STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# MANUAL CHANGE TRANSMITTAL		NO. 19-2
TITLE: Department of Transportation *Construction Manual*	APPROVED BY: Bob Finney Acting Chief, Division of Construction	DATE ISSUED: **01-10-2019**
SUBJECT AREA Sections 3-6, 6-2, and 6-3 of the *Construction Manual* on the Buy Clean California Act	ISSUING UNIT Division of Construction	
SUPERSEDES Sections 3-6, 6-2, and 6-3 of the July 2017 *Construction Manual*	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 has been updated to reflect new policy and supersedes the corresponding section of the *Construction Manual* as previously published. Updated sections are available at http://www.dot.ca.gov/hq/construc/constmanual/ and are indicated by the date listed in the right-hand column on that page. Changes are identified by change lines in the left margin.

Section 3-6, "Control of Materials"
Changes to this section reflect new contract administration requirements concerning the Buy Clean California Act, Public Contract Code sections 3500-3505, which establish requirements on certain materials or products based on their global warming potential.
• New Section 3-606, "Buy Clean California Act," outlines requirements for environmental product declarations based on Section 6-1.06, "Buy Clean California Act," of the special provisions, based on bid opening date of projects and legally mandated timeframes. Subsequent sections are renumbered.

Section 6-2, "Acceptance of Manufactured or Fabricated Materials and Products"
Changes to this section reflect updated links to supplemental guidance, updated guidance concerning materials certificates of compliance, and new contract administration requirements of the Buy Clean California Act, Public Contract Code sections 3500-3505.
• Updates links in Section 6-201A, "References," for the Materials Engineering and Testing Services (METS) to the J2 materials testing database and the METS *Quality Manual*.
• Updates Section 6-202A, "Contractor," to add contractor responsibility for providing environmental product declarations for specified materials or products in conformance with Buy Clean California Act requirements.
• Renames Section 6-202A (2) to "Certificates of Compliance, Mill Test Reports, Buy America, and Buy Clean California Act Requirements," and refers to Section 3-606, "Buy Clean California Act," of the *Construction Manual* for detailed guidance.
• Updates links in Section 6-202B (1), "Notice of Materials to be Used," to the METS J2 database for lists of product materials to be used on projects and for checking Form CEM-3101 of materials filed for projects.
• Updates link in Section 6-202C (3), "Form TL-0608, 'Notice of Materials to Be Furnished'," to the *QASI Manual*.
• Updates Table 6-2.3, "Materials Accepted by Certificate of Compliance," to add requirement of a certificate of compliance for glass beads; to delete entry for paint or thermoplastic pavement marking; to add thermoplastic traffic stripes and pavement markings requirement for a certificate of compliance by lot batch and test data report from an independent laboratory; and to add certificates of compliance and pre-painting test for two-component traffic stripes and pavement markings.

Section 6-3, "Field Tests"

Changes to this section reflect new contract administration requirements of the Buy Clean California Act, Public Contract Code, sections 3500-3505.

• Updates Section 6-302, "Field Inspection and Release of Materials," adding guidance on environmental product declaration documentation.

Section 6 Control of Materials

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Section 6
Control of
Materials

3-601 General

3-601
General

Section 6, "Control of Materials," of the *Standard Specifications*, describes the contractor's responsibilities regarding materials used on the project.

The service life of a properly designed highway depends on the construction methods and quality of materials used in the highway's construction. The resident engineer must verify that materials used in the work comply with contract specifications. This section presents general guidelines for assuring that specifications are met.

Materials Engineering and Testing Services (METS) will assign inspectors for materials that require inspection during manufacture or at the source of supply. Obtain a properly completed Form CEM-3101, "Notice of Materials to Be Used," which lists the contractor's sources of materials and the location at which those materials can be inspected. Review this form to verify that all expected materials are included, then forward the completed form to METS. METS will assure the proper assignment of inspectors and notify the suppliers of the required inspections. Refer to Section 6-202, "Responsibilities for Acceptance of Manufactured or Fabricated Materials and Products," of this manual for additional information.

For a list of products inspected by METS, refer to Table 6-2.1, "Inspection of Fabricated and Manufactured Materials," of this manual.

Not all products will be inspected by METS. METS has assigned to the resident engineer the inspection and release at the job site of those products listed in Table 6-2.2, "Materials Acceptance Based on Authorized Material List," and Table 6-2.3, "Materials Accepted by Certificate of Compliance," of this manual.

Do not allow any material to be incorporated into the work until the required evidence or certificate of compliance has been received and until the field inspection has been completed at the job site.

3-602 Department-Furnished Materials

3-602
Department-
Furnished
Materials

Section 6-1.02, "Department-Furnished Materials," of the *Standard Specifications* describes the conditions under which the contractor receives materials furnished by the California Department of Transportation (Caltrans). The resident engineer's duties related to these materials include the following:

- Review the special provisions for materials to be Department-furnished. For materials manufactured specifically for the project, such as signs, check with the district unit responsible for ordering them to make sure they will be available when the contractor requests them.
- Obtain the contractor's written request for all Department-furnished materials. Retain a copy of the request in the project file under Category 52, "Charges to Total Contract Allotment."

- Verify that the contractor signs a receipt for the materials when they are delivered. Retain a copy of the receipt in the project file.
- If Department-furnished materials are damaged or lost, deduct a sufficient amount from the contractor's monthly estimate to cover the estimated cost of repair or replacement, pending such repair or replacement.
- Assure the return or disposal of Department-furnished material that has not been used in the work.

3-603 Local Materials

3-603 Local Materials

Section 6-1.03, "Local Materials," of the *Standard Specifications*, covers the requirements for the use of local materials and the resident engineer's responsibility for testing the material. This section also requires the contractor to furnish material from any source the contractor may elect; however, when mandatory local sources of certain materials are designated in the special provisions or on the plans, the contractor must furnish material from those designated mandatory sources.

If the contractor elects to obtain material from a non-mandatory local source, the contractor is responsible for making all arrangements necessary to obtain materials from that source. The contractor must furnish the resident engineer with a copy of the contractor's agreement with the property owner and provide copies of all necessary permits, licenses, and environmental clearances prior to removing any material. Refer to Section 3-510, "Coordination With Other Entities," of this manual and Section 5-1.20, "Coordination With Other Entities," of the *Standard Specifications* for additional information.

Where Caltrans has entered into agreements with property owners in the vicinity of a project for obtaining material from an owner's property, the arrangements are made solely for the purpose of providing all bidders an equal opportunity to obtain material from that property. Provide the contractor a copy of the agreement between Caltrans and the property owner. Refer to Section 3-510, "Coordination With Other Entities," of this manual for more information.

The special provisions may require the contractor to obtain materials from a specified source. It may be necessary for the contractor to process the material as indicated in the special provisions to produce acceptable materials from this source.

If the resident engineer determines that the specified local material source can no longer be used for any reason, designate an alternative local material source for the balance of the material. Pay for the costs associated with the change in material source as extra work.

Occasionally, it becomes necessary to obtain additional embankment material from outside the local area and there is no item for "imported borrow." Under these circumstances, it is normal practice for Caltrans to locate an alternative source for this material. Consult with the district materials engineer for help locating an alternative material source.

In accordance with the State Contract Act, material sources must comply with the Surface Mining and Reclamation Act of 1975 (SMARA). Refer to Chapter 7, "Environmental Stewardship," of this manual and the Department of Conservation's website at the link provided later in this section for further information regarding SMARA requirements.

If a change order directs the contractor to obtain material from Caltrans' chosen source, the Federal Highway Administration (FHWA) considers the source mandatory. The FHWA then requires written approval of a public interest finding before approval of the change order.

At a minimum, the public interest finding, written by the resident engineer, must include the following:

- The reason the chosen source is the most economical. If the determination is not based on economy, other reasons such as public safety or convenience must be included.
- The alternatives considered.
- The effect on the value of the material site.

All such sites are subject to compliance with SMARA. Mining operations determined to be in compliance are listed on the AB 3098 SMARA Eligible List. This list can be obtained from the Division of Construction or at the Department of Conservation's website:

http://conservation.ca.gov/omr/SMARA%20Mines/ab_3098_list/Pages/Index.aspx

The above requirements do not apply to "local borrow," as defined in Section 19-7, "Borrow Material," of the *Standard Specifications*. Refer to Chapter 7, "Environmental Stewardship," of this manual for a list of mining operations that are or are not subject to SMARA requirements.

3-604 Buy America

3-604
Buy America

Section 6-1.04 "Buy America" of the *Standard Specifications* includes Buy America provisions for crumb rubber, steel, and iron materials. Buy America provisions apply to Caltrans projects regardless of funding source, unless the special provisions indicate otherwise.

3-604A Crumb Rubber

Buy America requirements apply to crumb rubber incorporated into the work. The crumb rubber must be produced in the United States and derived from waste tires taken from vehicles owned and operated in the United States. Verify that the contractor submits a certificate of compliance with furnished crumb rubber showing compliance with Buy America requirements.

3-604B Steel and Iron Materials

Buy America requirements apply to steel and iron materials permanently incorporated into the work. This includes steel and iron components of a manufactured product regardless of the overall composition of the manufactured product. For example, Buy America applies to the steel welded wire reinforcement or steel reinforcing components of a precast reinforced concrete pipe.

The steel and iron materials must be melted and manufactured in the United States, except that foreign pig iron or processed, pelletized, and reduced iron ore may be used in the domestic production of the steel and iron materials.

Manufacturing begins with the initial melting and mixing and continues through the bending and coating stages. Coating includes all processes that protect or enhance the value of the material to which the coating is applied.

The manufacturing process for a product with steel or iron content is considered complete when the product is ready for use in items such as fencing, posts, and girders. It could also be considered complete if the material is installed as a component of a more complex product through further assembly, as is the case for a traffic signal head. The final assembly process does not need to be accomplished domestically as long as the steel or iron component is only installed and no manufacturing process is performed on the steel or iron component.

A certificate of compliance from the manufacturer, not the contractor, showing compliance with Buy America requirements must accompany products with steel or iron content. Verify receipt of the required certificates of compliance and mill test reports.

3-604B (1) Resident Engineer Approval of Minimum Use Requirements

Buy America requirements do not apply to a minimal use of steel and iron materials incorporated in the work as specified in Section 6-1.04C, "Steel and Iron Materials," of the *Standard Specifications*.

Before incorporating foreign steel and iron materials into the work, the contractor must submit documentation regarding the quantity and value of the foreign steel and iron to the resident engineer. Review the documentation to determine if it supports the minimum-use rule before allowing the material to be incorporated into the project. If the minimum-use rule applies, approve the exception in writing. This applies as a one-time total exemption for each contract and not for each purchase. File the documentation, exceptions, and a running total of the value of minimum-use foreign steel and iron under Category 41, "Report of Inspection of Material."

3-604B (2) Federal Highway Administration Approval of Waivers

Caltrans does not have the authority to allow the use of foreign steel and iron content in products subject to Buy America in federal-aid projects without FHWA approval, except under the minimum-use rule. The California FHWA division administrator may grant waivers only upon receiving concurrence from FHWA headquarters in Washington, D.C. Approval or denial may take several months.

Approval by FHWA of the waiver is required prior to allowing foreign steel or iron that exceeds the minimum-use rule into the project. Lack of an FHWA-approved waiver can result in the loss of all federal funds for the project.

The contractor must submit the following information to the resident engineer when requesting a waiver to Buy America requirements:

- A detailed description of the waiver item
- Item cost—obtained from the manufacturer or supplier
- The country of origin for the product
- The reason for the waiver

The resident engineer must provide the following information when preparing a waiver request for the FHWA engineer:

- The contractor's waiver submission
- Federal-aid project number, description, and location
- Analysis of proposed redesigns using available domestic products

3-605 Brand or Trade Names and Substitutions

3-605
Brand or Trade Names and Substitutions

When specific brand or trade names are used to designate required products, the contractor may furnish other products that are of equal or better quality.

A product is not necessarily equivalent merely because it is on an Authorized Material List published by Caltrans. These lists indicate that the products meet the general qualifications. However, some of the listed products may not meet the specific needs of the project or may not be appropriate for a particular location because of factors such as climate conditions or maintenance difficulties. Consult with the responsible unit (the Design Unit, Traffic Unit, Maintenance Unit, or METS, for example) before making decisions about the acceptability of substitutes.

3-606 Buy Clean California Act

3-606
Buy Clean California Act

Section 6-1.06, "Buy Clean California Act," of the special provisions includes environmental product declaration (EPD) requirements for eligible materials or products, including carbon steel rebar, structural steel, flat glass, and mineral wool board insulation.

Review applicability of these provisions based on project duration, quantities of the eligible materials, and bid opening date as specified. Projects or quantities not meeting the specified criteria are exempt from EPD requirements. The project's bid opening date will determine applicable requirements for EPDs. Discuss project specific EPD requirements at the preconstruction conference as applicable.

For projects with bid openings after November 30, 2018, and through November 30, 2019, Caltrans is requesting existing EPDs for eligible materials. There is no requirement for contractors to develop new EPDs for projects within this timeframe.

For qualifying projects with bid openings December 1, 2019, through May 31, 2021, contractors must submit facility-specific material or product EPDs for eligible materials as an informational submittal within 15 days of installation. In the event the contractor fails to submit this information, withhold $10,000 for each missing EPD. The $10,000 amount approximates the cost of a new facility-specific EPD. If the contractor fails to provide the required EPD by contract acceptance, return the withhold and make a payment adjustment to the associated items for work not performed in the same manner as work-character changes.

For qualifying projects with bid openings after May 31, 2021, contractors must submit facility-specific material or product EPDs for eligible materials as an action submittal at least 15 days before installing the material or product. The EPD must show that the global-warming potential of the material or product is less than or equal to the global-warming potential threshold values published by the Department of General Services in the *State Contracting Manual* at:

http://www.dgs.ca.gov/ols/Resources/StateContractManual.aspx.

Materials with EPDs greater than the threshold value cannot be used on the project. If the contractor fails to provide an EPD for an eligible material, installation may not proceed and no compensation can be made, including materials-on hand-payments, for these materials.

EPD submittals are made by PDF copy to the resident engineer and through the Data Interchange for Materials Engineering (DIME) site at:

https://dime.dot.ca.gov/

Contractors will need to register in advance to use the DIME site.

EPDs are developed in conformance with program category rules established by program operators. Contractors are to use the product category rule in effect on the date of bid opening unless otherwise authorized. Only consider a more recently dated product category rule if requested by the contractor. Where a product category rule for material or product has expired without replacement as of the bid opening date, no EPD is required for that material or product. METS maintains an up-to-date listing of product category rules, in addition to related Buy Clean California Act information at:

http://www.dot.ca.gov/mets/ab-262/

3-607 Quality Assurance

Quality Assurance

Quality assurance encompasses all materials and construction activities on a project and directly affects the service life of a transportation facility.

Section 6-2, "Quality Assurance," of the *Standard Specifications* includes provisions covering the contractor's quality control over the work and Caltrans' verification and acceptance of the work.

Section 6-2.02, "Quality Control," of the *Standard Specifications* informs the contractor of general quality control requirements regarding the materials incorporated into the work. Verify that the contractor maintains a quality control program that includes employing appropriate personnel and keeping thorough quality control records.

Section 6-2.03, "Department Acceptance," of the *Standard Specifications* allows the resident engineer access to the material sources to inspect, sample, and test materials for Department acceptance. Refer to Section 3-501, "General," of this manual for information regarding safe access.

Resident engineers and their authorized representatives have a primary duty to inspect the work and to sample and test the materials incorporated into the work to verify compliance with the *Standard Specifications*, special provisions, and plans.

Deduct retesting costs. Contact the district materials engineer who oversees the district materials lab for guidance on determining the costs. For hot mix asphalt verification retesting, refer to Section 39-2.01A(4)(b), "Job Mix Formula Verification," of the *Standard Specifications*.

Additional information about quality assurance can be found in the Division of Construction publication *Construction Quality Assurance Program Manual* at:

http://www.dot.ca.gov/hq/construc/publicationlist.htm

3-608 Out-of-State Fabrication

Out-of-State Fabrication

Section 6-2.01E, "Material Source Inspection and Testing," of the *Standard Specifications* includes deductions in payment for fabrication at some distance from Sacramento and Los Angeles. In addition, some special provisions may modify the amount to be deducted. Deduct the appropriate amount, applying it as an administrative deduction on estimates that include payment for the item. Use a standard description of "Out of State Inspect" on Form CEM-6101, "Project Record—Estimate Request." This deduction should be made in whole, when appropriate. However, if the deduction is large, the resident engineer has the option to deduct incremental amounts until the full deduction is made.

3-609 Testing by Caltrans

In addition to the California tTest methods, the *Standard Specifications* contain references to the standards and tests of the American Association of State Highway and Transportation Officials and the American Society for Testing and Materials.

California test methods are available at:

http://www.dot.ca.gov/hq/esc/ctms/index.html

American Association of State Highway and Transportation Officials, American Society for Testing and Materials, and other test methods are available by clicking on Material Standards (ASTM/AASHTO) to get the IHS Spec's and Standards Search link accessible by Caltrans staff on the Caltrans intranet at:

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

Whenever samples are taken from materials sites, the resident engineer must assure that the samples are representative of material being used. Degradation and segregation may occur in aggregates between the processing operation and their incorporation in the work. The resident engineer cannot assume that material satisfactorily tested at the source or at the processing plant is still satisfactory at the job site. To assure specification compliance, confirm the contractor tests at the frequencies shown in the specifications as the material is being incorporated into the work. Also, perform and record acceptance sampling and testing as required by Section 6-1, "Sample Types and Frequencies," of this manual. Deliver acceptance samples to the district laboratory within 1 business day for projects within 50 miles and within 2 business days for projects more than 50 miles from the district laboratory, except where sampling or test methods conflict. Report acceptance test results to the contractor within 2 business days of receipt from the laboratory. The contractor must be advised that all test results are available for their inspection. Accordingly, test results must remain in the project files. Provide copies of acceptance tests to the contractor upon request.

3-609A Operating Range and Contract Compliance

Section 25, "Aggregate Subbases"; Section 26, "Aggregate Bases"; Section 27, "Cement Treated Bases"; Section 28, "Concrete Bases"; Section 37, "Seal Coats"; and Section 90, "Concrete," of the *Standard Specifications,* all contain provisions for an acceptable range of test results. If a test result fails to meet the requirements of the operating range but meets contract compliance, the contractor usually needs to make some change in operations to ensure that subsequent test results meet the operating range requirements. The resident engineer should document the contractor's actions and any off-site testing done before the next day's work.

If a test result fails to meet the specified value for contract compliance, the result should be treated just like any other failing test result. However, if the contractor writes a request, the resident engineer may consider leaving the material in place and applying the specified deduction, if the specifications allow. The contractor's written request, along with documentation of reasons for leaving the material in place and the contractor's actions, is sufficient for the contract records. A change order accepting out-of-specification material is not required in this case because the specifications provide the procedure for acceptance.

The resident engineer must inform the contractor promptly of test results that indicate unacceptable or borderline work.

3-610 Testing by the Contractor

3-610 Testing by the Contractor

The contractor must be satisfied at all times that the quality of materials entering the work and the work performed, regardless of who supplies the materials or performs the work, will meet the contract requirements. For acceptance of materials or work, resident engineers must not use as documentation any tests the contractor performs to control the work, except where verification testing is specified.

3-610A Action Limit and Suspension Limit

Action and suspension limits are similar to operating range and contract compliance except they apply to the contractor's quality control testing as specified in Section 40, "Concrete Pavement," and Section 41-9, "Individual Slab Replacement With Rapid Strength Concrete," of the *Standard Specifications*.

3-611 Suspected Fraudulent Test and Inspection Reports

3-611 Suspected Fraudulent Test and Inspection Reports

When fraudulent tests or inspection reports are suspected, discuss the situation with the Division of Construction field coordinator. Contact the district materials engineer or METS for assistance in evaluating the reports. Retest the material represented by suspect tests, as appropriate. If after investigating, fraud is still suspected, the deputy district director provides the facts in writing to the Division of Construction field coordinator.

Section 2 Acceptance of Manufactured or Fabricated Materials and Products

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Section 2
Acceptance of Manufactured or Fabricated Materials and Products

6-201 General

6-201
General

This section describes procedures for acceptance of manufactured or fabricated materials and products. This section also describes the types of materials that are considered manufactured materials and provides guidelines for sampling these materials.

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

The contractor is responsible for notifying the resident engineer of the need for inspection and acceptance testing of manufactured materials and products by submitting Form CEM-3101, "Notice of Materials to Be Used," early in the project. Refer to Section 6-202, "Responsibilities for Acceptance of Manufactured or Fabricated Materials and Products," of this manual for details on completing and submitting this form.

The resident engineer needs to be knowledgeable about acceptance methods used for different manufactured or fabricated materials and products, including:

- Source inspection and testing
- Manufacturer certificate of compliance
- Manufacturer certificate of compliance with additional attachments
- Field release of material
- Field samples of manufactured materials or products

When field sampling of manufactured or fabricated materials or products is required, the resident engineer is responsible for the "chain of custody" for material and product acceptance samples. Material acceptance samples must be under the control of Caltrans from the sampling point to when the sample is tested. The chain of custody for material and product samples is an important part of the Caltrans quality assurance program.

6-201A References

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

  http://www.dot.ca.gov/hq/esc/Translab/ormt/IA_reports/index.htm

- *Bridge Construction Records and Procedures* manual, Vol. 2, Structure Construction:

  http://www.dot.ca.gov/hq/esc/construction/manuals/

- California Test Methods, METS, Caltrans:

  http://www.dot.ca.gov/hq/esc/ctms/index.html

- AASHTO, ASTM, and other test methods are available at IHS Standards Expert website (by clicking on Material Standards (ASTM/AASHTO) to get IHS Specs and Standards Search), accessible by Caltrans staff at:

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

- J2 Database, METS, Structural Materials electronic materials management database where each project's test results and CEM-3101 responses are captured along with other METS project-related information and accessible by Caltrans staff:

  https://j2.dot.ca.gov/#

- *Material Plant Quality Program (MPQP),* Division of Construction:

  http://www.dot.ca.gov/hq/construc/hma/

- *Quality Manual,* METS, Structural Materials, methods and procedures to provide consistent quality assurance and source inspection:

  https://j2.dot.ca.gov/qs/?tab=2&sdiv=METS&off=OSM

- *Overhead Sign Structures Guide,* Design and Technical Services, accessible to Caltrans staff:

  http://des.onramp.dot.ca.gov/structure-policy-innovation/signs-overhead-structures

6-202 Responsibilities for Acceptance of Manufactured or Fabricated Materials and Products

6-202 Responsibilities for Acceptance of Manufactured or Fabricated Materials and Products

The following describe the responsibilities for acceptance of manufactured or fabricated materials and products.

6-202A Contractor

The contractor is responsible for providing materials that comply with the contract specifications. The contractor is responsible for the quality of materials and, where required by the specifications, must provide a notice of materials to be used, shop drawings, certificates of compliance, mill test reports, environmental product declarations when specified, quality control plans, and quality control test results. The contractor must use materials from the Authorized Material List, provide fabricated materials from audited facilities, and use materials that comply with Buy America and specified Buy Clean California Act requirements.

6-202A (1) Notice of Materials to Be Used

The contractor is responsible for submitting Form CEM-3101, "Notice of Materials to Be Used," to the resident engineer for all materials to be used on the project. The contractor must provide sufficient notification to the resident engineer on the source and location of materials to be inspected and tested so that the work will not be delayed. Section 6, "Control of Materials," of the *Standard Specifications* requires the contractor to list on Form CEM-3101 all sources of materials and locations where these materials are available for inspection. Receiving this form in a timely manner is critical to the success of the materials management process.

Form CEM-3101, which includes detailed instructions, is available at:

http://www.dot.ca.gov/hq/construc/forms.htm

6-202A (2) Certificates of Compliance, Mill Test Reports, Buy America and Buy Clean California Act Requirements

The *Standard Specifications* requires the contractor to submit a certificate of compliance for various materials before they are incorporated into the work. Section 6-2.03C, "Certificates of Compliance," of the *Standard Specifications* states that when a certificate of compliance is required it must be:

- Submitted for each lot of material and clearly indicate which lot is included in the certificate.
- Signed by the producer of the material stating that it complies with the contract.

The intent of the certificate of compliance is to communicate to Caltrans that the contractor has accepted the material and is confident that it complies with the contract specifications. The contractor is responsible for providing the certificate of compliance prior to incorporating material into the project. The certificate of compliance and any supporting documentation must accompany the material to the job site when materials are delivered.

Table 6-2.3, "Materials Accepted by Certificate of Compliance," in Section 6-203C, "Materials Accepted on the Basis of a Certificate of Compliance," of this manual provides a list of materials requiring a certificate of compliance, as well as any additional documents.

The *Standard Specifications* requires the contractor to provide certified test reports along with the certificate of compliance for various materials. For steel, this test data is commonly known as a mill test report. A certified mill test report is required for each heat and must contain physical and chemical analysis of the material. The requirements for the mill test report vary depending on the section of the *Standard Specifications* the material falls under.

Section 6-1.04, "Buy America," of the *Standard Specifications* provides detailed information on Buy America requirements. Refer to Section 3-604, "Buy America," of this manual for additional information. The following are examples of acceptable language included in the certificate of compliance to verify Buy America compliance:

"All melting and manufacturing processes for the product occurred in U.S."

"100 percent melted and manufactured in the U.S.A."

Section 6-1.06, "Buy Clean California Act," of the special provisions provides detailed information on Buy Clean California Act requirements including environmental product declarations. Refer to Section 3-606, "Buy Clean California Act," of this manual for additional information.

6-202A (3) Shop Drawings

The *Standard Specifications* requires the contractor to submit shop drawings for review by Caltrans for certain structures such as structural steel and structural precast concrete. The shop drawings must include both shop details and erection plans. For more information on submittal and authorization of shop details and erection plans, refer to the *Standard Specifications*.

Contractors must submit shop drawings for overhead sign structures. For more information on submittal and authorization of shop drawings, refer to the *Overhead Sign Structures Guide*. Section 4-56, "Overhead Sign Structures, Standards, and Poles," of this manual contains additional information.

Prior to Caltrans performing any source inspection, the contractor is required to have a copy of the authorized shop drawings at the location of inspection.

6-202A (4) Quality Control Plans

The *Standard Specifications* requires the contractor to submit a quality control plan for certain types of production. Information on quality control plans for those production types is provided in the *Standard Specifications*:

- Section 11-2, "Welding Quality Control." METS also has information on quality control plan requirements for welding:

  http://www.dot.ca.gov/hq/esc/Translab/OSM/smbresources.htm

- Section 39-2: "Hot Mix Asphalt." The Division of Construction also offers guidance on quality control issues:

  http://www.dot.ca.gov/hq/construc/hma/

- Section 40: "Concrete Pavement"
- Section 41-9: "Individual Slab Replacement with Rapid Strength Concrete"
- Section 56-2: "Overhead Sign Structures"
- Section 59-2: "Painting Structural Steel"
- Section 59-5: "Thermal Spray Coat Structural Steel"
- Section 90-4: "Precast Concrete"

The resident engineer does not allow work to begin until the quality control plan is authorized for that production. For more information on the contents of quality control plans, refer to the *Standard Specifications*.

Specifications for welded products usually require the contractor to submit the fabricator's welding quality control plan to the resident engineer for authorization prior to manufacturing any products for Caltrans. For details on quality control plans for welding, refer to Section 180, "Welding," of *Bridge Construction Records and Procedures*, Vol. 2:

http://www.dot.ca.gov/hq/esc/construction/manuals/

6-202B Resident Engineer

The resident engineer must verify that materials entering the work comply with the requirements in the contract specifications.

6-202B (1) Notice of Materials to be Used

The resident engineer must verify that the contractor submits Form CEM-3101, "Notice of Materials to Be Used," for all materials. If the contractor does not submit Form CEM-3101 before the preconstruction conference, provide a list to the contractor during the preconstruction meeting of materials required to be listed on Form CEM-3101.

If the sources of all materials are not known, the contractor may submit a partial list of materials sources on Form CEM-3101 and submit Form CEM-3101 supplements as soon as other sources are known.

METS developed the J2 database for tracking project materials requirements, Form CEM-3101 processing, materials test results, and source inspection. Entering the contract number at the top of the database in the "Projects" box opens that project's main page. Clicking on the "3101 Report" tab opens a list of all the bid items requiring CEM-3101s for the project and which CEM-3101s have been received. The list shows the name and address of the supplier and the date the CEM-3101 was received.

Assistance in developing a list of project materials that require Form CEM-3101 and in navigating the J2 database is available from the structural materials representative for the project:

http://www.dot.ca.gov/hq/esc/Translab/OSM/

The contractor's submitted Form CEM-3101 must include the following information:

- The contract number and the contract items for which the material will be used. If the contractor uses a project number different from the Caltrans contract number, include that number.
- The name, address, and telephone number of the manufacturer.
- The name, address, and telephone number of the supplier or manufacturer where the material can be inspected.
- If the source of material is outside California, also include the name, address, and telephone number of the contractor or subcontractor placing the order and the order number.

Check Form CEM-3101 for the required information and for completeness. To make sure that all structural materials are listed, a list of materials necessary based on contract bid item is available at:

https://mets.dot.ca.gov/j2_item_categories.php

If the contractor's Form CEM-3101 is incomplete or incorrect, require the contractor to complete the form. When the contractor's Form CEM-3101 has been reviewed and is complete, promptly distribute Form CEM-3101 copies, including one to METS. The resident engineer sends Form CEM-3101 to the materials administrator using one of the following methods:

- Email: MaterialsAdministratorMETS@dot.ca.gov
- Fax: (916) 227-7084
- Postal mail:

  Materials Administrator, Mail Station #5
  Materials Engineering and Testing Services
  5900 Folsom Blvd, Room 517
  Sacramento, CA 95819

METS will make required assignments for sampling, testing, and inspection of materials as noted in Section 6-202C, "Materials Engineering and Testing Services," of this manual.

6-202B (2) Job Site Materials Inspection

Based on assignment of materials inspection from METS to the resident engineer and the information shown on Form CEM-3101, the resident engineer must identify the appropriate district samplers, testers, and inspectors. Following is a partial list of those who may need to be notified to perform material acceptance:

- District staff who will be obtaining samples and tests on each material
- District staff who will be obtaining samples for each material accepted on the basis of a certificate of compliance. Testing is normally done by METS
- Structure Construction for reviewing and authorizing shop drawings for overhead sign structures
- District weights and measures coordinator for inspecting materials plants in accordance with the *MPQP*

6-202B (3) Authorized Facilities Audit List

Some structural materials such as structural precast concrete, overhead signs and poles, and steel pipe piling must be fabricated at a facility on the authorized facility audit list of fabricators who have successfully completed Caltrans' facility audit. If these materials are included in the scope of work, make sure that the contractor is aware of these requirements. Information on the authorized facility audit list is available at:

http://www.dot.ca.gov/hq/esc/Translab/OSM/

6-202B (4) Materials Production Plants

The resident engineer must assure materials production plants meet specifications prior to producing material for Caltrans. Request assistance from the district weights and measures coordinator for inspecting materials plants including:

- Hot mix asphalt plants
- Concrete plants
- Volumetric proportioning plants (rapid strength concrete, polyester concrete, and pavement seal coats)

Section 9-1.02, "Measurement," of the *Standard Specifications* indicates the general requirements for weighing, measuring, or metering devices and the requirement to place security seals on material plant controllers. The district weights and measures coordinator will follow the *MPQP* and the contract specifications for material plant authorization.

6-202C Materials Engineering and Testing Services

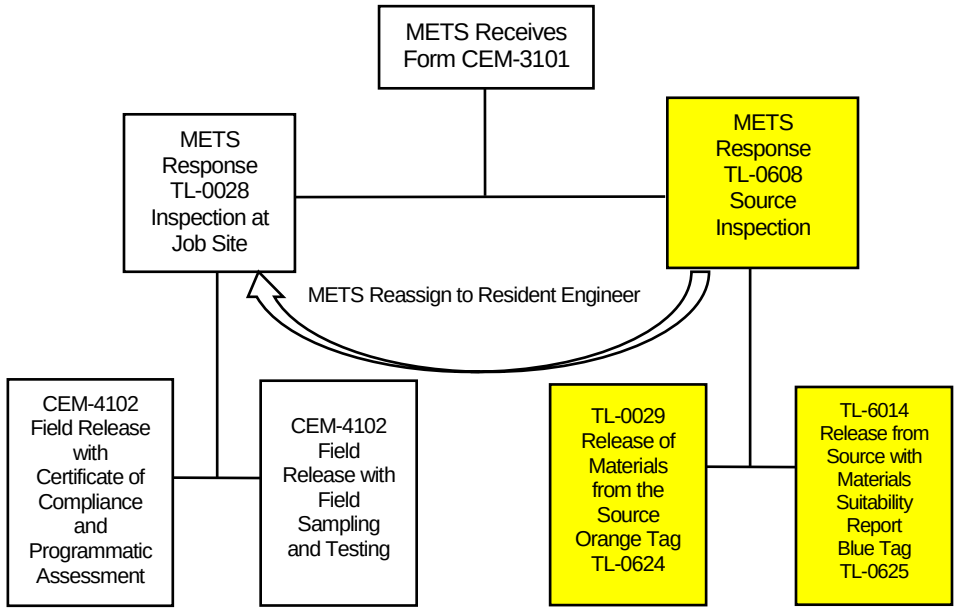
METS assigns personnel for sampling, testing, and inspecting manufactured materials and products, usually at the source of supply. Manufactured materials and products shown in Table 6-2.3, "Materials Accepted by Certificate of Compliance," in Section 6-203C, "Materials Accepted on the Basis of a Certificate of Compliance," of this manual, are the responsibility of METS but have been delegated to the resident engineer for inspection.

METS assigns the responsibility for sampling, testing, and inspecting manufactured materials and products based on the information submitted on Form CEM-3101. METS

offices in Sacramento, the San Francisco Bay Area, or Los Angeles conduct most of the inspections. METS may assign sampling, testing, and inspecting of manufactured materials and products to the district materials engineer, resident engineer, or a commercial laboratory.

The METS process for inspecting and releasing manufactured or fabricated materials or products is shown in Figure 6-2.1, "Inspection and Release Flowchart—Source Inspection."

Figure 6-2.1 Inspection and Release Flowchart—Source Inspection



6-202C (1) Processing Form CEM-3101

Once Form CEM-3101 is received by the materials administrator, it is routed to the appropriate METS office for processing. Any questions regarding Form CEM-3101 processing by METS may be routed to the project structural materials representative. Structural materials listed on Form CEM-3101 are processed by the quality assurance and source inspection (QASI) office assigned to that project.

6-202C (2) Form TL-0028, "Notice of Materials to Be Inspected at Job Site"

If it is determined that the material does not require source inspection, METS will assign inspection to the job site by completing Form TL-0028 for that material item. This form indicates that the material item does not require source inspection from Caltrans at this time. METS will send Form TL-0028 to the resident engineer, prime contractor, and suppliers to inform them that source inspection is not required prior to shipment to the job site.

The resident engineer will release these materials at the job site using Form CEM-4102, "Materials Inspected and Released on Job." Section 6-3, "Field Tests," of this manual contains details on testing that occurs at the job site. Depending on the material, the resident engineer bases the field material acceptance on various methods. Refer to

Section 6-203D, "Field Inspection and Release by the Resident Engineer," of this manual for the field inspection and release procedures.

6-202C (3) Form TL-0608, "Notice Of Materials to Be Furnished"

If it is determined that the material requires source inspection prior to shipment to the job site, METS will issue Form TL-0608 to the resident engineer, contractor, and supplier. A hard copy of Form TL-0038, "Inspection Request," is mailed with Form TL-0608 to the supplier. The inspection request form is to be used by the contractor or any subcontractors to inform METS when the material is ready for inspection.

Source inspection by Caltrans is described in Section 6-202C, "Materials Engineering and Testing Services," of this manual and is detailed in the *QASI Manual*:

https://j2.dot.ca.gov/qs/?tab=2&sdiv=METS&off=OSM

6-202C (4) Form TL-0038, "Inspection Request"

Form TL-0038 is used by the contractor or supplier to inform Caltrans that material located away from the job site is ready for inspection. If the contractor has received a Form TL-0608 for an item, Caltrans will be expecting a Form TL-0038 to initiate the source inspection.

Form TL-0038 and instructions for submitting the request are available at:

http://www.dot.ca.gov/hq/esc/Translab/OSM/smbforms.htm

It is important to remind the contractor that, in accordance with Section 6-2.01E, "Material Source Inspection and Testing," of the *Standard Specifications*, the inspection request must be submitted:

- At least 3 business days before the requested inspection date for a material source within California.
- At least 5 business days before the requested inspection date for a material source outside California but within the U.S.
- Fifty days before the planned production start for a material source outside the U.S. and notify the resident engineer at least 20 days before the actual start.

The resident engineer may also use Form TL-0038 to request field inspection by METS for structural items such as field welding.

6-202D Assignment to Resident Engineer

METS may assign inspection of manufactured or fabricated materials and products for which they have acceptance responsibility back to the resident engineer. Refer to Section 6-203D, "Field Inspection and Release by the Resident Engineer," of this manual for details on inspection and release.

6-203 Manufactured or Fabricated Materials and Products Acceptance

6-203 Manufactured or Fabricated Materials and Products Acceptance

The resident engineer must verify that materials entering the work meet the contract specifications acceptance criteria. Materials acceptance can be based on:

- Source inspection.
- Product on Authorized Material List.

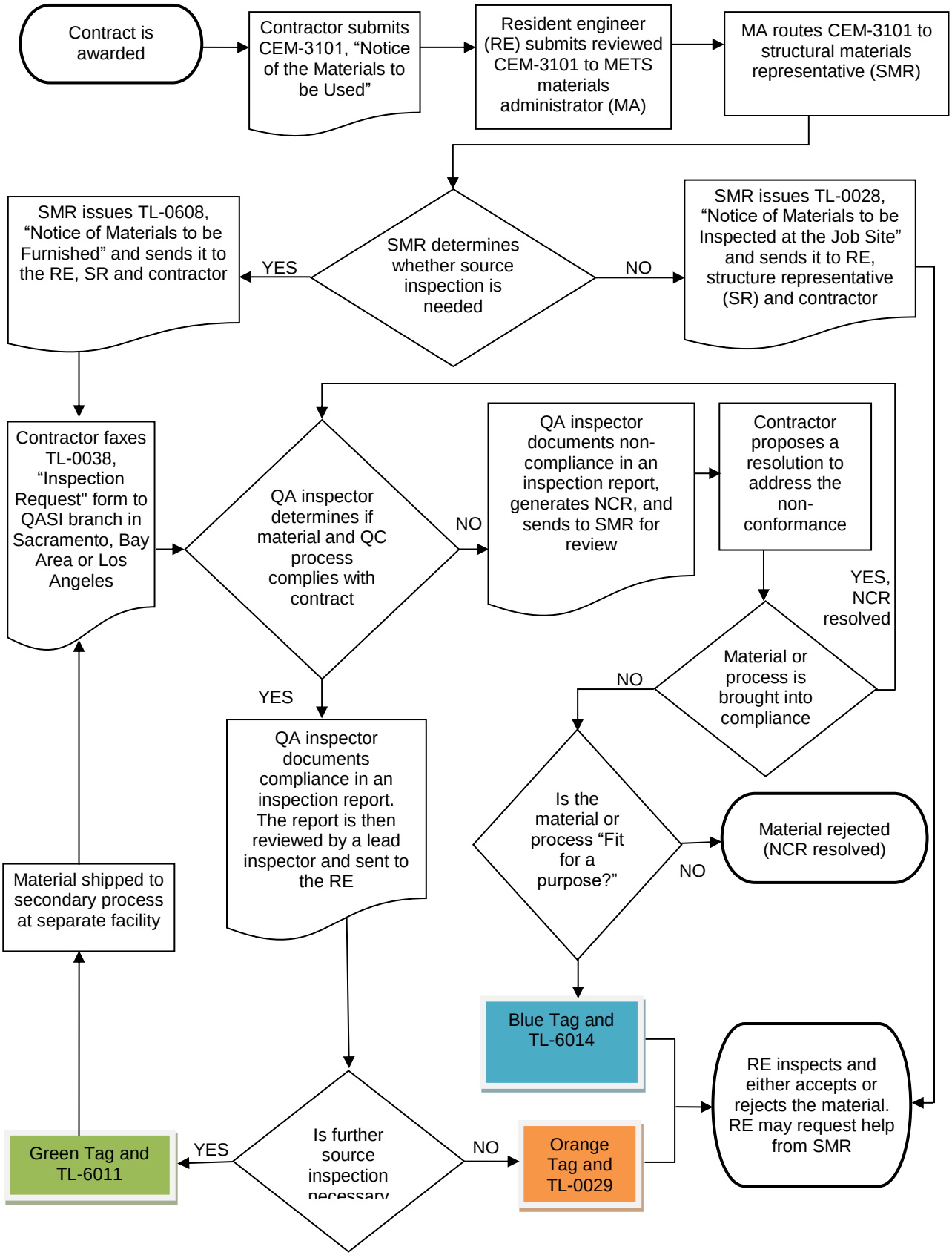
- Certificate of compliance.
- Certificate of compliance with accompanying documents.
- Field inspection and release by the resident engineer.

If the material delivered to the job site lacks proper identification, the report of inspection is unconfirmed, or the acceptability of the material is questionable, do not allow materials to be incorporated in the work until they have been found to comply with the specifications. Contact the assigned inspection unit to verify testing or submit samples for new acceptance tests.

6-203A Source Inspection

METS is responsible for the source inspection process shown in Figure 6-2.2, "Source Inspection Flowchart." The flowchart includes information on what happens when a material is not in compliance with the specifications, prompting use of a TL-0015, "Quality Assurance Nonconformace Report (NCR)."

Figure 6-2.2. Source Inspection Flowchart



When a material listed on Form CEM-3101 is assigned a Form TL-0608, source inspection is required prior to shipment of the material to the job site and final acceptance. Table 6-2.1, "Inspection of Fabricated and Manufactured Materials," provides a list of common materials on Caltrans projects and some of the primary source inspection activities. Table 6-2.1 follows Section 6-203A (5), "Source Inspected Materials Acceptance," of this manual.

A METS inspector will travel to the source of the material and perform inspection, sampling, verification testing, and material release as necessary. Complex fabrication, such as with precast prestressed concrete members and structural steel, typically requires inspection during fabrication (in-process inspection).

METS must receive all information that could affect materials that are source inspected. Forward all copies of authorized shop drawings as well as notification of approved change orders to the structural materials representative for the project. Forward to METS copies of approved shop drawings without established distributions (for example, buildings or small structures) and notification of approvals (such as paint color) or change orders. METS should receive copies of all correspondence with contractors or suppliers that may affect the fabrication.

Some inspections require out-of-state travel. It is important for METS to receive all documents before travel to assure timely inspection and release. For instance, light poles are manufactured at suppliers throughout the U.S.; therefore, it is crucial that authorized shop drawings are available for the METS inspector in time for inspection and release. The travel time for such inspections is significant. Coordination between resident engineer and METS is crucial for timely release of the poles.

In addition to source inspection, METS performs sampling and testing for certain materials for conformance with associated standards as a part of the quality assurance program. The list of additional tests performed by METS is available in detail in the *QASI Manual*.

The main point of contact for the resident engineer for anything related to source inspection is the structural materials representative assigned to the project. A list of structural materials representatives is available at:

http://www.dot.ca.gov/hq/esc/Translab/OSM/

6-203A (1) Inspection Requests and Dispatching

The contractor is responsible for submitting Form TL-0038, "Inspection Request," to the appropriate METS QASI office with sufficient notice as described in Section 6-2.01E, "Material Source Inspection and Testing," of the *Standard Specifications*. The appropriate office to send Form TL-0038 is available at the METS website:

http://www.dot.ca.gov/hq/esc/Translab/OSM/smbforms.htm

This website allows the contractor to determine the appropriate QASI office by selecting the county in which the project is located from a list. The TL-0038 can come from the contractor or subcontractors.

Each QASI office has a dispatcher who receives the TL-0038s and schedules inspections accordingly.

6-203A (2) Material Inspection—Sampling and Release

The structural materials representative assists the resident engineer with management of source-inspected materials. The METS inspector acts as the eyes and ears of the structural materials representative and resident engineer at the material's source. Inspected materials are identified with a unique inspector lot number that correlates the material with reports and release tags.

The METS inspector assesses the source's quality control methods and reviews the certificates of compliance and any additional documentation such as mill test reports. The METS inspector also performs random visual inspection of the material and any other required inspections such as nondestructive testing. For more information on the types of inspection required for common materials, refer to Table 6-2.1, "Inspection of Fabricated and Manufactured Materials," of this manual and the *QASI Manual*.

If sampling of the material is required at the source, the METS inspector will randomly sample the material at the required frequency and fill out a TL-0101, "Sample Identification Card," to accompany the material to the Transportation Laboratory. Sampling may be performed in the field by either the METS inspector or field construction staff. The material's certificate of compliance and any additional documents must be sent with the material to the lab as well. If the material is undergoing mechanical testing, the resident engineer can track the testing progress by using the J2 database and clicking on the "SMTL Test Reports" tab for the project.

If the material is found to be acceptable, the inspector identifies it with Form TL-0624, "Inspection Release Tag," commonly known as an orange tag. METS inspectors will not necessarily tag every bundle and piece in a shipment. If there are many components going out in one shipment, it is common that a single orange tag will be placed on the load. The orange tag will correlate to the certificate of compliance and bill of materials with the inspector's unique lot number. This tells the resident engineer what material the tag covers.

After the material is orange-tagged for release, the METS inspector enters the lot number, a description, and quantity of materials inspected on Form TL-0029, "Report of Inspection of Material." A completed copy of Form TL-0029 is sent to the resident engineer for the project records.

Certain materials are included in the METS authorization-to-deliver program. Source inspection for these materials is different from typical procedures in that it includes a recurring audit at a prescribed frequency, with material sampling and testing. If the facility is approved to be in the authorization-to-deliver program, it is authorized to ship material to the job site without receiving a physical tag for the material. A TL-0029AD, "Report of Inspection of Material (Authorization to Deliver)," is produced by METS and sent to the resident engineer and the supplier notifying them that the material is acceptable to be shipped. The resident engineer should not expect to obtain a tag from the material if a TL-0029AD report was received. However, the resident engineer should match the TL-0029AD report with the actual shipped material quantities and certificate of compliance to verify that the material arrives within a reasonable timeframe.

When source-inspected materials arrive on the job site, the attached Form TL-0624 informs the resident engineer to permit use of the materials. The attached form shows the identifying lot number, the inspector's initials, and the date of inspection. If the item does not lend itself to attaching of tags, such as reinforced concrete pipe, the inspector marks the lot number on each separate piece. In some instances, when there is a

possibility of losing tags, the inspector both attaches tags and marks a lot number on the pieces. METS inspectors will not necessarily tag every bundle and piece in a shipment (with the exception of reinforced concrete pipe).

It is important to note that the resident engineer must inspect the materials for damage that may have occurred during shipping or storage and for general workmanship and conformance to planned shape or dimensions. Table 6-2.1, "Inspection of Fabricated and Manufactured Materials," of this manual provides examples of types of field inspections for common materials.

The resident engineer may not receive the completed Form TL-0029, "Report of Inspection of Material," until after the materials have arrived at the job site. The resident engineer must check that the correct material was shipped to the job site by verifying that the lot number and quantity of material shown on Form TL-0029 matches the identifying information, such as Form TL-0624, that was attached to or marked on the materials. Notify the project structural materials representative of any discrepancies so that an investigation can be conducted.

The resident engineer must inform the assigned METS inspection office if Form TL-0029 is not received within 15 days after receipt of materials.

For in-process inspections, METS will produce an inspection report, unique to the type of inspection, and distribute it to the resident engineer for review and incorporation into the project files. More information on the various types of inspection reports is in the *QASI Manual*.

6-203A (3) Nonconforming Materials at the Source

If the inspector observes that the material does not comply with the specifications at the requested time of release, the manufacturer or fabricator is notified and allowed one work shift to correct. If the material cannot be brought into conformance within the time period, METS will send a TL-0015, "Quality Assurance Nonconformance Report," (NCR) to the resident engineer within 24 hours of the observation. The resident engineer then notifies, in writing, the contractor of the NCR and requests a written response to resolve the issue.

The purpose of the NCR is to formally document the reason the material does not meet the specifications and to prompt the contractor to propose resolution and prevention measures in the response letter. This report is entered into the J2 database under the "Issues" tab so that the information is available to Caltrans staff outside the project to help avoid future issues statewide.

When the resolution letter is submitted by the contractor, the resident engineer and METS will perform a review. If the resolution is insufficient, the contractor will be notified and allowed to revise the letter and resubmit. If the resident engineer decides that the material is not suitable for the project, it will be rejected and prohibited from incorporation into the project.

If the letter is found to be acceptable, METS will issue a TL-0016, "Quality Assurance-Nonconformance Resolution," to the resident engineer recommending a resolution and closure of the issue. In some cases, the material is found to be suitable for the intended purpose by the resident engineer, METS, and the engineer of record for project design, but it does not meet the contract specifications. In this case, METS will produce a TL-6013, "Material Suitability Documentation Report," to document the engineering judgment used to determine the material to be suitable and concurrence from

the resident engineer, METS, and engineer of record for project design. Once authorized, the material can be released by the inspector by placing a TL-0625, "Material Suitability Tag," (blue tag) onto the material in a similar fashion as with an orange tag. A TL-6014, "Material Suitability Report," is written in place of a TL-0029, "Report of Inspection of Materials," and sent to the resident engineer.

- When METS and the resident engineer disagree about whether the material is suitable or unsuitable, the METS Structural Materials senior engineer and the construction engineer discuss and resolve the disagreement. When consensus is not achieved at this level, the issue must be elevated to the appropriate supervisors and a mutual solution reached.
- The blue tag is only a release of the material from the source. The resident engineer may need to prepare a change order to address acceptance of the material. Section 5-303, "Purpose of Change Orders," of this manual includes guidance for deciding whether a change order is needed. When a change order is needed, it must be approved prior to incorporating the material into the work. The resident engineer sends METS copies of approved change orders addressing blue tag issues. The project's materials certification memorandum must include material that is approved for use but does not meet original contract specifications.

6-203A (4) Source Inspection Expense Deductions

Because of costs incurred by Caltrans when traveling for source inspection to material sources that are far from the job site, Section 6-2.01E, "Material Source Inspection and Testing," of the *Standard Specifications* provides the details for deductions to be taken when applicable. To determine where inspections have taken place for a project, the resident engineer can review the inspection reports that provide inspection locations.

6-203A (5) Source Inspected Materials Acceptance

The resident engineer and METS share the responsibility for inspection of materials at the source. The resident engineer has the sole responsibility for acceptance of material and may determine that materials are not acceptable for a project based on any of the following reasons:

- Damaged materials: The material may be damaged in shipment or installation.
- Material defects: It is not always practical for METS to make a 100 percent piece-by-piece inspection. The inspection is usually random sampling. The resident engineer or assistant resident engineer should check for visually detectable defects or damage.
- Incorrect wall thickness of metal culvert pipe: A given size of metal culvert pipe may vary in required thickness at various locations with different fill heights. METS inspectors cannot guarantee that a given piece of pipe will be placed at the proper location. They can only check the pipe for specified markings and determine that the measurement is within tolerance for the indicated thickness. Fit of band couplers should also be checked at the job site.
- Incorrect reinforced concrete pipe wall thickness: Some contracts require special wall thickness of reinforced concrete pipe at certain locations in the project, and the METS inspector would not know the specific job site location of that particular pipe when the pipe is released. The inspector can only determine that it fits one of the types specified.

- Specifications and change orders: The specifications may be difficult to interpret or the source inspector is not aware of a change order.

Another situation not controllable by inspection at the source is the transfer of materials from one contract to another. The inspector can confirm (by a copy of the original inspection report) that a given amount of material with a given lot number was inspected for the first contract. Identifying the material as that received on the first job under the original inspection report and monitoring its transfer from one job to another are responsibilities of the resident engineers involved. Such transfers should not be allowed unless the material is positively identified or is of a type (such as fencing or reinforcing steel) that can be resampled and retested in the event identification is lost or is questionable.

Table 6-2.1 lists manufactured or fabricated materials and products that are usually inspected at the site of manufacture or fabrication and indicates items that are checked by the inspector at the source. Table 6-2.1 also includes items that must be checked or rechecked at the job site to assure that the materials are acceptable. The table does not cover all manufactured or fabricated materials and products but provides typical examples. Verification at the source of fabrication does not preclude acceptance by the resident engineer at the job site. For more details on the inspection procedures, refer to Section 6-3, "Field Tests," of this manual, and the *QASI Manual*.

Table 6-2.1. Inspection of Fabricated and Manufactured Materials (1 of 3)

Product	Items Inspected and Tested by METS	Items to Check at Job Site
Bolts, nuts, and washers	Material sampling and testing including galvanizing, visual inspection.	Visible defects, dimensions, threads, galvanizing, marking for correct type fit of nuts. Make sure high-strength bolts and nuts are used where specified and nuts are lubricated properly. (Refer to *Bridge Construction Records and Procedures*.)
Curing compound (chlorinated rubber type)	Material tests by batch or lot, check marking. (Other types accepted at job site if properly packaged and labeled.)	Proper mixing, marking, check sample. Check for specified type of container and correct marking.
Bearing, elastomeric bearing pads - steel reinforced, PTFE bearing	Material sampling and specified tests, visual and dimensional inspection certification.	Damage, defects, uniformity, dimensions.
Electrical items: controllers, luminaires, signal heads, conductors	Controllers: complete tests and inspection. Luminaires: random tests, visual inspection. Signal heads, switches; visual inspection plans, type, operational check. Conductors: random tests.	Shipping damage, defects, conformance to plans, type, operational check. Check loop detectors for operation under field conditions inspection. See that all conductors are correct type and size.
Epoxy	Materials sampling and specified tests, markings, packaging.	Proper material for intended use, excessive thickening or crystallization, proper mixing.
Forgings, steel	METS inspection and tests upon request from resident engineer. Material tests, visual and dimensional inspection.	Size, uniformity, surface defects, warping (permit no repairs).
Girders, precast prestressed concrete	Material verification, in-process inspection of fabrication (such as forms, steel placement, stressing, concrete) workmanship, dimensions, conformance to plans.	Damage, workmanship, exposed steel dimensions, finish, cracks, or other defects.
Girders, structural steel	Material verification, check sample testing, qualifications of welders, inspection during fabrication, nondestructive testing, preparation and painting in the shop, conformance to plans and authorized shop drawings, proper joint preparation for shop-bolted connections.	Damage to members or paint: defects in steel, camber condition of paint, dimensions, condition of holes, straightness and squareness of members.
Joint sealant, Type A field mixed polyurethane or silicone sealant	Material sampling and testing by batch or lot.	Proper components, proper mixing, marking. Damage, workmanship, correct movement rating (from test report), size and type, lot and batch identification. (Refer to *Bridge Construction Records and Procedures*.)
Joint seal, Type B preformed elastomeric joint seal	Material sampling and testing.	Damage, workmanship, correct movement rating (from test report), size and type.
Markers, pavement	Tests of each batch or lot, random inspection.	Damage, surface defects.
Mechanical equipment, scales, pump truck inspection stations, roadside rests	Inspection usually assigned to resident engineer. Consult with Structure Design, Office of Electrical, Mechanical, Water and Wastewater Engineering, for assistance if required. http://des.onramp.dot.ca.gov/des-structure-design/office-electrical-mechanical-water-and-wastewater-engineering-emww	Damage, installation details, workmanship.

Table 6-2.1. Inspection of Fabricated and Manufactured Materials (2 of 3)

Product	Items Inspected and Tested by METS	Items to Check at Job Site
Metal beam guard rail	METS inspection and testing of galvanizing upon request by resident engineer.	Damage to rail or galvanizing, workmanship of rail and galvanizing, dimensions, conditions of holes, for example.
Metal crib wall	METS inspection and testing of galvanizing upon request by resident engineer.	Dimensions, workmanship, galvanizing, specified bolts.
Miscellaneous iron and steel, miscellaneous bridge metal, bearing assemblies, rings and covers, frames and grates	Materials sampling and testing as specified, qualification of welders, inspection of fabrication, galvanizing, dimensions.	Damage, welding or fabrication defects, conformance to drawings, galvanizing defects, grinding specified coating.
Paint	Materials sampling and testing by batch or lot.	Lumps, hard setting, color, marking of cans, adherence, surface preparation, lot numbers (same as on inspection report).
Piling, precast prestressed concrete	Material verification, in-process inspection of fabrication (such as forms, steel placement, stressing, concrete) workmanship, dimensions, conformance to plans.	Damage, workmanship (such as cracks, spalling), painting of strand ends, straightness.
Piling, steel pipe	Material verification, weld inspection of welding if field splices are necessary.	Damage to members, overlooked fabrication details, dimensions.
Pipe, galvanized	Material sampling and testing. Check galvanizing thickness.	Size, uniformity, surface defects (permit no repairs).
Poles, lighting	Material verification, inspection and review of welding and galvanizing, visual and dimensional inspection.	Dimensions, welds, workmanship, galvanizing type.
Prestressing strand	Material sampling and testing, package and storage, visual inspection when possible.	Check strand for rust, damage, surface defects. Check tags for stressing information.
Reinforced concrete pipe	Material verification, witness testing, visual inspection, dimensions, elliptical steel markings. Only for reinforced concrete pipe with diameter greater than 60 inches, unless requested by resident engineer.	Damage, defects, exposed steel, dimensions (specific locations per plans), straightness, concentricity.
Railings, barriers Bridge railing, barrier	Material tests, welder qualifications, welding and fabrication, galvanizing.	Damage to rail or galvanizing; fabrication or galvanizing defect, fit of sleeves, dimensions; types of bolts or nuts furnished.
Reinforcement splices: welded or mechanical couplers	METS sampling and testing, material verification.	Refer to *Bridge Construction Records and Procedures*.
Sign structures	Material verification, qualification of welders, inspection during and after fabrication, dimensions, cleaning and painting or galvanizing.	Damage, general workmanship, general conformance to requirements, position of sign panels, final check of electrical equipment for illuminated signs, proper nuts and bolts, properly torqued.

Table 6-2.1. Inspection of Fabricated and Manufactured Materials (3 of 3)

Product	Items Inspected and Tested by METS	Items to Check at Job Site
Signs, changeable message	Fabrication, operation, workmanship.	Refer to Section 4-56, "Overhead Sign Structures, Standards, and Poles" of this manual.
Steel flooring and grating	METS inspection and tests upon request from resident engineer.	Workmanship, dimensions.
Structural steel	Material verification, qualifications of welders, inspection during fabrication, nondestructive testing, preparation and painting in the shop, conformance to plans and authorized shop drawings, proper joint preparation for shop-bolted connections.	Damage to members or paint: defects in steel or in welds; overlooked fabrication details; camber condition of paint; dimensions; condition of holes; proper bolts and nut markings; proper torquing; straightness and squareness of members.
Welded steel pipe	METS inspection and testing upon request of the resident engineer. Material tests, welder qualifications, welding inspection; and spark testing, marking, dimensions.	Shipping damage, visible defects in pipe or coating marking, dimensions.
Wire mesh reinforcing	Materials sampling and testing.	Rust and broken welds.

6-203A (6) Materials Manufactured to Caltrans-Specified Formulation

The *Standard Specifications* requires that certain products be manufactured to state specifications. Occasionally, composition of the specified formulation is changed and the newer specification results in an equal or better product. Materials manufactured under specifications newer than those that apply to a particular project are acceptable for use. METS inspectors release such materials, and resident engineers may permit use of such materials without change orders unless specifically advised to the contrary. State specification numbers for manufacturer materials are shown in the *Standard Specifications* or special provisions.

Paint manufactured under state specifications is sampled at the factory, tested by METS, and identified by lot numbers before shipment to the project.

6-203B Materials Accepted on the Basis of Authorized Material List

The *Standard Specifications* identifies materials that must be on an Authorized Material List. The list is available at:

http://www.dot.ca.gov/hq/esc/approved_products_list/

The engineer must make sure materials or products listed in Table 6-2.2, "Materials Acceptance Based on Authorized Material List," are shown on the appropriate Authorized Material List before the material is used on the project. Materials shown on the Authorized Material List may also require a certificate of compliance or sampling and testing for acceptance.

Table 6-2.2. Materials Acceptance Based on Authorized Material List (1 of 2)

Material or Product	Authorized Material List
Alternative sound wall system	
Channelizers	Signing and delineation materials
Chemical adhesive Drilling and bonding dowels	Chemical adhesives / cartridge epoxies
Crack sealant	Flexible pavement crack treatment material
Concrete admixtures	Chemical admixtures for concrete
Concrete Cementitious material	Cementitious material
Concrete Innocuous aggregate	Innocuous aggregates for concrete
Concrete anchorage devices	Concrete inserts
Corrosion protection system	Corrosion protective coverings
Corrosion protection covering for splices	Corrosion protective coverings
Delineators	Signing and delineation materials
Detectable warning surface	Detectable warning surface
Earth retaining system	Earth retaining systems
Electrical Battery backup external cabinet	External battery backup system cabinet
Electrical LED signal modules	LED traffic signals
Epoxy powder	Fusion-bonded epoxy powder
Markers	Signing and delineation materials
Mechanical couplers	Steel reinforcing couplers
Organic zinc-rich primer	Organic zinc-rich primer list
Pavement markers	Signing and delineation materials
Pavement traffic stripe and marking tape	Signing and delineation materials
Plastic blocks	

Table 6-2.2. Materials Acceptance Based on Authorized Material List (2 of 2)

Material or Product	Authorized Material List
Post-tensioning prestressing system	Pre-approved systems (full list and details)
Precast portland-cement-based repair material	Precast portland-cement-based repair material
Reflectors	Signing and delineation materials
Reinforcement Headed bar	Headed bar reinforcement
Reinforcement Resistance-butt-welded splices	
Retroreflective • Retroreflective sheeting for barricades • Retroreflective bands for portable delineators • Retroreflective sheeting for construction area signs • Retroreflective sheeting for channelizers • Reflectors for Type K temporary railing • Retroreflective cone sleeves • White and orange-colored retroreflective stripes for plastic traffic drums • Portable signs Type VI, retroreflective, elastomeric roll-up fabric	Signing and delineation materials
Signs Retroreflective sheeting	Signing and delineation materials
Signs Fiberglass-reinforced plastic panels	Signing and delineation materials
Silane waterproofing	Silane reactive penetrating sealers
Temporary crash cushion Sand-filled	Highway safety features
Temporary traffic control devices Category 2	Acceptable, crashworthy Category 2 hardware for work zones
Temporary traffic control devices Category 3	Highway safety features
Thread locking systems	Anaerobic thread locking systems
Undercoating for ungalvanized sign structures	
Warm mix asphalt	Warm mix asphalt—approved technologies

6-203C Materials Accepted on the Basis of a Certificate of Compliance

In accordance with Section 6-2.03C, "Certificates of Compliance," of the *Standard Specifications*, the engineer may permit the use of certain materials before sampling and testing if accompanied by a certificate of compliance.

Acceptance based on certificates of compliance is used for products for which the industry has demonstrated a high degree of reliability in meeting specifications. METS performs a programmatic assessment on a periodic basis of materials that do not receive source inspection.

METS notifies the resident engineer when material from any producer is not acceptable on the basis of a certificate of compliance. The resident engineer must notify the contractor when material cannot be accepted based on a certificate of compliance and require submittal of samples for testing prior to use on the project.

Certificates of compliance should contain the following information:

- Name of company.
- Lot number traceable to a specific lot.
- A statement naming the applicable type and brand, and that the materials meet the requirements of the *Standard Specifications*, the special provisions, or both.
- Contract number.
- Signature of responsible officer of the company.

Materials accepted based on a certificate of compliance arrive on the job site without inspection by METS and Form TL-0029, "Report of Inspection of Material." When required by the *Standard Specifications* or the special provisions, verify that these materials have a certificate of compliance and any required additional backup documentation, such as mill test reports for steel, pressure treating reports for timber, and concrete test reports, to show that the materials comply with the specifications. Table 6-2.3, "Materials Accepted by Certificate of Compliance," shows materials in the *Standard Specifications* that are accepted based on a certificate of compliance.

In addition to the materials listed in Table 6-2.3, in accordance with Section 6-2.03C, "Certificates of Compliance," of the *Standard Specifications*, a certificate of compliance is required for material produced outside the United States.

Contact the project structural materials representative regarding any feedback or additional detail for programmatic assessment or systematic concerns regarding certain materials types

Table 6-2.3. Materials Accepted by Certificate of Compliance (1 of 8)

Material/Product	Remarks (Including Requirements for Additional Backup Information Required with Certificate of Compliance)
Alternative earth retaining systems	Must state that the supplied material complies with the index criteria for the system at the time of prequalification.
Asphalt	Certificates of compliance must include the following: 1. Name and location of the supplier. 2. Grade of the asphalt. 3. The date and time of shipment. 4. A unique shipment number, such as a bill of lading number or manifest number. 5. A statement confirming that the transport vehicle was checked before loading and was found acceptable for the asphalt shipped. 6. The following wording: *" (Supplier name) hereby certifies that the asphalt product accompanying this certification was produced in accordance with the California Department of Transportation's Certification Program for Suppliers of Asphalt, and that this product complies in all respects with the requirements of the applicable specifications for the asphalt product identified on this document.* *I hereby certify by my signature that I have the authority to represent the supplier providing the accompanying asphalt product."*
Asphaltic emulsion	Certificate of compliance must include the following: 1. Shipment number and shipment date. 2. Source refinery, consignee, and destination. 3. Type and description of material with specific gravity and quantity. 4. Contract or purchase order number. 5. Signature by the manufacturer of the material and a statement that the material complies with the contract.
Asbestos cement pipe	
Asbestos sheet packing	
Asphalt modifier	Test results required with each truckload.
Asphalt rubber joint sealant	A certified test report of the results for the required tests performed within 12 months before the proposed use.
Backer rods	Must include manufacturer's statement of compatibility with the joint sealant to be used.
Barbed wire	
Blast cleaning material	
Bonding agent for repairing spalled surface area	Submittal of certificate of compliance required for contracts of less than 60 working days.
Bonding material	
Brick	
Cable-type restrainers Lock nuts	Certificate of compliance must be submitted with a copy of each required test report.
Cast iron pipe	
Cast iron manhole rings and covers	

Table 6-2.3. Materials Accepted by Certificate of Compliance (2 of 8)

Material/Product	Remarks (Including Requirements for Additional Backup Information Required with Certificate of Compliance)
Chemical adhesive for bonding tie bars and dowel bars in concrete pavement	
Chemical adhesive for structures	Certificate of compliance must state compliance with ICBO AC58 and Caltrans. Augmentation/Revisions to ICBO AC58.
Concrete Admixture	Certificate of compliance from the manufacturer must certify that the admixture furnished is the same as that previously authorized for the Authorized Material List.
Concrete Cementitious material	Certificate of compliance must include the source name and location. If the cementitious material is delivered directly to the job site, the certificate of compliance must be signed by the cementitious material supplier. If the cementitious material is used in ready-mixed concrete, the certificate of compliance must be signed by the concrete manufacturer. If blended cement is used, the certificate of compliance must include a statement signed by the blended cement supplier that shows the actual percentage of supplementary cementitious material, by weight, in the blend.
Concrete Curing compound	Certificate of compliance must include: 1. Test results for the tests specified in Section 90-1.01D(6), "Curing Compound," of the *Standard Specifications*. 2. Certification that the material was tested within 12 months before use.
Concrete Minor concrete	Before placing minor concrete from a source not previously used on the contract, a certificate of compliance stating that the minor concrete to be furnished complies with the contract requirements, including the specified minimum cementitious material content.
Ceramic tile	
Chain link fencing and railing	Certificate required for protective coating system.
Concrete anchorage devices	
Concrete pipe Circular reinforced direct design method, less than 60 inches in diameter	Certificate of compliance must: 1. Be signed by the manufacturer's quality control representative. 2. State that all materials and workmanship comply with the specifications and authorized shop drawings.
Copper pipe	
Corrugated metal pipe	
Crack sealant	Certificate of compliance must include: 1. Manufacturer's name 2. Production location 3. Product brand or trade name 4. Product designation 5. Batch or lot number 6. Crack treatment material type 7. Contractor or subcontractor name 8. Contract number 9. Lot size 10. Shipment date 11. Manufacturer's signature
Crash cushions	
Crumb rubber modifier	Test results required with each truckload.

Table 6-2.3. Materials Accepted by Certificate of Compliance (3 of 8)

Material/Product	Remarks (Including Requirements for Additional Backup Information Required with Certificate of Compliance)
Culvert markers	
Delineators	Certificate of compliance required for: • Metal target plates • Enamel coating • Retroreflective sheeting
Dowel bar baskets	
Drop inlet grates and frames	
Drain tile	
Drip irrigation line	
Elastomeric bearing pads Plain	Certified test results for the elastomer. METS samples and tests bearing pads.
Elastomeric bearing pads Steel-reinforced	Certified test results. METS samples and tests bearing pads.
Electrical Battery backup system	Certificates of compliance are required for: • External cabinet • Batteries
Electrical Conductor	
Electrical Conduit (galvanized and plastic)	
Electrical Equipment	
Electrical Pull boxes (concrete and plastic)	
Electrical Service cabinets	
Epoxy	
Epoxy powder coating for dowel bars and tie bars	METS samples and tests epoxy coating.
Erosion control	Certificate of compliance is required for: • Straw • Fiber • Rolled erosion control product • Fasteners Certificate of compliance with attachments is required for: • Tackifier • Bonded fiber matrix Polymer-stabilized fiber matrix

Table 6-2.3. Materials Accepted by Certificate of Compliance (4 of 8)

Material/Product	Remarks (Including Requirements for Additional Backup Information Required with Certificate of Compliance)
Erosion control (continued)	Certificates of compliance attachments include: 1. Safety data sheet 2. Product label 3. List of applicable, nonvisible pollutant indicators for soil amendment and stabilization products as shown in the table "Pollutant Testing Guidance Table" in the Caltrans *Construction Site Monitoring Program Guidance Manual* 4. Report of acute and chronic toxicity tests on aquatic organisms conforming to EPA methods 5. List of ingredients, including chemical formulation 6. Properties of polyacrylamide in tackifier including: (1) percent purity by weight, (2) percent active content, (3) average molecular weight, and (4) charge density.
Expansion joint filler	
Fiberglass pipe	Certificate of compliance must be submitted with laboratory test results.
Filler material for repairing spalled surface areas	Submittal of certificate of compliance required for contracts of less than 60 working days.
Gabions	If PVC coating is shown, a suitable UV resistant additive must be blended with the PVC and the additive must be shown on the certificate of compliance.
Geocomposite drain	Certificate of compliance must certify that the drain produces the specified flow rate. The certificate must be accompanied by a flow capability graph for the geocomposite drain showing flow rates and the externally applied pressures and hydraulic gradients. Verification must be by an authorized laboratory for the flow capability graph.
Geosynthetics	Test sample representing each lot and minimum average roll value.
Glass beads	Certificate of compliance by lot or batch and test data from an independent laboratory.
Glue laminated timbers and decking	
Guide markers	
Irrigation hose	
Irrigation pipe	Certificate of compliance required for: • Polyethylene pipe Plastic pipe supply line for pipe with wall thickness of the bell less than the specified minimum wall thickness of the pipe
Joint filler material	
Joint seals (Type A and AL)	Certified test report for each batch of sealant.
Joint seal (Type B)	Certificate of compliance required for: • Elastomeric joint seal • Lubricant-adhesive Certificate of compliance must be submitted with certified test report for each lot of elastomeric joint seal and lubricant-adhesive. Test reports must include the seal movement rating, the manufacturer's minimum uncompressed width, and test results. METS samples and tests joint seal.

Table 6-2.3. Materials Accepted by Certificate of Compliance (5 of 8)

Material/Product	Remarks (Including Requirements for Additional Backup Information Required with Certificate of Compliance)
Joint seal Alternate joint seal assemblies	For alternative joint seal assemblies, a certificate of compliance must be submitted for each shipment of joint seal materials. The certificate must state that the materials and fabrication involved comply with the specifications and the data submitted in obtaining the authorization for the alternative joint seal assembly. METS samples and tests joint seal assemblies.
Joint seal Joint seal assemblies	METS samples and tests joint seal assemblies.
Lime	Certificate of compliance must include a statement certifying the lime furnished is the same as on the Authorized Material List.
Machine spiral wound PVC pipeliners	Certificate of compliance for each reel of PVC strip must include: 1. Name of manufacturer 2. Plant location 3. Date of manufacture and shift 4. Cell classification 5. Unit mass 6. Average pipeliner stiffness and profile type
Markers	Certificate of compliance required for: • Metal target plates • Enamel coating • Retroreflective sheeting
Masonry block	Certificate of compliance required for: • Concrete masonry units • Aggregate for grout • Grout
Micro surfacing emulsion	
Mulch	
Open steel flooring and grating	
Overside drains	Certificate of compliance based on steel materials, aluminum materials or plastic materials.
Parking area seal material	
Pavement markers	
Plastic lumber	Certificate of compliance for each shipment of plastic lumber, that must be accompanied by a laboratory test report.
Plastic traffic drums	
Plastic pipe for drainage	Certificate of compliance must include average pipe stiffness, resin material cell classification, and date of manufacture. For corrugated polyethylene pipe, manufacturer's copy of plant audits and test results from the National Transportation Products Evaluation Program for the current cycle of testing for each pipe diameter furnished.
Portable changeable message sign	

Table 6-2.3. Materials Accepted by Certificate of Compliance (6 of 8)

Material/Product	Remarks (Including Requirements for Additional Backup Information Required with Certificate of Compliance)
Precast concrete Cementitious material used in precast concrete products	Certificate of compliance must be signed by the precast concrete product manufacturer.
Precast concrete Box culverts	Certificate of compliance must signed by the manufacturer's quality control representative for each shipment.
Precast concrete members	Certificate of compliance is for materials and workmanship incorporated in the work, and for testing and inspections that have been performed.
Precast raised traffic bars	
Preformed compression seal for concrete pavement	
Preformed membrane sheet	Must include type of sheet and the conditioner or primer application rates.
PTFE bearing materials	
Rapid strength concrete	Certificate of compliance is required for each delivery of aggregate, cementitious material, and admixtures used for calibration tests. The certificate of compliance must state that the source of the materials used for the calibration tests is the same source as to be used for the planned work.
Reinforcement	You may request that the contractor submits with certificate of compliance: 1. Copy of the certified mill test report for each heat and size of reinforcing steel showing physical and chemical analysis. 2. Two copies of a list of all reinforcement before starting reinforcement placement.
Reinforcement Epoxy-coated	Certificate of compliance for each shipment of epoxy-coated reinforcement must be submitted with: 1. Certification that the coated reinforcement complies with ASTM A 775/A 775M for bar reinforcement or ASTM A 884/A 884M, Class A, Type 1, for wire reinforcement. 2. All certifications specified in ASTM A 775/A 775M for bar reinforcement or ASTM A 884/A 884M for wire reinforcement. METS samples and tests epoxy coating.
Reinforcement Epoxy-coated prefabricated reinforcement	Certificate of compliance for each shipment of epoxy-coated prefabricated reinforcement must be submitted with: 1. Certification that the coated reinforcement complies with ASTM A 934/A 934M for bar reinforcement or ASTM A 884/A 884M Class A, Type 2 for wire reinforcement. 2. All certifications specified in ASTM A 934/A 934M for bar reinforcement or ASTM A 884/A 884M for wire reinforcement. METS samples and tests epoxy coating.
Reinforcement Epoxy-coating patching materials	Certificate of compliance for the patching material must include certification that the patching material is compatible with the epoxy powder to be used.
Reinforcement Headed bar	Certificate of compliance for each shipment of headed bar reinforcement must be submitted with: 1. Mill test reports for the: 1.1. Bar reinforcement 1.2. Head material 2. Production test reports 3. Daily production logs METS samples and tests headed bar.

Table 6-2.3. Materials Accepted by Certificate of Compliance (7 of 8)

Material/Product	Remarks (Including Requirements for Additional Backup Information Required with Certificate of Compliance)
Reinforcement Splice material	Certificate of compliance for each shipment of splice material must be submitted with: 1. Type or series identification of the splice material, including tracking information for traceability. 2. Grade and size number of reinforcement to be spliced. 3. Statement that the splice material complies with the type of mechanical splice on the Authorized Material List. 4. For resistance-butt-welded material: 4.1. Heat number 4.2. Lot number 4.3. Mill certificates METS samples and tests reinforcement splices.
Sheet metal	
Sign panels	Certificates of compliance required for: • Aluminum sheeting • Retroreflective sheeting • Screened-process colors • Nonreflective, opaque, black film • Protective-overlay film
Silicone joint sealant	A certified test report of the results for the required tests performed within 12 months before the proposed use.
Slotted edge drain	
Snow poles	
Snow plow deflectors polyethylene material	
Soil amendment	
Steel crib wall	
Steel pipe piles	The certificate of compliance must be signed by the plant's quality control representative. The quality control representative must be on record with Structural Materials. Certificate of compliance must include: 1. Statement that all materials and workmanship incorporated in the work and all required tests and inspections of this work have been performed as described. 2. Certified mill test reports for each heat number of steel used in pipe piles being furnished. 3. Test reports for tensile, chemical, and any specified nondestructive test must be based on test samples taken from the base metal, steel, coil, or from the manufactured or fabricated piles. 4. Calculated carbon equivalent. The carbon equivalent may be shown on the mill test report.
Structural plate culverts	Certificate of compliance required for: • Structural metal plate pipe • Arches • Pipe arches Metal liner plate pipe
Structural shape steel piles	Certificate of compliance must include a statement that all materials and workmanship incorporated in the work and all required tests and inspections of this work have been performed as described.
Structural composite lumber used in falsework	

Table 6-2.3. Materials Accepted by Certificate of Compliance (8 of 8)

Material/Product	Remarks (Including Requirements for Additional Backup Information Required with Certificate of Compliance)
Structural steel thermal spray coat Wire feedstock	
Styrofoam filler	
Subsurface drain	
Temporary concrete washout	Certificate of compliance required for: • Gravel-filled bag • Plastic liner
Temporary fence (Type ESA)	Certificate of compliance required for: • High visibility fabric • Safety caps for metal posts
Temporary linear sediment barrier	Certificate of compliance required for: • Fiber roll • Safety cap for metal posts • Silt fence fabric • Sediment filter bag • Foam barrier • Gravel-filled bag fabric
Temporary railing (Type K)	
Thermoplastic traffic stripes and pavement markings	Certificate of compliance by lot of batch and test data report from an independent laboratory. Obtain a minimum 1-foot length of stripe test sample.
Tie bars	METS samples and tests epoxy coating.
Tie bar baskets	METS samples and tests epoxy coating.
Timber products (treated and untreated)	Certificate of compliance for timber and lumber must state the species of the material to be shipped and include a certified grading report. If treated, certified treating report.
Threaded tie bar splice couplers	
Turf sod	
Two-component paint traffic stripes and pavement markings	Certificate of compliance by lot or batch. Obtain a 50-foot test section before application of paint.
Underdrains	Certificate of compliance required for: • Type of pipe • Tubing • Fitting
Waterproofing fabric	
Waterstop	Certificate of compliance for waterstop material must state compliance with paragraph 6 of Army Corps of Engineers CRD-C 572.
Welded wire fabric	
Wire mesh fencing	
Wood Structures	Certificate of compliance for timber and lumber stating the species of the material to be shipped and including a certified grading report. If timber is treated, include a certified treating report. Certificate of compliance for glued laminated timbers and decking.

When material delivered with a certificate of compliance is improperly certified, or any part of it is found not to comply with specifications, reject the entire shipment and notify METS immediately.

Procedures for sampling and testing materials accepted by certificate of compliance vary depending on the material. Following are some details covering the sampling of materials accepted by certificate of compliance.

6-203C (1) Asphalt

Certification for asphalt must comply with Caltrans' *Certification Program for Suppliers of Asphalt*. Program requirements, procedures, and a list of approved suppliers, are available on the METS website:

http://www.dot.ca.gov/hq/esc/Translab/ormt/fpmcoc.htm

When asphalt arrives at the job site or at the plant accompanied by a certificate of compliance, accept the shipment for use and sample and test for acceptance during use. When shipments of asphalt arrive without certificates of compliance, sample the asphalt and do not allow use prior to receiving acceptance test results.

All samples of asphalt, along with the necessary forms and tickets, are sent to METS at Engineering Services. Ship sample cans two at a time, in the cardboard cartons used for shipping samples of the completed mix. Take samples in the amount and frequency shown in the tables in Section 6-1, "Sample Types and Frequencies," of this manual.

Asphalt is very hot; therefore, for safety reasons, the acceptance samples must be sampled by the contractor. The resident engineer must witness the contractor taking acceptance samples. The resident engineer must determine when the sample is to be taken and then observe that the sample is 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 specified in contract special provisions. Take possession of the sample from the contractor and transport it to a Caltrans office or the testing laboratory.

After obtaining a sample from a plant storage tank, write the shipment number on Form TL-0101, "Sample Identification Card."

METS sends test results to the district materials engineer and to the resident engineer.

6-203C (2) Asphalt Rubber Latex Joint Filler

Submit samples in 1-quart friction-top cans. Sample after the contents of the drum have been stirred thoroughly and brought to a uniform consistency and before the setting powder has been added. Note the batch number and the shipment number on Form TL-0101.

6-203C (3) Two-Component Joint Sealing Compounds

This material is usually in 2-gallon pails. Each pail requires a manufacturer's lot number. Before sampling, stir thoroughly. Samples should be taken in the amount and frequency shown in the tables in Section 6-1, "Sample Types and Frequencies," of this manual.

6-203C (4) Cement

For cement delivered directly to the job site by the manufacturer, require one certificate of compliance for each shipment.

A single certificate for each brand may certify the cement used in ready-mixed concrete by the vendor of the concrete, to cover all deliveries in a single day. It must show:

- The name or brand of cement.
- Mill source.
- The total number of cubic yards of concrete delivered under the certificate.
- A complete list of individual deliveries, identified by delivery slip number or other suitable identification.

A single certificate may cover all deliveries of precast products in a single lot. It must show the name or brand of cement and the length of each size of pipe or the number of precast units of other types represented.

METS inspects precast products, including pipe, made at a plant other than that of the contractors at the job site. When such inspection is complete, the resident engineer is relieved of responsibility for obtaining certificates of compliance and sampling of cement. The inspector at the precast product plant will handle cement inspection approximately as outlined for ready-mixed concrete.

Certificates of compliance for cement are inspected and filed by the resident engineer. In the event of a cement test failure, forward copies of certificates to METS.

Sample cement in accordance with the frequencies shown in Section 6-1, "Sample Types and Frequencies," of this manual, and in accordance with California Test 125, "Methods of Test for Sampling Highway Materials and Products Used in the Roadway Pavement Structure Sections."

Where plant facilities include a cement auger, the cement samples may be obtained by a pipe-sleeve sampling device or by any other convenient method.

A full 8 pounds is sampled at one time, not in smaller increments. Close the bag immediately, leaving room for the cement to shift. Place the sealed bag in a second plastic bag with the white copy of Form MR-0518, "Job Cement Samples Record." Form MR-0518 should show the certificate of compliance serial number, cement brand and type, name of mill or vendor, date, time sampled, and contract number.

After identification, box the cement samples in corrugated cartons designed to hold single, 8-pound samples or in concrete cylinder cartons, which will hold six samples. Ship no more than six samples in any one container.

Mark the shipping carton "Cement Sample," and ship it to METS.

Test reports of cement are issued by METS. Acceptability of current shipments from the mill will be shown on the report, but the reports may not actually include results of samples taken from a specific project. The test reports, however, are applicable to each contract identified on a test report. When a project has special requirements for cement, or if there are other nonroutine conditions, submit special samples with instructions that they be tested and reported for the specific project.

6-203C (5) Paint

Sample all paint in the field, except paint specified as commercial quality, and send the samples to METS for testing in accordance with the frequency shown in Section 6-1, "Sample Types and Frequencies," of this manual.

For bridges and other major structures, do not allow the paint to be used until the test results of field samples are available. For other miscellaneous painting, properly inspected and identified paint may be used pending test results.

Send paint samples from the field to METS as soon as it is received on the project. During the progress of the job, take special check samples when the paint exhibits hard settling or potential contamination of paint is suspected.

Proper sampling to obtain a representative portion of the paint is mandatory.

Use the following sampling methods:

- For bridges and other major structures, or whenever large quantities are involved, send an unopened 5-gallon bucket to METS. METS will return unused portions to the job.
- For smaller samples:
    1. Pour the top liquid into a clean container as large as the one being sampled.
    2. Stir the settled portion of the paint with a paddle, gradually reincorporating the decanted liquid until all has been added.
    3. "Box" the paint by pouring it back and forth between the two containers at least five or six times or until the paint is mixed thoroughly.
    4. Take a gallon sample immediately.

Send all samples to METS, along with all pertinent information. Use Form TL-0101, "Sample Identification Card."

When the paint is Department-furnished, check samples will not be required.

6-203C (6) Pavement Traffic Stripe and Marking Materials

California Test 406, "Method of Test for Field-Sampling of Pavement Marking Materials," describes procedures for obtaining samples of pavement-marking materials from a factory-sealed bag, bulk container, or stripe-application equipment. Circumstances at the job site often affect where to gather the sample. Field-striping inspectors must follow the procedures in California Test 406 to assure that representative samples are taken of pavement-marking materials.

Field sampling must be initiated by the striping inspector or the resident engineer under the following conditions:

- The material is more than 1 year old (based on the date of manufacture).
- Product tampering or adulteration is suspected.
- Adequate proof that the product has been pretested and approved is not provided (for example, missing batch approval paperwork or other product/batch number discrepancies on containers or paperwork).

Where large quantities of pavement-marking materials are being applied, random quality assurance sampling of these materials is advisable.

Samples of pavement-marking materials in unopened factory-sealed bags are preferred. Factory-sealed bags are labeled with the manufacturer's name and batch number, which makes identification easier. When sampling glass beads and thermoplastic, collect the following sample quantity to assure a representative sample:

- One unopened 50-pound bag of glass beads of the same manufacturer and lot number being used in the striping operation.
- One unopened 50-pound bag of thermoplastic of the same manufacturer and lot number being used in the striping operation.

For paint, bulk containers can be sampled only when the material is first homogeneously mixed using appropriately sized mixing equipment. For bulk containers of paint, obtain a 1-quart sample. Multiple samples are necessary when sampling paint directly from the application equipment to ensure that the product is homogeneously mixed. Each grab sample must be approximately 1 quart and submitted separately.

Label samples of pavement-marking materials according to where and how they were gathered at the job site. Include pertinent information on Form TL-0101, "Sample Identification Card," and send samples to METS for testing.

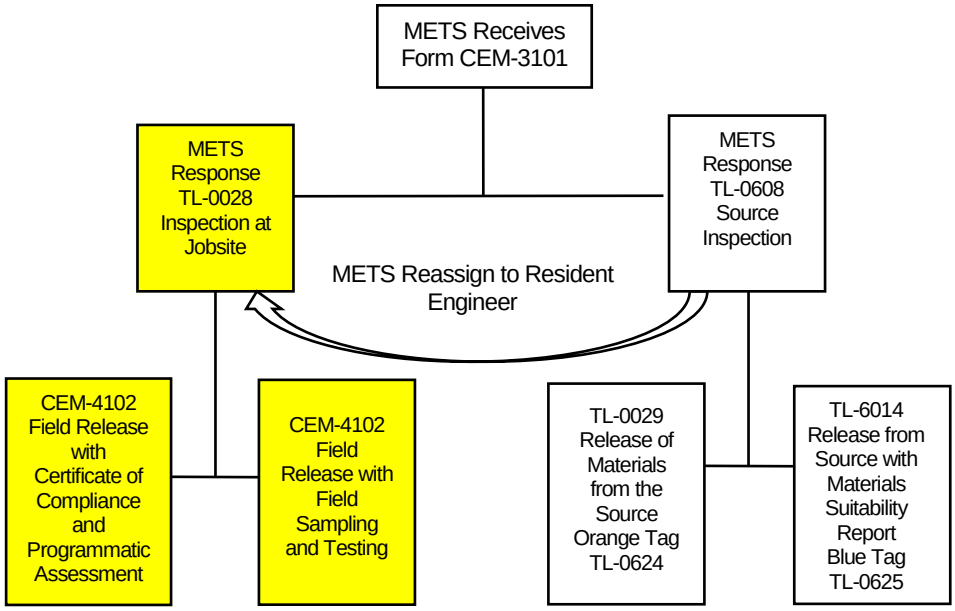
6-203C (7) Reinforcement

Refer to Section 4-52, "Reinforcement," of this manual for details.

6-203D Field Inspection and Release by the Resident Engineer

METS may assign inspection of manufactured or fabricated materials and products for which they have acceptance responsibility back to the resident engineer. The process to be followed for inspection at the job site is shown in Figure 6-2.3, "Inspection and Release Flowchart—Inspection at Job Site."

Figure 6-2.3. Inspection and Release Flowchart—Inspection at Job Site



METS assigns inspection responsibility to the resident engineer using Form TL-0028, "Notice of Materials to Be Inspected at Job Site."

Upon receipt of Form TL-0028, the resident engineer should inform the contractor that the material will be inspected, and if required, sampled, on the job site. When testing of material is required, inform the contractor of the approximate testing turnaround time so that the contractor can obtain the material to allow for sampling and testing before the work begins.

Materials may be accepted based on required certificates of compliance or sampling and testing and visual inspection. When material will be accepted and released at the job site by use of a certificate of compliance, the required certificate of compliance should accompany the material to the job site and be retained in the project files. Sample materials in accordance with the tables at the end of Section 6-1, "Sample Types and Frequencies," of this manual, or as requested by METS.

Field inspect and release materials assigned by METS at the job site using Form CEM-4102, "Materials Inspected and Released on Job." Refer to Section 6-3, "Field Tests," of this manual for details.

Section 3 Field Tests

Section 3 Field Tests

Section 3
Field Tests

6-301 General

6-301
General

The resident engineer must make sure that materials incorporated into the project comply with specifications. Refer to Section 3-609, "Testing by Caltrans," of this manual.

Perform field inspection of material and testing in accordance with the guidelines in this chapter. Sampling and testing frequencies for materials acceptance are shown in the tables included in Section 6-107, "Materials Acceptance Sampling and Testing," of this manual. Maintain a record of field tests and material inspected and released on the job as described in Section 5-102, "Organization of Project Documents," of this manual.

6-301A References

Unless specified, references are Caltrans guides and manuals.

California Test guidance, Materials Engineering and Testing Services (METS):

http://www.dot.ca.gov/hq/esc/ctms/index.html

American Association of State Highway and Transportation Officials (AASHTO), American Society for Testing and Materials (ASTM), and other test methods are available at IHS Standards Expert website accessible to Caltrans staff who click on the Material Standards (ASTM/AASHTO) link on this page:

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

Material Plant Quality Program (MPQP), Division of Construction:

http://www.dot.ca.gov/hq/construc/publicationlist.htm

Laboratory Safety Manual:

http://des.onramp.dot.ca.gov/des-safety-meeting-information

6-302 Field Inspection and Release of Materials

6-302
Field Inspection
and Release of
Materials

When materials or products listed in Table 6-2.3, "Materials Accepted by Certificate of Compliance," of this manual arrive on the job site, or where METS assigns inspection of products for which they normally have responsibility back to the resident engineer, use the following procedure:

- Verify that METS has sent Form TL-0028, "Notice of Materials to Be Inspected at Job Site." If a material does not have a corresponding TL-0028, contact the project's structural materials representative.
- Verify that the material meets the requirements of the specification and is undamaged by shipping and handling.
- When required by the specifications, verify that the material has a certificate of compliance from the supplier stating that the material meets all required specifications for the contract.
- Check that the appropriate documentation is included for materials covered by the

Buy America requirements. Refer to Section 3-604, "Buy America." of this manual for Buy America information.

- Verify that the applicable documentation (environmental product declaration) is provided for materials subject to Buy Clean California Act requirements. Refer to Section 3-606, "Buy Clean California Act," of this manual for information.
- Complete Form CEM-4102, "Material Inspected and Released on Job."

6-303 Field Laboratory

6-303 Field Laboratory

Suitable laboratories and equipment are necessary to perform proper field testing. When economically feasible, a field laboratory should be established to assess multiple construction projects in the immediate area.

Field laboratories must comply with the *Laboratory Safety Manual*. The *Laboratory Safety Manual* is required under California Code of Regulations Title 8, Section 5191 (8 CCR 5191). The *Laboratory Safety Manual* guidelines and procedures shall be implemented and enforced at all materials testing laboratories in Caltrans, including field construction laboratories.

Most laboratories have water, gas, and electricity. Field laboratory facilities are provided by any of the methods covered under Sections 1-4, "Facilities and Equipment," and 1-5, "Field Expenses and Purchases," of this manual.

The resident engineer should coordinate with the district materials engineer to establish a field laboratory.

6-304 Field Testing Equipment

6-304 Field Testing Equipment

Each district materials engineer must have an effective calibration program for equipment used for materials acceptance testing. Testing equipment must be in proper operating condition and calibrated within prescribed tolerances for accuracy.

Standards for calibration of testing equipment are described in the appropriate California Tests for calibration and manufacturer's instructions.

District materials laboratories perform periodic reconditioning and calibration of field laboratory testing equipment. The use of decals attached to testing equipment showing date of last calibration, name of calibrator, the district, and date that the next calibration is due, is a requirement for all testing items listed below. Acceptance samplers and testers should verify that field testing equipment is in good condition and check the date of last calibration on the decal.

Any testing equipment that does not meet calibration requirements is to be recalibrated or replaced without delay. Each piece of equipment should be recalibrated and reconditioned in accordance with the frequencies listed in the appropriate California Test. More frequent calibration may be required depending on use of equipment and on moving and handling practices.

While the maximum interval between calibrations may be as long as a year, equipment should be calibrated any time there is reason to believe it has been damaged or affected in any way that would alter calibration.

6-304A Scales and Balances

All scales and balances used in field testing must be periodically recalibrated. The district materials engineer can use a service contract to use technicians from private industry to

perform the recalibration. Recalibration of this equipment must be performed at least once each year. New scales and balances must be calibrated prior to use.

In the interest of standardization, the following types of scales are recommended for field use:

- A 20-kilogram balance equipped with graduated bars on the beam to give readings under 1,000 grams without recourse to loose weights.
- A 6-kilogram trip scale equipped with agate bearings and double beam. The upper beam should be graduated to 100-gram units, making a range of 1,100 grams directly on the beam without recourse to loose weights. The equipment should include one 1-kilogram and two 2-kilogram weights with scoop and scoop tare, all to provide a full capacity of 6 kilograms.
- A torsion balance of 500-gram capacity, accurate to 0.10 gram.

When the volume of work is large, an automatic digital scale can be used instead of the 20-kilogram and 6-kilogram scales described above.

6-304B Screens and Sieves

Examine all screens and sieves prior to performing grading tests. Inspection includes examination for broken wires, distortions and sags, and removal of particles stuck in the mesh, all as instructed in California Test 202, "Method of Test for Determining Sieve Analysis of Fine and Coarse Aggregates."

6-304C Portland Cement Concrete Air Meters

Data sheets accompanying newly purchased meters contain operation and calibration information. Supplemental sheets are available through METS.

California Test 504, "Method of Test for Determining Air Content of Freshly Mixed Concrete by the Pressure Method," covers the procedure for operation of the two most common brands in use by Caltrans. California Test 115, "Method of Calibration of Pressure Type Air Meters," covers calibration of these two meters.

6-304D Compaction Tubes

California Test 110, "Method of Calibration of Compaction Test Equipment," outlines the procedure for both calibration and repair.

6-304E Cement-Treated Base Compressive Strength Apparatus

District materials laboratories can check the calibration of the hydraulic jacks used with the apparatus. If a jack requires repair, contact the METS machine shop in Sacramento to make the necessary arrangements for repair.

6-305 Test Methods

6-305
Test Methods

Whenever a reference is made in the specifications to a test method by number, it means the test in effect on the day the "Notice to Bidders" for the work is dated. This means that the test methods for each project are fixed and are not necessarily the latest revisions.

Field personnel who perform tests for compliance with the specifications must be qualified to conduct the proper tests methods as indicated by the contract. The resident engineer must make sure that the correct versions of test methods are used. The latest revisions of the test methods are available on the METS website:

http://www.dot.ca.gov/hq/esc/ctms/index.html

Use the following guidelines for some of the tests performed in the field.

6-305A Method of Determining Approximate Grading of Mineral Aggregate by Dry Sieve Analysis

California Test 202, "Method of Test for Determining Sieve Analysis of Fine and Coarse Aggregates," requires that fine aggregate is subjected to a prescribed washing procedure before performing the sieve analysis. However, where large numbers of sieve analyses are performed on material from a given source, the tester may use the "Approximate Sieve Analysis of Processed Fine Aggregate" method in Appendix E of California Test 202. Any material subject to rejection because of excessive material retained on any sieve by the approximate method must be retested using the basic California Test 202.

6-305B Fabrication of Cement Treated Base Specimens

Test specimens are fabricated in the field. When compressive strength tests are desired, the specimens are cured, tested in the field, or shipped to the district materials laboratory for testing in accordance with applicable portions of California Test 312, "Designing and Testing of Classes 'A' and 'B' Cement Treated Bases."

6-305C Determination of Cement or Lime Content

Refer to California Test 338, "Determination of Cement or Lime Content in Treated Aggregate by the Titration Method," for instructions. The acid-base titration and constant neutralization titration tests are used to determine the percentage of portland cement or lime in aggregates that have been treated.

The resident engineer must devise and perform a cement-determination test program geared to the contractor's mixing and spreading operation. Increase testing frequency when mixing or spreading equipment is changed or altered or production rates are increased.

6-305D Portland Cement Concrete

Concrete samples are taken in accordance with California Test 539, "Method of Test for Sampling Fresh Concrete."

For penetration, test in accordance with California Test 533, "Method of Test for Ball Penetration in Fresh Portland Cement Concrete," each batch of concrete from which strength specimens are made.

For slump, test in accordance with ASTM C143 each batch of concrete from which strength specimens are made.

If air-entrained concrete is used, test the concrete using California Test 504, "Method of Test for Determining Air Content of Freshly Mixed Concrete by the Pressure Method," on each batch of concrete from which strength specimens are made. If concrete contains lightweight aggregate, air content is determined in accordance with California Test 543, "Method of Test for Determining Air Content of Freshly Mixed Concrete by the Volumetric Method."

If the cement content is being checked by California Test 518, "Method of Test for Unit Weight of Fresh Concrete," determine the cement content for each batch from which strength tests are made.

Review California Test 540, "Method of Test for Making, Handling, and Storing Concrete Compressive Test Specimens in the Field," to determine the maximum size of

coarse aggregate to be incorporated in the test specimen. Be sure to note removal of any oversize aggregate on the sample identification card.

California Test 540 covers the molding, transportation, curing, and storage of concrete cylinders.

6-305D (1) Number of Cylinders Required for a "Test"

Each compressive strength test of concrete is determined to be the average strength of two cylinders. If the strengths at both 14 and 28 days are required, submit two cylinders for the 14-day test and two cylinders for the 28-day test. District Materials Lab, Southern Regional Lab, or METS performs California Test 521, "Method of Test for Compressive Strength of Molded Concrete Cylinders" or ASTM C39, "Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens," and reports results to the resident engineer. The resident engineer evaluates the test results for compliance with the contract specifications.

The "2 cylinders = 1 test" concept applies to all concrete cylinder tests except trial batches.

6-305D (2) Trial Batches

Specifications state that for concrete designated by compressive strength greater than 3,600 pounds per square inch, or if prequalification is specified, the concrete must be prequalified by trial batches or certified test data before it is placed.

Make and test cylinders to prequalify the concrete. The test results must meet the contract specifications before the concrete designated by compressive strength may be considered as prequalified by trial batch.

Concrete for trial batches must be designed, produced, and tested by the contractor (or its supplier), and a certified trial batch test report must be obtained prior to use of such concrete. The resident engineer must make sure the certified trial batch test report contains all of the specified data.

The resident engineer must determine whether testing of trial batches will be performed during the life of the contract. Caltrans personnel must witness trial batch testing.

6-305E Relative Compaction Using Nuclear Gauges

California Test 231, "Method of Test for Relative Compaction of Untreated and Treated Soils and Aggregates Using Nuclear Gage," provides the procedures for determining relative compaction by using nuclear gauges.

In addition to California Test 231, use of nuclear gauges is contained in California Test 121, "Administrative Instructions for Use of Nuclear Gauges," as well as the manufacturer's manual pertaining to the gauge being used. A copy of these documents must be kept with each gauge. California Test 121 includes supervision and operator requirements for nuclear gauges, as well as requirements for nuclear gauge storage and transportation. For nuclear gauges, refer to the district radiation safety officer for any questions concerning operation, storage, and administrative requirements.

The person responsible for general inspection of the work and the person performing the test measurements are both involved in performing the complete test. The progressive steps are:

- Designating the test area.
- Selecting test sites within the test area.

- Taking physical measurements.
- Determining test maximum value for comparison with the average in-place density (California Test 231 only).
- Evaluation.

6-306 Material Plants

6-306 Material Plants

Determining the accuracy and suitability of scales and meters used to proportion materials in material processing plants is important to assure uniformity and quality of materials. Plants producing construction materials for Caltrans must be approved under the *MPQP*. Material plants used for producing materials under Sections 27, "Cement Treated Bases"; 28, "Concrete Bases"; 30, "Reclaimed Pavement"; 37, "Seal Coats"; 39-2, "Hot Mix Asphalt"; 60-3.04 "Deck Overlays"; and 90, "Concrete," of the *Standard Specifications* must comply with the *MPQP*. Refer to Section 3-9, "Payment," of this manual for weighing and metering procedures.

The *MPQP* covers these topics for materials plant weighing and measuring devices: inspection, calibration, dynamic testing, and approval. Chapter 2 of the *MPQP*, "Plant Equipment," is directed to the material producer and specifies the equipment requirements for material plants. Chapter 3, "Material Plant Calibration and Dynamic Testing," is directed to the user of the calibration and approval process and specifies the calibration and approval of plant proportioning systems.

The plant approval process must be performed when weighing or measuring devices are newly installed, repaired, or adjusted, or when the plant is relocated. The resident engineer may order that the approval process be performed to assure accurate proportioning at any time on any type of plant. The maximum interval for retesting proportioning equipment is as follows:

- Hot mix asphalt and portland cement concrete batch plants—1 year.
- Hot mix asphalt continuous mixing plants—6 months.
- Slurry seal mixer-spreader trucks—6 months or when aggregate sources are changed.
- Concrete volumetric mixers—every 30 days for pavement and 90 days for structures or when there is any change in ingredient sources.

The district weights and measures coordinator is responsible for material plant approval based on:

- Plant equipment safety inspection.
- Type approval of measurement elements, except continuous conveyor scales, by the California Department of Food and Agriculture, Division of Measurement Standards.
- Type approval of measurement elements outside the Division of Measurement Standards area of responsibility by the district weights and measures coordinator.
- Device calibration.
- Dynamic testing of the plant during operation.

Do not allow material production for Caltrans projects until plant approval is received.

The district weights and measures coordinator maintains a list of approved material plants and equipment currently in compliance with the *MPQP*.