

DEPARTMENT OF TRANSPORTATION

OFFICE OF MATERIALS MANGEMENT
INDEPENDENT ASSURANCE
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*Making Conservation
a California Way of Life.*

April 6, 2022, 2022

City of Fresno
1721 Van Ness Avenue
Fresno, CA 93721

QAP Review Approval

To the City of Fresno,

Caltrans Independent Assurance personnel reviewed The City of Fresno QAP (dated 9/21) and found it in compliance with the California Department of Transportation Quality Assurance Program (QAP) Manual for Use by Local Agencies (Jan 20, 2011 revision) and Federal Highway Administration, 23-CFR-637. This QAP will need to be reviewed again if there are any changes, deviations or upon its expiration date on 4/6/2027.

Sincerely,

A handwritten signature in black ink, appearing to read "Alexis R. England".

Alexis R. England

OMMIA North JTCP/ IA #133
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ONEFRESNO

Let's Build Together!

**Construction Management Division
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Fresno, CA 93721
(559) 621-5600**

Quality Assurance Program (QAP)

Revised September 2021

Approved By:

 2/16/22

Public Works Director,
Scott Mozier, RCE 54417

Date

Approved By:

 12-21-21

City Engineer,
Andrew Benelli, RCE 50022

Date

2021 CITY OF FRESNO QUALITY ASSURANCE PROGRAM (QAP)
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SECTION 01

SUMMARY OF CHANGES

The City of Fresno updated 2021 Quality Assurance Program has the following changes or revisions made to accommodate current City and State construction Material standards and specifications:

SECTION 03:

- Updated sample and testing frequency reference.
- Updated materials accepted by certificate of compliance.
- Added Caltrans Test method to ASTM Test Method Conversion Chart.
- Updated Acceptance of manufactured or Fabricated Materials within section 03 to allow for source inspection and use of materials acceptance based on authorized materials list.
- Updated Section 03 to allow for acceptance of minor quantities of materials without testing.
- Addition of Materials Requiring a Buy America Certification

SECTION 02

OVERVIEW OF QUALITY ASSURANCE PROGRAM

QUALITY ASSURANCE PROGRAM (QAP) CITY OF FRESNO

The purpose of this program is to provide assurance that the materials incorporated into all City of Fresno construction projects are in conformance with the contract specifications and comply with Local Assistance guidelines. This program will be updated every five years or more frequent if there are changes of the testing frequencies or to the tests themselves. To accomplish this purpose, the following terms and definitions will be used:

DEFINITION OF TERMS

- **Acceptance Testing (AT)** – Sampling and testing, or inspection, to determine the degree of compliance with contract requirements.
- **Independent Assurance Program (IAP)** – Verification that the AT is being performed correctly by qualified testers and laboratories.
- **Quality Assurance Program (QAP)** – A sampling and testing program that will provide assurance that the materials and workmanship incorporated into the construction project are in conformance with the contract specifications. The main elements of a QAP are the AT, and IAP.
- **Source Inspection** – AT of manufactured and prefabricated materials at locations other than the job site, generally at the manufactured location.

MATERIALS LABORATORY

The City of Fresno will be utilizing private consultant materials laboratory to perform AT on Federal-aid and other designated projects. The materials laboratory shall be under the responsible management of a California registered Engineer with experience in sampling, inspection and testing of construction materials. The Engineer shall certify the results of all tests performed by laboratory personnel under the Engineer's supervision. The materials laboratory shall contain certified test equipment capable of performing the tests conforming to the provisions of this QAP.

The materials laboratory used shall provide documentation that the laboratory complies with the following procedures:

1. **Correlation Testing Program** – The materials laboratory shall be a participant in one or more of the following testing programs:
 - a. AASHTO Materials Reference Laboratory (AMRL)
 - b. Cement and Concrete Reference Laboratory (CCRL)
 - c. Caltrans' Reference Samples Program (RSP)
2. **Certification of Personnel** – The materials laboratory shall employ personnel who are certified by one or more of the following:
 - a. Caltrans District Materials Engineer
 - b. Nationally recognized non-Caltrans organizations such as the American Concrete Institute, Asphalt, National Institute of Certification of Engineering Technologies, etc.
 - c. Other recognized organizations approved by the State of California and/or recognized by local governments or private associations.

3. **Laboratory and Testing Equipment** – The materials laboratory shall only use laboratory and testing equipment that is in good working order. All such equipment shall be calibrated at least once each year. All testing equipment must be calibrated by impartial means using devices of accuracy traceable to the National Institute of Standards and Technology. A decal shall be firmly affixed to each piece of equipment showing the date of the last calibration. All testing equipment calibration decals shall be checked as part of the IAP.
4. **Test Methods and Frequencies** - The City refers to the California Department of Transportation Construction Manual, Chapter 6 pages 6-1.15 to 6-1.77 (attachment 3B of this manual) for test methods and frequencies for materials and products incorporated into City of Fresno projects.

ACCEPTANCE TESTING (AT)

AT will be performed by a materials laboratory certified to perform the required tests. The tests results will be used to ensure that all materials incorporated into the project are in compliance with the contract specifications.

Testing methods will be in accordance with the CT Methods or a national recognized standard (i.e., AASHTO, ASTM, etc.) as specified in the contract specifications.

Sample locations and frequencies may be in accordance with the contract specifications. If not so specified in the contract specifications, samples shall be taken at the locations and frequencies as shown in attachment 3B of this manual.

A log summary for all acceptance tests and materials certificates of compliance can be found in the quality assurance section of the project file. See attachment 3C of this manual for an example log summary.

INDEPENDENT ASSURANCE PROGRAM (IAP)

IAP shall be provided by a separate independent assurance consultant/lab (**IAC**), not involved in any acceptance testing, and shall have a certified materials laboratory. IAP will be used to verify that sampling and testing procedures are being performed properly and that all testing equipment is in good condition and properly calibrated.

IAP personnel shall be certified in all required testing procedures, as part of IAP, and shall not be involved in any aspect of AT.

IAP shall be performed on every type of materials test required for the project. Proficiency tests shall be performed on Sieve Analysis, Sand Equivalent, and Cleanness Value tests. All other types of IAP shall be witness tests.

Poor correlation between acceptance tester's results and other test results may indicate probable deficiencies with the acceptance sampling and testing procedures. In cases of unresolved discrepancies, a complete review of AT shall be performed by IAP personnel, or an independent materials laboratory chosen by the Agency. IAP samples and tests are not to be used for determining compliance with contract requirements. Compliance with contract requirements is determined only by AT.

REPORTING ACCEPTANCE TESTING RESULTS

For every City of Fresno project, all onsite test results shall be immediately reported to the City Construction Management and inspection staff, all correlating lab results must be submitted as described in section 03 of this manual. Section 03 also outlines the materials acceptance guidelines for:

- Minimum Sample Frequencies
- Timelines for reporting results
- Annual asphalt binder test results
- Example Testing Log Summary
- Source Inspection
- Materials Accepted by Certificate of Compliance
- Acceptance of Manufactured or Fabricated Materials

SECTION 03

MATERIALS ACCEPTANCE TESTING PROGRAM SUMMARY

ACCEPTANCE TESTING (AT)

AT will be performed by a materials laboratory certified to perform the required tests. The tests results will be used to ensure that all materials incorporated into the project are in compliance with the contract specifications. Current agreements with the City of Fresno and AT can be found at the Construction Management office (1721 Van Ness Avenue Fresno, CA 93721).

Testing methods will be in accordance with the CT Methods and/or a national recognized standard (i.e., AASHTO, ASTM, etc.) and as specified in the contract specifications. A Caltrans Test Method – ASTM Test Method Conversion Chart (LAPM Exhibit 16-S) is provided as attachment A to this section.

Sample locations and frequencies may be in accordance with the contract specifications. If not so specified in the contract specifications, samples shall be taken at the locations and frequencies as shown in attachment B of this Section.

All materials acceptance sampling and testing requirements shall meet the frequencies identified in Chapter 6 of the Caltrans Construction Manual (attachment B of this section). Testing frequencies may be reduced as needed for materials that are used in minimal.

Relatively minor quantities of construction materials may be accepted without testing provided the following 3 conditions are met:

1. Visual examination of the material is performed.
2. The manufacturer or supplier has recently furnished similar materials found to be satisfactory using normal sampling and testing requirements.
3. The manufacturer (or supplier in the case of HMA or concrete) provides certification that the material furnished complies with the contract specifications.

The following list suggests approximate maximum quantities of materials that may be accepted under the conditions indicated above:

- Aggregates other than for use in Portland Cement Concrete; not to exceed 100 tons per day nor more than 500 tons per project
- Bituminous mixtures (includes HMA); not to exceed 50 tons per day (sample at Engineer's discretion if project total is less than 500 tons)
- Bituminous material (includes Asphalt); not to exceed 100 gallons per project

Annual Binder testing results for PG 64-10 hot mix asphalt oil from the San Joaquin Refinery can be found at the Construction Management office (1721 Van Ness Avenue Fresno, CA 93721).

REPORTING ACCEPTANCE TESTING RESULTS

Please refer to pages 6-1.5 through 6-1.8 in attachment B of this section for time required for materials acceptance tests. The following are test with expedited requested time periods for reporting material test results to the Resident Engineer or their designated representative:

- When the aggregate is sampled at material plants, test results for Sieve Analysis, Sand Equivalent and Cleanness Value should be submitted to the Resident Engineer within 24 hours after sampling.
- When materials are sampled at the job site, test results for compaction and maximum density should be submitted to the Resident Engineer within 24 hours after sampling.
- When soils and aggregates are sampled at the job site:
 - (1) Test results for Sieve Analysis, Sand Equivalent and Cleanness Value should be submitted to the Resident Engineer within 24 hours after sampling.
 - (2) Test results for “R” Value and asphalt concrete extraction should be submitted to the Resident Engineer within 96 hours after sampling.
- When HMA (hot mix asphalt) is sampled at the job site or production plant:
 - (1) Test results for oil content and job mix gradations shall be submitted to the Resident Engineer within **4** hours after sampling.

When sampling products such as Portland Cement Concrete (PCC), cement-treated base (CTB), hot mix asphalt (HMA), and other such materials; the time of such sampling shall be varied with respect to the time of the day insofar as possible, in order to avoid a predictable sampling routine. The reporting of AT results, if not performed by the Resident Engineer’s staff, shall be done on an expedited basis such as by telephone, email or text.

Each project is given a log summary (attachment C to this section) that outlines the number and frequency of inspections and tests as well as items requiring a certificate of compliance which is specific to each project, taking into account all applicable specifications.

ACCEPTANCE OF MANUFACTURED OR FABRICATED MATERIALS

Based on the project specifications the City will utilize one of the following 3 methods for the acceptance of manufactured and fabricated materials:

Source Inspection:

The City’s selected AT consultant will perform source inspections. Source inspection is the inspection, sampling and testing of manufactured and prefabricated materials at locations other than the job site. It is most commonly performed on materials involving structural integrity or safety to the public, such as precast pre-stressed concrete members, structural steel, and poles for electrical systems. The purpose is to ensure that structural materials

comply with contract requirements in regard to raw materials, fabrication processes, personnel certification, and in-process quality control testing.

The RE or designated representative must inspect the material upon arrival to be sure it meets the requirements of the specifications and is undamaged by shipping and handling. The source inspection report will be filled in the project files quality assurance folder.

Materials Accepted on the Basis of Authorized Materials List

It is the responsibility of the RE or their designated representative to verify the materials furnished are shown on the appropriate authorized materials list before the material is used on the project. Materials shown on the authorized materials list may also require a certificate of compliance or sampling and testing for acceptance.

Materials Accepted by Certificate of Compliance

A list of materials that can be accepted on the basis of a COC during construction can be found as attachment D to this section (Exhibit 16-T1). The manufacturer of the products, materials or assemblies must sign the Certificate of Compliance and state that the included materials and workmanship conform in all respects to the project specifications.

The COC must be furnished before the material is incorporated into the work and include:

- Project number
- Certified material lot number matching lot tags affixed or stenciled to the released materials
- Manufacturer's signature
- A statement that the material complies with the specifications of the contract

Manufactured products, materials or assemblies used on the basis of a Certificate of Compliance may be sampled again at the job site and tested at any time during the life of the contract. Items found not in conformance with contract requirements must be rejected whether in place or not.

All materials accepted on the basis of a signed Certificate of Compliance will be documented on the log summary and the original COC will be stored in the project files quality assurance folder at the Construction Management office.

Materials Requiring a Buy America Certification

Steel and iron products incorporated into the project must comply with Buy America requirements of the CFRs. All steel and iron products must be delivered with a COC stating all manufacturing processes involved in the production of the products occurred within the United States. These processes include:

- | | | |
|-------------|------------|------------|
| • Rolling | • Drilling | • Bending |
| • Extruding | • Coating | • Smelting |
| • Machining | • Welding | • Grinding |

In addition to the COC requirements mentioned earlier in this section, a Buy America COC must also include the mill markings or heat numbers.

The Buy America requirements apply to the entire construction contract if any federal-aid money has been authorized for any phase of the project, not just the construction phase. The Buy America requirement cannot be circumvented by declaring that the material is being paid for with the non-federal portion of the funding.

Buy America does not apply to temporary steel such as that used in falsework, sheet piling or shoring. A minimal use of foreign iron and steel is allowed provided that the total delivered cost to the project site is less than \$2,500.00 or 0.1 percent of the contract amount, whichever is greater. Supporting invoices, including the cost of transportation, must be on file in the project records.

Failure to comply with Buy America provisions will result in the loss of federal funding for not only the applicable contract items, but likely will result in the loss of all federal funding authorized for the construction phase of the project.

ATTACHMENT 3A

CALTRANS-ASTM TEST METHOD CONVERSION CHART

LOCAL ASSISTANCE PROCEDURES MANUAL (LAPM) EXHIBIT 16-S

CALTRANS TEST METHOD - ASTM TEST METHOD CONVERSION CHART**Testing Procedures - for local agency use only**

Use this CTM - ASTM conversion chart to assist you in determining acceptance test requirements and frequencies, as detailed in Caltrans *Construction Manual* Chapter 6, "Sampling and Testing." Refer to the Agency, special provisions, contract plans, and applicable standard specifications, for correct sampling and test methods (ASTM-CTM).

CTM	ASTM	Book of Standar	TEST PROCEDURE	NOTE S
105			Calculations Pertaining to Gradings and Specific Gravities	2
125	D75 D979	4.02 4.03	Sampling Highway Materials (when approved) Standard Practice for Sampling Aggregates Practice for Sampling Bituminous Paving Mixtures	3 3
201	C702	4.02	Soil & Aggregate Sample Preparation Reducing Field Samples of Aggregate to Testing Size	13
202	C136 C117	4.02 4.03	Sieve Analysis of Fine and Coarse Aggregate Sieve Analysis of Fine and Coarse Aggregate Material Finer Than 75-um (#200) Sieve in Mineral Aggregates by Washing	
205			Percentage of Crushed Particles	1
206	C127	4.02	Specific Gravity and Absorption of Coarse Aggregate Specific Gravity and Absorption of Coarse Aggregate	
207	C128	4.02	Specific Gravity and Absorption, Fine Aggregate Specific Gravity and Absorption, Fine Aggregate	
208			Apparent Specific Gravity of Fine Aggregate	1
211	C131	4.02	Abrasion of Coarse Aggregate by Use of the Los Angeles Rattler Machine Resistance to Degradation, Small-Size Coarse Agg. by Abrasion & Impact, L.A. Machine	
213	C40	4.02	Organic Impurities in Concrete Sand Organic Impurities in Fine Aggregate for Concrete	
214	C88	4.02	Soundness of Aggregates by Use of Sodium Sulfate Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate	1
216	D1556 D1557	4.08 4.08	Relative Compaction of Untreated and Treated, Soils & Aggregates Density of Soil In-place by the Sand Cone Method Moisture-Density Relations of Soils & Soil-Agg. Mixtures, 10-lb. Rammer, 18-in	11
217			Sand Equivalent (only authorized method per Caltrans 07, District Materials)	1,9
223			Surface Moisture in Concrete Aggregate	1
226	C566	4.02	Moisture Content in Soils by Oven Drying Total Moisture Content of Aggregate by Drying	
227			Evaluating Cleanness of Coarse Aggregate	1
229	D3744	4.03	Durability Index Aggregate Durability Index	1
231	D2922	4.08	Relative Compaction of Soils by the Area Concept Utilizing Nuclear Gages Density of Soil & Soil-Aggregate In-place by the Nuclear Method	4 4

Caltrans Test Method- ASTM Test Method Conversion Chart

CTM - ASTM Testing Procedures - for local agency use only

Use this CTM - ASTM conversion chart to assist you in determining acceptance test requirements and frequencies, as detailed in Caltrans *Construction Manual* Chapter 6, "Sampling and Testing." Refer to the Agency, special provisions, contract plans, and applicable standard specifications, for correct sampling and test methods (ASTM-CTM).

CTM	ASTM	Book of Standards	TEST PROCEDURE	NOTES
301	D2844	4.08	R-Value of Treated & Untreated, Bases, Subbases & Basement Soils R-Value and Expansion Pressure of Compacted Soils	1
302	D1664	4.03	Film Stripping Coating and Stripping of Bitumen-Aggregate Mixtures	
303			Centrifuge Kerosene Equivalent	1
304	D1561	4.03	Preparation of Bituminous Mixtures for Testing Prep. of Bituminous Mixture Test Specimens by Means of Calif. Kneading Compactor	1
305			Swell of Bituminous Mixtures	1
307			Moisture Vapor Susceptibility of Bituminous Mixtures	1
308	D1188	4.03	Bulk Specific Gravity and Weight Per Cubic Foot of Bituminous Mixtures Bulk Sp.G. and Density of Compacted Bituminous Mixtures, Paraffin-Coated Specimens	
310	D2172	4.03	Asphalt and Moisture Contents of Bituminous Mixtures by Hot Solvent Extraction of Bitumen from Bituminous Paving Mixtures (Method A, B, or C)	5 6,10
312			Design and Testing of Class "A" and "B" Cement Treated Base	1
338			Cement or Lime Content in Treated Aggregate by the Titration Method	1
339	D2995	4.03	Determination of Distributor Spread Rate Determining Application Rate of Bituminous Distributors	
362	D2172	4.03	Asphalt Content of Bituminous Mixtures by Vacuum Extraction Quantitative Extraction of Bitumen from Bituminous Paving Mixtures	5 6
366			Stabilometer Value	1
367			Recommending Optimum Bitumen Content (OBC.)	1
370	D4643	4.08	Determining Moisture Content of Asphalt Mixtures or Mineral Agg., Microwave Ovens Determination of Water (Moisture) Content of Soil by the Microwave Oven	
375	D2950	4.03	In-place Density & Relative Compaction of AC Pavement (nuclear) Density of Bituminous Concrete In-place by the Nuclear Method	5,7,12 6,7
379	D4125	4.03	Asphalt Content of Bituminous Mixtures by use of the Troxler Nuclear Gage Asphalt Content of Bituminous Mixtures by the Nuclear Method	5,8 6,8
405			Chemical Analysis of Water	1
415			Chloride Content in Organic Additives for Portland Cement Concrete	1

Caltrans Test Method- ASTM Test Method Conversion Chart

CTM - ASTM Testing Procedures - for local agency use only

Use this CTM - ASTM conversion chart to assist you in determining acceptance test requirements and frequencies, as detailed in Caltrans *Construction Manual* Chapter 6, "Sampling and Testing." Refer to the Agency, special provisions, contract plans, and applicable standard specifications, for correct sampling and test methods (ASTM-CTM).

CTM	ASTM	Book of Standard	TEST PROCEDURE	NOTES
504	C231	^s 4.02	Air Content of Freshly Mixed Concrete by the Pressure Method Air Content of Freshly Mixed Concrete by the Pressure Method	
515			Relative Mortar Strength of Portland Cement Concrete Sand	1
518	C138	4.02	Unit Weight of Fresh Concrete Unit Weight, Yield, and Air Content (Gravimetric) of Concrete	
521	C39	4.02	Compressive Strength of Molded Concrete Cylinders Compressive Strength of Cylindrical Concrete Specimens	
523	C293 C78	4.02 4.02	Flexural Strength of Concrete (using simple beam with center-point loading) Flexural Strength of Concrete (using simple beam with center-point loading) Flexural Strength of Concrete (using simple beam with third-point loading)	1
528			Freeze Thaw Resistance of Aggregates in Air-Entrained Concrete	1
529			Proportions of Coarse Aggregate in Fresh Concrete	1
530			Determining the Effect of H ₂ O-Reducing and Set-Retard. Admix. Drying Shrinkage PCC	1
533	C360 C143	4.03 4.02	Ball Penetration in Fresh Portland Cement Concrete Ball Penetration in Fresh Portland Cement Concrete Slump of Freshly Mixed PCC	
539	C172	4.02	Sampling Fresh Concrete Sampling Freshly Mixed Concrete	
540	C31	4.02	Making, Handling, & Storing Concrete Compressive. Test Specimens in the Field Making & Curing Concrete Test Specimens in the Field	
541			Flow of Grout Mixtures (flow cone method)	1
543	C173	4.02	Air Content of Freshly Mixed Concrete by the Volumetric Method Air Content of Freshly Mixed Concrete by the Volumetric Method	
548			Evaluation of Aggregate for Lean Concrete Base (LCB.)	1

Notes

1. Use the CALTRANS Method.
2. Use the methods of calculation within the applicable test method first. Refer to CTM 105 as necessary.
3. Use the Caltrans Construction Manual procedures as necessary when ASTM D75 or D979 do not adequately cover the item to be sampled.
4. Use the direct transmission method only, the air gap method shall not be used. All nuclear gages must have local Caltrans District calibration within the last year. The data sheets provided by the local Caltrans District shall be used when determining the in-place density.
5. Sample from the job site, across the mat, immediately behind the paving machine (Caltrans Construction Manual).
6. Sample per ASTM D 979 paragraph 4.2.3., sample from the job site, across the mat, immediately behind the paving machine.
7. All nuclear gages used for this test must be calibrated on the six (6) DNTM&R AC Standard Blocks. The Data sheets provided by the local Caltrans District shall be used when determining the in-place density.
8. Recommended Percent (%) AC method for Rubberized Bituminous Paving mixtures.
9. The hand method of shaking is not authorized and shall not be used. An electro-mechanical or hand- operated mechanical. Sand Equivalent shaker must be utilized for this test.
10. This Method covers hot solvent, centrifuge, and vacuum extraction.
11. Compaction Apparatus shall be calibrated in accordance with ASTM D 2168, Method B (ASTM Book 4.08).
12. Test Maximum Density (TMD) shall be performed by Caltrans Test Method 375, Section F. Test Max. Density.
13. Splitters must be of the fixed riffle type (no adjustable splitters).

ATTACHMENT 3B

MATERIALS ACCEPTANCE SAMPLING AND TESTING FREQUENCIES

CALTRANS CONSTRUCTION MANUAL, CHAPTER 6

Chapter 6

Sampling and Testing

Section 1 Sample Types and Frequencies

6-101 General

6-101A References

6-102 Types of Sampling and Testing

6-102A Preliminary Samples and Tests

6-102B Initial Samples and Tests

Table 6-1.1. Time Required for Source Testing

6-102B (1) Unprocessed Soils and Aggregates

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

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

6-102B (2) Processed Aggregates

6-102C Acceptance Samples and Tests

Table 6-1.2. Time Required for Materials Acceptance Tests (1 of 4)

Table 6-1.2. Time Required for Materials Acceptance Tests (2 of 4)

Table 6-1.2. Time Required for Materials Acceptance Tests (3 of 4)

Table 6-1.2. Time Required for Materials Acceptance Tests (4 of 4)

Table 6-1.3. Time Required for Products Acceptance Tests

6-102D Dispute Resolution Samples

6-102E Investigation Samples and Tests

6-102F Research Samples and Tests

6-103 Field Sampled Material Identification for Testing

Example 6-1.1. Sample Cylinder Label (Set of either five 6- by 12-inch or five 4- by 8-inch cylinders)

Example 6-1.2. Sample Cylinder Label (Set of two 6- by 12-inch cylinders)

6-104 Shipping of Field Samples

6-105 Acceptance Records

6-106 Project Materials Certification

6-107 Materials Acceptance Sampling and Testing

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

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

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

Table 6-1.5. Materials Acceptance Sampling and Testing Requirements: Stabilized Soils (*Standard Specifications* Section 24) (1 of 3)

Table 6-1.5. Materials Acceptance Sampling and Testing Requirements: Stabilized Soils (*Standard Specifications* Section 24) (2 of 3)

Table 6-1.5. Materials Acceptance Sampling and Testing Requirements: Stabilized Soils (*Standard Specifications* Section 24) (3 of 3)

- Table 6-1.6. Materials Acceptance Sampling and Testing Requirements:
Aggregate Subbases (*Standard Specifications* Section 25)
- Table 6-1.7. Materials Acceptance Sampling and Testing Requirements:
Aggregate Bases (*Standard Specifications* Section 26)
- Table 6-1.8. Materials Acceptance Sampling and Testing Requirements:
Cement Treated Bases (*Standard Specifications* Section 27) (1 of 3)
- Table 6-1.8. Materials Acceptance Sampling and Testing Requirements:
Cement Treated Bases (*Standard Specifications* Section 27) (2 of 3)
- Table 6-1.8. Materials Acceptance Sampling and Testing Requirements:
Cement Treated Bases (*Standard Specifications* Section 27) (3 of 3)
- Table 6-1.9. Materials Acceptance Sampling and Testing Requirements:
Concrete Bases (*Standard Specifications* Section 28) Lean Concrete Base
- Table 6-1.10. Materials Acceptance Sampling and Testing Requirements:
Treated Permeable Bases (*Standard Specifications* Section 29)
Asphalt Treated Permeable Base (ATPB) (1 of 4)
- Table 6-1.10. Materials Acceptance Sampling and Testing Requirements:
Treated Permeable Bases (*Standard Specifications* Section 29)
Asphalt Treated Permeable Base (ATPB) (2 of 4)
- Table 6-1.10. Materials Acceptance Sampling and Testing Requirements:
Treated Permeable Bases (*Standard Specifications* Section 29)
Asphalt Treated Permeable Base (ATPB) (3 of 4)
- Table 6-1.10. Materials Acceptance Sampling and Testing Requirements:
Treated Permeable Bases (*Standard Specifications* Section 29)
Asphalt Treated Permeable Base (ATPB) (4 of 4)
- Table 6-1.11. Materials Acceptance Sampling and Testing Requirements:
Recycled Pavement (*Standard Specifications* Section 30)
- Table 6-1.12. Materials Acceptance Sampling and Testing Requirements:
Bituminous Seals (*Standard Specifications* Section 37) (1 of 9)
- Table 6-1.12. Materials Acceptance Sampling and Testing Requirements:
Bituminous Seals (*Standard Specifications* Section 37) (2 of 9)
- Table 6-1.12. Materials Acceptance Sampling and Testing Requirements:
Bituminous Seals (*Standard Specifications* Section 37) (3 of 9)
- Table 6-1.12. Materials Acceptance Sampling and Testing Requirements:
Bituminous Seals (*Standard Specifications* Section 37) (4 of 9)
- Table 6-1.12. Materials Acceptance Sampling and Testing Requirements:
Bituminous Seals (*Standard Specifications* Section 37) (5 of 9)
- Table 6-1.12. Materials Acceptance Sampling and Testing Requirements:
Bituminous Seals (*Standard Specifications* Section 37) (6 of 9)
- Table 6-1.12. Materials Acceptance Sampling and Testing Requirements:
Bituminous Seals (*Standard Specifications* Section 37) (7 of 9)

- Table 6-1.12. Materials Acceptance Sampling and Testing Requirements:
Bituminous Seals (*Standard Specifications* Section 37) (8 of 9)
- Table 6-1.12. Materials Acceptance Sampling and Testing Requirements:
Bituminous Seals (*Standard Specifications* Section 37) (9 of 9)
- Table 6-1.13. Materials Acceptance Sampling and Testing Requirements:
Asphalt Concrete (*Standard Specifications* Section 39) (1 of 14)
- Table 6-1.13. Materials Acceptance Sampling and Testing Requirements:
Asphalt Concrete (*Standard Specifications* Section 39) (2 of 14)
- Table 6-1.13. Materials Acceptance Sampling and Testing Requirements:
Asphalt Concrete (*Standard Specifications* Section 39) (3 of 14)
- Table 6-1.13. Materials Acceptance Sampling and Testing Requirements:
Asphalt Concrete (*Standard Specifications* Section 39) (4 of 14)
- Table 6-1.13. Materials Acceptance Sampling and Testing Requirements:
Asphalt Concrete (*Standard Specifications* Section 39) (5 of 14)
- Table 6-1.13. Materials Acceptance Sampling and Testing Requirements:
Asphalt Concrete (*Standard Specifications* Section 39) (6 of 14)
- Table 6-1.13. Materials Acceptance Sampling and Testing Requirements:
Asphalt Concrete (*Standard Specifications* Section 39) (7 of 14)
- Table 6-1.13. Materials Acceptance Sampling and Testing Requirements:
Asphalt Concrete (*Standard Specifications* Section 39) (8 of 14)
- Table 6-1.13. Materials Acceptance Sampling and Testing Requirements:
Asphalt Concrete (*Standard Specifications* Section 39) (9 of 14)
- Table 6-1.13. Materials Acceptance Sampling and Testing Requirements:
Asphalt Concrete (*Standard Specifications* Section 39) (10 of 14)
- Table 6-1.13. Materials Acceptance Sampling and Testing Requirements:
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- Table 6-1.13. Materials Acceptance Sampling and Testing Requirements:
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- Table 6-1.13. Materials Acceptance Sampling and Testing Requirements:
Asphalt Concrete (*Standard Specifications* Section 39) (13 of 14)
- Table 6-1.13. Materials Acceptance Sampling and Testing Requirements:
Asphalt Concrete (*Standard Specifications* Section 39) (14 of 14)
- Table 6-1.14. Materials Acceptance Sampling and Testing Requirements:
Concrete Pavement (*Standard Specifications* Section 40) (1 of 2)
See Table 6-1.17 for concrete materials
- 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
- Table 6-1.15. Materials Acceptance Sampling and Testing Requirements:
Existing Concrete Pavement (*Standard Specifications* Section 41)
- Table 6-1.16. Materials Acceptance Sampling and Testing Requirements:
Concrete Structures (*Standard Specifications* Section 51) See
Table 6-1.17 for concrete materials

- Table 6-1.17. Materials Acceptance Sampling and Testing Requirements:
Concrete (*Standard Specifications* Section 90) (1 of 9) Concrete,
Except Minor Concrete and Rapid Strength Concrete
- Table 6-1.17. Materials Acceptance Sampling and Testing Requirements:
Concrete (*Standard Specifications* Section 90) (2 of 9) Concrete,
Except Minor Concrete and Rapid Strength Concrete
- Table 6-1.17. Materials Acceptance Sampling and Testing Requirements:
Concrete (*Standard Specifications* Section 90) (3 of 9) Concrete,
Except Minor Concrete and Rapid Strength Concrete
- Table 6-1.17. Materials Acceptance Sampling and Testing Requirements:
Concrete (*Standard Specifications* Section 90) (4 of 9) Concrete,
Except Minor Concrete and Rapid Strength Concrete
- Table 6-1.17. Materials Acceptance Sampling and Testing Requirements:
Concrete (*Standard Specifications* Section 90) (5 of 9) Concrete,
Except Minor Concrete and Rapid Strength Concrete
- Table 6-1.17. Materials Acceptance Sampling and Testing Requirements:
Concrete (*Standard Specifications* Section 90) (6 of 9) Concrete,
Except Minor Concrete and Rapid Strength Concrete
- Table 6-1.17. Materials Acceptance Sampling and Testing Requirements:
Concrete (*Standard Specifications* Section 90) (7 of 9) Concrete,
Except Minor Concrete and Rapid Strength Concrete
- Table 6-1.17. Materials Acceptance Sampling and Testing Requirements:
Concrete (*Standard Specifications* Section 90) (8 of 9) Concrete,
Except Minor Concrete and Rapid Strength Concrete
- Table 6-1.17. Materials Acceptance Sampling and Testing Requirements:
Concrete (*Standard Specifications* Section 90) (9 of 9) Minor
Concrete
- Table 6-1.18. Materials Acceptance Sampling and Testing Requirements:
Miscellaneous Materials (1 of 5)
- Table 6-1.18. Materials Acceptance Sampling and Testing Requirements:
Miscellaneous Materials (2 of 5)
- Table 6-1.18. Materials Acceptance Sampling and Testing Requirements:
Miscellaneous Materials (3 of 5)
- Table 6-1.18. Materials Acceptance Sampling and Testing Requirements:
Miscellaneous Materials (4 of 5)
- Table 6-1.18. Materials Acceptance Sampling and Testing Requirements:
Miscellaneous Materials (5 of 5)

Section 1 Sample Types and Frequencies

6-101 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 Pavement Structure 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 Program, Division of Engineering Services, Materials Engineering and Testing Services (METS), Caltrans:
<https://dot.ca.gov/programs/engineering-services/independent-assurance-program>

- 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 Markit 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>

6-102 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 before 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. Caltrans laboratories performing acceptance testing must be qualified under the AASHTO re:source and Caltrans' Independent Assurance Program. Caltrans' field laboratories also meet the re:source requirements when Caltrans' district or regional materials laboratory meets the requirement.

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 typical 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

Material	Time
Aggregates for concrete mixture	4 weeks
Aggregates for concrete pavement	60 days
Screenings for bituminous seals	2 weeks
Soils (R-value)	3 weeks
Untreated base materials	3 weeks

6-102B (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 Pavement Structure 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 specified timeframes are not applicable if specific sampling or test method requirements preclude doing so, for example, curing of specimens before 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 if 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.

Table 6-1.2. Time Required for Materials Acceptance Tests (1 of 4)

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 (Cement-treated base [CTB] aggregate – CT 312)	-	Age based	Age based	2	Age +2
Compressive Strength (Lean Concrete Base [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
BITUMINOUS SEALS					
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

Table 6-1.2. Time Required for Materials Acceptance Tests (2 of 4)

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)
BITUMINOUS SEALS (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
Bending Beam Rheometer (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
Percentage of Crushed Particles (Coarse) (AASHTO T 335)	1 to 2	2	5	2	5 to 9
Percentage 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

Table 6-1.2. Time Required for Materials Acceptance Tests (3 of 4)

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 – Rolling Thin Film Oven (RTFO) Phase (AASHTO T 315)	1 to 2	4	15	2	7 to 19
Dynamic Shear – Pressure Aging Vessel (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

Table 6-1.2. Time Required for Materials Acceptance Tests (4 of 4)

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 before 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 begins when the test is provided to the resident engineer and ends when the contractor is notified of the test results.

* Days to schedule lab for testing

Table 6-1.3. Time Required for Products Acceptance Tests

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.

6-103 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://mets.dot.ca.gov/aml/AsphaltBindersList.php>

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 set of two cylinders, set of three cylinders, or set of five cylinders shipped 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 set of two, set of three, or set of five, that is to be tested; and project coding. Use a flow pen or permanent marker to mark the cylinders.

Following are examples of the cylinder marking system.

Example 6-1.1. Sample Cylinder Label (Set of either five 6- by 12-inch or five 4- by 8-inch cylinders)

Contract No. 03-100844
Sample No. 1-28-1/5_ _ _ _
Date Cast _____
Structure ID: 59-5629L

For sample shown in Example 6-1.1, (Set of either five 6- by 12-inch or five 4- by 8-inch cylinders):

- 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 five cylinders, the third symbol on the card would be 1,2,3,4,5/5.

Example 6-1.2. Sample Cylinder Label (Set of two 6- by 12-inch cylinders)

Contract No. 03-100844
Sample No. 2-14-2/2_ _ _ _
Date Cast _____
Structure ID: 59-5629L

For sample shown in Example 6-1.2 (Set of two 6- by 12-inch cylinders):

- 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.

Example 6-1.3. Sample Cylinder Label (Set of three 4- by 8-inch cylinders)

Contract No. 03-100844
Sample No. 2-07-3/3_ _ _ _
Date Cast _____
Structure ID: 59-5629L

For sample shown in Example 6-1.3 (Set of three 4- by 8-inch cylinders)

- The first digit indicates method 2 storage for curing.
- The second two digits indicate that the cylinder is to be tested at 7 days.
- The 3/3 set indicates that it is the No. 3 cylinder of a group of 3 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 three cylinders, the third symbol on the card would be 1,2,3/3.

6-104 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 and Curing Concrete Test Specimens in the Field." Cylinders are shipped without removing the mold and are packed in cardboard containers available at the district warehouse.

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.

6-105 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.

6-106 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 a 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>

6-107 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, “Materials Acceptance Sampling and Testing Requirements,” 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 in 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.

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

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	

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

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 before use	
pH	California Test 643	50 lb	Materials site or stockpile	1 per source before use	
Sieve Analysis	California Test 202	50 lb	Stockpile	Before 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

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

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 before use	
Durability	California Test 229	50 lb	Materials site or stockpile	1 per project before use	
Unit Weight	California Test 212 Rodding Method	50 lb	Materials site or stockpile	1 per project before 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.

Table 6-1.5. Materials Acceptance Sampling and Testing Requirements:
Stabilized Soils (*Standard Specifications* Section 24) (1 of 3)

Test	Test Method	Sample Size & Container Size	Sampling Location (Note 1)	Acceptance Test Frequency	Remarks
LIME (Section 24-2.02)					
Various properties	See <i>Standard Specifications</i> 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	Before 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	Before 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 $\pm 5\%$ of ordered application rate
Lime Application (Slurry Form)	Volumetric measurement that is then reduced to lime weight	Determined over known area	Slurry holding tank	Each 40,000 sq ft, 2 per day minimum	To determine if application rate is within $\pm 5\%$ 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

Table 6-1.5. Materials Acceptance Sampling and Testing Requirements:
Stabilized Soils (*Standard Specifications* Section 24) (2 of 3)

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	Representative 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	Representative areas	1 every 4,000 sq yd, 1 per day minimum	Taken before 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	

Table 6-1.5. Materials Acceptance Sampling and Testing Requirements:
Stabilized Soils (*Standard Specifications* Section 24) (3 of 3)

Test	Test Method	Sample Size & Container Size	Sampling Location (Note 1)	Acceptance Test Frequency	Remarks
CURING SEAL-ASPHALTIC EMULSION (Section 24-1.02C)					
Various properties based on asphaltic emulsion type used	Based on asphaltic emulsion type used; see <i>Standard Specifications</i> Section 94	1 liter (or 1 qt) wide-mouth plastic bottle with screw on lids that are sealed with tape	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.

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

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.

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

Test	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
Resistance Value (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
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.

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

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 qualification	Windrow or roadway	Before production	
CEMENT Type II Portland Cement					
Various properties must comply with <i>Standard Specifications</i> Section 90-1.02B(2)	See <i>Standard Specifications</i> 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

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

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 before 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	Before production	
Moisture Content	California Test 226	10 lb in sealed container	Roadway before 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	6 cylinders 6x12 in. - 3 tests	Concrete truck discharge chute	1,000 cu yd or 1 day's production if less than 1,000 cu yd	
Compressive strength (3-days)	ASTM C39	6 cylinders 6x12 in. - 3 tests	Concrete truck discharge chute	1,000 cu yd or 1 day's production if less than 1,000 cu yd	Optional test to qualify for a transverse contraction joint waiver
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	6 cylinders 6x12 in. - 3 tests	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.

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

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	Before 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	Before 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	Before 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	

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

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 <i>Standard Specifications</i> Section 92	Based on asphalt type used; see <i>Standard Specifications</i> Section 92	1-qt double-seal friction-top metal cylindrical shaped 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	Before 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)	

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

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 <i>Standard Specifications</i> Section 90-1.02B(2)	Must comply with <i>Standard Specifications</i> 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 <i>Standard Specifications</i> 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

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

Test	Test Method	Sample Size & Container Size	Sampling Location (Note 1)	Acceptance Test Frequency	Remarks
WATER					
Alkalis	Must comply with <i>Standard Specifications</i> 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 <i>Standard Specifications</i> 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:
Recycled Pavement (*Standard Specifications* Section 30)

Test	Test Method	Sample Size & Container Size	Sampling Location (Note 1)	Acceptance Test Frequency	Remarks
FULL-DEPTH RECYCLING WITH NO STABILIZER (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 RECYCLING—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 locations per lot	See Section 4-4004 of this manual	
FULL DEPTH RECYCLING—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 $\pm 5\%$ 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.

Table 6-1.12. Materials Acceptance Sampling and Testing Requirements:
Bituminous Seals (*Standard Specifications* Section 37) (1 of 9)

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 <i>Standard Specifications</i>	See Section 37-2.02A(4)(b)(ii) of <i>Standard Specifications</i>	1 liter (or 1 qt) wide-mouth plastic bottle with screw on lids that are sealed with tape	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 liter (or 1 qt) wide-mouth plastic bottle with screw on lids that are sealed with tape	Transport tanker	Each shipment	Certificate of compliance required with each shipment
Sieve Test	AASHTO T 59	1 liter (or 1 qt) wide-mouth plastic bottle with screw on lids that are sealed with tape	Transport tanker	Each shipment	Certificate of compliance required with each shipment
Demulsibility	AASHTO T 59	1 liter (or 1 qt) wide-mouth plastic bottle with screw on lids that are sealed with tape	Transport tanker	Each shipment	Certificate of compliance required with each shipment

Table 6-1.12. Materials Acceptance Sampling and Testing Requirements:
Bituminous Seals (*Standard Specifications* Section 37) (2 of 9)

Test	Test Method	Sample Size & Container Size	Sampling Location (Note 1)	Acceptance Test Frequency	Remarks
POLYMER MODIFIED ASPHALTIC EMULSION (Cont.)					
Torsional Recovery	California Test 332	1 liter (or 1 qt) wide-mouth plastic bottle with screw on lids that are sealed with tape	Transport tanker	Each shipment	Certificate of compliance required with each shipment
Penetration	AASHTO T 49	1 liter (or 1 qt) wide-mouth plastic bottle with screw on lids that are sealed with tape	Transport tanker	Each shipment	Certificate of compliance required with each shipment
Ring and Ball	AASHTO T 53	1 liter (or 1 qt) wide-mouth plastic bottle with screw on lids that are sealed with tape	Transport tanker	Each shipment	Certificate of compliance required with each shipment

Table 6-1.12. Materials Acceptance Sampling and Testing Requirements:
Bituminous Seals (*Standard Specifications* Section 37) (3 of 9)

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	

Table 6-1.12. Materials Acceptance Sampling and Testing Requirements:
Bituminous Seals (*Standard Specifications* Section 37) (4 of 9)

Test	Test Method	Sample Size & Container Size	Sampling Location (Note 1)	Acceptance Test Frequency	Remarks
CRUMB RUBBER MODIFIER FOR ASPHALT RUBBER BINDER (Cont.)					
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					
Cone Penetration		1-qt double- seal friction- top metal cylindrical shaped can	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

Table 6-1.12. Materials Acceptance Sampling and Testing Requirements:
Bituminous Seals (*Standard Specifications* Section 37) (5 of 9)

Test	Test Method	Sample Size & Container Size	Sampling Location (Note 1)	Acceptance Test Frequency	Remarks
ASPHALT RUBBER BINDER (Cont.)					
Resilience		1-qt double-seal friction-top metal cylindrical shaped can	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 double-seal friction-top metal cylindrical shaped can	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	1 gal metal cylindrical shaped can with double-seal friction top	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 <i>Standard Specifications</i> Section 92	Five 1-qt double-seal friction-top metal cylindrical shaped can	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	

Table 6-1.12. Materials Acceptance Sampling and Testing Requirements:
Bituminous Seals (*Standard Specifications* Section 37) (6 of 9)

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:
Bituminous Seals (*Standard Specifications* Section 37) (7 of 9)

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) "Department Acceptance" of the <i>Standard Specifications</i>	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

Table 6-1.12. Materials Acceptance Sampling and Testing Requirements:
Bituminous Seals (*Standard Specifications* Section 37) (8 of 9)

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	

Table 6-1.12. Materials Acceptance Sampling and Testing Requirements:
Bituminous Seals (*Standard Specifications* Section 37) (9 of 9)

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 14)

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 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	For standard process, 1 for each 750 tons, 1 per day minimum For statistical pay factor (SPF) process, per stratified random sampling plan (See Notes 10 and 11)	Production start-up evaluation. For standard process, minimum 1 per day of paving For SPF process, test per stratified random sampling plan (See Note 14)	
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	For standard process, 1 for each 750 tons, 1 per day minimum, For SPF process, same frequency as gradations	Production start-up evaluation. For standard process, minimum 1 per day of paving For SPF process, test with gradation samples	Not required for OGFC (open graded friction course)

Table 6-1.13. Materials Acceptance Sampling and Testing Requirements:
Asphalt Concrete (*Standard Specifications* Section 39) (2 of 14)

Test	Test Method	Sample Size & Container Type	Sampling Location (Note 1)	Sampling Frequency	Acceptance Test Frequency	Remarks
AGGREGATE: All Types of HMA						
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 For the SPF process, see Note 17	Production start-up evaluation, and minimum 1 random for every 25,000 tons or less of paving For the SPF process, see Note 17	
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 For the SPF process, see Note 17	Production start-up evaluation, and minimum 1 random for every 25,000 tons or less of paving For the SPF process, see Note 17	
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 For the SPF process, see Note 17	Production start-up evaluation, and minimum 1 random for every 50,000 tons or less of paving For the SPF process, see Note 17	

Table 6-1.13. Materials Acceptance Sampling and Testing Requirements:
Asphalt Concrete (*Standard Specifications* Section 39) (3 of 14)

Test	Test Method	Sample Size & Container Type	Sampling Location (Note 1)	Sampling Frequency	Acceptance Test Frequency	Remarks
AGGREGATE: All Types of HMA (Cont.)						
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 For the SPF process, see Note 17	Production start-up evaluation, and minimum 1 random for every 50,000 tons or less of paving For the SPF process, see Note 17	
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 For the SPF process, see Note 17	Production start-up evaluation, and minimum 1 random for every 50,000 tons or less of paving For the SPF process, see Note 17	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 For the SPF process, see Note 17	Production start-up evaluation, and minimum 1 random for every 50,000 tons or less of paving For the SPF process, see Note 17	Not required for Minor HMA

Table 6-1.13. Materials Acceptance Sampling and Testing Requirements:
Asphalt Concrete (*Standard Specifications* Section 39) (4 of 14)

Test	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 <i>Standard Specifications</i> Section 92)	See <i>Standard Specifications</i> Section 92	1-qt double-seal friction-top metal cylindrical shaped can	Asphalt feed line connecting 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 <i>Standard Specifications</i> Section 39-2.03A(4)(e)(ii)	1-qt double-seal friction-top metal cylindrical shaped can	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 gal double-seal friction-top metal cylindrical shaped can	Asphalt rubber feed line connecting to the HMA plant	1 every lot	1 every lot	For safety, engineer may witness contractor perform test

Table 6-1.13. Materials Acceptance Sampling and Testing Requirements:
Asphalt Concrete (*Standard Specifications* Section 39) (5 of 14)

Test	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 <i>Standard Specifications</i> Section 92	1-qt double-seal friction-top metal cylindrical shaped can	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 double-seal friction-top metal cylindrical shaped can 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	

Table 6-1.13. Materials Acceptance Sampling and Testing Requirements:
Asphalt Concrete (*Standard Specifications* Section 39) (6 of 14)

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 Notes 5 and 18) (8x8x4=6 boxes, 8½x8½x4 ½=4 boxes) (See Notes 5 and 18)	Loose mix from behind the paver (See Note 4)	For standard process, 1 for each 750 tons, 1 per day minimum. For SPF process, per stratified random sampling plan (See Notes 10 and 11)	Production start-up evaluation; For standard process, minimum 1 per day of paving For SPF process, per stratified random sampling plan (See Note 14)	
Maximum Theoretical Density	AASHTO T 209	60 lb (See Notes 5 and 18) (8x8x4=6 boxes, 8½x8½x4 ½=4 boxes) (See Notes 5 and 18)	Loose mix from behind the paver (See Note 4)	For standard process, 1 for each 750 tons, 1 per day minimum For SPF process, two samples per shift with verification density cores (See Notes 10 and 13)	Production start-up evaluation. For standard process, 1 random test per day of paving For SPF process, per stratified random sampling plan	

Table 6-1.13. Materials Acceptance Sampling and Testing Requirements:
Asphalt Concrete (*Standard Specifications* Section 39) (7 of 14)

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) (8x8x4=10 boxes, 8½x8½x4½=8 boxes)	Loose mix from behind the paver (See Note 4)	Production start-up evaluation, 1 every 25,000 tons of paving. For HMA placed using SPF, see Notes 10 and 11	Production start-up evaluation, and minimum 1 random for every 25,000 tons of paving, except for HMA placed using SPF, see Note 14	
Voids in Mineral Aggregate	SP-2 Asphalt Mixture Volumetrics	100 lb (See Note 5) (8x8x4=10 boxes, 8½x8½x4½=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) (8x8x4=10 boxes, 8½x8½x4½=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	

Table 6-1.13. Materials Acceptance Sampling and Testing Requirements:
Asphalt Concrete (*Standard Specifications* Section 39) (8 of 14)

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	California Test 389	70 lb (See Notes 5 and 18) (8x8x4=7 boxes, 8½x8½x4½=6 boxes)	Loose mix at plant, truck, or windrow	Production start-up evaluation, 1 every 10,000 tons of paving For SPF process, see Note 16	Production start-up evaluation, and minimum 1 random for every 10,000 tons or less of paving For SPF process, see Note 16	Not required for Minor HMA
Moisture Susceptibility	AASHTO T 283	140 lb (See Notes 5, 6 and 18) (8x8x4=15 boxes, 8½x8½x4½=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 (8x8x4=1 box, 8½x8½x4½=1 box) (See Note 18)	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	

Table 6-1.13. Materials Acceptance Sampling and Testing Requirements:
Asphalt Concrete (*Standard Specifications* Section 39) (9 of 14)

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 Notes 5 and 18) (8x8x4=6 boxes, 8½x8½x4½=4 boxes)	Loose mix from behind the paver (See Note 4)	1 for each 750 tons, 1 per day minimum. For HMA placed using SPF, see Notes 10 and 11	Production start-up evaluation; 1 random test per day of paving. For HMA placed using SPF, see Note 10	
Maximum Theoretical Density	AASHTO T 209	60 lb (See Notes 5 and 18) (8x8x4=6 boxes, 8½x8½x4½=4 boxes)	Loose mix from behind the paver (See Note 4)	1 for each 750 tons, 1 per day minimum. For HMA placed using SPF, see Notes 11 and 13	Production start-up evaluation; minimum 1 per day of paving, except for HMA placed using SPF, see Notes 10 and 13	

Table 6-1.13. Materials Acceptance Sampling and Testing Requirements:
Asphalt Concrete (*Standard Specifications* Section 39) (10 of 14)

Test	Test Method	Sample Size & Container Type	Sampling Location (Note 1)	Sampling Frequency	Acceptance Test Frequency	Remarks
RUBBERIZED HOT MIX ASPHALT: Gap Graded (Cont.)						
Air Void Content	AASHTO T 269	100 lb (See Notes 5 and 18) (8x8x4=10 boxes, 8½x8½x4½=8 boxes)	Loose mix from behind the paver (See Note 4)	Production start-up evaluation, 1 every 25,000 tons of paving. For HMA placed using SPF, see notes 10 and 11	Production start-up evaluation, and minimum 1 random test for every 25,000 tons of paving For SPF process, test per stratified random sampling plan. See note 14	
Voids in Mineral Aggregate	SP-2 Asphalt Mixture Volumetrics	100 lb (See Notes 5 and 18) (8x8x4=10 boxes, 8½x8½x4½=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 Notes 5 and 18) (boxes, 8x8x4=10 boxes, 8½x8½x4½=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	

Table 6-1.13. Materials Acceptance Sampling and Testing Requirements:
Asphalt Concrete (*Standard Specifications* Section 39) (11 of 14)

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	California Test 389	75 lb (See Notes 5 and 18) (8x8x4=7 boxes, 8½x8½x4½=6 boxes)	Loose mix at plant, truck, or windrow	Production start-up evaluation 1 every 10,000 tons of paving For SPF process, see Note 16	Production start-up evaluation, and minimum 1 random test for every 10,000 tons or less of paving For SPF process, see Note 16	
Moisture Susceptibility	AASHTO T 283	75 lb (See Notes 5, 6 and 18) (8x8x4=15 boxes, 8½x8½x4½=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	

Table 6-1.13. Materials Acceptance Sampling and Testing Requirements:
Asphalt Concrete (*Standard Specifications* Section 39) (12 of 14)

Test	Test Method	Sample Size & Container Type	Sampling Location (Note 1)	Sampling Frequency	Acceptance Test Frequency	Remarks
OPEN GRADED FRICTION COURSE (OGFC) (Cont.)						
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	For the standard process, 1 for each 250 tons For the SPF process, see Note 12	For the standard process, 1 for each 250 tons For SPF process, test per stratified random sampling plan. See Note 14	Density applies to HMA thickness of 0.15 ft or greater

Table 6-1.13. Materials Acceptance Sampling and Testing Requirements:
Asphalt Concrete (*Standard Specifications* Section 39) (13 of 14)

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 <i>Standard Specifications</i> Section 92)	1-qt double-seal friction-top metal cylindrical shaped can	Spray bar on asphalt distributor truck	Each truckload	1 random per project	

Table 6-1.13. Materials Acceptance Sampling and Testing Requirements:
Asphalt Concrete (*Standard Specifications* Section 39) (14 of 14)

Test	Test Method	Sample Size & Container Type	Sampling Location (See Note 1)	Sampling Frequency	Acceptance Test Frequency	Remarks
TACK COAT (Cont.)						
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)
Asphaltic Emulsion	Based on emulsion type used (see <i>Standard Specifications</i> Section 94)	1 liter (or 1 qt) wide-mouth plastic bottle with screw on lids that are sealed with tape	Spray bar on emulsion distributor truck	Each truckload	1 random per project	

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 bonded wearing course 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 maximum theoretical 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 maximum theoretical density instead of calculating maximum density.
9. May use Inertial Profiler data and ProVAL Rolling Straightedge module to assist in determining where to check with 12-foot straightedge.
10. For the statistical pay factor (SPF) process, and for each lot, prepare a stratified random sampling plan for the following pay factor quality characteristic: aggregate gradations, binder content, air voids, and percent of maximum theoretical density. Sample at milestones identified in the stratified random sampling plan. Do not share the verification sampling time or location with the contractor until immediately before sampling. Do not share the stratified random sampling plan with the contractor until completion of the lot. For guidance on developing the engineer's stratified random sampling plans, refer to section 4-3902K, "Stratified Random Sampling Plan" of this manual.
11. Obtain enough material to split each sample into four parts. Perform verification testing on one part, provide one part to the contractor, hold one part for dispute resolution testing, and reserve the fourth part for additional verification testing in the event the lot runs short and you do not have at least the 3 tests needed for verification.
12. To determine in-place density, obtain verification density cores from the contractor's subplot identified in the engineer's stratified random sampling plan. Break the identified subplot into three equal parts, and randomly determine the coring location of each part. At each location, core three samples aligned longitudinally within 1 to 2 feet of the center core. Retain the center core for verification testing, and randomly determine which of the two remaining cores will be provided to the contractor and which will be retained by the engineer.
13. To determine the paving shift's maximum theoretical density value used for verification of percent in-place density, obtain two samples of HMA from each paving shift the verification density cores are obtained from. Determine the shift's maximum theoretical density value used for the verification by averaging the test results of the two samples. The two samples must be obtained randomly from the first and last half of the paving shift, or from a split of a single sample pulled within the subplot the density cores are obtained from.
14. Do not share the test results of pay factor quality characteristics with the contractor until completion of the lot.
15. For HMA placed using SPF, during production, sample non-pay factor items at the frequency determined by the engineer. Notify the contractor of your intent to sample, and obtain enough material to split into four parts. Test one part, provide one part to the contractor, and retain one part for independent third party testing. When sampling for non-pay factors, except sand equivalent testing, pull two samples from two consecutive sublots. If the first sample fails, immediately test the second sample. Refer to Section 4-3904A(5), "Monitoring Non-Pay Factor Quality Characteristics using Statistical Pay Factor Specifications" of this manual for guidance related to non-pay factor testing.
16. For HMA placed using SPF, when sampling for Hamburg Wheel Track, pull one additional sample for testing from the contractor's next subplot. Test this second sample if the first sample fails.

17. For HMA placed using SPF, sample at same frequency as aggregate gradations, except pull two samples and test the second sample if the first sample fails.
18. Box quantities indicated represent recommended amounts for each individual test. Use CT 125 Appendix B Table 1 for more comprehensive quantities or suites of tests.

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

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 before 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

Test	Test Method	Sample Size & Container Size	Sampling Location (Note 1)	Acceptance Test Frequency	Remarks
PAVEMENT (Cont.)					
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.

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

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.

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

Test	Test Method	Sample Size & Container Size	Sampling Location (Note 1)	Acceptance Test Frequency	Remarks
JOINT SEALS TYPE B (Section 51-2.02C)					
Various properties; must comply with <i>Standard Specifications</i> Section 51-2.02C(2)	See <i>Standard Specifications</i> Section 51-2.02C(2)	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)					
	Use Authorized Material List at: https://dot.ca.gov/programs/engineering-services/product-evaluation-program			Type A and AL joint seals must be on the Authorized Materials List for Type A and AL joint seals	Submit a certificate of compliance for each batch of sealant at least 15 days before use

Notes:

1. Refer to California Test 125 for sampling procedures.

Table 6-1.17. Materials Acceptance Sampling and Testing Requirements:
Concrete (*Standard Specifications* Section 90) (1 of 9)
Concrete, Except Minor Concrete and Rapid Strength Concrete

Test	Test Method	Sample Size & Container Size	Sampling Location (Note 1)	Acceptance Test Frequency	Remarks
AGGREGATE: Coarse Aggregate					
Los Angeles Rattler (loss at 500 revolutions)	California Test 211	See Note 2	Stockpile	Before 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	California Test 227	25 lb	Stockpile	Before 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	California Test 202	50 lb	Belt Feed	Before 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	California Test 213	See Note 2	Stockpile	Before production or when contamination is suspected	
Durability	California Test 229	See Note 2	Stockpile	Before production	
Sand Equivalent	California Test 217	25 lb	Stockpile	Before 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

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

Test	Test Method	Sample Size & Container Size	Sampling Location (Note 1)	Acceptance Test Frequency	Remarks
AGGREGATE: Fine Aggregate					
Sieve Analysis	California Test 202	50 lb	Belt feed	Before 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 Absorption	California Test 206, California Test 207	See Note 2	Stockpile	Before production and when aggregate source changes	
Soundness	California Test 214	See Note 2	Stockpile	Before production	Soundness for fine aggregate waived if durability is ≥ 60
Sieve Analysis (combined gradation determined with fine and coarse aggregate sieve analyses)	California Test 202		N/A	Before 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

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

Test	Test Method	Sample Size & Container Size	Sampling Location (Note 1)	Acceptance Test Frequency	Remarks
CEMENTITIOUS MATERIALS					
Cement, various properties; must comply with <i>Standard Specifications</i> Section 90-1.02B(2)	See <i>Standard Specifications</i> 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 <i>Standard Specifications</i> Section 90-1.02B(3)	See <i>Standard Specifications</i> Section 90-1.02B(3)	8 lb	Concrete plant	Sample each 100 tons of SCM, 2 per day maximum	SCM 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

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

Test	Test Method	Sample Size & Container Size	Sampling Location (Note 1)	Acceptance Test Frequency	Remarks
WATER (Cont.)					
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 <i>Standard Specifications</i> 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 <i>Standard Specifications</i> 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 <i>Standard Specifications</i> 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 <i>Standard Specifications</i> Section 90-1.02E	See <i>Standard Specifications</i> 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

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

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 <i>Standard Specifications</i> Section 90-1.01D(3)	Set of three: 4x4x11¼ in.	During mix design process	Before 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	

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

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. or 1 set of 3 cylinders 4x8 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 <i>Standard Specifications</i> 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	

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

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. or 1 set of 3 cylinders 4x8 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 <i>Standard Specifications</i> 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 <i>Standard Specifications</i> 2. Certification that material was tested within 12 months before use

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

Test	Test Method	Sample Size & Container Size	Sampling Location (Note 1)	Acceptance Test Frequency	Remarks
CEMENTITIOUS MATERIALS					
Cement, various properties; must comply with <i>Standard Specifications</i> Section 90-1.02B(2)	See <i>Standard Specifications</i> 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 <i>Standard Specifications</i> Section 90-1.02B(3)	See <i>Standard Specifications</i> 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 <i>Standard Specifications</i> Section 90-1.02E	See <i>Standard Specifications</i> 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

Table 6-1.17. Materials Acceptance Sampling and Testing Requirements:
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
Compressive Strength	California Test 540, California Test 521	1 set of 2 cylinders 6x12 in. or 1 set of 3 cylinders 4x8 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 <i>Standard Specifications</i> 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 <i>Standard Specifications</i> 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 <i>Standard Specifications</i> 2. 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.
3. Refer to California Test 539 for method of sampling fresh concrete.

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

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 <i>Standard Specifications</i> 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 <i>Standard Specifications</i> 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 <i>Standard Specifications</i> Section 86-1.02B	See <i>Standard Specifications</i> 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 <i>Standard Specifications</i> Section 86-1.02F	See <i>Standard Specifications</i> 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 <i>Standard Specifications</i> Section 96	See <i>Standard Specifications</i> 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 <i>Standard Specifications</i> Section 91	See <i>Standard Specifications</i> Section 91	For miscellaneous 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 <i>Standard Specifications</i> Section 81-3	See <i>Standard Specifications</i> Section 81-3	20 markers	Job site	As necessary for verification if quality is questionable	Each shipment must have certificate of compliance

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

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	Before use	
Sieve Analysis	California Test 202	50 lb	Stockpile	Before use, 1 every day	
PERMEABLE MATERIALS: Class 3 (Section 68-2.02F)					
Crushed Faces	California Test 205	50 lb	Stockpile	Before 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, storage tank, or both	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 <i>Standard Specifications</i> 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	Before 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	Before use	
Durability Index	California Test 229	75 lb	Quarry or stockpile	Before 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 <i>Standard Specifications</i> Section 59	See <i>Standard Specifications</i> 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 Wire Reinforcing Steel, must comply with <i>Standard Specifications</i> Section 52-1.02C	ASTM A 1064/A 1064M	9 sq ft	Job site	As necessary for verification if quality is questionable	Each shipment must be accompanied by a certificate of compliance

ATTACHMENT 3C

EXAMPLE

MATERIALS ACCEPTANCE TESTING LOG SUMMARY

City of Fresno - Quality Assurance Program Summary

Project Name: EXAMPLE
 Project Number: #####
 Project Inspector: N/A
 Project AT Firm: N/A

Materials to be Sampled or Tested	Sample Size	Sampling/Testing Frequency	Test Method/Comment	Required for Project	Sampling/Testing Summary
STUCTURE AND EMBANKMENT BACKFILL					
Soils/Aggregates for Structural Backfill	50-lb	One sample tested per every 1,000 tons of material placed or compacted. In crease Frequency if material type changes	ASTM 1557or CTM 216 for aggbase - Moisture,density relationship for soils	Yes - 7 Sample & Test Min.	
Soils/Aggregates for Structure Backfill	50-lb	One sample tested per every 5000 lf of planned pavement subgrade, subbase or aggbase- Minimum one per project	ASTM D2844 - Resistance Value of compacted materials	Yes - 4 Samples & Tests minimum on Import Borrow	
Soils/Aggregates for Structural Backfill	NA	One test for every 2000 Sq. Yd. at every 8 inches of thickness.	ASTM D6938 - Field densities of compacted soils using nuclear gage	Yes - 190 tests Min.	
Aggregates	50-lb	One sample tested per every 2,000 cubic yards of material <u>or</u> at least once per project	ASTM C136 - Gradation of soils and aggregates by sieve analysis	Yes - 6 Samples and Tests minimum	
Aggregates	50-lb	One sample tested per every 2,000 cubic yards of material <u>or</u> at least once per project	ASTM D2419 - SE-sand equivalent of soils and aggregates	Yes - 6 Samples and Tests minimum	
MSE WALL BACK FILL					
Soils/Aggregates for MSE Wall Backfill	50-lb	One sample tested per every 3,000 tons of material placed or compacted. Increase Frequency if material type changes.	ASTM 1557or CTM 216 for aggbase - Moisture,density relationship for soils	Yes 11 Sample & Test minimum	
Soils/Aggregates for MSE Wall Backfill	NA	One test for every 2000 Sq. Yd. at every 8 inches of thickness.	ASTM D6938 - Field densities of compacted soils using nuclear gage	Yes - Tests Around MSE Walls at specified frequency	
Aggregates	50-lb	One sample tested per every 2,000 cubic yards or 3000 tons of material <u>or</u> at least once per project. Frequency may be reduced to once per day if material is uniform and meets specification.	ASTM C136 - Gradation of soils and aggregates by sieve analysis - To conform to Section 47 of State Standard Specifiactions	Yes 11 Sample & Test minimum.	
Aggregates	50-lb	One sample tested per every 2,000 cubic yards or 3000 tons of material <u>or</u> at least once per project. Frequency may be reduced to once per day if material is uniform and meets specification.	ASTM D2419 - SE-sand equivalent of soils and aggregates	Yes 11 Sample & Test minimum	
Sois for MSE wall Backfill	50-lb	One sample tested at the start of the project and as needed when source/type material changes	Test for Plasticity Index, Minimum Resistivity, Sulfate Content, Chloride Content and PH of Soils. Reference Section 47 of State Standard Specification	2 Samples and Tests Minimum	
COLUMN BACKFILL					

City of Fresno - Quality Assurance Program Summary

Project Name: EXAMPLE
 Project Number: #####
 Project Inspector: N/A
 Project AT Firm: N/A

Materials to be Sampled or Tested	Sample Size	Sampling/Testing Frequency	Test Method/Comment	Required for Project	Sampling/Testing Summary
Soils/Aggregates for Column Backfill	50-lb	One sample tested per every 1,000 tons of material placed or compacted. In crease Frequency if material type changes	ASTM 1557or CTM 216 for aggbase - Moisture,density relationship for soils	Yes 1 Sample & Test minimum	
Soils/Aggregates for Column Backfill	NA	One test for every 2000 Sq. Yd. at every 8 inches of thickness.	ASTM D6938 - Field densities of compacted soils using nuclear gage	Yes - Testng Around each Column	
Aggregates	50-lb	One sample tested per every 2,000 tons of material <u>or</u> at least once per project	ASTM C136 - Gradation of soils and aggregates by sieve analysis	Yes 1 Sample & Test minimum.	
Aggregates	50-lb	One sample tested per every 2,000 tons of material <u>or</u> at least once per project	ASTM D2419 - SE-sand equivalent of soils and aggregates	Yes 1 Sample & Test minimum	
TENCH BACKFILL					
Soils/Aggregates for Trench Backfill	NA	Test as follows: 50' horizontal interval from subgrade bottom to -2. 150' horizontal interval from -2 to bedding zone (every 2' of depth). 500' horizontal interval at bedding zone.	ASTM D6938/D2937 - Field densities of compacted soils using nuclear gage or drive cylinder method as needed and approved	Yes - 45 Test Min.	
Soils/Aggregates for Structural Backfill	50-lb	One sample tested per every 1,000 tons of material placed or compacted.	ASTM 1557or CTM 216 for aggbase - Moisture,density relationship for soils	Yes - 3 Sample & Test Min.	
PCC/CONCRETE MATERIALS					
Concrete Mix Design	Submittal	Certificate of Compliance from each supplier of product used on project	Submittal Process	Yes	
Cement Fly Ash		Certificate of Compliance from each supplier of fly ash used on project	Submit as part of submittal process	Yes	
Cement		Certificate of Compliance from each supplier of cement used on project	Submit as part of submittal process	Yes	
Chemical Admixtures	N/A	Certificate of Compliance for each shipment of product used on project	Check labels and specs for dosage rates	Yes	
Water	Two quart sample	If water is suspected to be dirty, test sample	CT405, CT 422, CT417 - Test for chlorides and sulfates if warranted	No	municipal water will be used
Aggregate for PCC	50-lb	One sample per 500 cu. Yd <u>or</u> once per job which ever is greater. <u>Aggregate Testing for Piles, Columns & Caps, Stem & Soffit and Deck Pours</u>	ASTM D75 - Sampling Procedures-ASTM C136 - Gradation of aggregates by sieve analysis-CT 227 - Cleanness of coarse aggrate-ASTM C128 - Bulk specific gravity	Yes - Sample & Test minimum for each aggregate source.	
Fine Aggregate for PCC	50-lb	One sample per 500 cu. Yd <u>or</u> once per job which ever is greater. <u>Aggregate Testing for Piles, Columns & Caps, Stem & Soffit and Deck Pours</u>	ASTM D75 - Sampling Procedures-ASTM C136 - Gradation of aggregates by sieve analysis-CT 227 - Cleanness of coarse aggrate-ASTM C128 - Bulk specific gravity	Yes - 1 Sample & Test minimum for each aggregate source.	

City of Fresno - Quality Assurance Program Summary

Project Name: EXAMPLE
Project Number: #####
Project Inspector: N/A
Project AT Firm: N/A

Materials to be Sampled or Tested	Sample Size	Sampling/Testing Frequency	Test Method/Comment	Required for Project	Sampling/Testing Summary
Freshly mixed Concrete for CIDH	1 cu.ft	One set of 4 - 6"x12" cylinders per 300 cy. Yd Minimum one set per project	ASTM C172/C31 - Sampling PCC/Making Cylinders in Field-ASTM C39 - Testing of concrete for compressive strength using 6" x 12" cylinder-ASTM C143/C172 - Testing of slump concrete.	Yes - 1 Sample & Test for each CIDH Pile minimum.	
Freshly mixed Structural Concrete for Bridge, Pier protection wall and Approach Slabs	1 cu.ft	One set of 4 - 6"x12" cylinders per 300 cy. Yd <u>Minimum one set per Structure pour.</u>	ASTM C172/C31 - Sampling PCC/Making Cylinders in Field-ASTM C39 - Testing of concrete for compressive strength using 6" x 12" cylinder-ASTM C143/C172 - Testing of slump concrete.	Yes - 17 Samples & Tests Minimum	
Freshly mixed Structural Concrete for Bridge, Pier protection wall and Approach slab	1 cu.ft	One set of three 4"x4"x11.25" Specimens, prior to production during mix design process.	AASHTO T 160 Modified, See Standard Spec. Section 90-1.01D(3). Engineer may use Contractor-provided test results for acceptance. Test results must be within 3 years of Contract authorization date.	Yes	
Freshly mixed concrete for Curb & Guter, Median islands, Sidewalks Drive Ways and Curb Ramps.	1 cu.ft	One set of 4 - 6"x12" cylinders per 300 cy. Yd Minimum one set per project	ASTM C172/C31 - Sampling PCC/Making Cylinders in Field-ASTM C39 - Testing of concrete for compressive strength using 6" x 12" cylinder-ASTM C143/C172 - Testing of slump concrete-	Yes - 4 Sets & Tests Minimum.	
Freshly mixed concrete Storm Drain Inlets and Manholes	1 cu.ft	One set of 4 - 6"x12" cylinders per 300 cy. Yd Minimum one set per project	ASTM C172/C31 - Sampling PCC/Making Cylinders in Field-ASTM C39 - Testing of concrete for compressive strength using 6" x 12" cylinder-ASTM C143/C172 - Testing of slump concrete-	Yes - 5 Sets & Tests Min.	
REINFORCEMENT					
Prestressing - Steel Strand	Sample strand at various sizes	This item may be accepted using a Certificate of Compliance. Sample and test at least two strands per job when COC is not available	ASTM A370, A416,E328 - Test determines the tensile strength of uncoated seven wire stress relieved strand for pre-stressed concrete	Yes - For each Supplier on the project	
Prestressing hardware	Sample strand at various sizes	This item may be accepted using a Certificate of Compliance. Sample and test at least two strands per job when COC is not available	Subittal Process	Yes - For each Supplier on the project	
Prestressing ducts	Sample strand at various sizes	This item may be accepted using a Certificate of Compliance. Sample and test at least two strands per job when COC is not available	Submittal Process	Yes - For each Supplier on the project	
Prestressing grout	Sample strand at various sizes	Provide Cement COC for grout. Eflux testing by Contactor and Inspector.	See Specification for eflux testing details	Yes - For each Supplier on the project	

City of Fresno - Quality Assurance Program Summary

Project Name: EXAMPLE
 Project Number: #####
 Project Inspector: N/A
 Project AT Firm: N/A

Materials to be Sampled or Tested	Sample Size	Sampling/Testing Frequency	Test Method/Comment	Required for Project	Sampling/Testing Summary
Polymer Fiber	N/A	This item may be accepted using a Certificate of Compliance.	Submittal Process	Yes - For each Supplier on the project	
CIDH Reinforcing / Splicing	N/A	This item may be accepted using a Certificate of Compliance.	Submittal Process	Yes - For each Supplier on the project	
Steel Rebar	Sample rebar at various sizes	This item may be accepted using a Certificate of Compliance. Sample and test at least two steel rebar per job when COC is not available	ASTM A615, A370 - Test determines the steel reinforcement bar tensile strength and bend capability	Yes - For each Supplier on the project	Accepted NUCOR COC dated 9/22/2020. See QAP file.
Steel Rebar Couplers	Sample various sizes	This item may be accepted using a Certificate of Compliance. Sample and test at least 10% per job.	See Specification for testing details	Yes - For each Supplier on the project	
Galvanized Reinforcing	Sample various sizes	This item may be accepted using a Certificate of Compliance. Sample and test at least two steel rebar per job when COC is not available	Submittal Process. See Specifications for testing details	Yes - For each Supplier on the project	
Flash Welded Hoops	Sample various sizes	This item may be accepted using a Certificate of Compliance. Sample and test at least 10% per job.	See Specifications for testing details	Yes - For each Supplier on the project	
Welded Wire Mats	N/A	This item may be accepted using a Certificate of Compliance. Sample and test at least 10% per job.	See Specifications for testing details	Yes - For each Supplier on the project	
Welded Wire Mat Couplers	N/A	This item may be accepted using a Certificate of Compliance. Sample and test at least 10% per job.	See Specifications for testing details	Yes - For each Supplier on the project	
HOT MIX ASPHALT					
All testing	N/A	Certificate of Compliance from each supplier used on project	Submit as part of submittal process	Yes	
Asphalt concrete testing	one 30 lb sample	Obtain one sample for each 750 tons of AC placed <u>or</u> once per day which ever is greater	*ASTM 1560,D1561, CT366 -*Standard test methods unless otherwise specified. Stability value of asphalt concrete	YES - 7 Samples Minimum.	
Asphalt concrete testing	one 50 lb sample	Test one sample for each 750 tons of AC placed <u>or</u> once per job which ever is greater.Sample from plant production off belt	ASTM D75 - Procedures to sample aggregate from belt or hopper, random basis	YES - 7 Samples Minimum.	
Asphalt concrete testing	one 50 lb sample	Test one sample for each 750 tons of AC placed <u>or</u> once per job which ever is greater.Sample from plant production off belt	ASTM D1139/C136, CT 202 - Gradation of aggregates by sieve analysis - perapproved mix design	Yes - 7 Samples & Tests Minimum	
Asphalt concrete testing	one 50 lb sample	Test one sample for each 1,000 tons of AC placed <u>or</u> once job which ever is greater. . Sample from plant production off belt or place of delivery	ASTM D979 - Standard practice for sampling asphalt paving mixtures	Yes - 7 Samples & Tests Minimum	

City of Fresno - Quality Assurance Program Summary

Project Name: EXAMPLE
Project Number: #####
Project Inspector: N/A
Project AT Firm: N/A

Materials to be Sampled or Tested	Sample Size	Sampling/Testing Frequency	Test Method/Comment	Required for Project	Sampling/Testing Summary
Asphalt concrete testing	one 30 lb sample	Test one sample for each 1,000 tons of AC placed <u>or</u> once per job which ever is greater. Sample from plant production off belt or place of delivery	ASTM D 2172 extraction method or CT 382 utilizing ignition oven method. Determination of oil content - per approved mix design - Extraction or ignition oven method	Yes - 7 Samples & Tests Minimum	
Asphalt concrete Aggregate testing	one 100 lb sample	Once per job from cold feed belt	ASTM D1139/C88/C142/C131 - Sulfate soundness, clay lumps, and friable particles, degradation resistance	Yes - 1 Sample & Test Min.for each aggregate source	
Asphalt Binder (sampling)	0.5 Gallon	Sampled once per year, per AC supplier	PG 64-10 Compliance Testing	Yes - 1 sample & Test	Testing completed by Asphalt Pavement And Recycling Technologies, Inc, report dated 5-5-20, documented in City QAP Manual.
SOURCE INSPECTION ITEMS					
MSE	N/A	Source Inspection Required for Mats, inspection wire, Elastomeric Bearing Pads and Precast Panels	Source Inspection Required - For Welded Wire Mats and Precast panels per section 51 & 52 of the State Standeard Specifications	Yes	
CIDH Excavation	N/A	Inspection by Geotechnical Engineer as needed during Excavation	Source Inspection Required	Yes	
CIDH Concrete	N/A	For "wet" piles: down hole camera and silt testing, GGL and CSL testing and subsequent Geotechnical and Structural Evaluation	Source Inspection Required	Yes	
Prestressing	N/A	Source Inspection required for Strand & PT hardware	Source Inspection Required	Yes	
Structural Concrete	N/A	Source inspection of Reinforced Elastomeric Pads.	Source Inspection Required	Yes	
Joint Seal Materials & Assemblies	N/A	Source inspection of Joint Seal Assemblies	Source Inspection Required	Yes	
Reinforcing Bar	N/A	Source Inspection of - Mechanical Couplers, Galvanized Reinforcing, Flash Welded Hoops and headed reinforcing	Source Inspection Required	Yes	
Miscellaneous Metal	N/A	Source Inspection of Joint Armor Plates	Source Inspection Required	Yes	
Chain Link Railing	N/A	Source Inspection of Rail Fabrication and Galvanizing	Source Inspection Required	Yes	
Bridge Grounding & Bonding	N/A	Source Inspection of Wire & Plates	Source Inspection Required	Yes	
ADDITIONAL ITEMS FOR ACCEPTANCE TESTING					
Signal Loop Conductors	Submittal	Certificate of Compliance from each supplier of product used on project	Submittal Process	Yes	
Striping Paint & Signage	Submittal	Certificate of Compliance from each supplier of product used on project	Submittal Process	Yes	
Traffic Signal Posts	Submittal	Certificate of Compliance from each supplier of product used on project	Submittal Process	Yes	

City of Fresno - Quality Assurance Program Summary

Project Name: EXAMPLE
Project Number: #####
Project Inspector: N/A
Project AT Firm: N/A

Materials to be Sampled or Tested	Sample Size	Sampling/Testing Frequency	Test Method/Comment	Required for Project	Sampling/Testing Summary
Traffic Signal Mast Arms	Submittal	Certificate of Compliance from each supplier of product used on project	Submittal Process	Yes	
Pedestrian Push Buttons	Submittal	Certificate of Compliance from each supplier of product used on project	Submittal Process	Yes	
Cable Railing	Submittal	Certificate of Compliance from each supplier of product used on project	Submittal Process	Yes	
Chain Link Railing	Submittal	Certificate of Compliance from each supplier of product used on project	Submittal Process	Yes	
Welded Steel Pipe Casing	Submittal	Certificate of Compliance from each supplier of product used on project	Submittal Process	Yes	
Miscellaneous Metal	Submittal	Certificate of Compliance from each supplier of product used on project	Submittal Process	Yes	
MSE Elastomeric Bearing Pads	Submittal	Certificate of Compliance from each supplier of product used on project	Submittal Process	Yes	
MSE Fabric	Submittal	Certificate of Compliance from each supplier of product used on project	Submittal Process	Yes	
MSE Neoprene	Submittal	Certificate of Compliance from each supplier of product used on project	Submittal Process	Yes	
MSE Precast Panels	Submittal	Certificate of Compliance from each supplier of product used on project	Submittal Process	Yes	
CIDH Drilling Slurry	Submittal	Certificate of Compliance from each supplier of product used on project	Submittal Process	Yes	
Reinforced Elastomeric pads	Submittal	Certificate of Compliance from each supplier of product used on project	Submittal Process	Yes	
Expansion Joint filler for Structural Concrete	Submittal	Certificate of Compliance from each supplier of product used on project	Submittal Process	Yes	
Approach Slab Galvanized Rods	Submittal	Certificate of Compliance from each supplier of product used on project	Submittal Process	Yes	
Joint Seal Materials & Assemblies	Submittal	Certificate of Compliance from each supplier of product used on project	Submittal Process	Yes	
Approach Slab Plastic Slotted Pipe	Submittal	Certificate of Compliance from each supplier of product used on project	Submittal Process	Yes	
Approach Slab Filter Fabric	Submittal	Certificate of Compliance from each supplier of product used on project	Submittal Process	Yes	
Steel Water pipe and Appurtenances	Submittal	Certificate of Compliance from each supplier of product used on project	Submittal Process	Yes	
Approach Slab Woven Fabric	Submittal	Certificate of Compliance from each supplier of product used on project	Submittal Process	Yes	

A review of the plans and specifications conducted by Construction Management Staff prior to the start of construction, indicates the above specified items require AT sampling and testing for this project.

City of Fresno - Quality Assurance Program Summary

Project Name:

EXAMPLE

Project Number:

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Project Inspector:

N/A

Project AT Firm:

N/A

Materials to be Sampled or Tested	Sample Size	Sampling/Testing Frequency	Test Method/Comment	Required for Project	Sampling/Testing Summary
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Date:

Johnan Ruiz

QAP Coordinator

ATTACHMENT 3D

**MATERIALS ACCEPTED
BY CERTIFICATE OF
COMPLIANCE**

**LOCAL ASSISTANCE
PROCEDURES MANUAL
(LAPM) EXHIBIT 16-T1**

Exhibit 16-T1: Materials Requiring a Certificate of Compliance per Caltrans Standard Specifications

Caltrans 2018 Standard Specifications	Material	Additional Info and/or Attachments Required*
6-1.04 BUY AMERICA		
6-1.04B	Crumb rubber	COC
6-1.04C	Steel and iron materials	COC + cert. mill test reports
11-2 WELDING QUALITY CONTROL		
11-2.03D	Welding	COC
12-3 TEMP. TRAFFIC CONTROL DEVICES		
12-3.03A(3)	Plastic traffic drums	COC
12-3.20A(3)	Type K temporary railing	COC
12-3.23A(3)	Attenuator	COC
12-3.32A(3)	Portable CMS	COC
13-2 WATER POLLUTION CONTROL PROGRAM		
13-9 TEMP. CONCRETE WASHOUTS		
13-9.01C	Fabric bags for gravel-filled bags	COC
	Plastic liner	COC
13-10 TEMP. LINEAR SEDIMENT BARRIERS		
13-10.01C	Fiber rolls	COC
	Silt fence fabrics	COC
	Sediment filter bags	COC
	Foam barriers	COC
	Fabric for gravel-filled bags	COC
16-2.03 TEMP. HIGH-VISIBILITY FENCES		
16-2.03A(3)	High-visibility fabric	COC
18 DUST PALLIATIVES		
18-1.01C	Dust suppressant	COC
	Dust control binders	COC
	Fibers	COC
20 LANDSCAPE		
20-2 IRRIGATION		
20-2.08A(3)	Polyethylene pipe	COC
	Plastic pipe supply line	COC

* For those materials requiring additional information on or with the COC, see specification.

Caltrans 2018 Standard Specifications	Material	Additional Info and/or Attachments Required*
20-3 PLANTING		
20-2.08A(3)	Sod	COC
	Soil amendment	COC
20-5 LANDSCAPE ELEMENTS		
20-5.03A(1)(c)	Filter fabric	COC + product data
20-5.03D(1)(c)	Solidifying emulsion	COC + product data & samples
20-5.04A(3)	Wood mulch	COC + sample & authorization
21-2 EROSION CONTROL WORK		
21-2.01C(1)	Straw	COC
	Weed-free straw	COC + cert. of quarantine
	Fiber	COC
	RECP	COC
	Fasteners	COC
	Hydraulically applied erosion control materials	Submit records
21-2.01C(2)	Compost	Submit reports
21-2.01C(3)	Seed	Submit reports
21-2.01C(4)	Tackifier	COC
	Bonded fiber matrix	COC
24 STABILIZED SOILS		
24-1.01C(1)	Stabilizing agent	COC + sample
24-3 CEMENT STABILIZED SOIL		
24-3.01C	Cement	COC + sample
36-2 BASE BOND BREAKER		
36-2.01C	Base bond breaker	COC
37 BITUMINOUS SEALS		
37-1.01C	Asphalt binder	COC + test results
	Asphalt emulsion	COC + test results
37-3 SLURRY SEALS AND MICRO-SURFACINGS		
37-3.01A(3)	Asphaltic emulsion	COC + samples & test results
	Polymer modified asphaltic emulsion	COC + samples & test results
	Micro-surfacing emulsion	COC + sample & test results
37-2.04 ASPHALT RUBBER BINDER CHIP SEALS		
37-2.04A(3)	Asphalt rubber binder ingredients	COC + permits & submittals

* For those materials requiring additional information on or with the COC, see specification.

Caltrans 2018 Standard Specifications	Material	Additional Info and/or Attachments Required*
37-5 PARKING AREA SEALS		
37-5.01C	Parking area seal material	COC + sample & test results
37-6 CRACK TREATMENTS		
37-6.01C	Crack treatment materials	COC or sample & test results
39-2 HOT MIX ASPHALT		
39-2.01A(3)(f)	Liquid antistrip	COC + sample & production data
39-2.03A(3)(c)	Crumb rubber modifier	COC + test results
	Asphalt modifier	COC + test results
39-2.05A(1)(c)	Asphaltic emulsion	COC + test results
40 CONCRETE PAVEMENT		
40-1.01C(2)	Tie bars	COC
	Splice couplers for threaded bars	COC
	Dowel bars	COC
	Tie bar baskets	COC
	Joint filler	COC
	Epoxy-powder coating	COC
41 EXISTING CONCRETE PAVEMENT		
41-5 JOINT SEALS		
41-5.01C	Liquid joint sealant	COC + SDS & instructions
	Backer rods	COC + SDS & instructions
	Compression joint seal	COC + SDS & instructions
	Lubricant adhesives	COC + SDS & instructions
41-10 DRILL AND BOND BARS		
41-10.01C	Tie bars	COC
	Dowel bars	COC
	Dowel bar lubricant	COC
	Chemical adhesive	COC
	Epoxy powder coating	COC
48-2 FALSEWORK		
48-2.01C(1)	Structural composite lumber	COC + submittals
49-2 DRIVEN PILING		
49-2.02A(3)(d)	Steel pipe piles	COC + tests & mill reports
49-2.03A(3)	Structural shape steel piling	COC + test reports

* For those materials requiring additional information on or with the COC, see specification.

Caltrans 2018 Standard Specifications	Material	Additional Info and/or Attachments Required*
51 CONCRETE STRUCTURES		
51-1.01C(3)	Bonding materials	COC or sample & authorization
51-2 JOINTS		
51-2.01A(3)	Polyethylene material for snowplow deflectors	COC
51-2.02B(1)(c)	Sealant	COC + test reports & samples
51-2.02C(1)(c)	Elastomeric joint seal	COC + test reports
	Lubricant-adhesive	COC + test reports
51-2.02D(1)(c)	Joint seal materials	COC + authorization
51-2.02E(1)(c)(iii)	Joint seal assembly materials	COC
51-2.02F(1)(c)(iv)	Material used in the joint seals	COC + test reports
51-2.04A(3)	Waterstop material	COC + a statement
51-3 BEARINGS		
51-3.02A(3)(c)	Elastomer for bearing pads	COC + test reports
51-4 PRECAST CONCRETE MEMBERS		
51-4.01C(1)	Concrete box culvert	COC
52 REINFORCEMENT		
52-1.01C(3)	Reinforcement (rebar)	COC + mill test report
52-2 EPOXY-COATED REINFORCEMENT		
52-2.02A(3)(c)	Epoxy-coated reinforcement	COC + submittals
	Patching material	COC + a statement
52-5.01C(4)	Headed bar reinforcement	COC + test reports
52-6 SPLICING		
52-6.01C(5)	Service or butt splice material	COC + submittals
54 WATERPROOFING		
54-3 PREFORMED MEMBRANE WATERPROOFING		
54-3.01C	Preformed membrane sheet	COC + report
54-5 DECK SEAL		
54-5.01C	Preformed membrane sheet	COC + report
57-2 WOOD STRUCTURES		
57-2.01A(3)	Timber and lumber	COC + report
	Glued laminated timbers/decking	COC
57-3 PLASTIC LUMBER STRUCTURES		
57-3.01C(1)	Plastic lumber	COC + test report & sample

* For those materials requiring additional information on or with the COC, see specification.

Caltrans 2018 Standard Specifications	Material	Additional Info and/or Attachments Required*
58-2 MASONRY BLOCK		
58-2.01C(7)	CMUs	COC
	Aggregate for grout	COC
	Grout	COC
59 STRUCTURAL STEEL COATINGS		
59-1.01C	Blast cleaning material	COC + SDS
59-5 THERMAL SPRAY COAT STRUCTURAL STEEL		
59-5.01C(1)	Wire feedstock	COC
60-3.04B POLYESTER CONCRETE OVERLAYS		
60-3.04B(1)(c)	Methacrylate resins	COC + samples & test report
	Polyester resins	COC + samples & test report
	Aggregates	COC + samples & test report
61-2 CULVERT AND DRAINAGE PIPE JOINTS		
61-2.01C	Joint systems	COC + test results & reports
	Couplers	COC
64 PLASTIC PIPE		
64-1.01C	Plastic pipe	COC + report
65-2 REINFORCED CONCRETE PIPE		
65-2.01C	RCP, direct design method	COC + report
66 CORRUGATED METAL PIPE		
66-1.01C	Corrugated steel materials	COC
	Corrugated aluminum materials	COC
67-3 METAL LINE PLATE PIPE		
67-3.01C	Metal liner plate pipe	COC + mill test reports
68 SUBSURFACE DRAINS		
68-1.01C	Subsurface drain	COC
68-2 UNDERDRAINS		
68-2.01C	Pipe	COC
	Tubing	COC
	Fittings	COC
68-7 GEOCOMPOSITE DRAIN SYSTEMS		
68-7.01C	Geocomposite drain	COC + flow capability graph

* For those materials requiring additional information on or with the COC, see specification.

Caltrans 2018 Standard Specifications	Material	Additional Info and/or Attachments Required*
69 OVERSIDE DRAINS		
69-1.01C	Steel pipe piles	COC
	Aluminum	COC
	Plastic	COC
70-6 GRATED LINE DRAINS		
70-6.01C	Grated line drains	COC + docu. & inspec. report
71-3.09 MACHINE SPIRAL WOUND PVC PIPELINERS		
71-3.09A(1)(c)	Reel of PVC strip	COC + report
72-16 GABIONS		
72-16.01C	Gabion basket	COC
	PVC coating	COC + identify
75-3 MISCELLANEOUS BRIDGE METAL		
75-3.01C(1)	Anchorage devices	COC
75-3.01C(2) BRIDGE DECK DRAINAGE SYSTEM		
75-3.01C(2)	Fiberglass pipe and fittings	COC
80-3 CHAIN LINK FENCES		
80-3.01C	Protective coating system	COC
	Posts and braces	COC + test results
81 MISCELLANEOUS TRAFFIC CONTROL DEVICES		
81-2 DELINEATORS		
81-2.01C	Metal target plates	COC
	Enamel coating	COC
81-3 PAVEMENT MARKERS		
81-3.01C	Pavement markers	COC
82 SIGNS AND MARKERS		
82-2 SIGN PANELS		
82-2.01C	Aluminum sheeting	COC
	Retroreflective sheeting	COC
	Screened-process colors	COC
	Nonreflective, opaque, black film	COC
	Protective overlay film	COC

* For those materials requiring additional information on or with the COC, see specification.

Caltrans 2018 Standard Specifications	Material	Additional Info and/or Attachments Required*
82-5 MARKERS		
82-5.01C	Metal target plates	COC
	Enamel coating	COC
	Retroreflective sheeting	COC
83-3 CONCRETE BARRIERS		
83-3.01C	Type 60K portable concrete barrier	COC or test reports
84-2 TRAFFIC STRIPES AND PAVEMENT MARKINGS		
84-2.01C	Thermoplastic	COC + autho., SDS & data sheet
	Paint	COC + autho., SDS & data sheet
	Glass beads	COC + autho., SDS & data sheet
	Thermoplastic primer	COC + test results
DIVISION X ELECTRICAL WORK		
86-1.01C(6)	Signal heads	COC + test data
	Visors	COC + test data
87-2 LIGHTING SYSTEMS		
87-2.01C	High mast lighting luminaires	COC + test data
90 CONCRETE		
90-1.01C(3)	Cementitious materials	COC + app. signature
	Blended cement	COC + app. signature
90-1.01C(4)	Admixture	COC + authorization
90-1.01C(5)	Curing compound	COC + test samples
90-2 MINOR CONCRETE		
90-2.01C	Minor concrete	COC + weighmaster cert
90-3 RAPID STRENGTH CONCRETE		
90-3.01C(3)	Aggregate	COC + certified weight
	Cementitious materials	COC + certified weight
	Admixtures	COC + certified weight
90-4 PRECAST CONCRETE		
90-4.01C(2) and 90-4.01D(2)(a)	Cementitious materials	COC + app. signature
	Precast members (each)	COC + app. signature
	Curing compound	COC + test samples
94 ASPHALTIC EMULSIONS		
94-1.01C	Asphaltic emulsion	COC + reports

* For those materials requiring additional information on or with the COC, see specification.

Materials Requiring a Certificate of Compliance per Caltrans Standard Specifications

Caltrans 2018 Standard Specifications	Material	Additional Info and/or Attachments Required*
95 EPOXY		
95-1.01C	Epoxy	COC
96 GEOSYNTHETICS		
95-1.01C(1)	Geosynthetic	COC + test samples

* For those materials requiring additional information on or with the COC, see specification.

SECTION 04

INDEPENDENT ASSURANCE REQUIREMENTS

Independent Assurance Consultant (**IAC**) will ensure laboratories performing materials acceptance testing and inspection services for the City of Fresno (**City**) are accredited and these acceptance samplers and testers are qualified.

This generally includes verifying test equipment, checking for current calibration stickers, reviewing the testing laboratory's Quality Control Manual, issuing written examinations to qualify samplers and testers, and issuing Certificates of Proficiencies.

IAC will be compensated at the agreed upon rates. Current agreements between the Independent Assurance Consultant and the City of Fresno can be found at the Construction Management office (1721 Van Ness Avenue Fresno, CA 93721).

QUALIFICATIONS FOR IAC

IAC shall be qualified to verify equipment calibration, perform witness tests, perform proficiency tests, issue sampler and tester qualification certificates, issue laboratory accreditation and prepare accurate records associated with all IA services.

MINIMUM QUALIFICATIONS FOR THE IAC ARE NOTED BELOW:

The consultant shall have at least three years of experience in materials testing and/or construction.

IAC shall regularly perform proficiency tests with Caltrans, AMRL, CCRL and/or all.

IAC shall maintain accurate IA records, as outlined in this QAP. The IA shall have a good knowledge of all facets of the construction process. Specifically, the IAC should have a good understanding of transportation construction practices, standard test procedures, equipment calibration and materials testing. The IAC shall be organized and familiar with the City's approved QAP.

PROFICIENCY TESTING BY THE IAC

The IAC shall oversee a laboratory that performs annual proficiency tests using AMRL, CCRL and/or CT methods. Proficiency tests are also called corroboration tests, round-robin tests and split-sample tests. For local agencies that use ASTM and AASHTO standards, the qualified laboratory should be accredited by AASHTO and perform annual proficiency tests with AMRL and/or CCRL.

IAC RESTRICTIONS -IAC MUST REMAIN INDEPENDENT FROM ACCEPTANCE TESTING

The IAC shall not perform both IA services and acceptance testing for the City. The IAC shall remain totally separate (or independent) from all elements of the specification compliance process. The main function of the IAC is to “test the acceptance tester” and not be directly involved with the acceptance of materials.

USE SEPARATE TESTING EQUIPMENT FOR IA ACTIVITIES

When acceptance testers perform proficiency tests, the IAC shall not use testing equipment that is also used for acceptance testing. Separate testing equipment should be used. This separate equipment shall never be used by others, especially workers who perform acceptance testing for the City of Fresno.

ISSUING CERTIFICATES OF PROFICIENCY FOR ACCEPTANCE SAMPLERS AND TESTERS

Annually the IAC shall issue a Certificate of Proficiency to all materials acceptance samplers and testers to qualify these persons to perform work for the City of Fresno. To assist with this qualification process, samplers and/or testers may be asked to take a standard written examination to demonstrate knowledge of the test procedure. The Certificate of Proficiency shall include the following items:

- The printed full name of the acceptance sampler and/or tester
- The company and address of the qualified sampler and/or tester
- A list of the test methods the sampler and/or tester is qualified to perform
- The re-qualification date (month and year) for each test
- The printed name (and signature) of the IA person
- The date the certificate is issued

Each sampler and/or tester shall receive a copy of the Certificate of Proficiency. Prior to sampling and testing on any City of Fresno project, the IAC shall provide the Resident Engineer or their designated representative with a copy of the Certificate of Proficiency for each sampler and tester on the project. Current copies of these certifications can be found at the Construction Management office (1721 Van Ness Avenue Fresno, CA 93721).

ISSUING LABORATORY ACCREDITATION CERTIFICATES

At least once during each calendar year, the IAC shall review each materials testing laboratory that performs work for the City of Fresno to verify the laboratory has the following:

- A current copy of the local agency's QAP (signed and dated by the city engineer).
- A current copy of all test methods used by the local agency.
- Proper test equipment (with firmly attached calibration stickers dated within 12 months of the current date), supporting calibration records and round-robin test results (from an accredited laboratory tied to AMRL, CCRL or Caltrans' RSP).

The Laboratory Accreditation Certificate shall include the printed name and address of the laboratory, the accreditation date, a list of the tests the laboratory is accredited to perform and the full name of the IA person, and a statement that all of the above requirements have been met. Current copies of these certifications can be at the found Construction Management office (1721 Van Ness Avenue Fresno, CA 93721)

PERFORMING WITNESS TESTS

At least once during each calendar year, the IAC shall meet with the local agency acceptance samplers and testers, and observe them perform the test (or tests) that they are qualified to perform.

The meeting location may be designated by the IAC. Materials used for the witness testing may be from any source or location determined by the IAC. If the IA person observes that the sampling and/or testing procedures are performed correctly, the successful witness test is documented.

However, if a test is not performed correctly, or the equipment does not have a proper calibration sticker, the IA person is required to immediately notify the acceptance sampler and/or tester that they are disqualified for that test. The disqualified person should also be handed a notice stating the terms of the decertification. An example would be: "the acceptance tester improperly used a wooden stake instead of the required tamping rod to consolidate the concrete during fabrication of the test cylinders."

The disqualified person should then wait at least seven days before requesting another witness test for the test that was incorrectly performed. It should be noted, that when a person is disqualified for one or more tests, the person is still qualified to perform the other tests identified on the Certificate of Proficiency.

In the event of any extenuating circumstance that does not allow the IAC to meet with the AT personnel the local agency will rely on the existing valid certifications of proficiency obtained by the Acceptance Laboratory through an outside certification program such as

AASHTO AMRL/CCRL, American Concrete Institute (ACI), Caltrans Joint Training & Certification Program (JTCP), National Institute for Certifications in Engineering Technology (NICET). Or any other nationally or state recognized program.

PERFORMING PROFICIENCY TESTS (ALSO KNOWN AS CORROBORATION TESTS, ROUND-ROBIN TESTS AND SPLIT SAMPLE TESTS)

At least once during each calendar year, the IAC shall present each acceptance tester with a representative sample of soil or aggregate for proficiency testing. Corroboration samples are prepared by the IAC using materials either on or off the project site. One split sample is tested by the IA person, using test equipment not used for acceptance testing. These test results are used as a standard to evaluate the results obtained by the acceptance tester.

After a second split sample is presented to the acceptance tester, the acceptance tester is asked to go to the laboratory and perform the following tests: sand equivalent, cleanness value and sieve analysis.

The acceptance tester's results shall be e-mailed or faxed to the IAC within three days after the split sample is presented. Test results from the acceptance tester are then compared to the test results of the IAC using the following table.

DEGREE OF COORBORATION

Type of Test, Sieve Analysis (Percent Passing)

	Good (Satisfactory)	Fair (Satisfactory)	Poor (Unsatisfactory)
No. 4 Sieve and and larger	2 or less	3 to 4	5 or more
No. 8 – No. 30	2 or Less	3	4 or more
No. 50 – No. 100	2 or less	3	4 or more
No. 200	1 or less	2	3 or more
Sand Equivalent (Nearest whole number)	3 or less	4 to 5	6 or more
Cleanness (Nearest whole number)	3 or less	Value 4 to 6	7 or more

When an acceptance tester receives an “unsatisfactory rating”, the IAC shall immediately meet with the tester, examine the test equipment, the equipment calibration scores, and the

test procedures used by the acceptance tester and witness the acceptance tester perform the test using their own test equipment. If the non-corroboration can be resolved and a satisfactory score achieved by the acceptance tester, the acceptance tester may continue to perform testing on the project. If the non-corroboration cannot be resolved, both the tester and equipment cannot continue to be used for acceptance testing and the tester is disqualified for the test in question until the problem is resolved. Usually this is done by presenting a second split sample for testing. It should be noted, that when a tester is disqualified for one test, the tester is still qualified to perform the other tests identified on the Certificate of Proficiency. The disqualified tester should also be handed a notice stating the terms of the disqualification. The tester must wait at least seven days before requesting another witness test for the test that was incorrectly performed. All Resident Engineers or project engineers should immediately be notified once an acceptance tester becomes disqualified.

PROCEDURES FOR TESTER REINSTATEMENT

Once a tester has been disqualified, the tester must wait at least 7 days before contacting the IA person to request a meeting to become re-qualified. After the waiting period, the IA person may decide to give the acceptance tester another written examination, ask the acceptance tester to present test equipment with a current calibration sticker, perform another witness test, and/or conduct another split sample test. Once satisfied that the acceptance tester is now performing the test satisfactorily (using properly calibrated test equipment and correct test procedures), the IA person is required to reissue an updated Certificate of Proficiency. It is the responsibility of the IA person to record and maintain all IA documents pertaining to the reinstatement of the acceptance sampler and/or tester, (i.e., copy of the written disqualification notice, record of written examinations, recertification notice, etc.). It is the responsibility of the acceptance tester to immediately show their updated Certificate of Proficiency to the Resident Engineer or project engineer.

PROCEDURE FOR DISPUTE RESOLUTION

Dispute resolution refers to the process of denial, suspension, revocation, appeals, and reinstatement of an IA person, an acceptance sampler and tester, or a laboratory. If the contractor or acceptance laboratory has a dispute with the City of Fresno involving a quality assurance item, a manager from the City shall be selected to review the dispute. The IAC and the party in dispute will submit his/her substantiating paperwork to the management person, within 10 days after requested to do so. In some cases, one or more meetings may be needed to resolve disputes. Within a 30-day period, the City of Fresno management person should try to resolve the dispute, based on the evidence presented. Appeals by the contractor, acceptance tester or, the IAC person, may be made after the final decision by the local agency management person. The person making the appeal should be directed to contact the City Engineer no more than 14 days after receiving written notice of the final decision by the management person.

The City Engineer will head up the appeal process. Again, evidence will be presented and a final decision should be made within 30 days after receipt of the appeal. For additional guidelines concerning the dispute resolution process, refer to Caltrans IA Manual.

MAINTAINING ACCURATE RECORDS

It is the responsibility of the IAC and the City of Fresno project team to create, and maintain accurate records for all IA and acceptance materials testing performed on City of Fresno projects. Per CFR Title 49, Section 18.42, a local agency using federal funds for a transportation project must maintain pertinent construction records for three years subsequent to final project voucher reimbursement or through the period of litigation, whichever is later. A complete set of Records shall include the following:

- A log summary of the acceptance tests taken on the project (project QAP file and attachment 3C of this QAP)
- Copies of all tester qualification and lab certifications (QAP file, Construction Management office)
- All acceptance tests taken on the project (project QAP file)
- Copies of all IA testing performed on the project (project QAP file)
- Copies of Certificates of Compliance (project QAP file)
- Records of pre-manufactured materials (project QAP file)
- Materials certificate signed by the Resident Engineer at the completion of the project (project QAP file, attachment 5A of this QAP)
- A copy of the approved QAP with the date of approval (Construction Management Office)

SECTION 05

PROJECT COMPLETION / MATERIALS CERTIFICATION

PROJECT CERTIFICATION

Upon completion of a Federal-aid project a "Materials Certificate" shall be completed by the Resident Engineer.

The Agency shall include a "Materials Certificate" in the Report of Expenditures submitted to the Caltrans District Director, Attention: District Local Assistance Engineer.

A copy of the "Materials Certificate" shall also be included in the Agency's construction records. The Resident Engineer in charge of the construction function for the Agency shall sign the certificate.

All materials incorporated into the work which did not conform to specifications must be explained and justified on the "Materials Certification", including changes by virtue of contract change orders. See Attachment 5A within this section for an example "Materials Certification".

RECORDS


All materials acceptance test and inspection reports are to be reported timely to the construction management/ City inspection team during construction and ultimately kept in the projects quality assurance folder. All test and inspections performed are to be performed by a certified tester through the City's IA program and the tester/inspectors name is to be clearly indicated on the report.

All IAC issued certifications are to be kept up to date and managed by the City's IAC. Failure to maintain accurate records will result in non-utilization of the tester, inspector or lab.

All material records of samples and tests, material releases and certificates of compliance for the construction project shall be incorporated into the Resident Engineer's project file. If a Federal-aid project:

- The files shall be organized as described in Section 16 of the Local Assistance Procedures Manual.
- The complete project file will be available at a single location for inspection by Caltrans and Federal Highway Administration (FHWA) personnel.
- The project files shall be available for at least three years following the date of final project voucher.
- The use of a "Log Summary," as shown in attachment 3E of this QAP Manual facilitates reviews of material sampling and testing by Caltrans and FHWA, and assists the Resident Engineer in tracking the frequency of testing.

When two or more projects are being furnished identical materials simultaneously from the same plant, it is not necessary to take separate samples or perform separate tests for each project; however, copies of the test reports are to be provided for each of the projects to complete the records.

APPROVED BY:  RCE#78353 , Exp: 09/30/2023
(Signature) (CE# and Expiration Date)

NAME: Randall Morrison DATE: 03/21/2022

TITLE: Assistant Director of Public Works
(City of Fresno)

ATTACHMENT 5A

**EXAMPLE MATERIALS
CERTIFICATION FOR
PROJECT COMPLETION**

MATERIALS CERTIFICATE

Date: _____
Federal-Aid Project No.: «Funding_Source»
Caltrans File Category 61: _____
Job Stamp _____

Project: «Desc»

Subject: **Materials Certification**

This is to certify that:

The results of the tests on acceptance samples indicate that the materials incorporated in the construction work and the construction operations controlled by sampling and testing were in conformity with the approved plans and specifications.

- ☐ Exceptions to the plans and specifications are explained on the back of this memorandum (or on attached sheet).
- ☒ No exceptions to the plans and specifications were found.

Scott Sehm, PE Public Works Manager

Date

Distribution: 1) Local agency Project Files (original)
2) DLAE (1 copy in Report of Expenditures)