STATE OF CALIFORNIA

DEPARTMENT OF TRANSPORTATION

MANUAL CHANGE TRANSMITTAL		NO. 20-7
TITLE: Department of Transportation *Construction Manual*	APPROVED BY: Ramon Hopkins, Acting Chief Division of Construction	DATE ISSUED: **12-3-2020**
SUBJECT AREA Sections 3-7, 4-39, 5-4 and 6-1	ISSUING UNIT Division of Construction	
SUPERSEDES Sections 3-7 of June 2019, 4-39 of October 2019, 5-4 of December 2019, and 6-1 of June 2020	DISTRIBUTION All Requested Manual Holders	

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

MCT 20-7 [12/3/20]

Section 3-7, "Legal Relations and Responsibility to the Public"

Adds section 3-705, "Unsheltered Individuals Encampments," guidance for new specification requirements concerning roles and responsibilities in the removal and cleanup of unsheltered encampment areas. On-going contracts without the new specification requirements should continue to use CPD 20-17, "Unsheltered Encampments – COVID-19 Project Effects," for guidance.

Section 4-39, "Asphalt Concrete"

Update adds details throughout about administering contracts using hot mix asphalt statistical pay factor specifications. The specifications will be piloted on various projects in 2021 prior to incorporating them into the *Standard Specifications.*

Section 5-4, "Disputes"

Revisions include modification of target day timeframes within the claims process, clarification of dispute resolution authority, and introduction of a Department management meeting alternative within the claims process.

Section 6-1, "Sampling Types and Frequencies"

Add details in tables for sampling tests and frequencies for asphalt concrete when statistical pay factors are used to calculate project costs.

Chapter 3 General Provisions

Section 7 Legal Relations and Responsibility to the Public

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Section 7 Legal Relations and Responsibility to the Public

3-701 Laws to Be Observed

The contractor must be familiar with and comply with all laws, regulations, and ordinances that affect the labor, materials, and conduct of the work. However, the specifications do not intend or require that the resident engineer exercise police enforcement power. If the resident engineer learns that the contractor has violated a work-related law or regulation, the engineer must bring the matter to the contractor's attention in writing.

3-701A Reporting Apparent Attempts at Fraud on Construction Contracts

Resident engineers are confronted occasionally with situations where contractors or their subcontractors or suppliers attempt to obtain improper additional payment.

These matters may differ in magnitude and intent, and minor situations may be resolved satisfactorily at the project level. However, certain fraudulent acts, such as presenting false weighmaster certificates, padding the number of loads of a commodity delivered, tampering with scales, or falsifying test or inspection reports may require special investigation and appropriate action. Such investigations are confidential and begin with a discussion between the resident engineer and the construction engineer. To request a special investigation, write a letter to the Division of Construction field coordinator.

3-701B Labor Code Requirements and Fair Labor Standards Act

For the resident engineer's duties with regard to California Labor Code requirements and the U.S. Fair Labor Standards Act, refer to Chapter 8, "Employment Practices," of this manual.

3-701C Vehicle Code

In any areas open to public traffic within the project's limits, the contractor is not exempt from Vehicle Code requirements. Equipment that fails to comply with the Vehicle Code must not be operated on detours or any other roadway open to public traffic. Refer to Section 3-521B, "Load Limits," of this manual.

3-701D Occupational Safety and Health Standards

The contractor must conform to all Department of Industrial Relations, Division of Occupational Safety and Health standards. Refer to Section 2-1, "Safety," of this manual for guidelines on administering the contract's safety requirements.

3-701D (1) Excavation Safety

Structure Construction's *Trenching and Shoring Manual* provides technical guidance for analyzing designs of trenching and shoring systems. It also contains information

regarding California's legal requirements for excavation safety. The *Trenching and Shoring Manual* is available at:

https://dot.ca.gov/programs/engineering-services/

3-701D (2) Tunnel Safety

The California Code of Regulations, Title 8, Subchapter 20, "Tunnel Safety Orders," establishes minimum safety standards for excavation, construction, alteration, repair, or demolition. The contract will describe tunnel locations and the information handout with it will describe the classification. However, the contractor's activities may also create work conditions that will fall under the tunnel safety orders that were not identified in the contract. Be aware of potential tunneling activities such as the following:

- Boring and jacking operations of pipes with an outside diameter of 30 inches or greater.
- Shafts where excavations are greater than 20 feet deep, the depth is at least twice its greatest cross-sectional dimension, and employees may enter the shaft or approach the shaft area. Cofferdams may fit this definition.

The regulations related to these activities are covered in detail at the California Department of Industrial Relations web site:

http://www.dir.ca.gov/Title8/sub20.html

Consult the district construction safety coordinator for guidance.

3-701E Falsework Erection or Removal

Detailed instructions for reviewing falsework for bridges or other major structures are contained in Structure Construction's *Falsework Manual*. When the erection or dismantling of falsework is over or adjacent to a traveled way, the resident engineer must do the following:

- Before the erection or removal of falsework, determine the exact method of operation the contractor proposes to use.
- If any possibility exists that a material or equipment failure or human error could endanger the public, make sure traffic is rerouted or temporarily stopped during critical portions of the erection and removal operations.

Normally, the contract will provide necessary detours or other restrictions, such as the time of day when certain operations may be performed. In the absence of specific contract requirements, require the contractor to take the necessary measures in accordance with Section 7-1.04, "Public Safety," of the *Standard Specifications*.

3-702 Public Convenience

The following sections provide guidelines for enforcing the provisions in Section 7-1.03, "Public Convenience," of the *Standard Specifications* and contain discussion of other topics related to the passage of public traffic through construction projects.

3-702A Convenience of the Public and Public Traffic

The contractor has a contractual obligation to provide for the convenience of the public and public traffic. Section 7-1.03, "Public Convenience," of the *Standard Specifications* requires that operations present the least possible obstruction and inconvenience to the public. The public consists of anyone passing through or affected by construction operations, including pedestrians and residents, as well as vehicular traffic.

Make sure that the contractor maintains safe and convenient access through and around work zones for bicyclists and pedestrians, including persons with disabilities. For guidance, refer to Section 2-216, "Pedestrian Facilities," of this manual.

Make sure the contractor has made adequate provisions for public convenience when the specifications leave the manner of providing for convenience to the contractor's discretion. Also, make sure the contractor does not unnecessarily delay or interfere with traffic for the contractor's own benefit or convenience.

The "least possible obstruction and inconvenience" will always depend on judgment. What is permissible should be that which is accepted as good practice in the industry, complies with the specifications, and does not materially diminish the degree of convenience and free passage through the area that existed before construction. For example, do not accept a trench that lies adjacent to a traffic lane for the entire length of the project and that was excavated just to suit the contractor's convenience. A length of trench sufficient to accommodate an orderly and efficient progression of operations is reasonable. Likewise, it is physically impossible to carry on a series of operations between an existing roadway and adjoining properties that have access to the roadway without temporarily disrupting the access. However, whether permanent or temporary, restore the access as soon as possible without waiting for the work to be completed past all the adjacent access points.

The intent of Section 7-1.03, "Public Convenience," of the *Standard Specifications* is to support public convenience, not to minimize construction cost. Frequently, the contractor can achieve both through careful planning and skillful operation.

3-702B Maintenance of Passageway Through Construction

Normally, paved detours will be provided for the passage of public traffic during construction. On low volume roads where the cost of detour construction is unreasonably high, the contract may provide for traffic to pass through the work during the grading and structural section operations. Section 7-1.03 "Public Convenience," of the *Standard Specifications* specifies the responsibility of the contractor for providing reasonably smooth and even surfaces for passage of public traffic through the work. Make sure the contractor constructs a temporary joint taper

at the specified slope when a drop-off between the existing pavement and paving or cold planing area at transverse joints cannot be avoided before opening to traffic.

3-703 Public Safety

The contractor must bear all expenses associated with those devices primarily intended to protect traffic from hazards arising because of the contractor's operations. Typical items classified as public safety devices include barricades, signs, and lights placed to guard the public against damage. The contractor must protect the public from all potential hazards that may result from the construction activities including, but not limited to, falling rocks, falling trees, collision with equipment (whether idle or in operation), open trenches, and other excavations.

Some of the factors affecting public safety include the placement, movements, and actions of workers and equipment, the disposition of workers and the placement and handling of materials.

Under the specifications, the resident engineer can point out the contractor's failure to carry out any of the specification requirements. The specifications do not relieve the contractor of the cost of protecting the public simply because the engineer has or has not called attention to an unsafe situation.

3-703A Temporary Clearance and Bridge Permit Rating Changes

The following guidelines apply to situations where temporary changes occur in vertical or horizontal clearance for vehicular traffic or where temporary changes occur in bridge permit ratings. When providing notification of changes, use Forms TR-0019, "Notice Of Change In Clearance Or Bridge Weight Rating," for divided highways; TR-0020, "Notice of Change in Vertical Or Horizontal Clearance"; or TR-0029, "Notice Of Change In Clearance Or Bridge Weight Rating." The forms are available at:

http://cefs2.dot.ca.gov/jsp/forms.jsp

3-703A (1) Temporary Vertical and Horizontal Clearance Changes

Whenever an operation will reduce clearances available to public traffic, the specifications require the contractor to notify the resident engineer at least 25 days and not more than 125 days before the anticipated start of an operation that will change the vertical or horizontal clearance available to public traffic (including shoulders). At least 15 days before implementing proposed changes in vertical clearances, horizontal clearances, or both, notify the Transportation Permits Branch of the proposed changes and their duration. If the clearance change is on a local jurisdiction roadway, notify the affected agency in writing at the same time.

3-703A (2) Temporary Bridge Permit Rating Changes

Fifteen days before implementing proposed bridge permit rating changes, the structure representative must notify the resident engineer in writing and the bridge rating engineer of the proposed ratings and their duration. Use Forms TR-0019 or

TR-0029. The bridge rating engineer must then immediately notify the Transportation Permits Branch of any rating changes.

Within 3 days of rescinding the temporary bridge permit rating, the structure representative must notify the resident engineer in writing and the bridge rating engineer. The bridge rating engineer must then immediately notify the Transportation Permits Branch.

3-703B Permanent Clearance and Bridge Permit Rating Changes

The following guidelines apply to situations where permanent changes occur in vertical or horizontal clearance for vehicular traffic or where permanent changes occur in bridge permit ratings.

3-703B (1) Permanent Vertical and Horizontal Clearance Changes

Fifteen days before implementing proposed permanent vertical and horizontal clearance changes, the resident engineer must notify the Transportation Permits Branch of the proposed changes. Use Form TR-0019, TR-0020, or TR-0029. Also, to confirm the necessary information, the resident engineer must consult the Transportation Permits Branch before making field measurements.

3-703B (2) Permanent Bridge Permit Rating Changes

Fifteen days before implementing proposed changes to the bridge permit rating, the structure representative must notify the resident engineer in writing and the bridge rating engineer of the proposed bridge permit ratings. Use Form TR-0019 or TR-0029. The bridge rating engineer must then immediately notify the Transportation Permits Branch of any rating changes.

3-703B (3) Notification Procedure

Submit changes to be reported in accordance with the above procedures to either the North Region or South Region construction liaison, maintenance liaison, or both, in the Transportation Permits Branch. The North Region liaison is responsible for districts 1, 2, 3, 4, 5 (except San Luis Obispo and Santa Barbara Counties), 6 (except Kern County), and 10. The South Region liaison is responsible for districts 5 (San Luis Obispo and Santa Barbara Counties only), 6 (Kern County only), 7, 8, 9, 11, and 12.

The Transportation Permits Branch will, within 1 business day, send a fax to the resident engineer confirming receipt of the change.

3-704 Indemnification and Insurance

The contractor's obligation for insurance is contained in various sections of the *Standard Specifications.* Section 3-1.07, "Insurance Policies," has provisions describing the types of insurance documents required. Section 3-1.18, "Contract Execution," requires the contractor to submit those insurance documents at the time the contract is executed. Section 7-1.05, "Indemnification," requires the contractor to

indemnify Caltrans and Section 7-1.06, “Insurance,” requires the contractor to carry liability insurance without allowing it to lapse.

The contractor must also have railroad protective insurance when required by the contract. This topic is covered in Section 3-704C, “Railroad Protective Insurance,” of this manual.

3-704A Responsibilities

The Division of Construction is responsible for reviewing, approving, and monitoring contractor insurance documents.

The Division of Construction sends a notice of insurance approval to the districts. Each district has a designated person responsible for notifying resident engineers about insurance-related matters. That person serves as the resident engineer’s contact for all insurance issues. The resident engineer files insurance-related documents in the contract records.

For a contractor business name change submitted under Form CEM-1202A, “Contractor Action Request—Change of Name/Address,” the Division of Construction will validate and approve insurance policies and contract bonds issued with the new business name. For additional information on Form CEM-1202A, refer to Section 3-506, “Assignment,” of this manual. Send by email an electronic copy of the reviewed Form CEM-1202A (including all attachments) and a copy of the original contract bonds to the Division of Construction at Orm.Insurance.Review@dot.ca.gov.

3-704B Evidence of Insurance

The contractor may show evidence of insurance in two ways:

- A contractor may be pre-approved for insurance before bidding on a Caltrans contract. If a contractor is pre-approved, the Division of Construction will issue a certificate of pre-approved insurance valid until the next insurance policy expiration date. The Division of Construction has posted information and instructions for pre-approval of a contractor’s insurance on its website at:

  https://dot.ca.gov/programs/construction/insurance-pre-approval/

- The contractor may bid on any Caltrans contract without first obtaining insurance. If the contractor is the apparent low bidder, it must submit the insurance documents to the Office Engineer as a condition of contract approval.

Confirm the contractor’s required insurance does not lapse during the life of the project. If the contractor has not submitted the renewed insurance documents 10 days before expiration of its previous insurance, the Division of Construction will:

- Send a notice to the contractor of the failure to comply with the insurance requirements of the contract.
- Send a copy of the notice to the district’s insurance contact and the deputy district director of construction.

If the contractor has not submitted the renewed insurance documents 1 day before the expiration of the contractor's insurance, the Division of Construction sends a second notice to the district's insurance contact with a copy to the deputy district director for construction and the Division of Construction's field coordinator.

3-704B (1) Actions Allowed by the Standard Specifications

After consultation with the deputy district director for construction and the Division of Construction field coordinator, take one or both of the following actions:

- Suspend the contractor's operations in accordance with Section 8-1.06, "Suspensions," of the *Standard Specifications* until the contractor submits the insurance documents and the Division of Construction approves them. Inform the contractor's surety in writing that the contractor has failed to maintain insurance as required by the contract and that the work has been suspended temporarily.
- Act in accordance with the provisions of Section 7-1.06H, "Enforcement," of the *Standard Specifications*, which allows Caltrans to maintain the required insurance coverage and withhold or charge the expense to the contractor or to terminate the contractor's control of the work in accordance with Section 8-1.13, "Contractor's Control Termination," of the *Standard Specifications*.

Example 3-7.1, "Notice of Contract Suspension of Work," in this section can be used for either or both of the previous actions.

3-704C Railroad Protective Insurance

State highway construction occasionally requires a contractor to work on or near a railroad's operating property. This varies from minor side encroachments to work involving the direct crossing of a railroad's tracks. The contract defines the relationships between Caltrans, the contractor, and the railroad.

When work must be performed on or near a railroad's operating properties, the contractor must provide insurance to ensure the financial ability to meet legal liability for damage, and to cover the losses that a railroad might sustain because of the contractor's operations.

Requirements for railroad protective liability insurance vary depending on the railroad company involved. If the contract includes an agreement with a railroad company, Caltrans makes the provisions of the agreement available in the *Information Handout* in the document titled "Railroad Relations and Insurance Requirements."

The district railroad agreements coordinator within the Right of Way and Land Surveys Unit in the district is the point of contact for all railroad insurance issues. Before the contractor performs contract work that encroaches on the railroad's operating properties, the resident engineer must either receive a copy of the approved insurance documents from the contractor or district railroad agreements coordinator, or confirm with the district railroad agreements coordinator that the contractor has furnished railroad protective insurance.

For emergency contracts, obtain verbal release and authority to start work after the railroad has received all the insurance documents.

3-704C (1) Responsibility

The resident engineer must confirm the specified insurance is in force at all times when work that requires such insurance is being performed.

Prohibit work that involves encroachment on railroad property by either a prime contractor or subcontractor until the following conditions are met:

- The railroad or the district railroad agreements coordinator advises the resident engineer that the contractor, subcontractor, or both, have furnished the specified insurance.
- The resident engineer receives a copy of the approved proof of insurance.

3-704C (2) Insurance Renewal

The contractor's or subcontractor's obligation to renew the required railroad protective insurance before expiration is specified in the contract. The Division of Construction monitors the expiration of an approved railroad protective insurance. The Division of Construction will notify the district's insurance contact if the contractor fails to renew the railroad protective insurance.

If the contractor fails to renew the railroad protective insurance, suspend the operation related to the railroad operating property as stated in Section 3-704B (1), "Actions Allowed by the *Standard Specifications*," of this manual.

3-705 Unsheltered Individuals Encampments

Caltrans is responsible for the initial removal and cleanup of unsheltered individuals' encampment areas within the right-of-way. The contractor is required to provide specified advanced notice of the need of such areas for performing the work. Upon notification, contact the maintenance superintendent and arrange for the removal and cleanup of the areas. Maintenance uses a service contract for performing this specialized work and will be knowledgeable of the legal requirements as well as the health and safety precautions to be used. Once the area has been cleared notify the contractor that they are responsible for maintaining the area. Actual expenses incurred by Caltrans for additional removal operations in areas previously cleared will be borne by the contractor.

If a requested area is unable to be initially cleared within the specified time, evaluate the delay's effect on the critical path and determine if a contract time adjustment is appropriate.

Example 3-7.1. Sample Notice of Contract Suspension of Work Due to Insurance Lapse Letter

STATE OF CALIFORNIA—CALIFORNIA STATE TRANSPORTATION AGENCY GAVIN NEWSOM, Governor

DEPARTMENT OF TRANSPORTATION
DIVISION OF CONSTRUCTION
[Resident Engineer's Address]
[City, CA ZIP]
[PHONE (Area Code) xxx-xxxx]
[FAX (Area Code) xxx-xxxx]
TTY 711
www.dot.ca.gov

Making Conservation a California Way of Life.

Date: [*Month dd, yyyy*]

[*Name of Surety Company*]
[*Address*]
[*City, State ZIP*]

Subject: Notice of Contract Suspension of Work Due to Insurance Lapse
[*Contractor's Name*]
[*Contract Number/Project Description*]

Dear Surety:

This is to notify you that [*insert contractor's name*] has failed to maintain insurance on Contract No. [*insert contract EA and project description*] as required under Sections 7-1.05, "Indemnification," and/or 7-1.06, "Insurance," of the *Standard Specifications*. In accordance with Section 8-1.06, "Suspensions," of the *Standard Specifications* [*contractor's name*]'s operations on Contract No. [*insert contract EA*] are suspended effective [*effective date of temporary work suspension]*.

Your attention is directed to the provisions of Section 10253 of the Public Contract Code and to Section 8-1.13, "Contractor's Control Termination," of the *Standard Specifications* relating to the contractor's failure to comply with the insurance provisions of the contract. According to PCC §10253, unless the contractor submits proof of the required insurance as required by the contract, Caltrans may issue a 5-day notice to terminate the contractor's control.

You will be notified if the contractor provides the required proof of insurance before a notice to terminate the contractor's control of the work.

If you have questions, please contact me at [*(area code) xxx–xxxx*].

Sincerely,

[*Name of resident engineer*]
Resident Engineer

c:
bc:

"Provide a safe, sustainable, integrated and efficient transportation system

Chapter 4 Construction Details

Section 39 Asphalt Concrete

Chapter 4 Construction Details

Section 39 Asphalt Concrete

4-3901 General

Section 39, "Asphalt Concrete," of the *Standard Specifications* provides material and construction requirements for hot mix asphalt (HMA) including Type A, rubberized hot mix asphalt-gap graded (RHMA-G), open-graded friction course (OGFC), minor HMA, and hot mix asphalt with warm mix asphalt (WMA) additive technology. Unless WMA is specified, the term "hot mix asphalt" refers to all mixtures of aggregate and asphalt regardless of the mixing or placing temperature. Section 39 also provides construction requirements for work on existing asphalt concrete facilities.

All requirements including smoothness requirements in Section 39, except those in Section 39-3, "Existing Asphalt Concrete," of the *Standard Specifications,* apply to all types of HMA.

Construction of Quality Asphalt Pavements (Manual Series No. 22), published for sale by the Asphalt Institute, contains information on the uses of types of asphalts and the design and production of HMA. All personnel responsible for HMA should familiarize themselves with this publication.

4-3901A Warm Mix Asphalt

WMA technologies allow production plants to produce HMA at Fahrenheit temperatures 45 degrees to 85 degrees lower than the traditional mixing temperature. Reductions in mixing temperature have the benefits of cutting fuel consumption and decreasing the production of greenhouse gases, with engineering benefits of better compaction on the road, the ability to haul paving mix for longer distances, and extending the paving season by being able to pave at lower temperatures.

WMA technologies are divided into two categories—additive technology and water injection technology, or foaming. When a WMA technology is used to aid mixing and compaction of HMA produced at reduced temperatures, it is defined as HMA with WMA technology. The contract allows that both categories of WMA technology may be used for Type A HMA, RHMA-G, and OGFC. The contract may include special provisions that require the use of WMA additive technology. When a WMA technology is used, Section 39-2.01A(1), "Summary," of the *Standard Specifications* requires that contractors choose a technology that is on an Authorized Material List for WMA authorized technologies.

4-3901B Rubberized Hot Mix Asphalt

RHMA is produced by mixing asphalt rubber and aggregate. Asphalt rubber is specified to include 18 percent to 22 percent crumb rubber modifier (CRM) by total mass of the asphalt rubber blend. The CRM must also include 25 percent, plus or minus 2 percent, high natural rubber content scrap rubber by mass of the CRM that

may come from scrap tires or other sources. Caltrans requires use of extender oil as an asphalt modifier in asphalt rubber. RHMA includes RHMA-G (gap graded), RHMA-O (open-graded), and RHMA-O-HB (open-graded high binder).

4-3901C Paving Personnel

Producing HMA pavement requires a partnership among Caltrans, the plant producing the HMA, and the contractor placing the HMA. The resident engineer must clearly communicate assignments of responsibility and commensurate authority for all Caltrans personnel, both at the job site and at the plant.

Plant inspection and testing is essential to assure quality HMA. A plant inspector at the HMA plant usually performs the inspection and testing duties for the resident engineer. However, the resident engineer is responsible for enforcing contract specifications at the plant. The resident engineer must be kept informed of test results in a timely manner so appropriate contract administration action can be taken.

The paving inspector should have completed both “Hot Mix Asphalt Basics” and “Hot Mix Asphalt Inspection” training courses before assignment as the HMA paving inspector. In addition, a paving inspector who samples material must also be qualified on California Test 125, “Method of Test for Sampling Highway Materials and Products Used in the Roadway Pavement Structure Sections,” Appendix D, “Bituminous Materials.”

4-3901D Hot Mix Asphalt Quality Assurance Processes

HMA is placed using one of two specified quality assurance processes: The standard process or statistical pay factor (SPF) process. The applicable quality process is defined by the item description.

For the standard process, the quality assurance requirements are defined in Sections 39-2.01, “General”; 39-2.02, “Type A Hot Mix Asphalt,” and 39-2.03, “Rubberized Hot Mix Asphalt--Gap Graded,” of the *Standard Specifications*.

For the SPF process, the quality assurance requirements are specified in Sections 39-2.09, “Type A Hot Mix Asphalt Using Statistical Pay Factors,” and 39-2.10, “Rubberized Hot Mix Asphalt-Gap Graded Using Statistical Pay Factors,” of the project’s special provisions.

The SPF process is typically specified on projects in which at least 10,000 tons of HMA Type-A or RHMA-G are specified. The standard process will be specified for all other cases.

4-3901D (1) Standard Quality Assurance Process

Under the standard process, the contractor performs quality control testing and Caltrans performs acceptance testing and inspection. The acceptance decision is based on Caltrans’ test results only.

For most quality control characteristics, the contractor samples and tests at a minimum frequency of once every 750 tons of produced HMA.

For Caltrans acceptance sampling and testing, test at the frequency shown in Section 6-1, “Sample Types and Frequencies,” of this manual. Under the standard process, for most tests, test a minimum of every fifth sample, but not less than once per day.

Under the standard process, HMA represented by a single failed Caltrans test is noncompliant. Each test can represent no more than 750 tons. When Caltrans’ testing or the contractor’s quality control testing indicates two consecutive failures, or three failures in one day, the contractor must stop production, take corrective action, and demonstrate compliance before resuming production. Noncompliant material can be accepted with a change order. For guidance on addressing noncompliant material placed using the standard process, refer to Section 4-3904A (1), “Acceptance Test Results Outside Specified Limits on Non-Statistical Pay Factor Projects,” of this manual. For guidance on stopping production because of two consecutive failures or three failures in one day, refer to Section 4-3904A (2), “Two Consecutive Acceptance Test Results Outside Specification Limits on Non-Statistical Pay Factor Projects,” of this manual.

4-3901D (2) Statistical Pay Factor Quality Assurance Process

Under the SPF process, the contractor performs quality control inspection, sampling and testing. Caltrans performs verification sampling and testing. When Caltrans testing does not verify the contractor’s quality control test results, Caltrans testing is used for acceptance. Caltrans also takes an active role in inspection.

Under the SPF process, acceptance decisions are made on a lot-by-lot basis. A lot of material is typically limited to 15,000 tons of HMA. Each lot is broken into sublots of 750 tons each. A new lot starts when twenty sublots are complete, a new job-mix formula is used, or when production stops for more than 30 days. The contractor controls quality by testing at the frequency defined in the specifications. Most quality characteristics are sampled and tested once per sublot.

HMA quality has two general types of characteristics: pay factor quality characteristics and non-pay factor quality characteristics. The pay factor quality characteristics are used to determine acceptance and applicable payment adjustments. Acceptance and payment adjustments are based on a statistical analysis of the contractor’s verified pay factor quality control test results to determine the amount of material produced and placed within a specified limit. This value is referred to as percent within limits (PWL).

Quality of the produced and placed HMA is actively monitored during production using the contractor quality control testing of both the pay factor and non-pay factor quality characteristics.

There are five pay factor quality characteristics:

1. Core density (percent of theoretical maximum density)
2. Asphalt binder content
3. Air voids at N-design gyrations

4. Percent passing the number 200 sieve
5. Percent passing the number 8 sieve

The remaining quality characteristics are referred to as non-pay factor quality characteristics.

Pay factor quality characteristic tests for each lot are statistically evaluated to determine the PWL after completing each sublot. If the PWL value for any of the pay factor quality characteristics falls below the defined threshold, the contractor must stop production and identify which sublots will be rejected from the lot before continuing production.

The non-pay factor quality characteristics are also continuously tested to control quality but are not used for acceptance. The non-pay factor quality characteristics are used to identify issues with production, when to require corrective action, and for stopping production when corrective actions fail as demonstrated by two consecutive failures of tests from two consecutive sublots, or when three failures occur in a single production shift.

Upon completion and acceptance of each lot, an incentive or disincentive is determined based the contractor's verified PWL values. The SPF process is designated for projects with 10,000 tons or more of Type-A HMA or RHMA-G, because the incentives and disincentives encourage the contractor to implement quality controls that produce mix with higher quality standards. The incentives encourage production and use of HMA with reduced variability and at the target values designated by the approved job mix formula.

For additional guidance on the acceptance and payment adjustments, refer to Section 4-3904A (4), "Acceptance of Lots using Statistical Pay Factor Specifications," of this manual.

4-3902 Before Work Begins

Verify that the contractor submits a job mix formula and a quality control plan (QCP) for HMA production and placement for all types of HMA. Job mix formula and QCP submittals are not required for HMA that is used for miscellaneous areas and dikes.

For HMA placed using the standard process, verify that all elements required by Section 39-2.01A(3)(c), "Quality Control Plan," of the *Standard Specifications,* are included.

For HMA placed using the SPF process, verify the QCP is prepared in accordance with the "*Quality Control Manual for Hot Mix Asphalt Using Statistical Pay Factors.*" Use the checklist in Appendix K to assist with review of the QCP. The manual is available at:

https://dot.ca.gov/programs/construction/hot-mix-asphalt-construction

The contractor's laboratories used for testing aggregate and HMA qualities for determining the job mix formula and the independent third-party laboratory performing dispute resolution testing must be qualified under the American Association of State Highway and Transportation Officials (AASHTO) re:source

program, and the Caltrans' Independent Assurance Program (IAP). For the standard process, the contractor's quality control laboratory is not required to be certified by re:source or IAP, because the tests are not used for acceptance. For the SPF process, the contractor's quality control laboratory is required to be certified by AASHTO re:source and IAP, because the tests are used for acceptance. Certification is achieved through the Joint Training and Certification Program (JTCP).

Caltrans laboratories performing acceptance testing must be qualified under the AASHTO re:source and IAP. Caltrans' field laboratories meet the re:source requirements when Caltrans' District or Regional materials laboratory meets the requirement.

HMA plants must comply with the *Material Plant Quality Program* (*MPQP*) manual guidelines. A link to the manual may be found here:

https://dot.ca.gov/programs/construction/material-plant-quality-program

4-3902A General

Before the work begins, the resident engineer will:

- Determine the type of HMA specified for the project, the specification process, and review the plans and the special provisions. The special provisions specify the type of HMA, aggregate size, and asphalt binder grade.
- Review the project specifications' measurement and payment clauses and determine what records must be kept.
- The job mix formula requirements are the same for the standard and SPF specification processes.

4-3902B Job Mix Formula Submittal

Review the documents in the contractor's job mix formula submittal information to verify they are complete. Notify the contractor immediately if the submittal is incomplete. Include:

- Form CEM-3511, "Contractor Job Mix Formula Proposal," which documents target values for aggregate sieves, percent of asphalt binder, and source information for all HMA component materials. If applicable, Form CEM-3511 will also include the percentage of reclaimed asphalt pavement and antistrip treatment method.
- Form CEM-3512, "Contractor Hot Mix Asphalt Design Data," which documents the testing data developed by the mix design laboratory. If Form CEM-3513, "Caltrans Hot Mix Asphalt Verification," is not attached, the completed mix design data Form CEM-3512 must have been dated within the past 12 months.
- Form CEM-3513, "Contractor Hot Mix Asphalt Verification," if submitted, documents Caltrans' verification test results for the proposed job mix formula. Form CEM-3513 must have been signed by an engineer, preferably the district materials engineer, within 12 months of the start of planned HMA production.

- Safety data sheets in accordance with Section 39-2.01A(3)(b), "Job Mix Formula," of the *Standard Specifications*.

4-3902C Job Mix Formula Review

The resident engineer must:

- Review the contractor's proposed job mix formula submitted on Form CEM-3511, "Contractor Job Mix Formula Proposal," for compliance with Section 39-2, "Hot Mix Asphalt," of the *Standard Specifications* and additional requirements in the special provisions. Notify the contractor immediately if the proposed job mix formula does not comply with the specifications.
- Review the contractor's proposed job mix formula submitted on Form CEM-3511, and verify the asphalt binder supplier is on the Caltrans list of approved suppliers at:

  https://mets.dot.ca.gov/aml/AsphaltBindersList.php
- If the asphalt binder supplier is not on Caltrans' list of approved suppliers, notify the contractor that asphalt binder supplied for the project must comply with Section Q, "Requirements for Suppliers Supplying Asphalt Without a Certificate of Compliance," in the *Certification Program for Suppliers of Asphalt* document at:

  https://dot.ca.gov/documens/mets/prob\gram-guidelines.a11y.pdf
- If WMA technology (additive or water injection foam) or crumb rubber modifier is used, verify it is on the applicable Caltrans Authorized Material List at:

  https://dot.ca.gov/programs/engineering-services/authorized-materials-lists
- If the submitted job mix formula proposal complies with the specifications, notify the contractor within 5 days of submittal that:
  - The job mix formula is accepted if Form CEM-3513, "Caltrans Hot Mix Asphalt Verification," was issued within 12 months of proposed HMA production. The resident engineer signs and returns Form CEM-3511.
  - The job mix formula must be verified if Form CEM-3513 was not issued within 12 months of proposed HMA production. The resident engineer requests that the contractor give notice when HMA will be produced for verification and notifies the district materials engineer.
  - For open-graded friction course HMA, if Form CEM-3513 was not issued within 12 months of proposed HMA production, the resident engineer requests that the contractor give notice for sampling of aggregate, binder, and additives.

4-3902D Job Mix Formula Verification

4-3902D (1) General

The contractor takes the following steps related to job mix formula verification for all types of mixes.

If the proposed job mix formula has not been verified within 12 months of production, the contractor must furnish material samples in accordance with Section 39-2.01A(3)(b), "Job Mix Formula," of the *Standard Specifications*, including:

- Coarse, fine, and supplemental aggregate from stockpiles, cold feed belts, or hot bins. Samples must include at least 120 pounds for each coarse aggregate, 80 pounds for each fine aggregate, and 10 pounds for each type of supplemental fines.
- Reclaimed asphalt pavement from stockpiles or reclaimed asphalt pavement system, if used. Samples must be at least 60 pounds.
- Asphalt binder from the binder supplier. Samples must be in two 1-quart cylindrical cans with open top friction lids.
- Asphalt rubber binder with the components blended in the proportions to be used. Samples must be in four 1-quart cylindrical cans with open top friction lids.
- Antistrip additives if used.

The resident engineer's verification process includes:

- Receiving notification from the contractor at least 2 business days before sampling material so that an inspector may be present during the sampling.
- Witnessing the contractor sampling HMA and component materials.
- Shipping the samples immediately to the district materials laboratory. They will be processed according to the instructions included on Form TL-0101, "Sample Identification Card." The TL-0101 should be marked Priority and include Job Mix Formula Verification Sample under Remarks.
- Providing job mix formula verification results to the contractor on Form CEM-3513, "Caltrans Hot Mix Asphalt Verification," within 20 days of receiving all samples.

4-3902D (2) Verification Process for Open-Graded Friction Course

For samples of aggregate, asphalt binder, and additives, if applicable:

- Request that the district materials lab determine if the aggregates comply with the contract quality requirements.
- Request that the district materials laboratory determine asphalt binder content under California Test 368, "Method of Test for Optimum Bitumen Content (OBC) for Open Graded Friction Course."
- Within 20 days of material sampling, Caltrans will determine asphalt binder content and provide the contractor with Form CEM-3513.

- Within 20 days of receipt of a complete job mix formula submittal and material sampling, the resident engineer signs and returns the accepted or rejected job mix formula on Form CEM-3511, “Contractor Job Mix Formula Proposal,” with Form CEM-3513 attached, to the contractor immediately following receipt of Form CEM-3513 from the district materials laboratory.

4-3902D (3) Verification Process for Type A and Rubberized Hot Mix Asphalt-Gap Graded

If the contractor’s job mix formula proposal has not been verified, the contractor must provide aggregate and HMA verification samples from the plant that will be used for the project. The contractor samples in accordance with California Test 125, “Method of Test for Sampling Highway Materials and Products Used in the Roadway Pavement Structure Sections.”

Samples are obtained at the following locations:

- Aggregates are sampled from cold feed belts or hot bins.
- Reclaimed asphalt pavement, if used, is sampled from the reclaimed asphalt pavement system.
- HMA is sampled at the plant, in a truck, from a windrow, the paver hopper, or on the mat behind a paver.

Test verification samples for compliance with the specifications. Refer to Section 39-2.01A(4)(b), “Job Mix Formula Verification,” of the *Standard Specifications*.

Make sure the proposed job mix formula is verified by the district materials laboratory within 20 days of sampling HMA or when requested in writing by the contractor within 3 business days for rubberized HMA. Verification is complete after the district materials engineer completes and returns Form CEM-3513, “Caltrans Hot Mix Asphalt Verification,” to the resident engineer. Form CEM-3511, “Contractor Job Mix Formula Proposal,” must also be completed by the resident engineer and returned to the contractor along with Form CEM-3513 within this time frame.

For HMA using WMA technology:

- Obtain the result and a tested sample set for AASHTO T 324, “Standard Method of Test for Hamburg Wheel-Track Testing of Compacted Asphalt Mixtures,” from the contractor.
- Verify the HMA compliance with the mix design requirements for both AASHTO T 324 and AASHTO T 324 (Modified).
- Verify RHMA-G-WMA quality requirements within 5 business days.

4-3902D (4) Unverified Proposed Job Mix Formula

If the district materials laboratory does not verify the proposed job mix formula:

- The resident engineer notifies the contractor in writing on Form CEM-3511, “Contractor Job Mix Formula Proposal,” of the rejected job mix formula, attaching

Form CEM-3513, “Caltrans Hot Mix Asphalt Verification,” with Caltrans’ verification test results.

- The contractor may submit a new job mix formula on Form CEM-3511 with a new Form CEM-3512, “Contractor Hot Mix Asphalt Design Data,” or the contractor may adjust the job mix formula on Form CEM-3511 with allowable adjustments specified in Section 39-2.01A(4)(b), “Job Mix Formula Verification,” of the *Standard Specifications*.
- If the contractor disputes Caltrans’ verification test results, make sure the contractor complies with Section 39-2.01A(4)(i)(iv), “Dispute Resolution,” of the *Standard Specifications.*

4-3902D (5) Adjusted Job Mix Formula

The contractor may adjust the job mix formula to meet the specifications. Justification for any adjustments outside the target values shown on Form CEM-3512, “Contractor Hot Mix Asphalt Design Data,” must be listed on the modified Form CEM-3511, “Contractor Job Mix Formula Proposal.”

If the adjusted job mix formula proposal complies with the specifications, arrange with the contractor a time to witness the sampling of plant produced HMA.

Make sure that the proposed job mix formula is verified by the district materials laboratory within 20 days of sampling HMA or when requested in writing by the contractor or within 3 days of sampling rubberized HMA. Verification is done when the district materials engineer completes and returns Form CEM-3513, “Caltrans Hot Mix Asphalt Verification,” to the resident engineer. Form CEM-3511 must also be completed by the resident engineer and returned to the contractor with Form CEM-3513 within 20 days of sampling HMA.

If the district materials laboratory does not verify the adjusted proposed job mix formula, notify the contractor in writing on Form CEM-3511 and attach Form CEM-3513 with Caltrans’ verification test results.

If the adjustment failed to resolve the job mix formula verification problem, the contractor may propose a new job mix formula or dispute Caltrans’ test results in accordance with Section 39-2.01A(4)(i)(iv), “Dispute Resolution,” of the *Standard Specifications*.

4-3902E Job Mix Formula Renewal

Job mix formula approval is good for only 12 months. The contractor may request a job mix formula renewal before expiration of the approval.

Verify that the contractor takes the following steps for job mix formula renewal:

- Submits the proposed job mix formula on Form CEM-3511, “Contractor Job Mix Formula Proposal,” attaching the previously verified job mix formula on Form CEM-3513, “Caltrans Hot Mix Asphalt Verification,” and the mix design information for previously verified job mix formula on Form CEM-3512, “Contractor Hot Mix Asphalt Design Data.”

- Notifies the resident engineer before sampling materials.
- Samples materials at the locations and quantities shown in Section 4-3902D, "Job Mix Formula Verification," of this manual. HMA must be sampled at the location approved in writing by the resident engineer.
- Submits Form CEM-3514, "Contractor Job Mix Formula Renewal." Contractors use Form CEM-3514 to submit to the resident engineer their test results for renewal of HMA job mix formula.

The resident engineer's job mix formula renewal process includes:

- Reviewing the proposed job mix formula on Form CEM-3511. Refer to Section 4-3902C, "Job Mix Formula Review," of this manual. If the submitted job mix formula proposal complies with the specifications, the resident engineer notifies the contractor within 5 days that split-sampled HMA and component materials must be provided.
- Witnessing the contractor sampling HMA and component materials. Take possession of the material samples and hold until receiving contractor test results.
- Reviewing the information on Form CEM-3514 to confirm that the contractor test results comply with the specifications. When the test results indicate that the sampled and tested HMA complies with the specification, request that the district materials laboratory perform HMA verification testing.
- Shipping material samples to the district materials laboratory if the contractor's test results on Form CEM-3514 comply with the specifications. Samples will be processed according to the instructions on Form TL-0101, "Sample Identification Card." The TL-0101 should include Job Mix Formula Renewal Verification Sample under Remarks.
- Providing job mix formula verification results to the contractor on Form CEM-3513 within 30 days of receiving Form CEM-3514 from the contractor.

4-3902F Job Mix Formula Acceptance

Job mix formula acceptance requires the resident engineer to review and accept submitted Form CEM-3511, "Contractor Job Mix Formula Proposal," with Form CEM-3512, "Contractor Hot Mix Asphalt Design Data," and an accepted Form CEM-3513, "Caltrans Hot Mix Asphalt Verification," attached. Refer to Section 4-3902C "Job Mix Formula Review," of this manual for guidelines on reviewing Form CEM-3511.

4-3902G Plant Operations

HMA plants must be qualified under the *MPQP*. Refer to Section 3-902E, "Weighing Equipment and Procedures," of this manual for additional information.

Before production begins, take the following steps related to HMA plant operations:

- Verify with the district weights and measures coordinator that the proposed HMA plant and production equipment for performance grade modified asphalt binder

with CRM is Caltrans-qualified under the *MPQP*. Batch HMA plants must be qualified annually, and continuous HMA plants must be qualified at least every 6 months, in accordance with Chapter 1, Section II-C, "Frequency," of the *MPQP* manual.

- If the HMA plant is not qualified, notify the contractor in writing and provide the contact information for the district weights and measures coordinator. The contractor must give the district weights and measures coordinator 5 business days' notice to schedule HMA plant qualification.
- Accept HMA for as long as 14 days from a nonqualified plant if start-up approval has been granted in writing by the district weights and measures coordinator.

4-3902H Antistrip Treatment of Aggregates

HMA may be sensitive to moisture damage and require antistrip treatments. The treatment method can be either lime treatment (by dry lime, dry lime with marination, or lime slurry with marination) or liquid antistrip. Regardless of the type of antistrip treatment chosen by the contractor, the HMA must meet the requirements of AASHTO T 283, "Standard Method of Test for Resistance of Compacted Asphalt Mixtures to Moisture-Induced Damage," and AASHTO T 324, "Standard Method of Test for Hamburg Wheel-Track Testing of Compacted Asphalt Mixtures."

When the contractor chooses to use antistrip treatment of aggregate, the contractor must test the proposed HMA aggregate blend for plasticity index in accordance with California Test 204, "Method of Tests for Liquid Limit, Plastic Limit, and Plasticity Index of Soils." When California Test 204 indicates clay is present in the aggregates, the plasticity index is used to determine the type of antistrip treatment. Refer to Section 39-2.01B(2)(b) "Hot Mix Asphalt Treatments," of the *Standard Specifications* for the treatment method allowed.

4-3902H (1) Lime Treatment of Aggregates

There are two methods for lime treatment of aggregates:

- Hot mix asphalt aggregate lime treatment—slurry method
- Hot mix asphalt aggregate lime treatment—dry lime method

Using the slurry method, treated aggregates are always marinated. Under the dry lime method, if the plasticity index is 4 through 10, aggregates must be marinated. When marination is required, the lime-treated aggregate must be stockpiled for 24 hours to 60 days before using in HMA.

Reclaimed asphalt pavement used in the production of HMA does not need to be lime treated.

Quality characteristic acceptance test limits for aggregate properties are based on untreated aggregates. Therefore, aggregate quality control and acceptance testing must be performed on aggregate samples taken before lime treatment.

During lime treatment, the sand equivalent test is used to signal a change in the presence of clays. If sand equivalent values decrease significantly, the plasticity

index of the aggregate blend must be tested to verify that it continues to be in the acceptable range listed in the special provisions.

If clays are present in the aggregate blend, both lime treatment methods must be followed by marination.

For lime-treated aggregates, before lime treatment begins, take the following steps:

- Verify with the district weights and measures coordinator that the proposed lime treatment plant is Caltrans-qualified in accordance with the *MPQP.*
- Verify the lime proportions for the fine and coarse aggregate or for the combined aggregates shown on the job mix formula.

During lime treatment, take the following steps:

- Obtain aggregate samples from stockpiles in accordance with California Test 125, “Method of Test for Sampling Highway Materials and Products Used in the Roadway Pavement Structure Sections,” to field test for moisture content and sand equivalent at the frequency shown in Table 6-1.13, “Materials Acceptance Sampling and Testing Requirements: Asphalt Concrete,” in Section 6-1, “Sample Types and Frequencies,” of this manual.
- Test aggregate samples for sand equivalent at the frequency shown in Table 6-1.13 of this manual. Combine aggregate from individual stockpiles in the job mix formula proportions to test for sand equivalent. If the sand equivalent test result exceeds the specified limits, immediately notify the resident engineer.
- It is good practice to test aggregate samples for moisture content in accordance with AASHTO T 255, “Total Evaporable Moisture Content of Aggregate by Drying,” or AASHTO T 329, “Standard Method of Test for Moisture Content of Asphalt Mixtures by Oven Method,” because moisture influences proportioning. The plant inspector should confirm that the contractor is performing sampling and testing for moisture content at a frequency shown in Section 39-2.02A(4)(b)(ii), “Aggregates,” of the *Standard Specifications*.
- Obtain aggregate samples from stockpiles or aggregate belts before lime treatment, in accordance with California Test 125. Sample aggregates at the frequency shown in Table 6-1.13 of this manual for aggregate acceptance testing.

  Label each aggregate sample with the contract number, date, type of mix, aggregate gradation (for example, 1/2 inch), aggregate source, HMA producer, and producer’s mix identification number. Indicate the number of tons produced when the sample was taken.
- Test aggregate at the frequency shown in Table 6-1.13. For samples that will be shipped to the district material laboratory or field construction laboratory for testing, complete Form TL-0101, “Sample Identification Card.” Follow the instructions printed in the accompanying booklet and the information in Section 6-103, “Field Sampled Material Identification for Testing,” of this manual. Record the type of mix, the HMA producer, and the producer’s mix identification number.

Check the acceptance tests box on the TL-0101. Under Remarks, identify the tests to be performed:

1. Los Angeles Rattler
2. Percent of crushed particles coarse aggregate
3. Percent of crushed particles fine aggregate
4. Fine aggregate angularity
5. Flat and elongated particles
6. Other aggregate properties specified in the project special provisions, if applicable

If any test results exceed the specified limits, the materials laboratory will immediately notify the resident engineer.

- Verify that the aggregate treatment is adequate by witnessing contractor quality control testing, and be sure the contractor enters into a log the treatment data specified in the special provision.

  For each day of aggregate lime treatment, obtain the treatment data log in electronic format for the resident engineer's project files.

4-3902H (2) Marination of Lime-Treated Aggregates

Marination of the lime-treated aggregates must be done when required in the special provisions or when California Test 204, "Method of Tests for Liquid Limit, Plastic Limit, and Plasticity Index of Soils," indicates that the plasticity index is 4 through 10.

Lime-treated aggregate must marinate at least 1 day and no more than 60 days before use in HMA production. If rain is anticipated during the marination period, the contractor must protect the stockpiles. If the lime-treated aggregate has been exposed to rain, inspect the stockpiles. If aggregate lime coating has been damaged significantly, reject the aggregate. If only the outside surface of the stockpile has been damaged, require that the contractor remix the piles to redistribute the lime.

4-3902H (3) Liquid Antistrip Treatment

This treatment process requires the addition of the liquid antistrip to asphalt binder during HMA production.

Before production begins, take the following steps:

- Verify with the district weights and measures coordinator that the proposed liquid antistrip metering device and storage tank are Caltrans-qualified under the *MPQP*.
- Verify that the liquid antistrip is the same type and brand as shown on the accepted job mix formula.

4-3902I Prepaving Conference

Before work begins, the resident engineer holds a prepaving conference with the contractor to discuss HMA production and placement:

- Review the accepted job mix formula and check that Form CEM-3513, “Caltrans Hot Mix Asphalt Verification,” has been signed by Caltrans within the past 12 months.
- Confirm that the accepted job mix formula has not changed.
- Discuss with the contractor what atmospheric and pavement temperatures the contractor has chosen that would result in a notification to stop production of HMA at the plant.
- Discuss method of incorporating WMA technology.
- Discuss with the contractor pavement areas to receive tapered edge and construction methods to be used.
- Discuss with the contractor pavement areas to receive shoulder backing and construction methods to be used.
- If crumb rubber modifier is to be used, discuss the requirement that the crumb rubber usage reports are submitted monthly and at the end of the contract.
- Verify if the contractor intends to use a tapered notch wedge device to construct the longitudinal joint. A tapered notch wedge can be used only on a divided highway and when the special provisions do not include a requirement that adjacent traveled-way lanes be squared up from 5 feet to 10 feet at the end of each work shift.
- Discuss the minimum taper requirements for temporary joint tapers when a transverse joint greater than 0.04 foot cannot be avoided before opening to traffic.
- Verify that the type of spreading equipment proposed by the contractor has the necessary attributes for the project. Permit wing-type spreading equipment only for areas not requiring an asphalt paver, and then only for such widths, typically less than 5 feet, that will not adversely affect the surfacing on the traffic lane.
- Verify that rollers have the specified attributes. For method process, make sure the specified number of rollers will be used based on the type of HMA being placed.
- For SPF projects, discuss the requirement that the resident engineer and contractor’s quality control manager use copies of a common spreadsheet to enter and evaluate quality control test data from each lot. Discuss the requirement that the contractor enter test data after each sublot and export the data and submit it daily to the resident engineer. The engineer does not share verification data until completion of the lot.
- Where the SPF process is specified, discuss the requirement that both the contractor and Caltrans sample using their own stratified random sampling plans. Contractors sample randomly from each sublot in accordance with the random

plan included in their quality control plan. Caltrans obtains verification samples as defined in the Caltrans stratified random sampling plan. For guidance on developing the engineer's stratified random sampling plan, refer to section 4-3902K, "Stratified Random Sampling Plan" of this manual.

- When the SPF process is specified, discuss the requirement that Caltrans not share its stratified random sampling plan or verification test results with the contractor until the contractor submits all quality control test data for the completed lot.
- When the SPF process is specified, discuss the three-day look-ahead HMA production and paving schedule submittal. This submittal is required to communicate HMA production and paving schedules to the Caltrans samplers to facilitate the scheduling of their verification sampling. The three-day look-ahead schedule must be submitted after completing each shift and include the following items for each of the next three paving shifts:

    1. Contract number
    2. Job mix formula number
    3. HMA plant location
    4. Paving location; including county, route number and approximate postmiles
    5. Lot and sublot numbers planned to be placed each shift
    6. Total tonnage planned to be produced each shift including start and finish times of production

  When the standard process is specified, discuss the requirement to pull density cores from random locations determined by the engineer and that cores must be pulled in the engineer's presence and provided to the engineer at least once every 5 business days.
- When the SPF process is specified, discuss the requirement to pull contractor quality density cores from locations defined in the contractor's random sampling plan, and to pull verification cores where defined in the engineer's stratified random sampling. The contractor will take possession of the cores used for quality control testing, and the engineer will take possession of the cores used for verification testing and potential independent assurance testing. Discuss the requirement that both parties not locate the random core locations until after completing the compaction operations.
- If there is a bid item for data cores, discuss the requirements for pulling the data cores and the requirements for submitting the data core summary and photographic record to the engineer and Coring@dot.ca.gov.
- Discuss the contractor's method to produce smooth pavement that meets the specifications.
- If cold planing is required, discuss the requirement that the cold planer be equipped with automatic controls, such as a ski device or averaging system.

Discuss what practices will be used to promote a smooth cold-planed surface. For requirements, refer to Section 39-3.04C(2), "Grade Control and Surface Smoothness," of the *Standard Specifications*.

- Discuss how smoothness quality control will be accomplished.
- Discuss the requirements for submitting smoothness submittals to the secure file sharing system and for registering for the secure file sharing system by sending an email to Asphalt.Smoothness@dot.ca.gov.
- If the contract includes prepaving grinding:
  1. Emphasize that prepaving grinding work is only applicable to existing asphalt concrete surfaces that have not been cold planed or replaced.
  2. Remind the contractor that replaced asphalt concrete surfacing must meet the 12-foot straightedge specification. Corrective grinding on replaced asphalt concrete surfacing is part of the replace asphalt concrete surfacing work, not part of the prepaving grinding work.
- Discuss how corrective grinding locations will be determined, whether the contractor will use the ProVAL smoothness assurance module or an alternate method. Refer to Section 4-3602C, "Pavement Smoothness," of this manual, for additional information on ProVAL computer software.
- Discuss how locations identified in inertial profiles will be located in the field. Will the contractor be laying out locations using distance measurement instrumentation (DMI) tied to the beginning of the project, DMI measurement from intermediate fixed locations tied to "events" in the inertial profile, inertial profile stationing converted to global positioning system coordinates, or a combination of methods?
- Determine early if the contractor plans to perform inertial profiling as a means to control quality of smoothness or when the paving is completed.
- In areas where smoothness must meet the 12-foot straightedge requirement, discuss if the contractor will have a straightedge available, and who on the paving crew is responsible for using it.
- Suggest use of a rolling straightedge device for comparison in ProVAL, which will assist in identifying locations that should physically be checked with a 12-foot straightedge.
- Discuss contingency plans to minimize or eliminate delamination of cold-planed surfaces. Discuss what criteria and methods will be used to identify and record locations where the contractor and engineer mutually agree may reflect through to the final surface.
- Discuss the contractor's plans for determining where corrective grinding will occur on the final surface.
- Discuss the contractor's plans for scheduling paving after cold planing to meet the time requirements specified in Section 39-3.04, "Cold Planing Asphalt Concrete Pavement," of the *Standard Specifications.*

- Discuss the contractor's plans for assuring that material transfer vehicles (MTVs), or other types of heavy paving equipment that exceed the California Vehicle Code, Division 15, "Size, Weight, and Load," weight limits for vehicles on highways, are prevented from crossing a structure without written authorization. The authorization may be from Caltrans Transportation Permits office or from the engineer. Requests for authorization are subject to a 15-day review.
- Determine the type of tack coat the contractor has chosen to use, based on expected atmospheric conditions, tack coat material type availability, and local experience. Discuss the requirement to submit calculations for minimum spray rates required to achieve the minimum residual rate before the tack coat is applied. Also, discuss how far in advance of the paving operation the tack coat will be placed. For additional information about tack coats and the website for *Tack Coat Guidelines*, refer to Section 4-3908A, "References," of this manual, and to the *Minimum Tack Coat Spray Rates* at:

  https://dot.ca.gov/programs/construction/hot-mix-asphalt-construction
- Emphasize that public traffic will not be allowed on pavement with tack coat and discuss how the contractor will apply additional tack coat to damaged areas immediately before placing HMA.
- Confirm that the trucks used for tack coat application have the specified attributes. For distributor attributes, refer to Section 37-1.03B, "Equipment," of the *Standard Specifications*.

Discuss:

- The contractor's quality control plan.
- The contractor's communication between the quality control manager and production and placement personnel.
- How the contractor will transmit required quality control testing reports.
- How the resident engineer will transmit required acceptance test results.

With the contractor, discuss who has responsibility in the field to:

- Monitor HMA temperatures.
- Monitor atmospheric temperatures.
- Monitor pavement temperatures.
- Direct HMA truck drivers when loads must be tarped.
- Define the length of windrow, if applicable.
- Direct the HMA plant to slow or stop loading trucks because of truck queuing.
- Stop production when two consecutive quality control test results do not comply with the specifications, or when three in a single day do not comply with the specifications as applied to:

  1. All quality characteristics of HMA placed using the standard process. For guidance on standard process projects, refer to Section 4-3904A (2), "Two

Consecutive Acceptance Test Results Outside Specification Limits on Non-Statistical Pay Factor Projects" of this manual.

2. Non-pay factor quality characteristics of HMA placed using the SPF process. For guidance on the SPF process, refer to Section 4-3904A (5), "Monitoring Non-Pay Factor Quality Characteristics using Statistical Pay Factor Specifications" of this manual.

Stop production on SPF projects when any pay factor except the number 8 sieve falls below 0.90. Stop production if the pay factor for the number 8 sieve falls below 0.75.

Discuss the type of action that will be taken by the contractor when:

- The HMA plant shuts down unexpectedly.
- The HMA paver breaks down.
- The HMA compaction equipment breaks down.
- Atmospheric or pavement temperature drops.

Make sure that the contractor has coordinated any necessary cold-planing operations; signs for construction area drop-offs, shoulder, and uneven pavement; and temporary pavement delineation, if applicable.

Review with the contractor the production start-up evaluation requirements for the first 750 tons of mix. Except for AASHTO T 324 (Modified), "Hamburg Wheel-Track Testing of Compacted Asphalt Mixtures," and AASHTO T 283, "Resistance of Compacted Asphalt Mixtures to Moisture-Induced Damage" test results, the contractor and engineer must report test results within 5 business days of sampling, and for AASHTO T 324 (Modified) and AASHTO T 283 test results within 15 days of sampling.

4-3902J Paving Operations

Before work begins, take the following steps related to HMA paving operations:

- Review "Placing Hot-Mix Asphalt" in *Construction of Quality Asphalt Pavements (Manual Series No. 22)*, published by the Asphalt Institute.
- Make sure that the subgrade has been prepared as specified. If any HMA leveling is required to smooth an existing irregular surface, inform the contractor and determine the method of payment.
- Determine if crack sealing or dig outs (removing and replacing existing pavement) is required to repair small areas. When contract items are not included, inform the contractor of any extra work for crack sealing or dig outs.
- Review the accepted contractor's quality control plan.
- If resurfacing under structures will result in reduced clearance, follow the procedures in Section 3-703B, "Permanent Clearance and Bridge Permit Rating Changes," of this manual.

- Verify that personnel who will be taking mat acceptance samples and witnessing core sampling are qualified for California Test 125, "Method of Test for Sampling Highway Materials and Products Used in the Roadway Pavement Structure Sections."
- Coordinate requests for authorization for a vehicle exceeding the weight limits established by California Vehicle Code, Division 15, to cross a structure with the project's structure representative. If the project has not been assigned a structure representative, coordinate the review with the bridge construction engineer. Structure construction personnel will review the overload proposal in accordance with the *Bridge Construction Records and Procedures* manual, Vol. 2, Bridge Construction Memo 150-1.0, "Weight Overload Guidelines for Bridges on Construction Projects."

4-3902K Stratified Random Sampling Plan

For HMA placed using the SPF process, develop a stratified random sampling plan to predefine your verification sampling milestones for each of the five pay factor quality characteristics. For a general discussion on the purpose of this plan, refer to Section 4-3901D, "Hot Mix Asphalt Quality Assurance," of this manual.

Use the spreadsheet titled "Caltrans Stratified Random Sampling Plan" available at:

https://dot.ca.gov/programs/construction/hot-mix-asphalt-construction

Obtain verification samples reasonably close to the milestone locations defined in the random sampling plan. When a verification sampling milestone is missed, document the reason, the difference in tonnage, and steps taken to pull a replacement random sample free of intentional or unintentional bias.

Keep your stratified random sampling plan and the verification test results confidential until completion of the lot. You may share the results of the non-pay factor quality characteristics test results with the contractor at any time. If you share gradation results, do not share the percentage passing the number 8 or number 200 sieves because they are pay factor quality characteristics.

If a lot runs short of the planned quantity and there are fewer than 3 verification samples, then when there is a previous lot using same JMF, combine tests with the previous lot, and verify the short lot using the test results from both lots. Once verified, adjust each lot based on its own contractor quality control test results. If there is no previous lot using the same JMF, use test results from the next 5 sublots on the following lot. Once verified, adjust each lot based on its own contractor quality control test results.

When neither of preceding options is viable to obtain at least 3 verification test results, test randomly selected remaining verification samples that are not reserved for future independent third party dispute resolution testing.

For field compaction verification, report the day's theoretical maximum density (Rice value) using the average of two tests from one split of a single sample pulled at a random time during the shift the verification core is pulled. Do not attempt to time the sampling of the HMA with the locations the cores are to be obtained. Randomly

locate three density cores aligned longitudinally 1 to 2 feet apart from each 250-ton part of a randomly determined 750-ton contractor sublot. Retain two cores, one for verification testing and one for independent third-party testing. Provide the third core to the contractor. The contractor may not use this core as part of their reported quality control testing.

Determine the percentage of theoretical maximum density of each of verification core using the core density and the theoretical maximum density (Rice value) determined from the date the HMA was placed at the site of the core. Do not use average theoretical maximum density (Rice values) determined from previous shifts. Report the percentage of theoretical maximum density of the verification test as the average of the 3 “percent of theoretical maximum density” values determined from the 3 cores.

4-3903 During the Course of Work

4-3903A General

Quality production and placement of HMA requires a quality assurance process that consists of quality control by the contractor and acceptance by Caltrans. While some of these functions may seem redundant, each serves a separate purpose.

The contractor is responsible for providing a quality control plan (QCP). Verify that the contractor follows the QCP, and when required, makes any necessary changes to the QCP.

4-3903A (1) Quality Control

Quality control, sometimes called process control, is the testing performed by the contractor to make sure that the HMA being produced or placed meets the requirements of the specifications. Quality control testing of aggregates and HMA quality characteristics must be performed at a specified minimum frequency. Sampling should be performed at locations such as plant, windrow, or mat to assure that quality control test results are not influenced by sampling location. Sampling must be random and must not be split samples of Caltrans’ acceptance or verification samples.

The contractor will want to know early on how closely the contractor’s quality control test results replicate the quality acceptance test results. The job mix formula verification and production start-up evaluation both offer early opportunities for the contractor to compare quality control test results with acceptance test results. Unlike the comparison of contractor’s quality control and Caltrans’ acceptance test results during production and placement, the verification and production start-up evaluation test results are on the same split samples. Therefore, the results are a direct measure of the variation between the laboratories.

The contractor performs quality control testing for asphalt rubber binder, gradation, and fabric content of crumb rubber modifier; aggregate and reclaimed asphalt pavement moisture; and reclaimed asphalt pavement gradation and binder contents.

4-3903A (1a) Hot Mix Asphalt Density

The contractor is required to conduct quality control testing regularly. The specifications give required intervals in the quality control table of the specifications. If the total layer thickness is at least 0.15 foot, the contractor is required to conduct density testing. Do not allow the contractor to break a layer thickness of a single type of HMA into lifts less than 0.15 feet.

Under the standard process, the contractor is required to perform quality control density testing using a nuclear gauge that has been calibrated to cores taken on the first day of production.

Under the SPF process, the contractor is required to perform quality control density testing in accordance with the contractor's approved quality control plan.

Under both standard and SPF specifications, if the total layer thickness is less than 0.15 foot, the contractor must follow the requirements of the method process listed in Section 39-2.01C(15)(b), "Method Compaction," and the "Construction" sections of the applicable type of HMA: 39-2.02C for Type A; 39-2.03C for RHMA-G; or 39-2.04C for OGFC, of the *Standard Specifications.*

4-3903A (1b) Method Process

The contractor must comply with the specifications for placement, such as temperature and roller requirements. Depending on the type of HMA, the minimum compaction's temperatures may be reduced when WMA additive technology is used, but not when WMA water injection technology is used. Caltrans' inspection process should include documenting and reporting surface temperatures and roller passes to assure that compaction operations meet the method specification requirements.

4-3903A (2) Department Acceptance

Department acceptance of HMA consists of material acceptance testing and both plant and paving inspection. The resident engineer is responsible for coordinating necessary field personnel and taking contract administration action when required. Verify that Caltrans personnel who sample or test have met the requirements of the Caltrans Independent Assurance Program and are qualified to perform the sampling or testing.

Material acceptance sampling frequencies and material acceptance testing frequencies, shown in Table 6-1.13 of this manual, are not the same. Caltrans limited the risk to the contractor by specifying in Section 39, "Asphalt Concrete," of the *Standard Specifications* that no single test result may represent more than the smaller of 750 tons or one day's production, whichever is less, except AASHTO T 283, "Resistance of Compacted Asphalt Mixtures to Moisture-Induced Damage," and AASHTO T 324 (Modified), "Hamburg Wheel-Track Testing of Compacted Asphalt Mixtures." Therefore, during the work, it is important to split all acceptance sample materials. Use one sample for acceptance testing and one for dispute resolution.

Test the samples in a field construction laboratory or ship them to a district materials laboratory to be tested at the minimum testing frequency shown in Section 6-1,

"Sample Types and Frequencies," of this manual. Store the remaining samples in case additional acceptance testing is necessary.

When HMA is produced and placed using the standard process, the contractor may request that the resident engineer split acceptance samples. If requested, split acceptance samples into four parts: test one, provide one to the contractor, and store two for dispute resolution.

When HMA is produced and placed using the SPF process, the sampling requirements for pay factor and non-pay factor quality characteristics differ.

For pay factor quality characteristics, always split verification samples into four parts: test one, provide one to the contractor when requested, and retain two for dispute resolution.

For non-pay factor quality characteristics, always pull at least two samples from two consecutive sublots. Split each of the two samples into four parts, keep two parts, provide one part to the contractor and provide one part to the independent third party.

Dispute resolution testing of the first of two consecutive non-pay factor samples is optional and can be requested by the contractor or the engineer, but must be requested before the engineer starts testing of the first sample. Dispute testing on the second of the two consecutive samples is always required, but testing is only performed when the first sample fails.

When dispute resolution testing on either the first or second of the two consecutive non-pay factor quality characteristics samples is performed, the engineer, contractor and independent third party are required to test their splits of the sample. The sample is considered failed when two of the three split samples fail or when the engineer's split sample fails and any of the remaining two split samples tests are not yet reported.

Refer to section 4-3904A (5), "Monitoring Non-Pay Factor Quality Characteristics using Statistical Pay Factor Specifications," of this manual for guidance on this dispute resolution process.

When dispute resolution testing is required on a non-pay factor quality characteristic sample, and only one of the engineer's or independent test results indicates a failure, and contractor's test results are not submitted in a reasonable amount of time, direct the contractor to stop production until a passing test result is submitted.

On standard and SPF process contracts, quality assurance must be performed regularly, and verification and acceptance tests must be processed in a timely fashion. The resident engineer must make every effort to conduct the necessary inspection, make sure that sampling and testing staff are available, and have samples processed as quickly as possible so acceptance or verification decisions can be made as soon as possible.

Ship or transport acceptance samples to testing laboratories within the timeframes provided in Section 6-102C, "Acceptance Samples and Tests," of this manual. Assure the proper chain of custody is maintained throughout the process, including

delivery to and receipt from a commercial shipping service. Use Form CEM-3701, "Test Result Summary," to summarize acceptance test frequency and results on each material. Use this form to record the dates samples were taken, shipped to laboratory, test result received from laboratory, and the contractor notified of test results. Monitor timeliness of material testing turnaround against Table 6-1.2, "Time Required for Materials Acceptance Tests," of this manual and make sure corrective actions are taken and documented where deficiencies are encountered.

Notify the contractor of all acceptance test results within 2 business days of receipt from laboratory, except when using the SPF process. Do not share the verification test results for pay factor quality characteristics until the contractor has completed the lot and submitted the results of pay factor quality characteristic test results in the lot.

Quality pavement is obtained by strictly enforcing the specifications and notifying the contractor of failed tests as soon as possible. When a single quality assurance test for a single quality characteristic indicates that material does not comply, under the standard process, follow guidance in Section 4-3904A (1), "Acceptance Test Results Outside Specified Limits on Non-Statistical Pay Factor Projects," of this manual. Under the SPF process, for non-pay factor quality characteristics, follow the guidance in Section 4-3904A (5), "Monitoring Non-Pay Factor Quality Characteristics Using Statistical Pay Factor Specifications" of this manual.

For the SPF process, Caltrans samples and tests for verification of pay factor quality characteristics in accordance with stratified random sampling plans developed by the engineer. See Section 4-3902K, "Stratified Random Sampling Plan" of this manual for guidance on developing the sampling plans.

For the SPF process, Caltrans samples and tests non-pay factor quality characteristics at frequencies shown in Section 6-1, "Sample Types and Frequencies."

For HMA placed using the SPF process, once a lot has been completed and you have received all of the contractor's test results, immediately share your verification test results with the contractor.

Use Caltrans' SPFPay spreadsheet to verify the contractor's quality control test results and determine the applicable payment adjustment. The spreadsheet is available at:

https://dot.ca.gov/programs/construction/hot-mix-asphalt-construction

Except for pay factor quality characteristics using the SPF process, when two consecutive acceptance tests for a single quality characteristic do not comply with the specifications:

- Immediately notify the contractor to stop production.
- Verify that the contractor takes corrective action.

After the corrective action has been taken and the contractor has quality control test results showing conformance, witness the contractor taking and splitting samples (into four parts) for the resident engineer's tests. The contractor must test one part

for compliance with the specifications and submit three parts to the resident engineer, who tests one part for compliance with the specifications and stores two parts.

4-3903A (3) Dispute Process

The dispute resolution process for acceptance tests for all HMA placed using the standard process is specified in Section 39-2.01A(4)(i)(iv), "Dispute Resolution," of the *Standard Specifications*.

The dispute resolution process for HMA placed using the SPF process is specified in Section 39-2.09A(4)(c)(v)(A), "Dispute Resolution" for Type A HMA and in Section 39-2.10A(4)(c)(v)(A), "Dispute Resolution" for RHMA-G of the project's special provisions. Within each of these specifications, there are different dispute resolution processes for pay factor and non-pay factor quality characteristics.

For pay factor quality characteristics, when the engineer does not verify the contractor's quality control test results, the resident engineer notifies the contractor of the failed verification. The resident engineer uses Caltrans' test results to determine acceptance and the applicable payment adjustment.

If the contractor disputes Caltrans' determination of a non-verification, the specification requires the contractor to formally request dispute resolution. The first step of the dispute resolution process requires that the resident engineer and contractor share each other's tests results, supporting calculations, and together investigate why the difference exists.

If a reason for the difference cannot be found and corrected, and the contractor continues to dispute Caltrans' test results, the resident engineer provides to the independent third party split samples from Caltrans' samples used to produce the test results. The independent results are then compared to the contractor's test results to determine whether the contractor's quality control test results are compliant.

If the independent third-party test results verify the contractor's test results, the contractor's test results are used for acceptance and determination of the applicable adjustment. Caltrans pays for the independent third-party testing costs.

If the independent third-party does not verify the contractor's test results, the independent results are used for acceptance and determination of the payment adjustment, and the contractor pays for the independent testing costs.

For dispute of non-pay factor tests results, refer to Section 4-3904A (5), "Monitoring Non-Pay Factor Quality Characteristics Using Statistical Pay Factor Specifications" of this manual.

A contractor disputing the acceptance test results must notify the resident engineer within 5 business days of receiving a test result. Caltrans may also dispute the contractor's test results. To resolve disputed test results, the specifications require the use of an independent third party to perform referee testing. If the contractor disputes Caltrans' acceptance test results, and the resident engineer is satisfied with acceptance test results, before using the independent third party, suggest that the

contractor test one of the split samples from the material in question. If the contractor agrees to perform this test, it would be good practice to have a tester or a district independent assurance representative witness the contractor's testing.

The specifications require the testing of split samples of disputed material. If split samples of the material tests being disputed are not available, the third party uses any available material representing the disputed HMA for evaluation. Caltrans must retain possession of the split samples. Caltrans may discard stored split samples 5 days after the contractor has received the associated acceptance test results.

4-3903B Production Start-Up Evaluation

Section 39-2.01A(4)(h)(v), "Production Start-Up Evaluation," of the *Standard Specifications* applies to all construction processes. The production start-up evaluation allows:

- The contractor to compare quality control test results against Caltrans' acceptance test results on split sample material.
- Caltrans to verify early in the project that the aggregate properties and HMA comply with the job mix formula and specifications.
- Both parties to examine results of tests performed on split sample material.

Split samples are used only for job mix formula verification, for production start-up evaluation, and when the contractor is demonstrating compliance with the specifications if production has been stopped for out-of-specification material. In all other circumstances, acceptance samples must always be taken independently of contractor's quality control samples.

4-3903C Plant Operations

Before shift production begins, the plant inspector generally takes the following steps related to HMA plant operations:

- Verifies that the security seal has not been tampered with. If tampering is suspected, contact the district weights and measures coordinator.
- Verifies that the portioning equipment is interlocked as specified in the *MPQP*.
- Makes sure the job mix formula being used by the contractor is specific to the project and that no changes have been made to:
    1. Target asphalt binder percentage
    2. Asphalt binder supplier
    3. Asphalt rubber binder supplier
    4. Component materials or percentage of any component material used in asphalt rubber binder
    5. Combined aggregate gradation
    6. Aggregate sources

7. Substitution rate for reclaimed asphalt pavement aggregate of more than 5 percent
8. Any material in the job mix formula

- Notifies the resident engineer if there are changes in the job mix formula and asks if a new job mix formula will be required from the contractor before production can be started.
- Makes certain that the asphalt binder supplier is on the Caltrans approved supplier list or that asphalt binder samples have been taken from each truckload and tested in accordance with Section Q, "Requirements For Suppliers Supplying Asphalt Without a Certificate of Compliance," in the *Certificate Program for Suppliers of Asphalt*. Notifies the contractor and resident engineer if asphalt binder testing has not been completed for a supplier not on the approved supplier list.
- Makes sure that aggregate is stored separately, according to proposed sizes by comparing the material from each bin with Chapter 2, Section II-E, "Aggregate Storage," of the *MPQP* manual. If any segregation, degradation, or intermingling occurs, require that the contractor empty the storage facility and waste or re-screen the material.
- Checks that supplemental fine aggregate remains dry and is stored separately as specified in *MPQP* guidelines.

During production, the plant inspector generally takes the following steps related to HMA plant operations:

- Records daily HMA plant production information on Form CEM-3501, "Hot Mix Asphalt Production Report."
- Documents on Form CEM-4601, "Assistant Resident Engineer's Daily Report," additional information about plant production, including instructions to contractor's personnel.

The plant inspector performs the following additional duties:

1. Verifies that contractor personnel who sample or witness the contractor sampling at the hot mix asphalt plant are qualified to perform California Test 125, "Method of Test for Sampling Highway Materials and Products Used in the Roadway Pavement Structure Sections."
2. Obtains HMA samples for acceptance testing every 750 tons and tests at least once for every 5 samples or a minimum of once per day. Material samples must be split into two parts, one sample for potential acceptance testing and one for potential dispute resolution testing.
3. Samples for aggregate gradation at least once for every 750 tons, and tests at least once for every 5 samples or a minimum of once per day. Material samples must be split into two parts, one sample for potential acceptance testing and one for potential dispute resolution testing.

4. Monitors the contractor's HMA plant inspection for compliance with the contractor's quality control plan. Notifies the resident engineer of any noncompliance issues.

4-3903C (1) Antistrip Treatment of Aggregates and Hot Mix Asphalt

The HMA may be sensitive to moisture damage and may require one of the following antistrip treatments:

- Hot mix asphalt aggregate treatment—slurry method
- Hot mix asphalt aggregate treatment—dry lime method
- Liquid antistrip method

4-3903C (1a) Marinated Lime-Treated Aggregate

Aggregate that has been lime treated and stockpiled for marination is handled in the HMA production process in the same manner as untreated aggregates. Refer to Section 4-3902H (1), "Lime Treatment of Aggregates," of this manual for lime treatment plant operation requirements.

For aggregates that have been lime treated and stockpiled:

- Verify that aggregate quality characteristic acceptance samples and tests were performed and the aggregate meets the contract specifications.
- Do not perform sampling and testing for sand equivalent or aggregate quality characteristics as shown in Section 4-3903C (3), "Hot Mix Asphalt Production," of this manual.
- Verify that the lime marination was performed within the past 60 days.

Reclaimed asphalt pavement used in the production of HMA does not need to be lime treated.

4-3903C (1b) Hot Mix Asphalt Aggregate Treatment—Slurry Method

If an HMA production facility is using this process without marination, contact the Materials Engineering and Testing Services (METS) Office of Flexible Pavement for assistance.

4-3903C (1c) Hot Mix Asphalt Aggregate Treatment—Dry Lime Method

The quality characteristic acceptance test limits for aggregate properties are based on untreated aggregates. Aggregate testing must be performed on aggregate samples taken before lime treatment.

During lime treatment, the plant inspector takes the following steps:

- Obtain aggregate samples from stockpiles or from the aggregate belts before lime treatment for moisture content and sand equivalent testing at the frequency shown in Table 6-1.13, "Materials Acceptance Sampling and Testing Requirements," of this manual. Sample aggregate in accordance with California

Test 125, “Method of Test for Sampling Highway Materials and Products Used in the Roadway Pavement Structure Sections.”

- Test aggregate samples for sand equivalent at the frequency shown in Table 6-1.13 of this manual. If the aggregates are not combined before sampling, combine aggregate from individual stockpiles or belts in the job mix formula proportions to test for sand equivalent.
- It is good practice to test aggregate samples for moisture content in accordance with AASHTO T 255, “Total Evaporable Moisture Content of Aggregate by Drying,” or AASHTO T 329, “Moisture Content of Asphalt Mixtures by Oven Method,” because moisture influences proportioning. For lime slurry aggregate treatment, the plant inspector should confirm that the contractor is performing sampling and testing for moisture content at least once every 2 hours of treatment. For lime-treated aggregate, the plant inspector should confirm that the contractor is performing sampling and testing for moisture content at a frequency shown under the quality control section applicable to the type of HMA.

  Compare the contractor’s aggregate moisture quality control test results against the Caltrans test results. Notify both the contractor and the resident engineer if the test results are significantly different.

  Verify that the contractor is adjusting the HMA plant controller based on the contractor’s aggregate moisture quality control test results.
- Obtain aggregate samples from stockpiles or aggregate belts before lime treatment in accordance with California Test 125. Sample aggregates at the frequency shown in Table 6-1.13 of this manual for aggregate acceptance testing.
- Test aggregate for acceptance quality characteristics at the frequency shown in Table 6-1.13 of this manual for the following aggregate acceptance tests:
  1. Los Angeles Rattler
  2. Percent of crushed particles coarse aggregate
  3. Percent of crushed particles fine aggregate
  4. Fine aggregate angularity
  5. Flat and elongated particles
  6. Other aggregate properties specified in the project special provisions if applicable

If samples will be shipped to a district materials laboratory or to a construction laboratory, complete Form TL-0101, “Sample Identification Card,” following the instructions in the accompanying booklet and the information in Section 6-103, “Field Sampled Material Identification for Testing,” of this manual. Record the type of mix, the HMA producer, and the producer mix identification number. Check the box on the sample TL-0101 for acceptance test. Ship the samples to the district materials laboratory or field construction laboratory for testing. If any test results exceed the specified limits, the testing laboratory will immediately notify the resident engineer.

Make sure that aggregate treatment is adequate by witnessing contractor quality control testing, and that the contractor enters the treatment data specified in the special provisions into a log. For each day of aggregate lime treatment, obtain the treatment data log electronically for the resident engineer's project file.

4-3903C (1d) Liquid Antistrip Treatment

Make sure that data required in the liquid antistrip treatment section of the special provisions is entered into the production unit's treatment data log and submitted in the required format.

For each day of antistrip treatment, obtain the treatment data log electronically for the resident engineer's project files.

4-3903C (2) Production Start-Up Evaluation

A production start-up evaluation occurs within the first 750 tons produced on the first day of HMA production. The evaluation is also required when production has stopped for more than 30 days and if a new job mix formula is being used.

The plant inspector generally takes the following steps related to a production start-up evaluation:

- During the first 750 tons of production, witnesses the contractor sampling aggregate, asphalt binder, and reclaimed asphalt pavement on the first day of production in accordance with Section 39-2.01A(4)(h)(v), "Production Start-Up Evaluation," of the *Standard Specifications,* and California Test 125, "Method of Test for Sampling Highway Materials and Products Used in the Roadway Pavement Structure Sections." The inspector retains three split samples for testing and dispute resolution as described earlier.
- Labels each HMA sample with enough information to identify the exact location. Refer to Section 4-3903C (3), "Hot Mix Asphalt Production," of this manual.
- Ships one sample of asphalt binder to METS for testing as detailed in Section 6-2, "Acceptance of Manufactured or Fabricated Materials and Products," of this manual, noting that it is a production start-up acceptance test.
- Immediately tests one aggregate sample for aggregate gradation and sand equivalent. If reclaimed asphalt pavement is used, determine aggregate gradation in accordance with California Test 384 "Method of Test for Combining Gradations for Hot Mix Asphalt (HMA) Using Reclaimed Asphalt Pavement (RAP) and/or Reclaimed Asphalt Shingles (RAS)." California Test 384 is available at:

  https://dot.ca.gov/programs/engineering-services/california-test-methods
- When test results fall outside the specification limits, the inspector notifies the contractor, and requires and confirms that the contractor takes corrective action.
- If aggregate gradation or sand equivalent test results fall outside the specification limits, notify the resident engineer immediately.
- Tests one aggregate sample for aggregate acceptance quality characteristics.

For samples that will be shipped to the district material laboratory or field construction laboratory for testing, complete Form TL-0101, "Sample Identification Card," following the instructions printed in the form booklet and the information in Section 6-103, "Field Sampled Material Identification for Testing," of this manual. Record the type of mix, the HMA producer, the producer's mix identification number, and the production tonnage that this sample represents.

Check the box on the sample TL-0101 for acceptance test, marked Priority, and include Production Start-Up Evaluation Test under Remarks. Under Remarks, identify the tests to be performed:

1. Los Angeles Rattler
2. Percent of crushed particles coarse aggregate
3. Percent of crushed particles fine aggregate
4. Fine aggregate angularity
5. Flat and elongated particles
6. Other aggregate properties specified in the project special provisions, if applicable

The specifications require 3 days for test result turnaround, so samples must be shipped immediately. If any tests results fall outside the specified limits, the testing laboratory will immediately notify the resident engineer.

4-3903C (3) Hot Mix Asphalt Production

During production, the plant inspector generally takes the following steps related to HMA plant operations:

- Observes the overall plant operation to make sure the contractor controls dust and smoke. Requests that the contractor corrects any obvious violation and ceases operation if necessary to prevent damage to HMA mixture.
- Obtains aggregate samples and performs AASHTO T 255, "Total Evaporable Moisture Content of Aggregate by Drying," or AASHTO T 329, "Moisture Content of Asphalt Mixtures by Oven Method."
- Confirms that the contractor is performing sampling and testing for moisture content at the frequency shown under the quality control section of the *Standard Specifications* applicable to the type of HMA. Because moisture influences proportioning, it is good practice to test both aggregate and reclaimed asphalt pavement for moisture content.
- Compares the contractor's quality control test results with Caltrans test results and notifies both the contractor and resident engineer if the test results are significantly different. On SPF projects, the Caltrans verification test results for pay factor quality characteristics are not shared with the contractor until the contractor submits all test results for the lot.
- Verifies that the contractor is adjusting the HMA plant controller based on the contractor's aggregate moisture quality control testing.

- Obtains aggregate samples for field testing for aggregate grading and sand equivalent at the frequency shown in Table 6-1.13, "Materials Acceptance Sampling and Testing Requirements," of this manual. Tests aggregate samples before lime treatment for testing sand equivalent. (Reclaimed asphalt pavement does not need to be sampled for sand equivalent.) Do not use aggregate samplers that do not safely produce a manageable size sample.
- Labels each aggregate sample with the contract number, date, type of mix, aggregate gradation (for example, 1/2 inch), aggregate source, HMA producer, and producer's mix identification number. Indicates the number of tons produced when the sample was taken.
- Tests aggregate samples for aggregate gradation and sand equivalent at the frequency shown in Table 6-1.13 of this manual. If reclaimed asphalt pavement is used, determine aggregate gradation in accordance with California Test 384 "Method of Test for Combining Gradations for Hot Mix Asphalt (HMA) Using Reclaimed Asphalt Pavement (RAP) and/or Reclaimed Asphalt Shingles (RAS)." California Test 384 is available at:

  https://dot.ca.gov/programs/engineering-services/california-test-methods
- Notifies the contractor of aggregate gradation and sand equivalent test results, and confirms that any required plant adjustment has been made to correct for out-of-specification aggregate gradation.
- If aggregate gradation or sand equivalent test results fall outside the specification limits, notifies the resident engineer immediately. If the contractor makes significant or numerous adjustments in bin aggregate proportions, increase the frequency of aggregate gradation testing.
- Obtains aggregate samples for aggregate acceptance quality characteristics at the sampling frequencies shown in Table 6-1.13 of this manual and sample in accordance with California Test 125. If lime-treated, aggregate samples must be taken before lime treatment for testing aggregate properties. Reclaimed asphalt pavement does not need to be sampled.
- Labels each aggregate sample with the contract number, date, type of mix, aggregate gradation, aggregate source, HMA producer, and producer's mix identification number. Indicates the number of tons produced when the sample was taken. Refers to the guidance in Section 4-3903D (5), "Sampling and Testing Hot Mix Asphalt," of this manual. Tests aggregate at the frequency shown in Table 6-1.13 of this manual. For samples that will be shipped to the district material laboratory or field construction laboratory for testing, completes Form TL-0101, "Sample Identification Card." Follows the instructions printed in the booklet that contains the form and the information in Section 6-103, "Field Sampled Material Identification for Testing," of this manual. Records the type of mix, the HMA producer, and the producer's mix identification number. Checks the acceptance tests box on the TL-0101. Under "Remarks," identifies the tests to be performed:

  1. Los Angeles Rattler

2. Percent of crushed particles coarse aggregate
3. Percent of crushed particles fine aggregate
4. Fine aggregate angularity
5. Flat and elongated particles
6. Other aggregate properties specified in the project special provisions, if applicable

If any test results exceed the specified limits, the materials laboratory will immediately notify the resident engineer.

If any single quality characteristic has two consecutive acceptance or quality control tests not in compliance with the specifications, verify that before resuming production and placement of HMA on the project, the contractor:

1. Stops production
2. Notifies the resident engineer
3. Takes corrective action
4. Provides a split sample for the engineer's testing
5. Demonstrates compliance with the specifications before resuming production and placement of HMA on the project

- Samples asphalt binder at the frequencies shown in Section 6-1, "Sample Types and Frequencies," and in accordance with Section 6-2, "Acceptance of Manufactured or Fabricated Materials and Products," of this manual, and fills out Form TL-0101 before shipping samples to METS for testing.
- Assures asphalt binder quality by following Section 4-92, "Asphalt Binders," of this manual.
- For asphalt rubber binder components:
  1. Collect certificates of compliance for each truckload of crumb rubber modifier and asphalt modifier.
  2. Collect a "Buy America" certificate for each truckload of crumb rubber modifier. Refer to Section 3-604, "Buy America," of this manual for more information.
  3. Sample asphalt modifier binder at the frequencies shown in Section 6-1, "Samples Types and Frequencies," of this manual. Ship to METS as detailed in Section 6-2, "Acceptance of Manufactured or Fabricated Materials and Products," of this manual.
  4. Make sure the contractor submits Form CEM-4410, "Crumb Rubber Usage Report," monthly and at the end of the project. Refer to Section 7-108, "Crumb Rubber Usage Reporting," of this manual for more information.
- Verify that the temperatures of the asphalt binder, aggregate, and HMA do not exceed the limits specified in Section 39-2.01B(8), "Hot Mix Asphalt Production," of the *Standard Specifications*.

- Make sure that the batch size and feed rates do not exceed the mixing capacity range used during plant dynamic testing.
- Verify HMA mix moisture content from samples taken behind the paver in accordance with AASHTO T 329, “Moisture Content of Asphalt Mixtures by Oven Method.” However, the HMA can be sampled and tested at the plant to determine if sampling and testing at the mat are necessary by performing the informal test described below. If HMA samples taken at the plant meet the mix moisture acceptance requirements, samples taken behind the paver will also meet the specification requirement.

  To perform an informal, quick moisture content check at the plant, use the following procedure:

  1. Have the contractor take a shovelful of aggregate from the dryer’s discharge chute
  2. Notice any steaming or dark spots on the aggregate
  3. Pass a cool, shiny, clean mirror, spatula, or similar item in a slow, deliberate motion immediately above the aggregate
  4. Observe the amount of condensed moisture on the item
  5. Advise the contractor if moisture is seen

  This informal method cannot be used for acceptance.
- Observe production to assure the specified HMA mixture conforms to project specifications and the *MPQP*.

4-3903C (3a) Batch Plants

Do not approve a shorter mixing time than was used during the plant dynamic testing conducted for plant acceptance, in accordance with Chapter 3, Section II-B, “Dynamic Testing,” of the *MPQP* manual.

Verify that the automatic batching equipment functions within the limits specified in Chapter 2, Section II-F, “Batch Mixing HMA Plants,” of the *MPQP* manual.

4-3903C (3b) Continuous Mixing Plants

For continuous mixing plants (dryer drum or dryer drum pugmill), verify that the following are operating:

1. Vibrating unit on the fine bins
2. Low-level and no-flow interlock systems for aggregate and reclaimed asphalt pavement feeder bins
3. No-flow interlock system for asphalt binder storage and feed system
4. Automatic plant controller
5. Dust control systems
6. Segregation devices at HMA storage

The mixing time depends on the length of the mixing area and the rate of drop in the dryer drum during mixing. The most efficient pugmill mixing occurs when the material level remains at the top of the paddles along the length of the mixer. For best results, feeding must be continuous and uniform. Do not approve a production rate faster or slower than the range of production used during the plant dynamic testing conducted for plant acceptance in accordance with Chapter 3, Section II-B, "Dynamic Testing," of the *MPQP* manual.

4-3903C (4) Plant Weighing Systems

Observe the operation of all weighing systems. Whenever scales and meters seem inaccurate, contact the district weights and measures coordinator for further assistance. Be aware of scale and meter security seals and set points.

For batch plants:

- Make sure that the weigh box containing the total batch does not come in contact with anything that prevents a true indication of the batch weight.
- When intermediate storage, such as a silo, is used for HMA, periodically check the batching by comparing the total weight of the batches in a truckload with the platform scale weight for the same load.
- Check the asphalt binder scales frequently to verify that they return to within zero tolerance limits and that the scale lever systems or load cells move freely.

When plants are used for only one project, the accuracy of meter-driven devices that proportion asphalt binder can be checked. To do so, compare meter totalizer readings with asphalt binder tank stabbings and, in conjunction with an on-site vehicle scale, with the combined aggregate totalizer readings. Take into account any wasted mix or individual ingredients wasted after proportioning.

4-3903C (5) Hot Mix Asphalt Storage

Verify that HMA storage silos are in accordance with Chapter 2, Section II-J, "HMA Storage," of the *MPQP* manual.

4-3903C (6) Hot Mix Asphalt Transporting

Before the trucks are loaded, verify the absence of an excessive amount of parting agent or other contaminating material. Such material is excessive when it forms pools. Diesel or other petroleum-based products are prohibited from use as parting agents.

After the trucks are loaded, be sure the HMA aggregates are coated with the asphalt binder and not segregated. Notify the resident engineer if loads need to be rejected based on nonuniformity of HMA mixture.

Make sure that rubberized HMA gap-graded and open-graded friction course loads are completely covered with tarpaulins when the atmospheric temperature is below 70 degrees Fahrenheit. Tarps are not required if the time from discharge to truck until transfer to the paver's hopper or to the pavement surface is less than 30

minutes. If the trucks are tarped, record that information on Form CEM-3501, "Hot Mix Asphalt Production Report."

4-3903D Paving Operations

During HMA placement, the paving inspector generally takes the following steps:

- Record daily HMA placement information on Form CEM-3502, "Hot Mix Asphalt Placement Report," and additional information, including instructions to contractor's personnel, on Form CEM-4601, "Assistant Resident Engineer's Daily Report."
- Refer to "Placing Hot-Mix Asphalt" in *Construction of Quality Asphalt Pavements*, published by the Asphalt Institute, as guidance for best practices during HMA placement.

4-3903D (1) Atmospheric and Pavement Temperature

- Verify that placement occurs within the specified temperature ranges by taking sufficient measurements of the atmosphere, pavement, and HMA. The temperature ranges vary based on the type of HMA being placed. For temperature range requirements, refer to Section 39-2.01C(1) "General," and 39-2.02C, "Construction," of the *Standard Specifications*.
- Record temperatures and the time taken on Form CEM-3502, "Hot Mix Asphalt Placement Report." Notify the contractor to stop HMA placement when temperatures are below specified limits.

4-3903D (2) Tack Coat

- Make sure that tack coat is applied to surfaces to be paved and at a high enough rate to meet the minimum residual rate specified. Use guidance in Section 4-9403, "During the Course of Work," of this manual to determine the minimum required spray rate. The contractor may request and the paving inspector authorize that the application of tack coat is waived between layers when both of the following conditions apply:
  1. The surface to be paved does not have a film of dust or clay
  2. The temperature of the surface to be paved is at least 140 degrees Fahrenheit
- If the contractor uses asphaltic emulsion that has not yet been tested by Caltrans, verify that each delivery of asphaltic emulsion includes a certificate of compliance that covers items described in Section 94-1.01C, "Submittals," of the *Standard Specifications*. Also, check that each delivery includes a safety data sheet.
- Make sure that if asphaltic emulsion has been diluted, the contractor notifies the engineer of the dilution rate and includes the dilution information required by Section 39-2.01C(3)(f), "Tack Coat," of the *Standard Specifications*.

- For information on inspecting tack coat, refer to Section 4-3908A, “References,” of this manual for the *Tack Coat Guidelines* website.

4-3903D (3) Transporting and Spreading

- Verify that HMA delivery trucks have weighmaster certificates and collect the certificates electronically or from the arriving trucks. If inspection resources are limited, collect weighmaster certificates intermittently throughout the paving shift or daily. If HMA loads are rejected before placement, note on the back of the weighmaster certificate or on the electronic file and on Form CEM-4601, “Assistant Resident Engineer’s Daily Report,” why the HMA was rejected, such as cold mix, segregated mix, or contaminated mix.
- Be aware that queuing of trucks may contribute to excessive cooling of HMA mixture.
- Make sure the contractor uses a material transfer vehicle (MTV) when required. Section 39, Asphalt Concrete,” of the *Standard Specifications* requires the use of an MTV for all types of HMA except Type A and minor HMA. The special provisions may require the use of MTVs for Type A.
- Make sure the contractor does not cross a structure with an MTV or other heavy paving equipment that exceeds the weight limits for a vehicle on highways as defined in California Vehicle Code, Division 15, without written authorization. Coordinate all requests for authorization with the project’s structure representative. If the project has not been assigned a structure representative, coordinate the review through the bridge construction engineer.
- If windrowing is used, prevent overcooling of the HMA by not allowing excessive windrowing. When “method” compaction is used, verify that the windrow temperature does not fall below 260 degrees, or below 250 degrees Fahrenheit when WMA “additive” technology is used. In all cases, check that the windrow length does not exceed 250 feet in front of the loading equipment.
    1. Windrow temperatures can be monitored with an infrared heat gun. Type A HMA may be rejected for not meeting minimum first coverage of breakdown surface temperature shown in Section 39-2.02C, “Construction,” of the *Standard Specifications*. RHMA-G also may be rejected for not meeting minimum first coverage of breakdown surface temperature shown in Section 39-2.03C, “Construction,” of the *Standard Specifications*.
    2. When using a heat gun on a windrow, be aware that the instrument measures only surface temperature and that the interior of the windrow is hotter. When the HMA is run through the material transfer vehicle, paver, or both, the mat temperature may be above the minimum specified breakdown temperature.
    3. If windrow temperatures are inadequate, or if visual inspection of the material in the windrow identifies segregation, poor mixing, or an over-rich mix, notify the contractor. If this material is incorporated into the paving, additional inspection and testing may be necessary to determine if the mix is acceptable.

- When HMA is placed against the edge of a longitudinal or transverse construction joint that is damaged or not placed in a neat line, make sure the contractor saw cuts or grinds the pavement straight and vertically along the joint and removes the extraneous material.
- Verify that longitudinal joints on the finished surface correspond to the edge of traffic lanes and in lower lifts are offset and alternated at least 0.5 foot from each side of the lane line.
- Assure that the paver spreads the HMA at the required thickness and that lift thickness for Type A complies with Section 39-2.02C "Construction," of the *Standard Specifications*, and for HMA placed under method compaction specifications, the lift thickness does not exceed 0.25 foot.
- Verify pavement thickness by comparing the HMA spread rate with the theoretical rate and, if necessary, require the contractor to make adjustments.

  Below is an example spread-rate calculation assuming 12 feet wide, 0.15-foot thickness, mix 150 pounds per cubic foot, and 16 tons shown on a weighmaster certificate.

  1. Calculate the weight of HMA 0.15-foot thick required for 1 square foot: 150 x 0.15 = 22.5 pounds per square foot
  2. Calculate the weight of HMA for 1 linear foot:
     22.5 x 12 = 270 pounds per linear foot
  3. Calculate the linear feet that can be covered by one truckload:
     (16 tons x 2,000 pounds per ton) ÷ 270 pounds per linear foot = 118.5 linear feet
  4. Calculate the linear feet covered by 1 ton of HMA: 2,000 pounds per ton ÷ 270 pounds per linear foot = 7.41 feet

  Check layer thickness and spread rate during placement, and check daily theoretical spread rate against the distance actually paved for the day. Note these on Form CEM-3502, "Hot Mix Asphalt Placement Report."

  Payment for HMA is based on the weight shown on the weighmaster certificate. Because of the high cost of HMA, it is important to monitor the spread rate so an excess of HMA is not placed and project funding is not exceeded.

4-3903D (4) Production Start-Up Evaluation Samples

Section 39-2.01A(4)(h)(v), "Production Start-Up Evaluation," of the *Standard Specification*s requires samples of HMA within the first 750 tons of production on the first day of production.

- Observe the contractor sampling from the mat behind the paver or other location approved by the resident engineer. The contractor must sample in accordance with California Test 125, "Method of Test for Sampling Highway Materials and Products Used in the Roadway Pavement Structure Sections," and give the resident engineer three of the four split samples.

- Test the HMA production start-up evaluation sample for quality characteristics shown in Section 4-3903D (5), “Sampling and Testing Hot Mix Asphalt,” of this manual.
- Test aggregate at the frequency shown in Table 6-1.13, “Materials Acceptance Sampling and Testing Requirements,” of this manual. For samples that will be shipped to the district material laboratory or field construction laboratory for testing, complete Form TL-0101, “Sample Identification Card.” Follow the instructions printed in the form booklet and the information in Section 6-103, “Field Sampled Material Identification for Testing,” of this manual. Record the type of mix, the HMA producer, and the producer’s mix identification number. Check the acceptance tests box on the TL-0101. Under Remarks, identify the tests to be performed.

  Label each HMA sample with enough information to identify the exact location. Refer to the description in Section 4-3903D (5) of this manual.

Check the box on TL-0101 for acceptance test marked Priority, and include Production Start-up Evaluation Test under Remarks. Also under Remarks, list all required acceptance tests. The resident engineer must report the test results to the contractor within 5 business days of sampling. For AASHTO T 324 (Modified), “Standard Method of Test for Hamburg Wheel-Track Testing of Compacted Asphalt Mixtures,” and AASHTO T 283, “Standard Method of Test for Resistance of Compacted Asphalt Mixtures to Moisture-Induced Damage,” test results, report test results within 15 days of sampling. To meet these timelines, ship samples immediately.

4-3903D (5) Sampling and Testing Hot Mix Asphalt

- Obtain split samples of HMA from the mat behind the paver or other location approved by the resident engineer, in accordance with California Test 125, “Method of Test for Sampling Highway Materials and Products Used in the Roadway Pavement Structure Sections.” Table 6-1.13, “Materials Acceptance Sampling and Testing Requirements,” of this manual provides the frequency for sampling HMA mix.

  Label each HMA sample with the aggregate grading (for example, 1/2 inch), asphalt binder target value, producer, and producer’s mix identification number. Indicate both the stationing where the sample was taken and the area represented (for example, STA 100+50, NB, Lane 1, first layer). Also include the Form TL-0101, “Sample Identification Card,” number if the sample is being shipped to the district material laboratory or field construction laboratory for testing. The label must have enough information to identify the exact location in the event the HMA is rejected and must be removed.
- Test aggregate at the frequency shown in Table 6-1.13 of this manual. For samples that will be shipped to the district material laboratory or field construction laboratory for testing, complete Form TL-0101. Follow the instructions printed in the form booklet and the information in Section 6-103, “Field Sampled Material Identification for Testing,” of this manual. Record the type of mix, the HMA

producer, and the producer's mix identification number. Check the acceptance tests box on the TL-0101, and identify the acceptance tests to be performed under Remarks. Include only the acceptance tests that you are requesting to meet the acceptance test frequency in Table 6-1.13 of this manual:

1. Asphalt binder content
2. Air voids content at N-design
3. Voids in mineral aggregate
4. Dust proportion (report only if an adjustment for asphalt binder content target value is less than 0.3 percent from optimum binder content)
5. Maximum theoretical density AASHTO T 209, Method A
6. Hamburg Wheel Track (AASHTO T 324 [Modified])
7. Moisture susceptibility (AASHTO T 283), both dry strength and wet strength

If any single quality characteristic, except smoothness, has two consecutive acceptance or quality control tests out of compliance with the specifications, verify that before resuming production and placement of HMA on the project, the contractor:

1. Stops production
2. Notifies the resident engineer
3. Takes corrective action
4. Provides a split sample for the engineer's testing
5. Demonstrates compliance with the specifications

4-3903D (6) Compaction

The contractor must comply with the method process in Section 39-2.01C(2)(c), "Method Compaction Equipment," and in Section 39-2.01C(15)(b), "Method Compaction," of the *Standard Specifications* if:

- The total paved thickness is less than 0.15 foot
- The HMA is used in:
  1. Asphalt concrete remove-and-replace areas (dig outs)
  2. Leveling courses
  3. Detours not to remain in the final roadway structural section
  4. Areas in which the resident engineer determines that conventional compaction and compaction measurement methods are impeded

4-3903D (6a) Method Process Compaction

For the method process HMA compaction:

- Use the MultiCool program as a guide for determining the length of time available for achieving compaction, based on layer thickness, HMA temperature, existing

pavement temperature, and atmospheric temperature. Recognize that the MultiCool program forecasts the average temperature of the HMA lift as a function of time after placement, not the surface temperatures included in the method compaction specifications. The MultiCool program is available at:

https://dot.ca.gov/programs/construction/hot-mix-asphalt-construction

- Make sure that:
  1. Specified equipment performs the compaction in the specified order.
  2. A required number of coverages is made for each compaction type (first coverage, breakdown, and finish).
  3. The HMA compaction is completed above the specified minimum temperature for each compaction type (first coverage, breakdown, and finish).
  4. When a vibratory roller is specified for compaction, the speed of the vibratory roller in miles per hour does not exceed the vibrations per minute divided by 1,000. When the HMA layer thickness is less than 0.08 foot, the vibratory roller must be in the off mode.
  5. When a pneumatic-tire roller is specified for compaction, the speed does not exceed 5 miles per hour.
- Inspect the finished HMA surface for marks, tearing, and irregular texture that may be caused by segregated mix. Notify the contractor of noncompliant areas.

4-3903D (6b) Compaction Determination by Cores

When the total paved thickness is at least 0.15 foot:

- The contractor will determine the number of rollers and sequence necessary to meet the compaction requirements of the specifications.
- For quality control testing, the contractor must use nuclear gauges calibrated to cores under California Test 375, “Determining the In-Place Density and Relative Compaction of Hot Mix Asphalt Pavement Using Nuclear Gages,” to determine the relative compaction.
- The contractor will obtain the cores for the resident engineer within 5 days of HMA placement. The resident engineer will use the cores to determine relative compaction.
  1. Randomly select core locations for every 250 tons of hot mix asphalt placed according to Part 3, Section 3B, “Test Site Location,” of California Test 375, “Determining the In-Place Density and Relative Compaction of Hot Mix Asphalt Pavement Using Nuclear Gages.”
  2. Witness the contractor taking the cores, mark each core, and place the cores in a protective container before taking possession of the cores.
  3. Complete Form TL-0101, “Sample Identification Card,’’ following the instructions printed in the form’s booklet and the information in Section 6-103, “Field Sampled Material Identification for Testing,” of this manual. Identify the

stationing from which samples were taken and the area they represent, for example, “lane #1, first layer.” Label the samples with enough information that the exact location HMA was placed can be identified if it is rejected and has to be removed. On Form TL-0101, check the box for acceptance test.

4. Transport the cores to the district materials laboratory or construction field laboratory where they will be tested for in-place density (California Test 375), except the density of each core will be determined using AASHTO T 275, Method A, “Bulk Specific Gravity of Compacted Bituminous Mixtures Using Paraffin-Coated Specimens,” and the theoretical maximum density of the mix will be determined using AASHTO T 209, Method A. “Standard Method of Test for Theoretical Maximum Specific Gravity (Gmm) and Density of Asphalt Mixtures.”

4-3903D (7) Smoothness

Except for areas that must be tested for smoothness using a 12-foot straightedge, make sure the contractor tests all finish surfaces of HMA and the finish surface the open-graded friction course (OGFC) is being placed on, with an inertial profiler.

Refer to Section 36-3.01D(3)(b) “Smoothness,” of the *Standard Specifications* for surfaces that are to be measured with a 12-foot straightedge.

If existing asphalt concrete has been cold planed, before overlaying the surface with HMA, make sure the cold planed surface meets the 12-foot straightedge tolerance required by Section 39-3.04C(2) “Grade Control and Surface Smoothness,” of the *Standard Specifications*.

If existing asphalt concrete surfacing has been replaced, before overlaying the surface with HMA, make sure the replaced asphalt concrete surface meets the 12-foot straightedge tolerance as required by Section 36-3.01D(4) “Department Acceptance,” of the *Standard Specifications*.

When there is an item for prepaving grinding, and where existing asphalt concrete surfacing has not been cold planed or replaced:

1. Before overlaying the surface with HMA, make sure the contractor performs prepaving grinding to reduce or eliminate localized roughness to less than 180 inches per mile as required by Section 39-2.01C(3)(e) “Prepaving Grinding,” of the *Standard Specifications*.
2. If notified by the contractor that an existing asphalt concrete surface cannot be corrected by prepaving grinding, respond within 5 business days with agreement or disagreement. Formulate the response based on field review of the defined locations and the inertial profile data.

   If in agreement that the contractor-defined areas cannot be corrected by grinding, make sure the response defines the lane, direction, and the profiler stationing limits where the 12-foot straightedge will be used to evaluate smoothness on the final HMA surface. Upon completion of the final HMA surface, use these stations to define leave-out sections in the profile data file covering the final HMA surface.

If determined that the contractor-defined areas can be corrected by prepaving grinding, assure that the response defines the reasoning. The reasoning should include a ProVAL grind plan that demonstrates grinding can be performed to meet the requirements in Section 39-2.01C(3)(e), "Prepaving Grinding," of the *Standard Specifications*.

3. If the project has inadequate funds to cover prepaving grinding, contact the project manager to determine if additional funds are available to cover the additional work.

Where testing with a 12-foot straightedge is required, the paving inspector checks pavement smoothness for acceptance by daily use of a straightedge to determine whether the finished surface complies with the tolerances specified in Section 36-3.01D(4), "Department Acceptance," of the *Standard Specifications*. These checks are in addition to checks the contractor is required to make and report in accordance with Section 36-3.01C(4) "Straightedge Measurements" of the *Standard Specifications.*

The paving inspector records straightedge measurements on Form CEM-4601, "Assistant Resident Engineer's Daily Report," and notifies the contractor of all out-of-specification areas.

Where smoothness is to be measured with an inertial profiler, the contractor must measure smoothness with an inertial profiler that meets the requirements of Section 36-3, "Pavement Smoothness," of the *Standard Specifications.* Follow the guidelines in Section 4-36, "Surfacing and Pavements—General," of this manual to assure that the inertial profiler, inertial profiler operator, submittals, and measurements meet the requirements of Section 36-3, "Pavement Smoothness," of the *Standard Specifications.*

Review Section 39, "Asphalt Concrete," of the *Standard Specifications* for the specified smoothness acceptance requirements. Analyze the contractor's inertial profiles using ProVAL software.

- Check that prepaving grinding is performed only on existing asphalt concrete surfaces. Do not allow prepaving grinding work on existing asphalt concrete surfaces that are designated to be cold planed for mill and fill type paving, or in areas where existing asphalt concrete is designated to be replaced, or has been replaced, such as dig outs. Corrective grinding work on replaced asphalt concrete surfacing is considered part of the replace asphalt concrete surfacing work and is not prepaving grinding work. Make sure the contractor's prepaving inertial profiles are used to determine where prepaving grinding work is required. Do not use profiles provided with the bid documents.
- Monitor the contractor's planning for prepaving grinding. Document any concerns you have about methods planned for achieving smoothness on an existing surface. A handbook and training videos on using ProVAL to develop grind plans are available at:

  https://dot.ca.gov/programs/construction/training

- After making prepaving grinding corrections, make sure the contractor takes and submits the corresponding inertial profiles. Require the contractor to repeat prepaving grinding and inertial profile submittal process, if necessary.
- Verify that the profile data file covering the surface of the completed prepaving grinding work defines lane sections where the final pavement surface will and will not have the smoothness specifications applied to it.
- Unless authorized by a change order, reject any HMA placed over an existing asphalt concrete surface that is required to, but does not meet the prepaving grinding smoothness requirements.
- Make sure prepaving profiles are taken before cold planing, and after replacing asphalt concrete surfacing.
- Once it has been determined that the contractor's prepaving grinding profiles meet the requirements, request Caltrans' inertial profiler be run to verify that the profiles are within 10 percent.

Verify that the final HMA surface meets the smoothness requirements.

When OGFC is being placed atop HMA, make sure the HMA surface meets the smoothness requirements before placement of OGFC.

Retain one copy of profile information in ".ppf" ProVAL format.

4-3903D (8) Miscellaneous Areas and Dikes

The contractor must place HMA at miscellaneous areas and place dikes where shown on the plans and in accordance with Section 39-2.01B(11), "Miscellaneous Areas and Dikes," of the *Standard Specifications.*

4-3903D (9) Fog Seal Coat

The contractor applies fog seal coat to rumble strip ground areas and ground areas caused by smoothness correction grinding. If smoothness correction grinding is excessive, contact the Division of Maintenance Office of Asphalt Pavements before allowing the contractor to fog seal within the traveled way.

The contract item for fog seal coat is used when fog seal must be applied to shoulders, miscellaneous areas, and dikes. Prohibit the contractor from applying fog seal coat to the traveled way.

Fog seal coat applied to ground-in rumble strips and smoothness correction areas is not paid separately. Refer to Section 4-37, "Seal Coats," of this manual for additional information.

4-3903D (10) Open to Traffic

Do not allow traffic on new HMA until its mid-depth temperature is below 160 degrees Fahrenheit. The contractor may request in writing and the resident engineer authorize cooling of HMA Type A with water when rolling is complete.

The contractor must spread sand at a rate of 1 to 2 pounds per square yard before opening to public traffic on new rubberized HMA.

Temporary construction signs and temporary pavement delineation must be in place before opening to public traffic.

4-3903D (11) Temporary Transverse Joint Taper

Make sure the contractor constructs a temporary joint taper between the existing pavement and any newly placed paving or cold planing area when a transverse joint greater than 0.04 foot cannot be avoided before opening to traffic.

Verify that the taper transition rates meet the requirements of Section 7-1.03, "Public Convenience," of the *Standard Specifications.*

Check that the temporary joint taper surface is uniform and there is no more than a 0.02-foot gap from the lower edge of a 12-foot straightedge and the taper surface when placed parallel and perpendicular to traffic.

4-3903D (12) Existing Asphalt Concrete

Make sure the contractor makes a 2-inch deep saw cut along limits where asphalt is designated to be removed.

Check that the contractor schedules cold planing and placement of HMA in accordance with the timeline requirements covered by Section 39-3.04, "Cold Planing Asphalt Concrete Pavement," of the *Standard Specifications.*

Verify that cold planing equipment has automatic controls for the longitudinal grade and transverse slope of the cutter head. When cold planing, document contractor's methods to control grades of the cold planer.

Inspect the cold planed surface to verify that the planing operations result in a neat and uniform surface. Make sure the contractor replaces broken, missing, or worn teeth if the surface pattern indicates the surface is not uniform.

Inspect the cold planed surface for signs of delamination. To minimize the potential for differential compaction, if necessary, provide direction to make minor adjustments or second passes to the cold planer to decrease potential for delamination. Document any locations that may cause smoothness issues if left unaddressed. Document any locations where you and the contractor disagree that delamination may be significant enough to cause differential compaction. Documentation should include high-resolution digital photographs or videos.

4-3904 Contract Administration

The resident engineer must review the notice of materials to be used, review and accept the job mix formula for HMA, review and accept the contractor's quality control plan when applicable, and verify Caltrans inspection reports and acceptance testing results for contract compliance. The resident engineer makes decisions regarding noncompliant materials and placement.

The Federal Highway Administration requires Caltrans to have a quality assurance program. As part of that program, this chapter defines quality assurance and contract administration requirements for HMA. Caltrans requires that these same quality assurance standards be met for state-funded projects. If the requirements are not met, there is a risk that federal funds will be withheld or withdrawn. The resident engineer takes the following steps for HMA contract administration:

- Verifying that Form CEM-3101, "Notice of Materials To Be Used," includes all component materials and materials sources used in HMA. Refer to Section 6-202, "Responsibilities for Acceptance of Manufactured or Fabricated Materials and Products," of this manual for details.
- Making sure that the job mix formula for the project is verified and accepted before placement of HMA.
- Verifying that the contractor's quality control plan is submitted and complies with the requirements of Section 39-2.01A(3)(c) "Quality Control Plan," of the *Standard Specifications.* The quality control plan must describe the organization and procedures used by the contractor to control HMA quality, sampling, implementing and maintaining quality, when corrective actions are needed based on the contractor's action limit, implementing corrective actions, and method used to backfill core locations.

  The submitted quality control plan must also address the following elements affecting HMA quality: aggregate, asphalt binder, additives, and production paving.

4-3904A Acceptance Testing and Evaluation

The resident engineer makes sure that acceptance testing is performed at least at the minimum frequency shown in Table 6-1.13, "Materials Acceptance Sampling and Testing Requirements: Asphalt Concrete," of this manual. Record test results on Form CEM-3701, "Test Result Summary," so that minimum acceptance testing frequency is documented and easily verified.

The resident engineer verifies that acceptance samples are transported to testing laboratories within the timeframes specified in Example 6-1.2, "Sample Cylinder Label," of this manual, except where specific sampling or test method requirements preclude doing so, for example, curing of specimens before transport. Test within 1 business day from sampling for projects within 50 miles of the testing laboratory or within 2 business days from sampling for projects more than 50 miles from the testing laboratory. Make sure the proper chain of custody is maintained throughout the process, including delivery to and receipt from a commercial shipping service. Use Form CEM-3701, "Test Result Summary," to summarize acceptance test frequency and results on each material. Use this form to record dates for sampling, shipping to laboratory, receiving test results from laboratory, and notifying the contractor of test results. Monitor timeliness of material testing turnaround against Table 6-1.2, "Time Required for Materials Acceptance Tests," of this manual, and make sure corrective actions are taken, and document deficiencies encountered. 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 inspection and provide copies of these test results upon request. Maintain copies of the test results in Category 37, "Initial Tests and Acceptance Tests," of the project files.

The resident engineer verifies that final inertial profile submittals meet the requirements for mean roughness index and areas of localized roughness. Use 4-3603B, "Pavement Smoothness," of this manual as a guide in reviewing submittals.

The resident engineer compares the contractor's and Caltrans' International Roughness Index values over each 0.1-mile section of lane. The resident engineer uses the contractor's final inertial profiles for acceptance when they are within 10 percent of Caltrans' values.

The resident engineer assures that production start-up evaluation testing is completed and recorded on Form CEM-3703, "Production Start-Up Evaluation," and that the contractor is provided with a copy of the completed form.

4-3904A (1) Acceptance Test Results Outside Specified Limits on Non-Statistical Pay Factor Projects

If any acceptance test result, except smoothness, is outside the limits specified, notify the contractor in writing that the material represented by the tests is noncompliant, and include a statement that the noncompliant material is rejected and must be removed or remedied in accordance with Section 5-1.30, "Noncompliant and Unauthorized Work," of the *Standard Specifications*. Attach a copy of the acceptance test result.

Ask the contractor if any corrective action has been taken based on quality control test data for the period when the acceptance sample was taken.

For every in-place density test failure, notify the contractor in writing that the material represented by the failed in-place density test is noncompliant, and include the following statements:

> "The noncompliant material is rejected and must be removed or remedied in accordance with Section 5-1.30, 'Noncompliant and Unauthorized Work,' of the *Standard Specifications.*
>
> "At the engineer's option, noncompliant material may be accepted based on the engineer's evaluation of the effectiveness of your corrective actions. If the engineer decides to accept the noncompliant material, payment will be based on the table 'Reduced Payment Factors for Percent of Maximum Theoretical Density,' in Section 39-2.01A(4)(i)(ii), 'In-Place Density,' of the *Standard Specifications*."

For two consecutive density test failures, follow guidance in Section 4-3904A (2) "Two Consecutive Acceptance Test Results Outside of Specification Limits on Non-Statistical Pay Factor Projects," of this manual.

If acceptance test results are disputed within the period specified in Section 39-2.01A(4)(i)(iv), "Dispute Resolution," of the *Standard Specifications,* try to resolve these issues at the project level before involving the independent third party.

If an acceptance test is outside the acceptance specification limits, immediately direct the field construction lab, district materials lab, or METS to test the most recent acceptance sample for compliance with the specifications. There may be additional samples that have not been tested. Always test the most recently pulled sample first. Designate this sample for priority testing.

If the most recent sample fails, follow guidance in Section 4-3904A (2) of this manual.

If the most recent sample passes, test the samples immediately before and after the initial failed sample. At a minimum, continue testing samples taken before and after the initial failed sample until a sample passes. If during this testing there are two consecutive failures, and there are passing results after these failures that indicate necessary corrective actions were already implemented, do not follow the guidance in Section 4-3904A (2) of this manual.

4-3904A (2) Two Consecutive Acceptance Test Results Outside Specification Limits on Non-Statistical Pay Factor Projects

If two consecutive acceptance test results do not comply with the specifications:

- Immediately inform the contractor to stop production.
- Inform the contractor in writing that the material represented by the two out-of-specification acceptance tests is noncompliant, and include a statement that the noncompliant material is rejected and must be removed or remedied in accordance with Section 5-1.30, “Noncompliant and Unauthorized Work,” of the *Standard Specifications*. Attach copies of both test results that indicate the material is outside specification limits.
- Submit any samples taken between the two failed tests to the appropriate lab for priority testing to define the amount of material not in compliance with the specifications.
    1. Notify the appropriate lab that two consecutive acceptance tests are outside the acceptance specification limits.
    2. Direct the testing labs to test all samples between the first and second out-of-specification acceptance tests and any remaining samples immediately before or after any failure. Use their test results to define the quantity of hot mix asphalt that will be rejected.
- Notify the contractor in writing of results of all additional acceptance tests conducted to determine the extent of the out-of-specification material. In the notice, include language that the material represented by out-of-specification material is noncompliant and rejected and must be removed or remedied to comply with Section 5-1.30, “Noncompliant and Unauthorized Work,” of the *Standard Specifications*.
- Require the contractor to:
    1. Take corrective action to remedy the cause of out-of-specification material.

2. Provide written documentation of corrective action taken.
3. Demonstrate compliance by providing quality control testing of material produced but not delivered to the project.
4. Provide samples of HMA for both the resident engineer and contractor to test. The contractor samples this material in the engineer's presence and splits the samples into four parts.
5. Test one part of the split sample to verify that the corrective action taken by the contractor was successful.

If both Caltrans' and the contractor's test results are within specifications, the contractor has demonstrated compliance with the specifications and may resume production.

Since the samples tested by the contractor and resident engineer are from a split sample, the test results should not be significantly different. If there is a significant difference, the resident engineer and the contractor should investigate the reason for the discrepancy. Contractors can choose to begin production during this investigation but proceed at their own risk.

- The contractor may dispute any out-of-specification acceptance test result within the specified number of days of receiving the test result by notifying the resident engineer in writing in accordance with Section 39-2.01A(4)(i)(iv), "Dispute Resolution," of the *Standard Specifications*. Try to resolve testing or sampling issues at the project level before involving the independent third party.

4-3904A (3) Contractor Requests for Accepting Noncompliant Work

If the contractor agrees that the HMA placed is noncompliant, the contractor may propose to the resident engineer in writing that the noncompliant material will be remedied or that the noncompliant material will be left in place for reduced compensation. Consult with the district materials engineer and either the Division of Maintenance Office of Asphalt Pavements, the district's construction field coordinator, or both, about acceptance of the contractor's proposal. Document material remediation or reduced pay by issuing a contractor-requested change order. Document all noncompliant materials test results including the action taken on Form CEM-6302, "Final Materials Certification." Refer to Section 6-106, "Project Materials Certification," of this manual for documentation requirements.

4-3904A (4) Acceptance of Lots using Statistical Pay Factor Specifications

For an overview of the quality assurance process used for HMA using statistical pay factor specifications, refer to section 4-3901D (2), "Statistical Pay Factors Quality Assurance Process," of this manual.

Administering SPF projects requires analysis of contractor quality control test data, engineer's verification test data, and when a dispute arises, independent third-party laboratory test data. The analysis is performed each day and upon completion of each lot using a Caltrans-furnished spreadsheet titled SPFPay. The spreadsheet is available at:

https://dot.ca.gov/programs/construction/hot-mix-asphalt-construction

The SPF specifications require that the quality control manager enter the quality control test data into the SPFPay spreadsheet after each sublot. The quality control manager submits this data daily to the resident engineer. The resident engineer imports the contractor's quality control data into a copy of the spreadsheet. Any new or revised data is highlighted. If a highlighted test result indicates a previously submitted test result has been changed, the engineer does not accept the data until the contractor provides evidence of justifiable reason for changing the data, such as correcting a clerical error. If the highlighted data is only new test data, the engineer accepts the data.

After accepting the data, the engineer reviews the SPFPay spreadsheet for any stop production notifications. These stop production notifications indicate the material in the lot to that point is not acceptable until one or more sublots of material is rejected from the sublot, regardless of improvement to the percent within limits (PWL) or quality factors after the notification. If the resident engineer finds these stop notifications and that the quality control manager did not stop production or notify the engineer of the need to stop production, the resident engineer stops production, and does not allow production to proceed until the contractor identifies the sublot or sublots of material that will be rejected from the lot. The stop notification indicates that PWL for a pay factor quality characteristic fell below an acceptable threshold. The threshold requires the quality factor to be 0.90 or greater, which is also expressed as a PWL of 70 percent or greater. The number 8 sieve is less critical, and requires the quality factor to remain above 0.75, which is also expressed as PWL threshold of 45 percent.

Upon completion of a lot, all stop notifications on previously completed sublots must be cleared. Clearing the stop notifications requires rejection and removal of the sublot, and its corresponding test results from SPFPay. The engineer allows the contractor to continue production of a lot only after the contractor identifies which sublots will be removed and rejected from the lot.

The engineer does not share pay factor verification test data with the contractor until the lot is completed and all of the contractor's quality control test data has been submitted.

At completion of the lot, and after receiving all of the quality control test data for the lot, the engineer runs a verification check of the contractor's quality control data. Once verified, the engineer notifies the contractor and makes the applicable adjustment on the next progress pay estimate.

A lot is a quantity of HMA. A new lot begins when one of the following occurs:

1. 20 sublots are complete
2. JMF changes
3. Production stops for more than 30 days

Upon completion of each lot, the engineer verifies the contractor's quality control data using the engineer's verification test results. The engineer uses the SPFPay spreadsheet to perform this check.

Once the contractor's quality control test data is verified, the engineer accepts the lot. The SPFPay spreadsheet calculates the quality factors for each of the five pay factor quality characteristics using the following equation and without rounding:

quality factor = (PWL ÷ 2) + 0.55

Each quality factor typically results in a value from 0.90 through 1.05. The lot is acceptable when all quality factors are 0.90 or higher, except above 0.75 or higher for the percent passing the number 8 sieve, and there are no stop notifications shown on any sublot requiring one or more sublots of material to be rejected and removed from the lot.

Once the lot is accepted, the resident engineer pays for the HMA at item price and includes the incentive or disincentive payment adjustment for the lot on the next progress estimate. Refer to section 4-3907E, "Compensation Adjustment for Hot Mix Asphalt Placed using the Statistical Pay Factor Specifications," of this manual for guidance on making the payment adjustment.

4-3904A (5) Monitoring Non-Pay Factor Quality Characteristics using Statistical Pay Factor Specifications

The contractor's minimum sampling frequency is defined in the specifications. When the contractor's testing indicates a non-pay factor test is out of specification, the contractor is required to notify the engineer and document corrective actions taken. If the contractor's quality control test for a single non-pay factor quality characteristic falls out of specification two consecutive times, or any non-pay factor quality characteristic fails 3 times in a single day, the contractor must stop production, notify the engineer and demonstrate compliance before continuing production.

The resident engineer may perform testing on non-pay factor quality characteristics at any time, but at a minimum frequency defined in Table 6-1.12, "Materials Acceptance Sampling and Testing Requirements," of this manual.

When the resident engineer determines that a non-pay factor quality characteristic is to be tested, samples are pulled from two consecutive contractor defined sublots. These samples are independent of the contractor's. Refer to section 4-3903A (2), "Department Acceptance," of this manual for detailed guidance on sampling and testing of non-pay factor quality characteristics, and stopping production because of two consecutive non-pay factor test failures.

4-3904B Testing for Significant Difference

The resident engineer should compare the contractor's test results against Caltrans' test results to determine if they are significantly different. Compare the test results in one of two ways:

1. A one-to-one comparison of the test results of a single split sample (job mix formula verification and production start-up).

2. The comparison of groups of test results, that is, the average of all acceptance tests compared to the average of all quality control tests.

The resident engineer should always examine the differences between contractor and Caltrans test results for job mix formula verification, production start-up, and dispute resolution based on a one-to-one comparison of the test results. For job mix formula verification and production start-up evaluation, the test result comparison will show whether the contractor and Caltrans can test properly sampled and split samples for aggregate and HMA and get reasonably close test results. If a significant difference exists, the resident engineer should notify the contractor. The resident engineer and contractor should examine what is causing the difference and try to find a way to bring their results closer.

The resident engineer should never consider a one-to-one comparison of two test results from different samples, such as Caltrans' acceptance result of a sample taken in the morning compared to a contractor's quality control test result of a sample taken in the afternoon. If examination of the contractor's and Caltrans' test results shows large differences, compare the test result groups to determine if the results are significantly different. Compare the average of all acceptance test results to the average of the contractor's quality control test results, and use Table 4-39.1, "Precision Index," of this manual, to determine if the difference between the test results is reasonable or significantly different. If the comparison between the test results indicates a significant difference, notify the contractor. The resident engineer and contractor together should examine and investigate the cause of test result differences.

Use the reasonable testing difference values in Table 4-39.1 to evaluate whether a significant testing difference exists.

Table 4-39.1. Precision Index

Quality Characteristic	Test Method	Reasonable Testing Differences	
		Single Results	Averages
Sand equivalent	AASHTO T 176	6	2
Theoretical maximum specific gravity (see Note 1)	CT 375	0.05	0.02
Percentage of maximum specific gravity (see Note 1)		3% (see Note 2) 2% (see Note 4)	1% (see Note 3)
Design air voids content (see Note 1)	MS-2 Asphalt Mix Design Methods	2.8%	4.5%
Asphalt binder content	AASHTO T 308, Method A	0.3% 0.5%	0.1% 0.2%
Aggregate gradation	AASHTO T 27		
3/4” or 1/2”		3%	1%
3/8”		3%	1%
No. 4		3%	1%
No. 8		3%	1%
No. 30		3%	1%
No. 200		3%	1%

NOTES:

1. Examine the AASHTO T 209, Method A values for theoretical maximum density also. Determine whether resolution of AASHTO T 209, Method A is necessary and sufficient to resolve issues with percent theoretical maximum density or design air void content.
2. Comparing one core to the average of quality control test results within the same 250 tons.
3. Comparing the average of Caltrans’ cores to the average of quality control test results for the same volume of HMA or the same area.
4. Comparing the average of three of Caltrans’ cores in 3 lots of 250 tons each to the average of quality control test results for the same 3 lots of HMA.

4-3904C Certificates of Compliance

The resident engineer obtains certificates of compliance for each delivery of asphalt binder (attach bill of lading), crumb rubber modifier, tack coat, and fog seal.

Keep track of total quantity of material delivered and check that inspectors have obtained an adequate number of certificates of compliance to cover the quantity of material received.

In addition, perform the following contract administration reviews for certificates of compliance:

- Refer to the *Certification Program for Suppliers of Asphalt* to determine what information must be shown on the certificate of compliance for asphalt binders.
- Obtain "Buy America" certification for each shipment of crumb rubber modifier.

Assure that asphalt binder contract administration requirements are met by following Section 4-92, "Asphalt Binders," of this manual.

4-3905 Level of Inspection

Suggested levels of field inspection for typical concrete pavement activities are:

- Benchmark inspection of subgrade for compaction and elevation requirements
- Intermittent inspection of HMA production operations
- Continuous inspection of HMA delivery, placement
- Continuous inspection of HMA compaction operation using method compaction specifications
- Benchmark inspection of HMA compaction operation using the core density compaction specifications
- Continuous acceptance sampling and testing of HMA
- Intermittent monitoring of the contractor's adherence to their quality control plan
- Benchmark evaluation of pavement surfacing for signs of segregation, raveling, or other distresses
- Benchmark inspection for smoothness

4-3906 Quality Control

Guidance for quality control activities included in this section is summarized as follows:

- Review contractor's quality control plan within 5 business days of the submittal. For the standard process, verify the plan complies with the requirements of Section 39-2.01A(3)(c) "Quality Control Plan," of the *Standard Specifications.* For the for Type-A HMA using the SPF process, verify the plan complies with the requirements of 39-2.09A(3)(b), "Quality Control Plan," of the special provisions. For RHMA-G using the SPF process, verify the plan complies with the requirements of 39-2.10A(3)(b), "Quality Control Plan," of the special provisions.

- Verify that the contractor submits a copy of the AASHTO re:source accreditation for the laboratory performing the mix design. A current list of accredited labs is available at:

  http://aashtoresource.org/aap/accreditation-directory

- For HMA placed using the SPF process, verify the contractor's quality control testing laboratories performing AASHTO tests have a current AASHTO re:source accreditation.
- For HMA placed using the SPF process, verify contractor's quality control testing laboratory and quality testing personnel are accredited and qualified under the Department's Independent Assurance Program. The list of accredited and qualified laboratories and personnel are maintained in the *Statewide Independent Assurance Database (SIAD).* The SIAD is available at:

  https://sia.dot.ca.gov/index.php

  Review the contractor's quality control test results to verify that testing meets the specifications for Caltrans acceptance. For most quality control characteristics, the contractor samples and tests at a minimum frequency of once per 750 tons of produced HMA.
- Verify that, when any quality characteristic is beyond the action limits shown in the quality control plan, the contractor is taking corrective action. The contractor must document the corrective action in accordance with Section 39-2.01A(4)(h), "Quality Control," of the *Standard Specifications*.
- Verify that the contractor is complying with the minimum quality control testing frequencies specified in Section 39-2.01, "General," of the *Standard Specifications*, and the frequencies specified under Section 39-2.01A(4)(h) "Quality Control" for the type of HMA being produced.
- For HMA placed under the standard process, make sure the contractor stops production when two consecutive quality control or acceptance tests are out of specification, notifies the resident engineer, takes corrective action, and demonstrates compliance with the specifications before resuming production and placement of HMA.
- For HMA placed under the SPF process, make sure the contractor; stops production when two consecutive non-pay factor quality control or acceptance tests are out of specification, notifies the resident engineer, takes corrective action, and demonstrates compliance with the specifications before resuming production and placement of HMA.
- Verify that certifications for the inertial profiler and operator have not expired. The corresponding expiration dates are available at:

  https://dot.ca.gov/programs/engineering-services/inertial-profiler-certification-program

- Review the contractor's monitoring of best paving practices that promote smoothness. Encourage the contractor to monitor and record locations where

paving practices commonly known to negatively affect smoothness occur, then to follow up and compare those locations to the localized roughness reports of the corresponding International Roughness Index values. Examples of common occurrences are: paver stops, excessive screed angle adjustments, excessive variation in head of material in front of screed (paving width adjustments, poor controls), variations in paving speed, poor or lack of automated grade controls using a ski or averaging system, or poor roller practices.

- Before paving, use MultiCool software to estimate how rapidly a freshly placed HMA mat will cool as a function of the mix properties and site conditions. The MultiCool software is available at:

  https://dot.ca.gov/programs/construction/hot-mix-asphalt-construction

  A MultiCool application is also available for smartphones using either the Android or iOS operating systems.

- Before placing tack coat, make sure the contractor plans to spray tack coat at a rate required to achieve the minimum residual rate. Rates vary based on the application and the dilution rate. To determine the minimum rate, calculate your own rate as shown in the example at 4-9403, "During the Course of Work," of this manual or use the "*Minimum Tack Coat Spray Rates* (PDF)" at:

  https://dot.ca.gov/programs/construction/hot-mix-asphalt-construction

4-3907 Payment

For details of payment, review the applicable, "Payment" subsection of Section 39 "Asphalt Concrete," of the *Standard Specifications*.

For guidelines on how to weigh HMA, refer to Section 3-902E, "Weighing Equipment and Procedures," of this manual.

For measuring asphalts, liquid asphalts, and asphaltic emulsions used as tack coat, refer to Sections 4-92, "Asphalt Binders"; and 4-94, "Asphaltic Emulsions," of this manual.

4-3907A Payment Adjustment for Core Density

For HMA placed using the standard process, determine if a deduction is required for cores outside specification limits for the percent of maximum theoretical density. Use the table, "Reduced Payment Factors for Percent of Maximum Theoretical Density," in Section 39-2.01A(4)(i)(ii), "In-Place Density," of the *Standard Specifications*. The core density (compaction) deduction should be taken on the next monthly estimate as an administrative deduction.

4-3907B Compensation Adjustment for Price Index Fluctuations

For compensation adjustments for price index fluctuations for asphalt binder, use the guidance provided in Section 4-9205A "Compensation Adjustments for Price Index Fluctuations" of this manual.

4-3907C Payment After Dispute Resolution for Independent Third Parties

If applicable, when the dispute resolution process determines the contractor's test results are correct, Caltrans pays the independent third party testing costs and adjusts the contract time. The resident engineer adjusts payment and contract time in accordance with Section 8-1.07, "Delays," of the *Standard Specifications* and processes a change order to allow for payment and adjustment.

4-3907D Compensation and Contract Time for Delays

When failing to comply with the specified times to return test results to the contractor, the resident engineer must adjust payment and contract time under Section 8-1.07, "Delays," of the *Standard Specifications*:

- Within 20 days of sampling for job mix formula verification
- Within 3 days of rubberized HMA production sampling for job mix formula verification
- Within 3 days of sampling for production start-up evaluation

Make compensation and contract time adjustments only when work completion is delayed.

4-3907E Compensation Adjustment for Hot Mix Asphalt Placed Using the Statistical Pay Factor Specifications

The resident engineer determines acceptance of each lot of HMA placed using the SPF process using guidance in Section 4-3904A (4), "Acceptance of Lots Using Statistical Pay Factor Specifications" of this manual.

Once a lot is accepted, the resident engineer uses the SPFPay spreadsheet to determine the composite quality factor for the lot. The composite quality factor is the weighted average of the individual quality factors for each of the five pay factor quality characteristics, rounded to two decimal places. The individual quality factors are not rounded before determining the composite quality factor.

The resident engineer then uses the composite quality factor for the lot and the contractor's bid item price to determine the unit price adjustment. That unit price adjustment is then applied to each ton of HMA placed in the accepted lot. The unit price adjustment per ton is determined as follows:

Unit Price Adjustment for Lot = (composite quality factor - 1.00) x HMA Bid Price

Using the unit price adjustment equation, if the composite quality factor is 1.05, the contractor earns a 5 percent incentive, or if the composite quality factor is 0.95, the contractor earns 5 percent less, which is a disincentive.

The resident engineer includes the applicable adjustment on the next progress estimate after the lot has been accepted and the adjustment has not been disputed. When the adjustment is not included on the next progress estimate, and the amount is an incentive, the resident engineer includes it on the next progress estimate and

pays interest calculated in accordance with the requirements of Section 9-1.03, "Payment Scope," of the *Standard Specifications.*

When the engineer's test data does not verify the contractor's test data, the engineer immediately notifies the contractor and uses the Caltrans verification test data in place of the contractor's quality control test data as basis for acceptance and determination of a payment adjustment.

If the contractor disputes the non-verification, the engineer follows the dispute process defined in the specifications. For Type-A HMA, refer to section 39-2.09A(4)(c)(v), "Dispute Resolution" of the project's special provisions. For RHMA-G, refer to section 39-2.10A(4)(c)(v), "Dispute Resolution" of the project's special provisions.

If the contractor disputes the engineer's non-verification of the lot, the specifications require that both parties first attempt to resolve the dispute without involvement of an independent third party. This may include witness testing and sharing of test data worksheets. If this first step does not resolve the dispute, the engineer provides the split samples from the engineer's disputed verification test samples to the independent third party, who runs the tests on those samples. Those test results are used in the verification test of the contractor's quality control samples reported for the lot.

If the independent test results verify the contractor's test results, the lot is considered verified and the payment adjustment is determined using the contractor quality control test data. The engineer then pays for the independent testing costs.

If the independent test results do not verify the contractor's test results, the lot is not verified, and the payment adjustment is determined using the independent test results. The contractor then pays the independent third party testing costs.

4-3908 References and Resources

The following provide construction personnel with additional sources of information:

4-3908A References

- Authorized Materials Lists (AML)

  https://dot.ca.gov/programs/engineering-services/authorized-materials-lists
- California Test Methods, METS:

  https://dot.ca.gov/programs/engineering-services/california-test-methods
- Certification Program for Suppliers of Asphalt, METS:

  https://mets.dot.ca.gov/aml/AsphaltBindersList.php
- CEM forms, Division of Construction:

  https://dot.ca.gov/programs/construction/forms
- *Independent Assurance Manual*, Procedures for Accreditation of Laboratories and Qualification of Testers, METS:

https://dot.ca.gov/programs/engineering-services/independent-assurance-program

- Material Plant Quality Program, Division of Construction:

  https://dot.ca.gov/programs/construction/material-plant-quality-program

- Materials Engineering and Testing Services (METS), Caltrans:

  https://des.onramp.dot.ca.gov/materials-engineering-and-testing-services-mets

- Maintenance Technical Advisory Guide (MTAG)

  https://maintenance.onramp.dot.ca.gov/paveprogram/pavement-preservation-program

- Quality Control Manual for Hot Mix Asphalt using Statistical Pay Factors

  https://dot.ca.gov/programs/construction/hot-mix-asphalt-construction

- *Construction of Quality Asphalt Pavements*, Asphalt Institute.

  https://mx.asphaltinstitute.org/Shop/Product-Catalog?category=100000003

- *Standard Specifications*, Caltrans:

  https://dot.ca.gov/programs/design/ccs-standard-plans-and-standard-specifications

- *Tack Coat Guidelines*, Division of Construction:

  https://dot.ca.gov/programs/construction/hot-mix-asphalt-construction

- Minimum Tack Coat Spray Rates, Division of Construction

  https://dot.ca.gov/programs/construction/hot-mix-asphalt-construction

4-3908B Resources

Use available experts within your district or region to resolve issues and obtain additional information about HMA production and placement. Contact the construction engineer and Division of Construction coordinator for issues about contract administration related to HMA specifications. Contact the district materials engineer for issues about materials and the district independent assurance coordinator for issues concerning testing.

When questions about Section 39, “Asphalt Concrete,” of the *Standard Specifications* or related special provisions cannot be addressed by district or region experts, or the construction engineer refers the resident engineer to the Division of Construction or Engineering Services for assistance, contact the following:

For materials or testing issues:

Chief, Office of Central Laboratories
Materials Engineering and Testing Services
California Department of Transportation

For contract administration, measurement or payment issues:

Chief, Office of Construction Standards
Division of Construction
California Department of Transportation

Chapter 5 Contract Administration

Section 4 Disputes

Chapter 5 Contract Administration

Section 4 Disputes

5-401 General

The objective of this section is to provide guidance to the contract administrative team so that requests for information, protests, contract disputes, potential claims, and claims are addressed and resolved expeditiously and consistently. The contract administrative team includes the resident engineer, the construction engineer, and other California Department of Transportation (Caltrans) personnel with the responsibility to analyze and resolve disputes.

The contract administrative team, represented by the resident engineer, administers the dispute resolution process. Subject matter experts are consulted to help evaluate the technical aspects of a dispute.

Contractors submit requests for information to the resident engineer when there is discrepancy or confusion in the contract, to ask for a time extension, or to protest a resident engineer's decision. The resident engineer responds to the request within the specified time. A contract dispute results when the contractor does not agree with the response.

A contract dispute is a disagreement between the contractor and Caltrans over the interpretation of plans, specifications, bid proposals, material handouts, and other documents. When a dispute occurs, the contractor provides notice of the dispute using the three-part Potential Claim Record process. The resident engineer acknowledges receipt of the dispute and begins analysis and potential resolution. Try to resolve disputes as early as possible, in accordance with the contract, and at the lowest responsible level. Determine the relevant facts and responsibilities. Compensate the contractor where merit exists, even in part, and deny compensation with clear reasons when no merit exists.

Take this action within your authority as described in Section 5-311, "Change Order Approval Process," and Table 5-4.2, "Disputes Resolution Authority—Entitlement," in Section 5-417, "Dispute Resolution Authority," of this manual.

If you lack the authority to resolve the dispute, discuss the dispute with the rest of the contract administrative team and the Division of Construction field coordinator. Promptly issue and obtain approval of a change order for the portions of the dispute that have merit.

Disputes that have not been resolved before issuing the proposed final estimate may become claims if the contractor lists them as exceptions to the proposed final estimate. Caltrans reviews the contractor's claims and issues its final determination of claims in an expeditious manner. Caltrans has 240 days from contract acceptance to issue its final determination of claims. The contractor can initiate arbitration by filing a complaint with the Office of Administrative Hearings within 90 days of the receipt of the district director determination of claims letter or 240 days after contract acceptance if no district director determination of claims letter was issued. The district director determination of claims

letter is the Department's final written decision on the claims under Public Contract Code Section 10240.1. Caltrans' Legal Division is the lead for representing Caltrans in arbitration. The districts and the Division of Construction support the Legal Division in arbitration proceedings. Refer to Section 5-412, "Arbitration," of this manual for additional information.

Provisions for contract claims are incorporated into Minor B contracts based on California Government Code. Resident engineers must follow Section 5-407, "Minor B Contracts," of this manual, when resolving disputes on Minor B contracts.

5-402 Disputes and Claims Prevention

There are many things that the contract administrative team can do to minimize the number and size of disputes and claims. Be proactive, professionally communicate with the contractor, and properly administer the contract. Partner with the contractor, within the confines of the contract, and maintain a respectful relationship through completion of the project. Be knowledgeable about the contract documents, policies, procedures, and federal and state laws applicable to the proper administration of the contract. Knowing the contractual responsibilities of each party will help in the timely resolution of the dispute.

Take the following actions to minimize claims:

- Partner with the contractor.
- Expeditiously investigate the issue.
- Consider the facts.
- Define the critical issues.
- Review the appropriate contract specifications.
- Communicate your position as soon as possible.
- Work within the contractual constraints.
- Document resolution and elevate to a greater authority, if appropriate.

5-403 Requests for Information and Potential Claim Records

The contractor may ask questions and make requests for additional compensation. Sections 5-1.42, "Requests for Information," and 5-1.43, "Potential Claims and Dispute Resolution," of the *Standard Specifications* include provisions and requirements for the contractor and the resident engineer to follow to document the request and move toward resolution if a dispute occurs The contract administrative team must respond without delay to the contractor's requests. Timeframes for the responses are included in these sections.

Requests for information must be submitted by the contractor to the resident engineer during the course of the project and until receiving the proposed final estimate. Requests for information that pertain to the resident engineer's decisions or orders may have specified timeframes for the contractor submittal. The resident engineer's response may lead to a dispute if the contractor protests the response. Section 5-1.43, "Potential Claims and Dispute Resolution," of the *Standard Specifications* outlines the three-part potential

claim record process, which includes an initial potential claim record, a supplemental potential claim record, and a full and final potential claim record. Note the date and time these documents were received and the name of the person who received them. For contracts with internet potential claim record requirements, the contractor's submittal using the Caltrans electronic potential claim record system is mandatory. For additional information on the electronic system see related information at:

https://dot.ca.gov/programs/construction/epcr

Disputes become claims when the contractor lists them as exceptions to the proposed final estimate.

5-403A Requests for Information

The contractor submits a request for information upon recognition of any event or question of fact arising under the contract in accordance with Section 5-1.42, "Requests for Information," of the *Standard Specifications*. Respond to requests for information within the time specified.

Make every effort to provide a complete response to the contractor's request. If it is unclear about what is being requested, ask the contractor to clarify the request. If more information is needed from the contractor, be specific about what is needed, request that it be provided, and let the contractor know that you cannot respond until it is received. Notify the contractor when unable to provide an answer because more information is forthcoming from other sources. Provide a date when the information will be available. For additional information, refer to Section 3-523, "Requests for Information and Potential Claim Records," of this manual.

5-403B Potential Claim Records

Section 5-1.43A, "Potential Claims and Dispute Resolution—General," of the *Standard Specifications* outlines the three-part potential claim record procedure and informs the contractor that failure to comply with it is a waiver of the potential claim, a waiver of the right to a corresponding claim for the disputed work in the administrative claims process, and is a bar to arbitration.

A unique identification number must be assigned to each potential claim and the nature and circumstances of the potential claim must not change throughout the submittal of all three potential claim record components:

- Initial Potential Claim Record
- Supplemental Potential Claim Record
- Full and Final Potential Claim Record

Make sure that the contractor is aware of and complies with the contractual responsibility to minimize and mitigate the effects of potentially claimed work or events.

5-403C Documentation

Place copies of all documents related to every dispute on the project in Category 62, "Disputes," of the project records. This information provides the basis for preparing position papers in the alternative dispute resolution process and development of the preliminary construction claim findings. Follow the procedures outlined in Section 5-102, "Organization of Project Documents," of this manual for documenting claims. Refer to Section 3-523D, "Documentation Guidelines for Disputes," of this manual for more information.

5-404 Alternative Dispute Resolution

The purpose of the alternative dispute resolution process is to provide a means for Caltrans and the contractor to resolve disputes at the project level with the help of a neutral party who has no financial interest in the outcome of the dispute. The alternative dispute resolution process is not allowed for disputes solely between the contractor and a subcontractor, because those disputes are outside of the scope of the contract that Caltrans has with the contractor. Additionally, the alternative dispute resolution process is not allowed for overhead-type disputes. Refer to Section 5-410, "Overhead Claims," of this manual for information regarding overhead-type disputes.

The contractor is required to use alternative dispute resolution in order to pursue a claim. Partnering-facilitated dispute resolution, dispute resolution ladder (DRL), dispute resolution advisor (DRA), and dispute resolution board (DRB) are different types of alternative dispute resolution processes available. Refer to Section 3-524, "Alternative Dispute Resolution Processes," of this manual for more information.

5-405 Claims

The contractor submits a written claim statement for each unresolved potential claim record, administrative issue, and overhead adjustment by listing them as exceptions to the proposed final estimate as described in Section 9-1.17D, "Final Payment and Claims," of the *Standard Specifications*.

All claims included in the exceptions to the proposed final estimate should be considered. Exceptions to the proposed final estimate that were not previously submitted in accordance with Section 5-1.43, "Potential Claims and Dispute Resolution," of the *Standard Specifications* are considered new claims. Exceptions for administrative or overhead claims are not considered new claims. Overhead claims are addressed in Section 9-1.17D(2)(b), "Overhead Claims," of the *Standard Specifications*. Refer to Section 5-410, "Overhead Claims," of this manual for information regarding overhead-type disputes.

Analyze the merit of new claims and document the claims as outlined in Section 3-523D, "Documentation Guidelines for Disputes," of this manual. Include the analysis in the preliminary construction claims findings.

Examples of claims correspondence are listed at:

https://construction.onramp.dot.ca.gov/claim-correspondence-examples

5-406 Claims Resolution Process

The following claims processing milestones were established to assure that the claims process is completed within the statutory requirement of 240 days after contract acceptance. The number of days is calculated from the date of contract acceptance.

Districts are responsible for populating and updating the Division of Construction's claims database with the actual milestone dates to verify that milestones, events, dates, and stated costs, are current and correct. See Table 5-4.1, "Required Post Acceptance Event Codes and Dates," below. Project claims information should be updated by the 15th of each month to maintain reliability of the data.

Table 5-4.1. Required Post Acceptance Event Codes and Dates (1 of 2)

Event Code	Definition	Applicable Date
ACF	Arbitration case filed	Use the date that the contractor filed a complaint with the Office of Administrative Hearing.
CED	Construction expenditures done	Input the date that all construction expenditures were completed.
DCS	District claim settlement memorandum sent to Headquarters Construction	Use the date that the district sent the memorandum to Headquarters Construction.
DDD	District director determination sent to contractor	Use the date that the district sent the final district director determination of claims letter to the contractor, regardless of who signed the letter.
DDS	Review of claims by the deputy district director of Construction sent to the contractor	Use the date that the district sent the letter to the contractor.
DMM	Department management meeting	Use the date of the Department management meeting.
DMMR	Department management meeting findings	Use the issuance date of the management meeting findings or board of review recommendation.
LCFC	Legal case file closed	Use the date that the Legal Division arbitration attorney returns the legal case files to the district and no longer charges against the expense authorization.

Table 5-4.1. Required Post Acceptance Event Codes and Dates (2 of 2)

Event Code	Definition	Applicable Dates
PFEAE	Proposed final estimate (PFE) returned with administrative exceptions, including item of work exceptions, change order work, and extra work bill exceptions	Use the date that the contractor returned the PFE designated by the earliest date stamp by the mailroom or resident engineer. Internal routing time is not considered in this event date code.
PFEC	Proposed final estimate returned with claims	Use the date that the contractor returned the PFE designated by the earliest date stamp by the mailroom or resident engineer. Internal routing time is not considered in this event date code.
PFENE	Proposed final estimate returned without claims and administrative exceptions	Use the date that the contractor returned the PFE designated by the earliest date stamp by the mailroom or resident engineer. Internal routing time is not considered in this event date code.
PFER	Proposed final estimate received	Use the date that the contractor received the PFE.
PFES	Proposed final estimate sent to the contractor	Use the date that the contractor is sent the PFE by certified mail.

Prepare and obtain approval of change orders compensating the contractor for claims

5-406A Proposed Final Estimate Received by Contractor—Target Day 40

The resident engineer issues a proposed final estimate that is received by the contractor within 40 days after contract acceptance. Issue the proposed final estimate with the understanding that the estimate represents the final payment to the contractor. If the proposed final estimate shows money due to the contractor, do not wait for the contractor's response, process a semifinal estimate as described in Section 3-907C, "Semifinal Estimate," of this manual.

Do not postpone issuing the proposed final estimate to await additional information from the contractor. Make sure that all quantity calculations and adjustments are completed in time to process the proposed final estimate within the target date. Send the proposed final

estimate by certified mail with return receipt requested. Refer to Section 3-907B, "Proposed Final Estimate," of this manual for additional information.

5-406B Proposed Final Estimate Returned—Target Day 70

The contractor has 30 days after receiving the proposed final estimate to review, sign, and respond either with or without a written claim statement. Document the receipt of the contractor's response by postal receipt or written receipt if hand delivered.

Process the final estimate when the contractor returns the proposed final estimate indicating acceptance, or when the contractor does not return the proposed final estimate within the required 30-day period.

When the contractor returns the proposed final estimate with a written claim statement within the 30-day period, district construction sends a copy of the contractor's claim package to the resident engineer, construction engineer, and district construction claims engineer.

5-406C Written Claim Statement - Initial Review Completed —Target Day 80

If claims are submitted after the 30-day period, the entire submittal must be returned to the contractor with a cover letter stating that Caltrans will not address the claims because they were not submitted in accordance with the contract requirements, and the final estimate must be processed. The cover letter is signed by the district director and serves as the Department's final written decision on the claims under Public Contract Code Section 10240.1.

The resident engineer, construction engineer and district construction claims engineer review the contractor's written claim statement for conformance with procedural requirements. This review checks that each claim is a continuation of a previously submitted potential claim. Overhead claims or administrative disputes that occur after issuance of the proposed final estimate do not need to be a continuation of a previously submitted potential claim. Document the contractor's failure to comply with the potential claim process, and file the detailed findings in Category 62, "Disputes," of the project records. Detail any procedural failures by each claim for inclusion in the preliminary construction claim findings. The detailed procedural findings may include, but are not limited to:

- Failure to provide the identification number corresponding to the supporting full and final documentation of the potential claim record and the final amount of requested additional compensation.
- Failure to provide documentation in support of the final amount of the claim if different from that stated in the full and final potential claim record.

If the contractor submits a claim without the corresponding identification number, or if there is a disparity in the identification number, notify the contractor of the omission or disparity. The contractor has 15 days after receiving the notification to correct the omission or disparity. Assign an identification number if the contractor fails to correct the omission or disparity.

The resident engineer, construction engineer and district construction claims engineer segregate the claims into the following three categories:

- Administrative
- Entitlement
- Management referral

Administrative claims occurring or recognized after issuance of the proposed final estimate may include the following:

- Contract item quantity payments
- Changed item quantity payment adjustments
- Administrative deductions and withholds
- Extra work payments

If the written claim statement includes claims for overhead, such as subcontractor field or home office, these claims must be supported with an audit by an independent certified public accountant. Projects with a time-related overhead bid item that have exceeded 149 percent of the quantity shown in the bid item list may require an audit report as part of the item adjustment, but this is not considered a claim for overhead. Send these types of claims to the deputy district director of construction as part of the preliminary construction claim findings. The Independent Office of Audits and Investigations may review the audit. For additional details, refer to Section 5-410, "Overhead Claims," of this manual.

5-406D Administrative and Entitlement Claims Addressed —Target Day 90

Review administrative claims. If administrative claims have merit, payment is made through item payments, change orders, or by releasing withholdings. Accompany payment of those claims in writing that the payment resolves the respective claim in its entirety. If the contractor does not accept the payment as full resolution, refer to Section 5-409, "Claim Payments," of this manual, for more information.

Review claims with entitlement, and process payments in a similar manner. Support payment with independent cost analysis that will be filed and maintained in the project records.

The results of the attempted resolution of these claims must be sent to the district construction claims engineer no later than day 200 for incorporation into the construction claim findings.

5-406E Preliminary Construction Claim Findings Completed—Target Day 100

By target day 100, the resident engineer or construction engineer completes the preliminary construction claim findings for claims that have been segregated for referral to management, including those claims for which the contractor has failed to comply with procedural requirements. Claims segregated for referral include a compilation of the existing information and documents that are filed in Category 62, "Disputes," of the contract records. The construction engineer sends the preliminary construction claim findings to the deputy district director of construction. Refer to Section 5-413, "Preliminary

Construction Claim Findings and Category 62 Preparation and Guidelines," of this manual for detailed format, content, and suggestions in preparing this document.

5-406F District Construction Review of Preliminary Construction Claim Findings Completed—Target Day 120

The deputy district director of construction, region division chief of construction, or delegated authority completes the review of the preliminary construction claim findings for the claims designated for management review and determines whether a Department management meeting with the contractor is needed. The Department meeting will consist of either of the following:

- Meeting with the contractor and the deputy district director of construction, region division chief of construction or delegated authority
- Board of review meeting as described in the "Board of Review Handbook" at:

  https://construction.onramp.dot.ca.gov/board-of-review-handbook

The deputy district director of construction, region division chief of construction, or delegated authority may determine that some claims previously identified as "management referral" have entitlement and should be paid. The district construction claims engineer finalizes the preliminary construction claim findings and authorizes payment for claims with entitlement.

5-406G Department Management Meeting and Findings—Target Days 150 and 190

A Department management meeting convenes when the deputy district director of construction, region division chief of construction, or a delegated authority decides that certain claims may warrant further analysis in a management meeting. The target date to hold a management meeting is 150 calendar days after contract acceptance. Notify the contractor of the date, time, and location of the meeting as soon as all the necessary arrangements have been made. In the notification letter, state that both the contractor and Caltrans will be allowed to make presentations in support of their previously submitted written information and that no additional written information will be accepted at the meeting. Identify only those claims that will be presented and heard at this meeting. Refer to the example "Department Management Meeting Notification Letter" at

https://construction.onramp.dot.ca.gov/claim-correspondence-examples

The resident engineer, supported by Caltrans personnel, is responsible for preparing and delivering the presentation at the Department meeting. The management meeting is an informal meeting allowing the contractor and Caltrans staff the opportunity to make presentations in support of their claim positions. Only those claims identified within the notification letter will be presented. If requested, Caltrans personnel, including district and structure personnel involved with the contract, may attend the meeting to assist in presenting the claims. Arrange to have other personnel involved in the project available to answer questions during the meeting regarding complex claims or for firsthand knowledge of events. If the contractor has indicated they will have legal counsel attend, make arrangements to have a Legal Division representative attend. Mock presentations

in advance of the management meeting are encouraged for complex issues and offer an opportunity for critical feedback.

At the management meeting, the contractor's position is followed by the resident engineer's position. Management then may discuss the potential claim records, responses, relevant documents, schedules, specifications, and DRA or DRB recommendations for clarification and attempted resolution. Additional support information may also be requested within an abbreviated time period to clarify a party's stated position.

The results of the management review meeting should be documented for inclusion within the construction claim findings within 190 days after contract acceptance. If the contractor did not attend a scheduled Department management meeting, the results will be based on the information contained in the preliminary construction claim findings. Since the contractor did not attend the meeting, the claims to be heard cannot be filed in arbitration as stated in Section 10240.2, of the Public Contract Code. If this happens, identify the claims within the district director determination of claims that failed to follow the contractual claims process. For an example of the letter, refer to the example "District Director Determination of Claims," at

https://construction.onramp.dot.ca.gov/claim-correspondence-examples

5-406H Construction Claim Findings and Draft District Director Determination of Claims Completed—Target Day 220

The construction claim findings will name each of the contractor's claims in summary form including the items below:

- References to the supporting documents
- Resolution of the administrative claims by the resident engineer
- Resolution of claims with entitlement
- Department management meeting findings

For detailed information on preparing the construction claim findings, refer to Section 5-414, "Construction Claim Findings Preparation and Guidelines," of this manual.

In addition to preparing the construction claim findings, the district construction claims engineer prepares a draft district director determination of claims. For detailed information on preparing the draft district director determination of claims, refer to Section 5-415, "District Director Determination of Claims Preparation and Guidelines," of this manual.

Send the construction claim findings and the draft district director determination of claims to the deputy district director of construction by day 220.

The deputy district director of construction approves the construction claim findings, and then sends the findings and the draft determination of claims to the district director for signature.

Prepare and obtain approval of a change order compensating the contractor for claims found to have merit based on the construction claim findings. The change order must

state that the payment is for full resolution of the claim specified. Refer to Section 5-3, "Change Orders," of this manual for more information.

Run a semifinal estimate to make payment and add any time for approved change orders.

5-406I District Director Determination of Claims—Target Day 230

The district director determination of claims is the final determination of claims and completes the claims resolution process. The determination concludes Caltrans' administrative claims process, triggers preparation of the final estimate, and opens the contractor's 90-day arbitration filing window.

The district director reviews and approves the final determination of claims. If all issues have been resolved, this approval may be delegated to the deputy district director of construction or region division chief of construction. The district construction claims engineer sends the approved final determination of claims letter to the contractor within 230 days after contract acceptance. The region director may delegate the authority for approval to the district director in a district served by a region. Refer to the example "District Director Determination of Claims" at:

https://construction.onramp.dot.ca.gov/claim-correspondence-examples

When all the claims are resolved, the district director may delegate signature authority for determination letters to the construction deputy district director, who may further delegate this authority to the construction manager.

After the district director final determination of claims letter is sent, do not have any further discussion of claims with the contractor.

District construction processes a final estimate within 30 days of sending the district director determination of claims. For information on the final estimate, refer to Section 3-907D, "Final Payment and Claims," of this manual.

Before submitting a request for the final estimate, verify that change order payment has been made for all claim determinations.

The district must store all project records in accordance with the procedures outlined in Section 5-104, "Final Construction Project Records," of this manual.

If the contractor has diligently pursued and exhausted the administrative procedures specified in the contract, the contractor is entitled to file for arbitration of its claims 240 days after contract acceptance, even if the district director determination of claims has not been issued.

If the contractor files for arbitration and the final determination of claims has not yet been issued, the district must nevertheless send a final determination of claims letter to the contractor. The format of the final determination of claims may be similar to the example "District Director Determination of Claims" at:

https://construction.onramp.dot.ca.gov/claim-correspondence-examples

Consult the Division of Construction field coordinator and the designated attorney for guidance. Send a draft copy of the final determination of claims to the designated attorney for concurrence. After the designated attorney provides concurrence, the district director approves the final determination of claims, and it is sent to the contractor. Do not have any further contact or discussion with the contractor concerning the merit of claims.

Do not try to resolve claims after issuing the district director determination of claims. If the contractor files for arbitration, any resolution is handled by Caltrans Legal Division, according to the delegated settlement authority shown in Table 5-4.4, "Claims Resolution Authority—Settlement After Arbitration Filing," in Section 5-417, "Dispute Resolution Authority," of this manual.

5-407 Minor B Contracts

By law, the contractor has a maximum of 1 year from contract acceptance to file a claim with the Department of General Services, Government Claims Program for Minor B contracts. If a contractor submits a potential claim record, alternative dispute resolution will help resolve disputes and mitigate damages. Use the concepts and levels of the dispute resolution ladder as described in Section 3-524B, "Dispute Resolution Ladder," of this manual to assist the potential claims record process.

5-407A Contract Accepted—Target Day 0

When the contract is accepted, the resident engineer discusses and attempts to resolve any disputes. This will begin the dispute resolution process at Level 1.

5-407B Claim and Invoice Submission—Target Day 30

Within 30 calendar days following acceptance of the contract, the contractor must submit a written claim for an unresolved dispute as part of the fully itemized invoice covering the actual work performed. Process payment to the contractor for the undisputed portion of the invoice. Immediately request additional information for the unresolved claims. When the written claim is received, this ends Level 1 of the dispute resolution process. Elevate the unresolved claims to the construction engineer, beginning Level 2. Use Form CEM-6209, "Elevation of a Dispute," to define the unresolved claims when elevating to this level.

5-407C Additional Information Received—Target Day 45

When the additional information is received for the unresolved claims, begin preparation of the preliminary construction claim findings (refer to Section 5-413, "Preliminary Construction Claim Findings and Category 62 Preparation and Guidelines" of this manual. Concurrently, the district construction claims engineer prepares a draft district director determination of claims (refer to Section 5-414, "Construction Claim Findings Preparation and Guidelines," of this manual).

5-407D Preliminary Determination of Claims—Target Day 50

If the construction engineer cannot resolve the claims, finalize the construction claims findings and provide a copy to the contractor; this ends Level 2 of the dispute resolution

process. This will serve as a preliminary determination of claims and notifies the contractor of the opportunity to present any unresolved claims within 30 days to the construction manager, or deputy district director of construction depending on the district's preference. This begins Level 3 of the dispute resolution process.

5-407E Presentation of Unresolved Claims—Target Day 80

Any unresolved claims are presented, merits of the claims are discussed, and an attempt is made to resolve the claims by the respective representatives at Level 3.

5-407F Final Determination of Claims—Target Day 85

The final determination of claims is completed by the district claims engineer and submitted to the deputy district director of construction for approval. The approved final determination of claims is sent to the contractor by day 85 and ends Level 3 of the dispute resolution process. The contractor can accept the district's decision, thereby ending the process, or continue the process through the Department of General Services, Government Claims Program or Superior Court, as applicable.

5-407G Department of General Services, Government Claims Program and Superior Court

The Division of Construction arbitration engineer is responsible for coordinating Minor B claims with the Legal Division and for updating the database that includes tracking, monitoring, and reporting on all Minor B claims filed with the Department of General Services, Government Claims Program, Superior Court, or Division of Construction. The arbitration engineer is the point of contact regarding the status of and providing statistics for all Minor B claims filed with Department of General Services, Government Claims Program, Superior Court, or Division of Construction.

The contractor has 6 months to file a complaint in Superior Court after the Department of General Services, Government Claims Program or the chief of the Division of Construction rejects the contractor's claim. The Legal Division is responsible for representing Caltrans in court and expects district and headquarters construction staff to provide assistance upon request.

5-408 Claim Settlement

A claim settlement is defined as a compromise of the contract requirements to settle a dispute in Caltrans' best interest. Settlements of claims may arise when both Caltrans and the contractor contributed to the disputed issue, and total responsibility is difficult to attribute to either party. In these situations, district management, or Caltrans Legal Division will explore the possibility of settlement with the contractor.

A claim settlement request must be approved by the district director, Division of Construction chief, or the deputy director for Project Delivery depending on the settlement amount. The region director may delegate the authority for approval to the district director in a district served by a region. Refer to Table 5-4.3, "Disputes Resolution Authority—

Settlement Before District Director's Determination of Claims," for the claim settlement authority and responsible parties.

No claim can be addressed between the district director determination of claims and the contractor's filing for arbitration.

5-408A Claim Settlement Process

When considering a decision to settle a claim, analyze Caltrans' exposure to help determine potential liability. This will serve as a guide for the settlement. The Division of Construction field coordinator provides assistance on all settlement analyses and should be consulted early in the process.

For consideration of settlements before arbitration, the field coordinator engages the Legal Division. The Legal Division will provide direction to the district for preparing a claim settlement request memorandum. For consideration of settlements during arbitration, the case attorney prepares this memorandum for approval.

The claim settlement request memorandum is an internal, confidential document protected under attorney-client communication privilege and must not be given to the contractor or included in the project files. The original claim settlement request memorandum with signatures will be kept by Legal. Delete or destroy all other drafts and copies of claim settlement request memoranda. The claim settlement request memorandum must be approved before any negotiations with the contractor.

5-408A (1) Claim Settlement Request Memorandum

The claim settlement request memorandum must include certain items and follow an executive summary format. Refer to the example "Claim Settlement Request Memorandum" at:

https://construction.onramp.dot.ca.gov/claim-correspondence-examples

5-408A (2) Claim Settlement Agreement

A fully executed change order is considered the claim settlement agreement for claims settled before the district director determination of claims is issued. The change order must be written in sufficient detail so that it clearly describes the claims being settled, adjustments in contract time, disposition of liquidated damages, and compensation amount. Refer to Section 5-3, "Change Orders," of this manual for guidance and see standard change order clauses at:

https://dot.ca.gov/programs/construction/change-order-information

The change order memorandum must refer to the approved claim settlement request memorandum. Do not substitute a change order memorandum for a claim settlement request memorandum.

During arbitration, the Caltrans case attorney prepares and signs a claim settlement agreement. Agreement is reached when the opposing counsel signs the document. To complete the administrative process, the Division of Construction's arbitration engineer prepares a unilaterally approved change order for payment.

5-408B Contract Time Settlements

Time adjustments for reasons other than those specifically enumerated in the contract are considered contract time settlements. Prepare a claim settlement request memorandum and settlement agreement as described above for contract time settlements.

5-409 Claim Payments

If adequate funding is available, make payment immediately when you reach agreement with the contractor or find entitlement on a claim. Prepare and process a supplemental funds request if there are insufficient funds for payment.

When a change order is necessary to make payment for disputed work and the contractor refuses to sign it, issue a unilaterally approved change order in accordance with Section 4-1.05, "Changes and Extra Work," of the *Standard Specifications,* and Section 5-3, "Change Orders," of this manual.

Claim payments are made in accordance with Table 5-4.2, "Disputes Resolution Authority—Entitlement"; Table 5-4.3, "Disputes Resolution Authority—Settlement Before District Director's Determination of Claims"; and Table 5-4.4, "Claims Resolution Authority—Settlement After Arbitration Filing," in Section 5-417, "Dispute Resolution Authority," of this manual depending on the resolution type and the timing of the resolution. For detailed information on contract payments, refer to Section 3-9, "Payment," of this manual.

5-410 Overhead Claims

Overhead claims generally fall into two categories: home office overhead and field office overhead. Overhead claims generally occur when there have been delays to the completion of the contract. Delays caused by Caltrans to the controlling operation on contracts with a time-related overhead bid item are compensated through bid item quantity adjustments to the time-related overhead item. Refer to Section 3-905, "Time-Related Overhead," of this manual.

All other overhead claims must be supported by an audit. The contractor must provide the required audit in accordance with Section 9-1.17D(2)(b), "Overhead Claims," of the *Standard Specifications*. Provide a written response regarding Caltrans' consideration of the overhead claim to the contractor before issuing the proposed final estimate. If the resident engineer determines that a compensable delay exists, evaluate the overhead claim through the audit process.

When a claim for overhead expenses is received without an audit by a Certified Public Accountant (CPA) to justify the claimed amount, notify the contractor that the submittal is incomplete and will not be considered until an independent CPA audit report is received. Failure to comply with the requirements justifies denying the overhead claim.

5-410A Home Office Overhead

Home office overhead, or general and administrative expenses, consists of indirect costs that are not associated with a specific project but are the costs of general facilities and administration necessary for the contractor's performance on all contracts.

5-410B Field Office Overhead

Field office overhead consists of indirect costs that are associated with a specific project. These costs do not include costs for labor, materials, or equipment used in performing the work.

5-410C Contractor Submitted Audits

The Independent Office of Audits and Investigations will assist the resident engineer by performing a preliminary check of the independent audit report's compliance with the requirements of the American Institute of Certified Public Accountants (AICPA) Attestation Standards.

Audits and Investigations will perform an audit of contractor submitted audits if the following conditions exist:

- The deputy district director of construction and the Division of Construction field coordinator have made a determination that an audit is warranted.
- The contractor has submitted an independent CPA audit report that conforms to the AICPA Attestation Standards.
- The Division of Construction has received and prioritized the audit request.
- The contractor has fulfilled the provisions of Section 9-1.17D, "Final Payment and Claims," of the *Standard Specifications.*

A systematic review of the contractor's claim and audit is required to decide if there is reason to proceed with a detailed analysis of the costs contained within the contractor submitted audit.

The audit process is initiated by the contractor's written request for a Caltrans audit review of home office overhead and field office overhead by submitting exceptions to the proposed final estimate.

If determination has been made to consider the overhead claim, verify that the contractor's claim for home office overhead or field office overhead is submitted along with a supporting independent CPA audit report in accordance with Section 9-1.17D and the policies in the *CPA Desk Guide for Overhead Audits*, available at the Division of Construction's intranet site. Unallowable expenses including those relating to other businesses of the contractor must be excluded from the claimed expenses for field office overhead and home office overhead. For typical unallowable expenses, refer to the Code of Federal Regulations, Title 48, Section 31.205 (48 CFR 31.205), "Selected Costs." The independent CPA audit report may be faxed to the Independent Office of Audits and Investigations for assistance. Deny the audit request if the audit report does not comply with Section 9-1.17D.

The Division of Construction field coordinator decides if the facts and circumstances warrant a detailed analysis requiring a state audit review. This determination may involve significant analysis of many variables, including concurrent delays as evidenced by the Critical Path Method (CPM) schedule and time impact analyses. The Division of Construction field coordinator will inform the resident engineer to deny the claim and audit request if there is no justification.

If the audit report complies with Section 9-1.17D, "Final Payment and Claims," of the *Standard Specifications* and the Division of Construction field coordinator decides an audit request is warranted, draft the audit request memorandum. Refer to Section 5-411A, "Audit Request Procedure," of this manual for guidance on requesting an audit.

5-411 Audits

The Independent Office of Audits and Investigations provides a service to Construction by performing audits. Their audit services include:

- Reviewing contractor-submitted audits for overhead claims.
- Reviewing contractor-submitted audits for full and final potential claim records that exceed $500,000.
- Reviewing the contractor's project files.
- Auditing the contractor's records.
- Reviewing cost escalation claims.
- Reviewing costs for contract termination.
- Reviewing costs for complicated work-character changes.
- Reviewing costs for complicated item adjustments.
- Reviewing costs for differing site conditions.

5-411A Audit Request Procedure

When it is determined that an audit by the Independent Office of Audits and Investigations is needed, the deputy district director of construction gets concurrence from the Division of Construction field coordinator and submits the audit request memorandum to the Division of Construction. For guidance, refer to the example "Audit Request Memorandum" at:

https://construction.onramp.dot.ca.gov/claim-correspondence-examples

The memo must include the following information, as appropriate:

- Contract number
- Contractor name
- District contact person's name, title, and phone number
- A justification

The justification must explain the reasons the contractor has entitlement on the claims and the associated costs that a Caltrans audit needs to verify. If appropriate, the justification must be accompanied by a summary of delay-related claim descriptions, a chronology of events, and amounts. For a sample summary of delay-related claims, refer to the examples "Summary of Delay-Related Claims" and "General Contract Information and Contract Chronology" at:

https://construction.onramp.dot.ca.gov/claim-correspondence-examples

Upon receipt of the district's audit request memorandum, the Division of Construction sends a memorandum to the audit manager of the Independent Office of Audits and Investigations requesting an audit. The policy of Audits and Investigations is to complete audits within 100 days after receiving an audit request memorandum.

5-411B Construction Response to Audit Reports

The initiator of the request for the audit must provide an acceptable corrective action plan in response to audit findings and recommendations.

The Division of Construction is responsible for the corrective action plans for force account audits authorized under Section 5-1.27, "Records," of the *Standard Specifications*. Approval of the district corrective action plans may not be delegated below the level of district division chief of construction.

A corrective action plan must be submitted to the external audit chief for the Independent Office of Audits and Investigations.

The district will use the final audit report or draft audit findings to decide if the contractor is due any payment adjustments. The final audit report is a matter of public record, and its distribution is not limited.

If compensation is due, the Division of Construction field coordinator will request that district construction processes a change order for payment in accordance with the overhead claim administration delegation of authority in Table 5-4.2, "Disputes Resolution Authority—Entitlement," in Section 5-417, "Dispute Resolution Authority," of this manual. Note the name of the person authorizing the change order in the change order memorandum.

Other delay-related expenses besides overhead, such as escalated materials, equipment, and labor costs, may be included in the contractor's claim. The escalated costs may be included in the audit request if complex. Account for simple cases of escalated costs because of delays caused by Caltrans, unless they are easily combined into an audit for overhead. Unlike audits for overhead, escalated cost audits may be performed before receiving the contractor's written claim statement. An independent CPA audit is not required to support escalated cost claims because of delays caused by Caltrans.

Force account markups are not included in any escalated cost calculation. Recovery of additional overhead incurred because of escalated costs requires submittal of an overhead claim with an independent CPA audit report.

5-412 Arbitration

The contractor is entitled by law to file a complaint in arbitration no later than 90 days after receipt of the written district director final determination of its claims. If the contractor has diligently pursued and exhausted the administrative procedures specified in the contract, the contractor is entitled to file for arbitration of its claims 240 days after contract acceptance if the district director determination of claims has not been issued. The arbitration process is initiated by filing a complaint with the Office of Administrative Hearings.

The Caltrans Legal Division handles all construction contract arbitrations. When a contractor files for arbitration, all contacts with the contractor regarding the specific project must go through the designated attorney. The resident engineer, the construction engineer, and other personnel involved with the contract must assist in the arbitration process. This assistance may be preparing calculations, performing technical analyses, preparing documents, assisting in the discovery process, or providing testimony. Keep project records at a single location for ease of discovery by the Legal Division.

The arbitration payment process includes the Division of Construction, the Legal Division, the district, the Division of Budgets, and the Division of Accounting. The Division of Construction arbitration engineer is responsible for updating the database that includes tracking, monitoring, and reporting all arbitration cases. The Division of Construction arbitration engineer is the point of contact regarding status of ongoing arbitration cases, coordinating arbitration payments, and providing statistics on all arbitration cases.

5-413 Preliminary Construction Claim Findings and Category 62 Preparation and Guidelines

Preparation of the preliminary construction claim findings can be completed quickly by compiling documents in Category 62, "Disputes," of the project records. Complete the preliminary construction claim findings when you receive exceptions to the proposed final estimate from the contractor. Refer to the example "Construction Claim Findings" at:

https://construction.onramp.dot.ca.gov/claim-correspondence-examples

5-413A Preliminary Construction Claim Findings Format

The preliminary construction claim findings includes the same sections and follows the same format of the construction claim findings identified in Section 5-414, "Construction Claim Findings Preparation and Guidelines," of this manual.

A well-organized Category 62, "Disputes," of the project records is imperative for preparing the construction claim findings. Refer to Section 5-102C, "Description of Categories," of this manual for more details about the file categories. For each claim, Category 62 should include:

- Claim checklist, refer to the example "Claim Checklist" at:

  https://construction.onramp.dot.ca.gov/claim-correspondence-examples
- Request for Information (RFI)
- Form CEM-6201D, "Initial Potential Claim Record" and Caltrans' response
- Form CEM-6201E, "Supplemental Potential Claim Record" and Caltrans' response
- Form CEM-6201F, "Full and Final Potential Claim Record" and Caltrans' response
- Independent CPA cost audit report if stated cost is greater than $500,000, and the Independent Office of Audit's review
- All correspondence
- District's position paper for the dispute resolution board (DRB)

- Contractor's position paper for the DRB
- DRB recommendation
- Resident engineer daily reports
- Assistant resident engineer daily reports
- Applicable parts of plans and specifications
- Relevant change orders
- Photographs
- Calculations and analysis
- Weekly Statements of Working Days
- Critical path method schedules
- Other pertinent information

Refer to Section 5-406F, "District Construction Review of Preliminary Construction Claim Findings Competed—Target Day 120," of this manual for more information.

5-414 Construction Claim Findings Preparation and Guidelines

Department management meeting findings are incorporated into the construction claim findings. The construction claim findings provide the basis for the district director determination of claims. The district construction claims engineer prepares the construction claim findings by refining the preliminary construction claim findings. Incorporate claims resolved and list the status of unresolved administrative claims addressed by the resident engineer, and claims addressed in a Department management meeting. When preparing the construction claim findings document, consider that the document is used by a Caltrans attorney if claims are filed in arbitration.

Concurrently, the district construction claims engineer prepares the draft district director determination of claims. Refer to Section 5-415, "District Director Determination of Claims Preparation and Guidelines," of this manual.

The district construction claims engineer transmits the construction claim findings to the deputy district director of construction for approval.

The district construction claims engineer then transmits the construction claim findings and the final district director determination of claims to the district director for approval.

The following sections provide format, content, and guidelines for preparing the construction claim findings. For an illustrative sample of the format and content of construction claim findings, refer to the example "Construction Claim Findings" at:

https://construction.onramp.dot.ca.gov/claim-correspondence-examples

5-414A Format

Construction claim findings follow the format below:

5-414A (1) Title Page

The title page states the following:

- "Construction Claim Findings"
- Contract identification data such as contract number, district, county, route, postmile, and federal project number, if applicable
- Applicable *Standard Specifications* and *Standard Plans* sections
- Names of the contractor, resident engineer, and other personnel with significant involvement
- Date

5-414A (2) Table of Contents

Number all pages in the table of contents.

5-414A (3) Project Chronology

The project chronology includes:

- Advertisement date
- Bid opening date
- Contract award date
- Contract approval date
- First working day (date and working day number)
- Date contractor began work
- Working days specified (number of days)
- Computed completion date (date and working day number)
- Change order time adjustment (number of days)
- Nonworking days (number of days)
- Working days not worked on controlling operation (number of days)
- Extended date for completion (date and working day number)
- Project completion date
- Contract acceptance date
- Overrun in contract time (number of working and calendar days)

5-414A (4) General Information

The general information section should be presented in a narrative format, and include:

- Description of the work
- Contractor's bid amount

- Proposed final estimate amount
- Date the proposed final estimate was sent to the contractor
- Date the contractor returned the proposed final estimate with exceptions
- Total number and amount of claims submitted

5-414A (5) Summary of Claims

Provide:

- Identification numbers and titles
- Claimed amounts
- Recommended payments
- Remaining amounts

5-414A (6) Claim Categories

Show the segregation of claims into categories:

- Administrative claims
- Claims heard at the Department management meeting
- Claims not heard at the Department management meeting

5-414A (7) Claim Number, Title, and Claim Amount

A boldfaced, underlined title bar will be used for each claim. In the left-hand column, place the claim number. In the middle column, position the claim title. In the right-hand column locate the claim amount, including days claimed.

5-414A (8) Description of the Claim

Provide:

- An explanation of what caused the claim.
- Pertinent statements of facts, not beliefs or opinions.
- A reference to the applicable specifications relating to the claim. You may include a separate section titled “Applicable Specifications,” listing the section numbers and excerpts.
- The circumstances leading to each claim. Use facts supported with exhibits that include daily reports or letters.
- Relevant dates if the claim includes time considerations.
- A statement of actions and responses made by Caltrans and the contractor.
- The method and time of notification of the claim.

5-414A (9) Contractor's Position

Quote directly from the contractor's RFI, potential claim records, or written claim statement. Add any other pertinent information provided in other documentation. Do not interpret the contractor's position. If the contractor has not stated the basis for the claim, note that the basis was not stated. State whether a cost analysis was submitted.

Provide the information in the following order:

- Full and Final Potential Claim Record with reference to the independent CPA audit report if stated cost exceeds $500,000
- Supplemental Potential Claim Record
- Initial Potential Claim Record
- Contractor's RFI pertaining to the claim
- Reference table to contractor's supporting exhibits

5-414A (10) District's Position

The district's position must be compiled from the responses to potential claim records, and supported by exhibits including related correspondence. Additional arguments supporting the district's position are not required. If the contractor provides reasons for changing the amount of requested additional compensation from that stated in the full and final documentation, additional opposing statements may be included.

Provide the information in this order:

- Resident engineer's response to the Full and Final Potential Claim Record.
- Resident engineer's response to the Supplemental Potential Claim Record.
- Resident engineer's response to the RFI.
- A list of exhibits including change orders for partial resolution of the potential claim, photographs, CPM analysis, cost analysis, audit report review, correspondence, and daily reports.

Include a separate section stating deficiencies if the contractor did not comply with Section 9-1.17C, "Proposed Final Estimate," of the *Standard Specifications*.

5-414A (11) Findings and Recommendations

State the district's conclusions on the merit of the claim in bullets, following the format of a board of review report.

Briefly state the reason for the conclusions based on the information provided. Recommend denial if there is no merit, but do not deny the claim. Only the district director has the authority to deny the claim.

5-414A (12) Tabular Reference to Supporting Information

5-414A (13) Summary of Resolved Claims in Tabular Format for All Claims

5-414A (14) Deputy District Director of Construction Signature Block

5-414A (15) Exhibits

Include exhibits as appropriate:

- Copy of the contractor's written claim statement
- Correspondence
- Cost data
- RFIs and potential claim records
- Detailed chronology of correspondence, other documents, or events
- CPM schedule, time impact analysis, or revised schedule
- Photographs

5-414B Helpful Hints

These suggestions may be helpful when preparing the construction claim findings:

- Identify specific references in the following manner: "Section [*xx*] of the special provisions requires . . ."
- Quote all excerpts. Avoid paraphrasing them.
- Include all pertinent correspondence.
- Include pertinent photographs.
- Identify the central issue, identify irrelevant contentions, and provide a response to every relevant contention that the contractor has made.
- Use exact dates and numbers.
- State whether days are working or nonworking.
- When referring to days, when applicable, include the month, day number, and year.

5-414C Things to Avoid

When preparing the construction claim findings, avoid:

- Using the words "denied," "rejected," or "determined." Only the district director can use these terms in the district director determination of claims.
- Including a copy of Sections 1 through 9 of the *Standard Specifications*.
- Making the background section of the district's position a chronology of letters or events. Write the background as a narrative, referencing relevant letters or events, if appropriate.

- Including correspondence, photographs, or other exhibits that have no direct bearing on the claim.

5-415 District Director Determination of Claims Preparation and Guidelines

The district director makes the final determination of claims. The district director determination of claims is the Department's final written decision on the claims under Public Contract Code 10240.1. The district director determination of claims is a stand-alone document and does not reference the management meeting findings or construction claim findings. The district director determination is presented in a bulleted format, listing the construction claim findings.

For a sample district director determination of claims refer to the example "District Director Determination of Claims—Major and Minor A Contracts" at:

https://construction.onramp.dot.ca.gov/claim-correspondence-examples

Once the district director determination of claims is completed, send it to the contractor by hand delivery or deposit in the U.S. mail. Issue the final estimate in writing.

Once the district director determination of claims is submitted to the contractor, there should be no further contact or discussion concerning merits of claims. If the contractor pursues unresolved claims in arbitration, Caltrans' Legal Division coordinates necessary responses.

5-416 Copy Distribution of Claim Documents

The district must process and distribute copies of claims documents produced during the claims resolution process. The district is also responsible for retaining copies in the project files.

5-417 Dispute Resolution Authority

Disputes that the contractor is entitled to in accordance with the contract can be resolved at any time during construction, during the claims resolution process, or after arbitration has been filed. Table 5-4.2 shows dispute resolution authority from the start of work to the district director's determination of claims for notices, protests, potential claims, and claims, based on entitlement. Table 5-4.3 shows dispute resolution authority from the start of work to the district director's determination of claims for notices, protests, potential claims, and claims, based on settlement amount. Table 5-4.4 shows arbitration settlement authority for requests for settlement, from filing of arbitration to before the arbitrator's decision. The deputy district director of Construction is responsible for obtaining FHWA concurrence on all Projects of Division Interest settlements.

Table 5-4.2. Disputes Resolution Authority—Entitlement

Period	Items	Entitlement Authority
Before issuance of proposed final estimate	Notices, protests, and potential claims	Authority to approve change orders resolving entitlement may be delegated under the authority to approve change orders.
From return of proposed final estimate to district director determination of claims	Claims	Deputy district director of construction or region division chief of construction approves. Authority may be delegated to construction managers, but not to construction engineers.
District director determination of claims	Claim denial	District director

Table 5-4.3 Disputes Resolution Authority—Settlement Before District Director's Determination of Claims

Responsible Party	Settlement ≤$200,000 per issue	Settlement >$200,000 to $5 million (or ≤10% of bid more than $50 million)	Settlement >$5 million (or >10% of bid more than $50 million)
District, in consultation with Legal Division	Prepares claim settlement request	Prepares claim settlement request	Prepares claim settlement request
Deputy district director of construction or region division chief of construction	Recommends approval and submits claim settlement request for approval	Recommends approval and submits claim settlement request for approval	Recommends approval on claim settlement request
District director or Region director	Approves claim settlement request	No action	Recommends approval and submits claim settlement request for approval
Division of Construction field coordinator	Reviews claim settlement request for consistency for region- or district-level approval	Recommends approval on claim settlement request	Recommends approval on claim settlement request
Division of Construction chief	No action	Approves claim settlement request	Recommends approval on claim settlement request
Project Delivery deputy director	No action	No action	Approves claim settlement request

Table 5-4.4 Claims Resolution Authority—Settlement After Arbitration Filing

Responsible Party	Settlement ≤ $5 million (or ≤10% of bid more than $50 million)	Settlement > $5 million (or >10% of bid more than $50 million)
Legal Division	Prepares claim settlement request and submits it for approval	Prepares claim settlement request and submits it for approval
Deputy district director of construction or Region division chief of construction	Recommends approval on claim settlement request	Recommends approval on claim settlement request
Division of Construction field coordinator	Recommends approval on claim settlement request	Recommends approval on claim settlement request
District director or Region director	No action	Recommends approval on claim settlement request
Division of Construction chief	Approves claim settlement request	Recommends approval on claim settlement request
Project Delivery deputy director	No action	Approves claim settlement request

Chapter 6 Sampling and Testing

Chapter 6 Sampling and Testing

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

  https://des.onramp.dot.ca.gov/materials-engineering-and-testing-services-mets

- 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 IAP. Caltrans' field laboratories 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 normal time required for testing initial source samples of potential local materials sources is shown in Table 6-1.1.

Table 6-1.1. Time Required for Source Testing

Material	Time
Aggregates for hot mix asphalt	2 weeks
Aggregates for cement treatment	4 weeks
Aggregates for concrete mixture	4 weeks

Material	Time
Aggregates for concrete pavement	60 days
Screenings for seal coats	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 above 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
SEAL COATS					
Los Angeles Rattler (CT 211)	1 to 2	2	4	2	5 to 8
Percentage of Crushed Particles (CT 205)	1 to 2	2	5	2	5 to 9
Film Stripping (CT 302)	1 to 2	2	7	2	5 to 11
Gradation (CT 202)	1 to 2	1	3	2	4 to 7

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)
SEAL COATS (Cont.)					
Gradation (ASTM C136)	1 to 2	1	3	2	4 to 7
Cleanness Value (CT 227)	1 to 2	2	3	2	5 to 7
Durability Index (CT 229)	1 to 2	2	5	2	5 to 9
Sand Equivalent (CT 217)	1 to 2	1	3	2	4 to 7
Viscosity (AASHTO T 59)	1 to 2	3	15	2	6 to 19
Viscosity (ASTM D7741)	1 to 2	3	15	2	6 to 19
Viscosity (ASTM D445)	1 to 2	3	15	2	6 to 19
Flash Point (ASTM D92)	1 to 2	3	15	2	6 to 19
Aromatics (ASTM D2007)	1 to 2	7	15	2	10 to 19
Cone Penetration (ASTM D217)	1 to 2	3	15	2	6 to 19
Resilience (ASTM D5329)	1 to 2	3	15	2	6 to 19
Settlement (AASHTO T 59)	1 to 2	7	30	2	10 to 34
Sieve Test (AASHTO T 59)	1 to 2	3	15	2	6 to 19
Demulsibility (AASHTO T 59)	1 to 2	3	15	2	6 to 19
Torsional Recovery (CT 332)	1 to 2	3	15	2	6 to 19
Penetration (AASHTO T 49)	1 to 2	3	15	2	6 to 19
Ring and Ball Softening Point Temperature (AASHTO T 53)	1 to 2	3	15	2	6 to 19
Field Softening Point (ASTM D36)	1 to 2	3	15	2	6 to 19
Elastic Recovery (AASHTO T 301)	1 to 2	4	15	2	7 to 19
Ductility (AASHTO T 51)	1 to 2	4	15	2	7 to 19
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
Percent of Crushed Particles (Coarse) (AASHTO T 335)	1 to 2	2	5	2	5 to 9
Percent of Crushed Particles (Fine) (AASHTO T 335)	1 to 2	2	5	2	5 to 9
Flat and Elongated Particles (ASTM D4791)	1 to 2	2	4	2	5 to 8
Fine Aggregate Angularity (AASHTO T 304, Method A)	1 to 2	2	4	2	5 to 8
Asphalt Binder					
Flash Point (AASHTO T 48)	1 to 2	3	15	2	6 to 19
Solubility (AASHTO T 44)	1 to 2	3	15	2	6 to 19
Viscosity (AASHTO T 316)	1 to 2	3	15	2	6 to 19

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 pair of cylinders shipped in the same carton as follows:
  - Fill in every blank space with complete information.
  - Indicate sources of aggregates and include the SMARA listing number. Aggregate sources must be in compliance with or not subject to SMARA. For additional information, refer to Section 7-103H (2), “Surface Mining and Reclamation Act,” of this manual. Indicate in the space for water the total weight of water used per cubic yard of cementitious material in the mix based on actual weight (not design weight).
  - Under “Remarks,” indicate the specified concrete strength.
  - Under “Remarks,” indicate if the unit weight of the hardened concrete cylinders is required. The testing laboratory will not furnish unit weight data unless it is specifically requested.
  - To protect the sample card against moisture or stains, place it in a plastic bag or shipping label protector, and tape it to the sample container.
  - Distribute copies as shown on the form on the same day the sample is shipped.

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

Following are examples of the cylinder marking system.

Example 6-1.1. Sample Cylinder Label

Contract No. 03-100844

Sample No. 1-28-1/5_ _ _ _ _

Date Cast _____

For sample shown in Example 6-1.1:

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

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

Example 6-1.2. Sample Cylinder Label

Contract No. 03-100844

Sample No. 2-14-2/2_ _ _ _

Date Cast _____

For sample shown in Example 6-1.2:

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

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

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, Handling, and Storing Concrete Compressive Test Specimens in the Field.” Cylinders are shipped without removing the mold and are packed in cardboard containers available at the district warehouse. Each carton holds two cylinders.

If the district laboratory is equipped to test concrete cylinders, they should be shipped there. Otherwise cylinders may be delivered either to the Southern Regional Lab at

13970 Victoria Street, Fontana, CA 92336, or METS at 5900 Folsom Boulevard, Sacramento, CA 95819, whichever is more convenient. Ship concrete cylinders within the time limits specified in California Test 540 or the test result cannot be used as an acceptance test.

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

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

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

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

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

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

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

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 *Standard Specifications* Section 24-2.02	One 10-lb sample for each type and source of lime; use a 2-qt airtight container	Initial sample provided by contractor; subsequent sampling from mid-point of delivery	Each 100 tons of lime, 2 per day maximum	Must be on an Authorized Material List and certificate of compliance must accompany each shipment; recommend 1 acceptance test per 5 samples of lime
LIME TREATMENT					
DETERMINATION OF LIME APPLICATION RATE (Section 24-2.01D)					
Unconfined Compressive Strength	California Test 373	100 lb	Native soils; test each type of material to be treated	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 ± 5% of ordered application rate
Lime Application (Slurry Form)	Volumetric measurement that is then reduced to lime weight	Deter-mined over known area	Slurry holding tank	Each 40,000 sq ft, 2 per day minimum	To determine if application rate is within ± 5% of ordered application rate
Uniformity of Mixed Stabilized Soil	Phenolphthalein alcohol indicator solution spray	N/A	Representative areas	Each day at five separate locations	Taken after completion of initial mixing

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	Representa-tive areas at mid depth	Each day at five separate locations to verify contractor's quality control tests	Taken during mellowing period
Gradation of Mixed Stabilized Soil	California Test 202	25 lb	Representa-tive areas	1 every 4,000 sq yd, 1 per day 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 *Standard Specifications* 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 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 qualifica-tion	Windrow or roadway	Before production	
CEMENT Type II Portland Cement					
Various properties must comply with *Standard Specifications* Section 90-1.02B(2)	See *Standard Specifications* Section 90-1.02B(2)	8 lb	Cement treated base plant or cement spreader	1 each 100 tons of cement, 2 per day maximum	Recommend 1 acceptance test per project for cement from approved suppliers and certificate of compliance with each shipment
WATER					
Chlorides	California Test 422	Clean 2-qt plastic jug with lined, sealed lid	1 per source; at point of use		Water supplies for domestic use do not need to be tested

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

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

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

Note:

1. Refer to California Test 125 for sampling procedures.

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 *Standard Specification* Section 92	Based on asphalt type used; see *Standard Specifications* 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 *Standard Specifications* Section 90-1.02B(2)	Must comply with *Standard Specifications* Section 90-1.02B(2)	8 lb	Concrete plant	1 for each 100 tons, 2 per day max	Recommend 1 acceptance test per project for cement from approved suppliers with certificate of compliance
WATER					
Chlorides	California Test 422	Clean 2-qt plastic jug with lined, sealed lid At point of use; see Remarks	1 per source		Water supplies for domestic use do not need to be tested
Sulfates	California Test 417	Clean 2-qt plastic jug with lined, sealed lid At point of use; see Remarks	1 per source		Water supplies for domestic use do not need to be tested
Setting Time	ASTM C 191 or ASTM C 266	Contact METS for required quantity of water sample	At point of use	1 per source	Water supplies for domestic use do not need to be tested
Mortar Compressive Strength	ASTM C109	Contact METS for required quantity of water sample	At point of use	1 per source	Water supplies for domestic use do not need to be tested
Coloring Agents	Must comply with *Standard Specifications* Section 90-1.02D	Contact METS for required quantity of water sample	At point of use	1 per source	Water supplies for domestic use do not need to be tested

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 *Standard Specifications* Section 90-1.02D	Contact METS for required quantity of water sample	At point of use	1 per source	Water supplies for domestic use do not need to be tested
Specific Gravity	Must comply with *Standard Specifications* Section 90-1.02D	Contact METS for required quantity of water sample	At point of use	1 per source	Water supplies for domestic use do not need to be tested

Notes:

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

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

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

Notes:

1. Refer to California Test 125 for sampling procedures.

Table 6-1.12. Materials Acceptance Sampling and Testing Requirements: Seal Coats (*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 *Standard Specifications*	See Section 37-2.02A(4)(b)(ii) of *Standard Specifications*	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: Seal Coats (*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: Seal Coats (*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: Seal Coats (*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					
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: Seal Coats (*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					
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 *Standard Specification* 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: Seal Coats (*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:
Seal Coats (*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 *Standard Specifications*	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: Seal Coats (*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:
Seal Coats (*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 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, placed using statistical pay factors, 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 *Standard Specifications* Section 92)	See *Standard Specifications* 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 *Standard Specifications* 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 *Standard Specifications* 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, 8½x8½x4½=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, 8½x8½x4½=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 statistical pay factors, 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 statistical pay factors, 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 statistical pay factors, see Notes 10 and 11	Production start-up evaluation; 1 random test per day of paving. For HMA placed using statistical pay factors, 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 statistical pay factors, see Notes 11 and 13	Production start-up evaluation; minimum 1 per day of paving, except for HMA placed using statistical pay factors, 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						
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 statistical pay factors, 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)						
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 *Standard Specifi-cations* 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 *Standard Specifi-cations* 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 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 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 not have at least the 3 tests needed for verification.
12. To determine in-place density, obtain verification density cores from the contractor's sublot identified in the engineer's stratified random sampling plan. Break the identified sublot into three equal parts, and randomly determine the coring location of each part. At each location, core three samples aligned longitudinally within one to two 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 sublot 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 statistical pay factors, 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 statistical pay factors, when sampling for Hamburg Wheel Track, pull one additional sample for testing from the contractor's next sublot. Test this second sample if the first sample fails.
17. For HMA placed using statistical pay factors, 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					
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(2))					
Various properties; must comply with *Standard Specifications* Section 51-2.02C(2)	See *Standard Specifications* Section 51-2.02(C)	1 piece, 3 ft	Job site	Each lot	Certificate of compliance and certified test report required for each lot; test report must include the seal movement rating, manufacturer minimum uncompressed width and test results; submit samples at least 30 days before use
JOINT SEALS Type A and Type AL (Section 51-2.02B)					
Various properties; must comply with *Standard Specifications* Section 51-2.02B(2)	See *Standard Specifications* Section 51-2.02B(2)	1 qt of each component and primer	Job site	1 sample from each component of each batch	Certificate of compliance required for each batch of sealant; submit samples at least 30 days 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 revolu-tions)	Cali-fornia 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	Cali-fornia 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	Cali-fornia 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	Cali-fornia Test 213	See Note 2	Stockpile	Before production or when contamination is suspected	
Durability	Cali-fornia Test 229	See Note 2	Stockpile	Before production	
Sand Equivalent	Cali-fornia 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 *Standard Specifications* Section 90-1.02B(2)	See *Standard Specifications* Section 90-1.02B(2)	8 lb	Concrete plant	Sample each 100 tons of cement, 2 per day maximum	Cement must be on Authorized Material List; cement accepted based on certificate of compliance with each shipment; recommend 1 verification test per 5 samples
Supplementary Cementitious Materials (SCM), various properties; must comply with *Standard Specifications* Section 90-1.02B(3)	See *Standard Specifications* Section 90-1.02B(3)	8 lb	Concrete plant	Sample each 100 tons of SCM, 2 per day maximum	SCMs must be on Authorized Materials List; SCM accepted based on certificate of compliance with each shipment; recommend 1 verification test per 5 samples
WATER					
Chlorides	California Test 422	Clean 2-qt plastic jug with lined, sealed lid	At point of use	1 per source	Water supplies for domestic use do not need to be tested
Sulfates	California Test 417	Clean 2-qt plastic jug with lined, sealed lid	At point of use	1 per source	Water supplies for domestic use do not need to be tested
Setting Time	ASTM C 191 or ASTM C 266	Contact METS for required quantity of water sample	At point of use	1 per source	Water supplies for domestic use do not need to be tested

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					
Mortar Compressive Strength	ASTM C109	Contact METS for required quantity of water sample	At point of use	1 per source	Water supplies for domestic use do not need to be tested
Coloring Agents	Must comply with *Standard Specifications* Section 90-1.02D	Contact METS for required quantity of water sample	At point of use	1 per source	Water supplies for domestic use do not need to be tested
Alkalis	Must comply with *Standard Specifications* Section 90-1.02D	Contact METS for required quantity of water sample	At point of use	1 per source	Water supplies for domestic use do not need to be tested
Specific Gravity	Must comply with *Standard Specifications* Section 90-1.02D	Contact METS for required quantity of water sample	At point of use	1 per source	Water supplies for domestic use do not need to be tested
ADMIXTURES: Air Entraining Agent					
Air entraining properties Must comply with *Standard Specifications* Section 90-1.02E	See *Standard Specifications* 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 *Standard Specifications* 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. for each test	Concrete truck discharge chute (See Note 3)	1 set per age for every 300 cu yd concrete or as required for acceptance, minimum 1 set per project	For trial batches, see *Standard Specifications* or job special provisions and Section 6-3, "Field Tests," of this manual
Air Content	California Test 504	See test method	Concrete truck discharge chute (See Note 3)	1 every 4 hours of production and when test specimens are fabricated	Where air is specified for freeze-thaw resistance, a minimum of 1 every 30 cu yd
CONCRETE WITH COMPRESSIVE STRENGTH LESS THAN 3,600 psi					
Concrete Uniformity	ASTM C143, California Test 533	See test method	Concrete truck discharge chute (See Note 3)	When compressive test specimen is fabricated and when uniformity is questionable	

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., for each test	Concrete truck discharge chute (See Note 3)	1 set per age for every 300 cu yd, minimum 1 set per project	
Air Content	California Test 504	See test method	Concrete truck discharge chute (See Note 3)	When compressive test specimens are fabricated	Where air is specified for freeze-thaw resistance, a minimum of 1 every 100 cu yd
CURING COMPOUND					
Curing Compound; must comply with *Standard Specifications* Section 90-1.03B(3)	ASTM C309	1-qt can	At time of use (See Note 1)	1 every shipment	Each shipment must have certificate of compliance that includes: 1. Test results for tests specified in Section 90-1.01D(6) of *Standard Specifications* 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 *Standard Specifications* Section 90-1.02B(2)	See *Standard Specifications* Section 90-1.02B(2)	8 lb	Concrete plant	Sample and test if cement quality is questionable	Cement source must be shown on Authorized Materials List; certificate of compliance must accompany each cement shipment
Supplementary cementitious materials (SCM), various properties; must comply with *Standard Specifications* Section 90-1.02B(3)	See *Standard Specifications* Section 90-1.02B(3)	8 lb	Concrete plant	Sample and test if SCM quality is questionable	SCM source must be shown on Authorized Materials List; certificate of compliance must accompany each SCM shipment
ADMIXTURES: Air Entraining Agent					
Air entraining properties; must comply with *Standard Specifications* Section 90-1.02E	See *Standard Specifications* Section 90-1.02E	N/A	N/A		Must be on Authorized Materials List and certificate of compliance must accompany each shipment
CHEMICAL ADMIXTURES: Water Reducers or Set Retarders					
Claimed properties, chloride identification	ASTM C494 Type A, B, D, F or Type G California Test 415	N/A	N/A		Must be on Authorized Materials List and certificate of compliance must accompany each shipment

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
Com-pressive Strength	California Test 540, California Test 521	1 set of 2 cylinders, 6x12 in., for each test	Concrete truck discharge chute (See Note 3)	Sample and test if concrete quality is questionable; minimum 1 per mix design	Minor concrete must have the strength described or 2,500 psi, whichever is greater; see *Standard Specifications* Section 90-1.02A
Air Content	California Test 504	See test method	Concrete truck discharge chute (See Note 3)	Where air is specified for freeze-thaw resistance, a minimum of 1 every 100 cu yd	
CURING COMPOUND					
Curing Compound; must comply with *Standard Specifi-cations* Section 90-1.03B(3)	ASTM C309	1-qt can	At time of use; (See Note 1)	1 every shipment	Each shipment must have certificate of compliance that includes: 1. Results for tests specified in Section 90-1.01D(6) of *Standard Specifications* 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 *Standard Specifications* Section 80-2.02D	ASTM A121	1 yd length	Job site	As necessary for verification if quality is questionable	
BOLTS AND HARDWARE (Section 75)					
		2 samples each diameter		Each lot	Sample and test if not previously inspected at the source
CHAIN LINK FENCES (Section 80-3)					
Wire Mesh, various properties; must comply with *Standard Specifications* Section 80	ASTM A116, Class 1	2 ft width	Job site	Each lot for verification if quality is questionable	Certificate of compliance required for vinyl clad fencing
CONCRETE PIPE (Section 65)					
Compliance with specifications		Contact METS for instructions		Contact METS for instructions	Sample and test if not previously inspected at source
CONDUIT (Section 86-1.02B)					
Conduit, various properties; must comply with *Standard Specifications* Section 86-1.02B	See *Standard Specifi-cations* Section 86-1.02B	2 ft. long from center of length, 2 samples each size	Job site	As necessary for verification if quality is questionable	

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

Test	Test Method	Sample Size & Container Size	Sampling Location	Acceptance Test Frequency	Remarks
ELECTRICAL CONDUCTORS AND CABLES (Section 86-1.02F)					
Electrical conductors and cables, various properties; must comply with *Standard Specifications* Section 86-1.02F	See *Standard Specifications* Section 86	2 ft. long, include markings, 2 samples per gauge	Job site	Each lot for verification if quality is questionable	
EXPANSION JOINT FILLER					
Compliance with specifications		6 in. long, full width of sheet		Each 1,000 sq ft not less than 2 per shipment	
GEOSYNTHETICS (Section 96)					
Various properties; must comply with *Standard Specifications* Section 96	See *Standard Specifications* Section 96	1 piece, 3 ft x full width of roll	Job site	Each lot for verification if quality is questionable. See Remarks	Certificate of compliance required for each lot; unroll at least 1 circumference before sampling
PAINT (Section 91)					
Paint, various properties; must comply with *Standard Specifications* Section 91	See *Standard Specifications* 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 *Standard Specifications* Section 81-3	See *Standard Specifications* 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 *Standard Specifi-cations* Section 52	2 samples, 30 in., except 40 in. for No. 14 and No. 18	Job site	As necessary for verification if quality is questionable	Each shipment must be accompanied by a certificate of compliance
SLOPE PROTECTION (Section 72)					
Size	N/A		Quarry or stockpile	As required for acceptance	Adequate size of slope protection documented by measuring or weighing the material
Apparent Specific Gravity	California Test 206	75 lb	Quarry or stockpile	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 *Standard Specifications* Section 59	See *Standard Specifi-cations* 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 *Standard Specifi-cations* 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