.)** | | | | | | |
| Hamburg Wheel Track | AASHTO T 324  (Modified) | 70 lb (See Note 5) (8x8x3=9  boxes, 8x8x4=7  boxes, 8½x8½x4  ½=6 boxes) | Loose mix at plant, truck, or windrow | Production start-up evaluation, 1  every 10,000 tons of paving | Production start- up evaluation, and minimum 1 random for every 10,000 tons or less of paving | Not required for Minor HMA |
| Moisture Susceptibility | AASHTO T 283 | 140 lb  (See Notes 5 &  6) (8x8x3=18  boxes, 8x8x4=15  boxes, 8½x8½x4  ½=12  boxes) | Loose mix at plant, truck, or windrow | Production start-up evaluation, 1  every 50,000 tons of paving | Production start- up evaluation, and minimum 1 random test for every 50,000 tons of paving | Test for dry strength and wet strength; not required for Minor HMA |
| **HOT MIX ASPHALT: With RAP/RAS** | | | | | | |
| Binder Recovery | AASHTO T 164  ASTM D1856 | 10 lb  (8x8x3=1  box, 8x8x4=1  box, 8½x8½x4  ½=1 box) | Loose mix from behind the paver  (See Note 4) | Production start-up evaluation, 1  every 25,000 tons of paving | 1 random for  every 25,000 tons or less of paving |  |

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| **Test** | **Test Method** | **Sample Size & Container Type** | **Sampling Location**  (Note 1) | **Sampling Frequency** | **Acceptance Test Frequency** | **Remarks** |
| **RUBBERIZED HOT MIX ASPHALT: Gap Graded** | | | | | | |
| Moisture Content | AASHTO T 329 | 10 lb, sealed metal container | Loose mix from behind the paver  (See Note 4) | Production start-up evaluation, and minimum 1 per project | Production start- up evaluation, and minimum 1 per project during paving | Test within 1 hour of sampling |
| Asphalt Binder Content | AASHTO T  308, Method A | 60 lb  (See Note 5) (8x8x3=8  boxes, 8x8x4=6  boxes, 8½x8½x4  ½=4 boxes) | Loose mix from behind the paver  (See Note 4) | 1 for each  750 tons, 1 per day minimum | Production start- up evaluation; 1 random test per day of paving |  |
| Theoretical Maximum Density | AASHTO T 209 | 60 lb  (See Note 5) (8x8x3=8  boxes, 8x8x4=6  boxes, 8½x8½x4  ½=4 boxes) | Loose mix from behind the paver  (See Note 4) | 1 for each  750 tons, 1 per day minimum | Production start- up evaluation; minimum 1 per day of paving |  |

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| **Test** | **Test Method** | **Sample Size & Container Type** | **Sampling Location**  (Note 1) | **Sampling Frequency** | **Acceptance Test Frequency** | **Remarks** |
| **RUBBERIZED HOT MIX ASPHALT: Gap Graded** | | | | | | |
| Air Void Content | AASHTO T 269 | 100 lb (See Note 5) (8x8x3=1  2 boxes, 8x8x4=10  boxes, 8½x8½x4  ½=8 boxes) | Loose mix from behind the paver (See Note 4) | Production start-up evaluation, 1  every 25,000 tons of paving | Production start- up evaluation, and minimum 1 random test for every 25,000 tons of paving |  |
|  |  | 100 lb |  |  |  |  |
| Voids in Mineral Aggregate | SP-2  Asphalt Mixture Volumetrics | (See Note 5) (8x8x3=1  2 boxes, 8x8x4=10  boxes, 8½x8½x4  ½=8 boxes) | Loose mix from behind the paver (See Note 4) | Production start-up evaluation, 1  every 25,000 tons of paving | Production start- up evaluation, and minimum 1 random test for every 25,000 tons of paving |
| Dust Proportion | SP-2  Asphalt Mixture Volumetrics | 100 lb (See Note 5) (8x8x3=1  2 boxes, 8x8x4=10  boxes, 8½x8½x4  ½=8 boxes) | Loose mix from behind the paver (See Note 4) | Production start-up evaluation, 1  every 25,000 tons of paving | Production start- up evaluation, and minimum 1 random test for every 25,000 tons of paving |  |

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| **Test** | **Test Method** | **Sample Size & Container Type** | **Sampling Location**  (Note 1) | **Sampling Frequency** | **Acceptance Test Frequency** | **Remarks** |
| **RUBBERIZED HOT MIX ASPHALT: Gap Graded (Cont.)** | | | | | | |
| Hamburg Wheel Track | AASHTO T 324  (Modified) | 75 lb (See Note 5) (8x8x3=9  boxes, 8x8x4=7  boxes, 8½x8½x4  ½=6 boxes) | Loose mix at plant, truck, or windrow | Production start-up evaluation, 1  every 10,000 tons of paving | Production start- up evaluation, and minimum 1 random test for every 10,000 tons or less of paving |  |
| Moisture Susceptibility | AASHTO T 283 | 75 lb (See Notes 5 &  6) (8x8x3=1  8 boxes, 8x8x4=15  boxes, 8½x8½x4  ½=12  boxes) | Loose mix at plant, truck, or windrow | Production start-up evaluation, 1  every 50,000 tons of paving | Production start- up evaluation, and minimum 1 random test for every 50,000 tons of paving | Test for dry strength and wet strength |
| **OPEN GRADED FRICTION COURSE (OGFC)** | | | | | | |
| Asphalt Binder Content | AASHTO T  308, Method A | 20 lb (See Note 5)  4, 1-gal metal containers with friction lids | Loose mix from behind the paver (See Note 4) | 1 for each  750 tons, 1 per day minimum | Production start- up evaluation; minimum 1 per day of paving |  |

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| **Test** | **Test Method** | **Sample Size & Container Type** | **Sampling Location**  (Note 1) | **Sampling Frequency** | **Acceptance Test Frequency** | **Remarks** |
| **OPEN GRADED FRICTION COURSE (OGFC)** | | | | | | |
| Moisture Content | AASHTO T 329 | 10 lb, sealed metal container | Loose mix from behind the paver (See Note 4) | Production start-up evaluation, and minimum 1 per project | Production start- up evaluation, and minimum 1 per project during paving | Test within 1 hour of sampling |
| **BONDED WEARING COURSE: Gap Graded (BWC-G) (See Note 7)** | | | | | | |
| Asphalt Binder Content | AASHTO T  308, Method A | 20 lb  (See Note 5)  4, 1-gal metal containers with friction lids | Loose mix at plant | 1 for each  750 tons, 1 per day minimum | Production start- up evaluation.  Minimum 1 per day of paving |  |
| Moisture Content | AASHTO T 329 | 10 lb sealed metal container | Loose mix at plant | Production start-up evaluation, and minimum 1 per project | Production start- up evaluation, and minimum 1 per project during paving | Samples should be tested within 1 hour of sampling |
| **PAVEMENT DENSITY** | | | | | | |
| Density of cores  (% of maximum theoretical density)  (See Note 8) | California Test 375 | 4- or 6–in cores | Final layer, cored to the specified total paved thickness | 1 for each  250 tons | 1 for each 250 tons | Density applies to HMA  thickness of  0.15 ft or greater |

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| **Test** | **Test Method** | **Sample Size & Container Type** | **Sampling Location**  (See Note 1) | **Sampling Frequency** | **Acceptance Test Frequency** | **Remarks** |
| **PAVEMENT SMOOTHNESS** | | | | | | |
| Straightedge | N/A | N/A | Pavement surface (See Note 9) | Entire final surface | Entire final surface | Areas exempt from Inertial Profiler |
| Inertial Profiler for Mean Roughness Index and Areas of Localized Roughness | California Test 387 AASHTO R  56 & AASHTO R 57 | Each 0.1 mile | Pavement surface | Entire final surface | Entire final surface | Entire final surface excluding areas requiring straightedge; use contractor- furnished profiles for IRI values within 10% of Caltrans’ IRI values |
| **TACK COAT** | | | | | | |
| Asphalt Binder | Based on asphalt type used (see *Standard Specifi- cations* Section 92) | 1-qt round wide- mouth can with friction top lid | Spray bar on asphalt distributor truck | Each truckload | 1 random per project |  |
| Asphaltic Emulsion | Based on emulsion type used (see *Standard Specifi- cations* Section 94) | 1/2-gal plastic jug with screw-on lid | Spray bar on emulsion distributor truck | Each truckload | 1 random per project |  |

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| **Test** | **Test Method** | **Sample Size & Container Type** | **Sampling Location**  (Note 1) | **Sampling Frequency** | **Acceptance Test Frequency** | **Remarks** |
| **TACK COAT** | | | | | | |
| Spread Rate | California Test 339 | N/A | Pavement | N/A | As necessary for verification of tack coat spread rate | Verify tack coat spray rate is sufficient to meet the minimum specified residual rate. (see example in Section 4-  9403, “During the Course of Work,” in this manual) |

Notes:

1. Refer to California Test 125 for sampling procedures.
2. When using RAP, RAS or RAP/RAS, adjust gradation by the correction factor determined under California Test 384.
3. Store three 20-lb canvas bags for dispute resolution.
4. Sampling HMA behind the paver is the preferred location. You may also take samples from the windrow, production plant, or truck.
5. Sample sizes are based on split samples—one sample for acceptance testing, and one for dispute resolution. Store one-half of the boxes or cans for dispute resolution.
6. Contractor ships directly to district material laboratory.
7. For BWC using RHMA-G, RHMA-O, or HMA-O, sampling and testing must comply with requirements for RHMA-G, RHMA-O, or HMA-O.
8. Determine percent of theoretical maximum density under California Test 375, except use AASHTO T 275 to determine in-place density of each core and AASHTO T 209, Method A to determine theoretical maximum density instead of calculating maximum density.
9. May use Inertial Profiler data and ProVAL Smoothness Assurance “Rolling Straightedge Comparison Tool” to assist in determining where to check with 12-foot straightedge.

Concrete Pavement (*Standard Specifications* Section 40) (1 of 2) See Table 6-1.17 for concrete materials

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| **Test** | **Test Method** | **Sample Size & Container Size** | **Sampling Location** (Note 1) | **Acceptance Test Frequency** | **Remarks** |
| **CONCRETE** | | | | | |
| Modulus of Rupture (Open to Traffic) | California Test 523 (Field Curing) | 3 beams of 6x6x20 in. for third- point loading | Concrete truck discharge chute | 1 set for the last pavement section placed prior to opening to traffic | Not used for acceptance, only to verify that pavement can be opened to traffic |
| Modulus of Rupture (28- days) | California Test 523 | 3 beams of 6x6x20 in. for third- point loading | Concrete truck discharge chute | 1 set per age for each 1,000 cu yd, 1 per day minimum (See Note 2) | Recommend frequency of every 2,000 cu yd if after 10 sets all tests are in compliance |
| Air Content | California Test 504 | See test method | Concrete truck discharge chute | 1 every day of production | Only test when air entrainment is specified |
| **PAVEMENT** | | | | | |
| Thickness | California Test 531 | 4-in. diameter core, full thickness of pavement | See Section 4-  4004, “Level of Inspection,” of this manual | 1 every 1,200 sq yd |  |
| Dowel Bar Alignment and Concrete Consolidation | Measurement and Inspection | 4-in. diameter core size | Transverse pavement joints | 1 test every 700 sq yd | Each test consists of 2 cores, one on each end of dowel bar |
| Tie Bar Alignment and Concrete Consolidation | Measurement and Inspection | 4-in. diameter core size | Longitudinal pavement joints | 1 test every 4,000 sq yd | Each test consists of 2 cores, one on each end of tie bar |
| Coefficient of Friction | California Test 342 | N/A | Pavement surface | 1 test for each day of paving | Each test consists of 5 measurements |
| Smoothness - Straightedge | Measurement with 12-ft straightedge | N/A | Pavement surface | Entire final surface requiring straightedge |  |

Table 6-1.14. Materials Acceptance Sampling and Testing Requirements: Concrete Pavement (*Standard Specifications* Section 40) (2 of 2)

See Table 6-1.17 for concrete materials

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| **Test** | **Test Method** | **Sample Size & Container Size** | **Sampling Location** (Note 1) | **Acceptance Test Frequency** | **Remarks** |
| **PAVEMENT** | | | | | |
| Smoothness - Inertial Profiler for Mean Roughness Index and Areas of Localized Roughness | AASHTO R 56, AASHTO  R 57, and California Test 387 | 0.1 mile | Pavement surface | Entire final surface | Entire final surface excluding specified areas |

Notes:

1. Refer to California Test 125 for sampling procedures.
2. If concrete modulus of rupture is close to specification limit or outside the specification limits, sample and test concrete every 1,000 cu yd so that deductions may be taken for noncompliant material.

Existing Concrete Pavement (*Standard Specifications* Section 41)

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| **Test** | **Test Method** | **Sample Size & Container Size** | **Sampling Location**  (Note 1) | **Acceptance Test Frequency** | **Remarks** |
| **INDIVIDUAL SLAB REPLACEMENT WITH RAPID STRENGTH CONCRETE (Section 41-9)** | | | | | |
| Coefficient of Friction | California Test 342 | N/A | Pavement surface | 1 every 1,200 sq yd | Each test consists of 5 measurements |
| Smoothness  -  Straightedge | Measurement with 12-ft straightedge | N/A | Pavement surface | Entire final surface | Areas exempt from Inertial Profiler |
| Modulus of rupture (3- days) | California Test 524 | 3 beams of 6x6x20 inches | Concrete truck discharge chute | 1 per shift |  |

Notes:

* 1. Refer to California Test 125 for sampling procedures.

Concrete Structures (*Standard Specifications* Section 51) See Table 6-1.17 for concrete materials

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| **Test** | **Test Method** | **Sample Size & Container Size** | **Sampling Location**  (Note 1) | **Acceptance Test Frequency** | **Remarks** |
| **JOINT SEALS TYPE B (Section 51-2.02C(2))** | | | | | |
| Various properties; must comply with *Standard Specifica- tions* Section 51- 2.02C(2) | See *Standard Specifica- tions* Section 51- 2.02(C) | 1 piece, 3 ft | Job site | Each lot | Certificate of compliance and certified test report required for each lot;  test report must include the seal movement rating, manufacturer minimum uncompressed width and test results;  submit samples at least 30 days before use |
| **JOINT SEALS Type A and Type AL (Section 51-2.02B)** | | | | | |
| Various properties; must comply with *Standard Specifica- tions* Section 51- 2.02B(2) | See *Standard Specifica- tions S*ection 51- 2.02B(2) | 1 qt of each component and primer | Job site | 1 sample from each component of each batch | Certificate of compliance required for each batch of sealant; submit samples at least 30 days prior to use |

Notes:

1. Refer to California Test 125 for sampling procedures.

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| **T****est** | **Test Method** | **Sample Size &**  **Container Size** | **Sampling Location** (Note 1) | **Acceptance Test Frequency** | **Remarks** |
| **AGGREGATE: Coarse Aggregate** | | | | | |
| Los Angeles Rattler (loss at 500  revolu- tions) | Cali- fornia Test 211 | See Note 2 | Stockpile | Prior to production and minimum 1 random test for every 25,000 cu yd | 1 for every 4,000 cu yd, if initial test shows abrasion loss greater than 40% |
| Clean- ness Value | Cali- fornia Test 227 | 25 lb | Stockpile | Prior to production and minimum 1 for every 600 cu yd, 1 per day minimum | Recommend 1 acceptance test per day if 3 consecutive results exceed 80; increase sampling to 1 for every 300 cu yd (deductive lot) with engineer’s authorization |
| Sieve Analysis | Cali- fornia Test 202 | 50 lb | Belt Feed | Prior to production and minimum 1 for every 600 cu yd, 1 per day minimum | Recommend 1 acceptance test per day if 3 consecutive results are within operating range; increase sampling to 1 for every 300 cu yd (deductive lot) with engineer’s authorization |
| **AGGREGATE: Fine Aggregate** | | | | | |
| Organic Impurities | Cali- fornia Test 213 | See Note 2 | Stockpile | Prior to production or when contamination is suspected |  |
| Durability | Cali- fornia Test 229 | See Note 2 | Stockpile | Prior to production |  |
| Sand Equivalent | Cali- fornia Test 217 | 25 lb | Stockpile | Prior to production and minimum 1 for every 600 cu yd, 1 per day minimum | Recommend 1 acceptance test per day if 3 consecutive results exceed 80; increase sampling to 1 for every 300 cu yd (deductive lot) with engineer’s authorization |

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| **T****est** | **Test Method** | **Sample Size &**  **Container Size** | **Sampling Location** (Note 1) | **Acceptance Test Frequency** | **Remarks** |
| **AGGREGATE: Fine Aggregate** | | | | | |
| Sieve Analysis | Cali- fornia Test 202 | 50 lb | Belt feed | Prior to production and minimum 1 for every 600 cu yd, 1 per day minimum | Recommend 1 acceptance test per day if 3 consecutive results are within operating range; increase sampling to 1 for every 300 cu yd (deductive lot) with engineer’s authorization |
| **AGGREGATE**: **Coarse & Fine Aggregate** | | | | | |
| Specific Gravity and Absorp- tion | Cali- fornia Test 206,  Cali- fornia Test 207 | See Note 2 | Stockpile | Prior to production and when aggregate source changes |  |
| Sound- ness | Cali- fornia Test 214 | See Note 2 | Stockpile | Prior to production | Soundness for fine aggregate waived if durability is ≥ 60 |
| Sieve Analysis (combined gradation deter- mined with fine and coarse aggregate sieve analyses) | Cali- fornia Test 202 |  | N/A | Prior to production and minimum 1 for every 600 cu yd, 1 per day minimum | Recommend 1 acceptance test per day if 3 consecutive results are within operating range. Increase sampling to 1 for every 300 cu yd (deductive lot) with engineer’s authorization |

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| **Test** | **Test Method** | **Sample Size & Container Size** | **Sampling Location** (Note 1) | **Acceptance Test Frequency** | **Remarks** |
| **CEMENTITIOUS MATERIALS** | | | | | |
| Cement, various properties; must comply with *Standard Specifications* Section 90- 1.02B(2) | See *Standard Specifications* Section 90- 1.02B(2) | 8 lb | Concrete plant | Sample each 100 tons of  cement, 2 per day maximum | Cement must be on Authorized Material List; cement accepted based on certificate of compliance with each shipment; recommend 1 verification test per 5 samples |
| Supplementary Cementitious Materials (SCM), various properties; must comply with *Standard Specifications* Section 90- 1.02B(3) | See *Standard Specifications* Section 90- 1.02B(3) | 8 lb | Concrete plant | Sample each 100 tons of  SCM, 2 per day maximum | SCMs must be on Authorized Materials List; SCM accepted based on certificate of compliance with each shipment; recommend 1 verification test per 5 samples |
| **WATER** | | | | | |
| Chlorides | California Test 422 | Clean 2-qt plastic jug with lined, sealed lid | At point of use | 1 per source | Water supplies for domestic use do not need to be tested |
| Sulfates | California Test 417 | Clean 2-qt plastic jug with lined, sealed lid | At point of use | 1 per source | Water supplies for domestic use do not need to be tested |
| Setting Time | ASTM C 191  or  ASTM C 266 | Contact METS for required quantity of water sample | At point of use | 1 per source | Water supplies for domestic use do not need to be tested |

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| **Test** | **Test Method** | **Sample Size & Container Size** | **Sampling Location** (Note 1) | **Acceptance Test Frequency** | **Remarks** |
| **WATER** | | | | | |
| Mortar Compressive Strength | ASTM C109 | Contact METS for required quantity of water sample | At point of use | 1 per source | Water supplies for domestic use do not need to be tested |
| Coloring Agents | Must comply with *Standard Specifi- cations* Section 90- 1.02D | Contact METS for required quantity of water sample | At point of use | 1 per source | Water supplies for domestic use do not need to be tested |
| Alkalis | Must comply with *Standard Specifi- cations* Section 90- 1.02D | Contact METS for required quantity of water sample | At point of use | 1 per source | Water supplies for domestic use do not need to be tested |
| Specific Gravity | Must comply with *Standard Specifi- cations* Section 90- 1.02D | Contact METS for required quantity of water sample | At point of use | 1 per source | Water supplies for domestic use do not need to be tested |
| **ADMIXTURES: Air Entraining Agent** | | | | | |
| Air entraining properties Must comply with *Standard Specifications* Section 90- 1.02E | See *Standard Specifi- cations* Section 90- 1.02E | 1-qt can or plastic bottle of liquid, 2 lb of powder | Concrete plant | Sample each shipment | Must be on Authorized Materials List and certificate of compliance must accompany each shipment; recommend 1 verification test per 5 samples |

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| **Test** | **Test Method** | **Sample Size & Container Size** | **Sampling Location** (Note 1) | **Acceptance Test Frequency** | **Remarks** | |
| **CHEMICAL ADMIXTURE: Water Reducers or Set Retarders** | | | | | | |
| Claimed properties, chloride identification | ASTM C494 Type A, B, D, F  or Type G California Test 415 | 1-qt can of liquid, 2 lb of powder | Concrete plant | Sample each shipment | Must be on Authorized Materials List and certificate of compliance must accompany each shipment; recommend 1 verification test per 5 samples | |
| **CONCRETE for Pavement and Structures** | | | | | | |
| Shrinkage | AASHTO T 160  Modified  See *Standard Specifications* Section 90- 1.01D(3) | Set of three: 4x4x11¼ in. | During mix design process | Prior to production | Engineer may use contractor-provided test result for acceptance; test results must be within 3 years of contract authorization date | |
| **CONCRETE Designated Compressive Strength 3600 psi or Greater** | | | | | | |
| Yield | California Test 518 | See test method | Concrete truck discharge chute; (See Note 3) | As necessary to assure accuracy of mix design; minimum 2 per each mix design | | No deductions for cement content will be made based on the results of California Test 518 |
| Concrete Uniformity | ASTM C143,  California Test 533 | See test method | Concrete truck discharge chute (See Note 3) | When compressive test specimen is fabricated and when consistency or uniformity is questionable, minimum 2 per day | |  |

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| **Test** | **Test Method** | **Sample Size & Container Size** | **Sampling Location** See Note 1) | **Acceptance Test Frequency** | **Remarks** |
| **CONCRETE Designated Compressive Strength 3600 psi or Greater (Cont.)** | | | | | |
| Concrete Uniformity | California Test 529 | 100 lb | Concrete truck discharge chute (See Note 3) | When uniformity is questionable |  |
| Compressive Strength | ASTM C172,  California Test 540 | 1 set of 2 cylinders 6x12 in. for each test | Concrete truck discharge chute (See Note 3) | 1 set per age for every 300 cu yd concrete or as required for acceptance, minimum 1 set per project | For trial batches, see *Standard Specifications* or job special provisions and Section 6-3, “Field Tests,” of this manual |
| Air Content | California Test 504 | See test method | Concrete truck discharge chute (See Note 3) | 1 every 4 hours of production and when test specimens are fabricated | Where air is specified for freeze-thaw resistance, a  minimum of 1 every 30 cu yd |
| **CONCRETE WITH COMPRESSIVE STRENGTH LESS THAN 3,600 psi** | | | | | |
| Concrete Uniformity | ASTM C143,  California Test 533 | See test method | Concrete truck discharge chute (See Note 3) | When compressive test specimen is fabricated and when uniformity is questionable |  |

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| **Test** | **Test Method** | **Sample Size & Container Size** | **Sampling Location** (Note 1) | **Acceptance Test Frequency** | **Remarks** |
| **CONCRETE WITH COMPRESSIVE STRENGTH LESS THAN 3,600 psi** | | | | | |
| Concrete Uniformity | California Test 529 | 100 lb | Concrete truck discharge chute (See Note 3) | When uniformity is questionable |  |
| Compressive Strength | California Test 540, California Test 521 | 1 set of 2 cylinders, 6x12 in., for each test | Concrete truck discharge chute (See Note 3) | 1 set per age for every 300 cu yd, minimum 1 set per project |  |
| Air Content | California Test 504 | See test method | Concrete truck discharge chute (See Note 3) | When compressive test specimens are fabricated | Where air is specified for freeze- thaw resistance, a minimum of 1 every 100 cu yd |
| **CURING COMPOUND** | | | | | |
| Curing Compound; must comply with *Standard Specifications* Section 90- 1.03B(3) | ASTM C309 | 1-qt can | At time of use (See Note 1) | 1 every shipment | Each shipment must have certificate of compliance that includes:   1. Test results for tests specified in Section 90- 1.01D(6) of   *Standard Specifications*   1. Certification that material was tested within 12 months before use |

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| --- | --- | --- | --- | --- | --- |
| **Test** | **Test Method** | **Sample Size & Container Size** | **Sampling Location** (Note 1) | **Acceptance Test Frequency** | **Remarks** |
| **CEMENTITIOUS MATERIALS** | | | | | |
| Cement, various properties; must comply with *Standard Specifications* Section 90- 1.02B(2) | See *Standard Specifications* Section 90- 1.02B(2) | 8 lb | Concrete plant | Sample and test if cement quality is questionable | Cement source must be shown on Authorized Materials List; certificate of compliance must accompany each cement shipment |
| Supplementary cementitious materials (SCM), various properties; must comply with *Standard Specifications* Section 90- 1.02B(3) | See *Standard Specifications* Section 90- 1.02B(3) | 8 lb | Concrete plant | Sample and test if SCM quality is questionable | SCM source must be shown on Authorized Materials List; certificate of compliance must accompany each SCM shipment |
| **ADMIXTURES: Air Entraining Agent** | | | | | |
| Air entraining properties; must comply with *Standard Specifications* Section 90- 1.02E | See *Standard Specifications* Section 90- 1.02E | N/A | N/A |  | Must be on Authorized Materials List and certificate of compliance must accompany each shipment |
| **CHEMICAL ADMIXTURES: Water Reducers or Set Retarders** | | | | | |
| Claimed properties, chloride identification | ASTM C494 Type A, B, D, F or Type G California Test 415 | N/A | N/A |  | Must be on Authorized Materials List and certificate of compliance must accompany each shipment |

Concrete (*Standard Specifications* Section 90) (9 of 9) Minor Concrete

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Test** | **Test Method** | **Sample Size & Container Size** | **Sampling Location** | **Acceptance Test Frequency** | **Remarks** |
| **CONCRETE** | | | | | |
| Yield | California Test 518 | See test method | Concrete truck discharge chute (See Note 3) | As necessary to assure accuracy of mix design; minimum 1 per each mix design | No deductions for cement content will be made based on the results of California Test 518 |
| Com- pressive Strength | California Test 540, California Test 521 | 1 set of 2 cylinders, 6x12 in., for each test | Concrete truck discharge chute (See Note 3) | Sample and test if concrete quality is questionable; minimum 1 per mix design | Minor concrete must have the strength described or 2,500 psi, whichever is greater; see *Standard Specifications* Section 90-1.02A |
| Air Content | California Test 504 | See test method | Concrete truck discharge chute (See Note 3) | Where air is specified for freeze-thaw resistance, a minimum of 1  every 100 cu yd |  |
| **CURING COMPOUND** | | | | | |
| Curing Compound; must comply with *Standard Specifi- cations* Section 90- 1.03B(3) | ASTM C309 | 1-qt can | At time of use; (See Note 1) | 1 every shipment | Each shipment must have certificate of compliance that includes:   1. Results for tests specified in Section 90- 1.01D(6) of   *Standard Specifications*   1. Certification that material was tested within 12 months before use |

Notes:

1. Refer to California Test 125 for sampling procedures.
2. For initial testing, provide 100 lb of 1-1/2 in. x 3/4 in., 75 lb of 3/4 in. x No. 4, 75 lb of pea gravel, and 50 lb of sand. Use this material for California Test 202, 206, 207, 211, 213,

214, 217, 227 and 229.

1. Refer to California Test 539 for method of sampling fresh concrete.

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| --- | --- | --- | --- | --- | --- |
| **Test** | **Test Method** | **Sample Size & Container Size** | **Sampling Location** | **Acceptance Test Frequency** | **Remarks** |
| **BARBED WIRE AND WIRE MESH FENCES (Section 80-2)** | | | | | |
| Barbed Wire, various properties; must comply with *Standard Specifications* Section 80-2.02D | ASTM A121 | 1 yd length | Job site | As necessary for verification if quality is questionable |  |
| **BOLTS AND HARDWARE (Section 75)** | | | | | |
|  |  | 2 samples each diameter |  | Each lot | Sample and test if not previously inspected at the source |
| **CHAIN LINK FENCES (Section 80-3)** | | | | | |
| Wire Mesh, various properties;  must comply with *Standard Specifications* Section 80 | ASTM  A116, Class 1 | 2 ft width | Job site | Each lot for verification if quality is questionable | Certificate of compliance required for vinyl clad fencing |
| **CONCRETE PIPE (Section 65)** | | | | | |
| Compliance with specifications |  | Contact METS for instructions |  | Contact METS for instructions | Sample and test if not previously inspected at source |
| **CONDUIT (Section 86-1.02B)** | | | | | |
| Conduit, various properties;  must comply with *Standard Specifications* Section 86-1.02B | See *Standard Specifi- cations* Section 86- 1.02B | 2 ft. long from center of length,  2 samples each size | Job site | As necessary for verification if quality is questionable |  |

Table 6-1.18. Materials Acceptance Sampling and Testing Requirements: Miscellaneous Materials (2 of 5)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Test** | **Test Method** | **Sample Size & Container Size** | **Sampling Location** | **Acceptance Test Frequency** | **Remarks** |
| **ELECTRICAL CONDUCTORS AND CABLES (Section 86-1.02F)** | | | | | |
| Electrical conductors and cables, various properties;  must comply with *Standard Specifications* Section 86-1.02F | See *Standard Specifi- cations* Section 86 | 2 ft. long, include markings, 2 samples per gauge | Job site | Each lot for verification if quality is questionable |  |
| **EXPANSION JOINT FILLER** | | | | | |
| Compliance with specifications |  | 6 in. long, full width of sheet |  | Each 1,000 sq ft not less than 2 per shipment |  |
| **GEOSYNTHETICS (Section 96)** | | | | | |
| Various properties;  must comply with *Standard Specifications* Section 96 | See *Standard Specificatio ns* Section 96 | 1 piece, 3 ft x full width of roll | Job site | Each lot for verification if quality is questionable. See Remarks | Certificate of compliance required for each lot;  unroll at least 1 circumference before sampling |
| **PAINT (Section 91)** | | | | | |
| Paint, various properties;  must comply with *Standard Specifications* Section 91 | See *Standard Specifi- cations* Section 91 | For miscellaneo us painting, 1 qt (see  Section 6-2 of this manual) | Job site | Each batch | If less than 20 gallons, testing not required and resident engineer must field release.  Zinc-rich primer must be on the Authorized Materials List |
| **PAVEMENT MARKERS (Section 81-3)** | | | | | |
| Pavement Markers, various properties;  must comply with *Standard Specifications* Section 81-3 | See *Standard Specifi- cations* Section 81-  3 | 20 markers | Job site | As necessary for verification if quality is questionable | Each shipment must have certificate of compliance |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Test** | **Test Method** | **Sample Size & Container Size** | **Sampling Location** | **Acceptance Test Frequency** | **Remarks** |
| **PERMEABLE MATERIALS: (Section 68-2.02F)** | | | | | |
| Durability Index | California Test 229 | 50 lb | Stockpile | Prior to use |  |
| Sieve Analysis | California Test 202 | 50 lb | Stockpile | Prior to use,1 every day |  |
| **PERMEABLE MATERIALS: Class 3 (Section 68-2.02F)** | | | | | |
| Crushed Faces | California Test 205 | 50 lb | Stockpile | Prior to use |  |
| **PRESTRESSED TENDON GROUT (Section 50)** | | | | | |
| Efflux time | California Test 541 | One 6x12 in. cylinder mold can | From batch immediately after mixing for prequalification, thereafter from outlet end of tendon  and/or storage tank | At the start of each day’s work, and thereafter 1 test per each 5% of ducts;  see Remarks | Repeat acceptance tests whenever source of material is changed |
| **RAISED BARS (PRECAST)** | | | | | |
| Compliance with specifications |  | 1 unit or full size bar |  | Each lot | Sample and test if not previously inspected at the source |
| **REINFORCING STEEL (Section 52)** | | | | | |
| Reinforcing Steel, various properties | See *Standard Specifi- cations* Section 52 | 2 samples,  30 in.,  except 40 in. for No. 14 and No.  18 | Job site | As necessary for verification if quality is questionable | Each shipment must be accompanied by a certificate of compliance |
| **SLOPE PROTECTION (Section 72)** | | | | | |
| Size | N/A |  | Quarry or stockpile | As required for acceptance | Adequate size of slope protection documented by measuring or weighing the material |
| Apparent Specific Gravity | California Test 206 | 75 lb | Quarry or stockpile | Prior to use |  |

Table 6-1.18. Materials Acceptance Sampling and Testing Requirements: Miscellaneous Materials (4 of 5)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Test** | **Test Method** | | **Sample Size & Container Size** | | **Sampling Location** | **Acceptance Test Frequency** | **Remarks** |
| **SLOPE PROTECTION (Section 72) (Cont.)** | | | | | | | |
| Absorption | | California Test 206 | | 75 lb | Quarry or stockpile | Prior to use |  |
| Durability Index | | California Test 229 | | 75 lb | Quarry or stockpile | Prior to use |  |
| **STEEL PRODUCTS** | | | | | | | |
|  | |  | | Contact METS for  instructions |  | Contact METS for  instructions |  |
| **STRUCTURAL STEEL AND MISCELLANEOUS METAL (Sections 55 & 75)** | | | | | | | |
|  | |  | | 2 samples, 30-in., cut parallel to direction of  rolling |  | Each heat or melt or 10 tons or fraction | Sample and test if not previously inspected at the source |
| **STRUCTURAL STEEL COATINGS (Section 59)** | | | | | | | |
| Paint, various properties;  must comply with *Standard Specifications* Section 59 | | See *Standard Specificatio ns* Section 59 | | For bridge or major structure, send an unopened 5-gal can | Job site | Each batch; see Remarks | Unused portion of 5-gal sample will be returned to job; see Section 6-2, “Acceptance of Manufactured or Fabricated Materials and  Products,” of this manual |
| **WATER-PROOFING MATERIALS (Section 54)** | | | | | | | |
| Glass Fiber | | ASTM D1668,  Type 1 | | 9 sq ft of asphalt saturated cotton fabric | Job site | 1 sample from each lot |  |
| Asphalt | | ASTM D449 | | 5 lb of asphalt | Job site | 1 sample from each lot |  |
| Primer | | ASTM D41 | | 1 qt of asphalt primer | Job site | 1 sample from each lot |  |

Table 6-1.18. Materials Acceptance Sampling and Testing Requirements: Miscellaneous Materials (5 of 5)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Test** | **Test Method** | **Sample Size & Container Size** | **Sampling Location** | **Acceptance Test Frequency** | **Remarks** |
| **WELDED WIRE REINFORCEMENT (Section 52-1.02C)** | | | | | |
| Welded | ASTM A | 9 sq ft | Job site | As necessary | Each shipment must |
| Wire | 1064/A |  |  | for verification | be accompanied by |
| Reinforcing | 1064M |  |  | if quality is | a certificate of |
| Steel, |  |  |  | questionable | compliance |
| must |  |  |  |  |  |
| comply with |  |  |  |  |  |
| *Standard* |  |  |  |  |  |
| *Specifi-* |  |  |  |  |  |
| *cations* |  |  |  |  |  |
| Section 52- |  |  |  |  |  |
| 1.02C |  |  |  |  |  |