STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

# MANUAL CHANGE TRANSMITTAL		NO. **18-2**
TITLE: California Department of Transportation *Construction Manual*	APPROVED BY: Rachel Falsetti Chief, Division of Construction	DATE ISSUED: 4/23/18
SUBJECT AREA Section 4-84 and 6-2 of the *Construction Manual*	ISSUING UNIT Division of Construction	
SUPERSEDES None	DISTRIBUTION All Requested Manual Holders	

The purpose of this manual change transmittal is to announce updates and corrections to the Caltrans *Construction Manual*. Please note the updates, and print new sections for your manual as needed. Updates are published on http://www.dot.ca.gov/hq/construc/constmanual/ and are indicated by the date listed in the right-hand column. Specific changes are enumerated below:

The following changes were made to the sections listed below:

- If applicable, updated cross-references to other *Construction Manual* or *Standard Specifications* sections.
- If applicable, updated broken or changed web links and changed titles to other documents or manuals.
- Updated organizational changes to align with policy or procedures updated after publishing the most recent *Construction Manual* edition, July 2017.
- Changed all section footers to update publication date to April 2018.

Section 4-84, "Markings"

- Section 4-8402A, "Traffic Stripes and Pavement Markings," adds thermoplastic testing requirements to preconstruction meeting topics. It requires the contractor to provide a material data sheet, verification of test data, and a certificate of compliance. A revised Section 84, "Markings," of the *Standard Specifications* requires thermoplastic manufacturers to perform quality-control testing.
- Section 4-8403A, "Traffic Stripes and Pavement Markings," adds verification that thermoplastic material was heated to a specified temperature, and that contractor followed guidelines for application of primer. Pavement temperature also is to be documented, and contractors should provide a copy of retroreflectivity readings of installed retroreflective materials.
- Section 4-8405, "Quality Control," requires witnessing the contractor's test section of thermoplastic stripe and submission of a test sample.

Section 6-2, "Acceptance of Manufactured or Fabricated Materials and Products"

- In Table 6-2.3, "Materials Accepted by Certificate of Compliance," for "glass beads" entry requires: "certificate of compliance by lot or batch and test data from an independent laboratory."
- In Table 6-2.3, for "two-component paint traffic stripes and pavement markings" entry requires: "certificate of compliance by lot or batch. Obtain a 50-foot test section before application of paint." "Pavement marking. Paint or thermoplastic" was changed to "Two-component paint traffic stripes and pavement markings" and moved to below "turf sod" entry.

- In Table 6-2.3, entry for “thermoplastic” was changed to “thermoplastic traffic stripes and pavement markings.” Requires a certificate of compliance by lot or batch and test data report from an independent laboratory and obtaining a minimum 1-foot length or stripe test sample.
- In Table 6-2.3, delete entry for “traffic stripe. Paint or thermoplastic.”

Section(s)	Background or reason for change	References
Section 4-84, “Markings”	New requirement that contractors provide certificates of compliance for thermoplastic materials, document applications, and provide test samples.	Section 84, “Markings,” of the *Standard Specifications*
Section 6-2, “Acceptance of Manufactured or Fabricated Materials and Products”	New requirement that contractors provide certificates of compliance for thermoplastic materials, document applications, and provide test samples.	Section 4-84, Markings,” of the *Construction Manual*

Section 84 Markings

4-8401 General

This section provides guidelines for inspecting markings for work specified under Section 84, "Markings," of the *Standard Specifications*. The work consists of applying painted and thermoplastic traffic stripes and pavement markings, constructing rumble strips, and removing existing markings. The special provisions may also allow the contractor to substitute traffic striping and pavement marking tape. Review the Bid Item List, special provisions, and the contract plans to determine where paint or thermoplastic is required.

4-8402 Before Work Begins

Before work begins, discuss the operation with the maintenance striping superintendent or supervisor. Ask if there are any particular striping or marking concerns or requests that should be addressed.

Discuss materials to be used with the contractor. If the contractor plans to use solvent-borne or acetone-based paint, ensure its use conforms to the regulations of the local agency for air pollution control.

Review striping and marking plans, standard details, and any special requirements.

Review existing field conditions. Consult with district traffic operations personnel if any changes appear to be necessary.

Verify that Form CEM-3101, "Notice of Materials to Be Used," includes striping tape, paint, thermoplastic material, and glass beads. All materials listed on Form CEM-3101 must be on the Authorized Material List for signing and delineation materials. Refer to Section 6-202, "Responsibilities for Acceptance of Manufactured or Fabricated Materials and Products," of this manual for additional information.

4-8402A Traffic Stripes and Pavement Markings

Discuss the thermoplastic testing requirements at the preconstruction meeting.

Obtain a copy of the manufacturer's thermoplastic certificate of compliance and quality control test data from an independent testing laboratory.

Verify that the manufacturer submitted to the Department's Chemical Testing Branch a copy of the certificate of compliance and a single split 6,000 gram representative sample of the thermoplastic lot.

Obtain the material data sheet for thermoplastic primer.

Obtain the certificate of compliance, Materials Engineering and Testing Services notification letter, and safety data sheet for each lot or batch of paint, and glass beads. Ensure that test results for beads used in drop-on applications include the EPA test method and that it can be traced to the specific test sample. Verify that the test for arsenic and lead content was performed by an independent laboratory.

Verify large-gradation glass beads are on the Authorized Material List for two-component traffic striping paints and large-gradation retroreflective glass beads.

Read the manufacturer's instructions for striping tape and thermoplastic materials. When primer is required, determine the type the manufacturer recommends. Also determine the application temperature range for the thermoplastic material.

Discuss with the contractor the methods that will be used to remove existing markings to ensure there will be no "ghost line" left behind.

Inspect the contractor's equipment for specification compliance either in the contractor's or subcontractor's yard or on another project.

Examine the contractor's methods for:

- Checking spread rates of paint and glass beads.
- Measuring application temperatures of thermoplastic material.
- Measuring maximum temperatures of paint.

Ensure that the contractor's stencils will produce correctly dimensioned pavement markings.

4-8403 During the Course of Work

4-8403 During the Course of Work

4-8403A Traffic Stripes and Pavement Markings

Check the contractor's layout work. Determine that traffic stripes and pavement markings will be correctly located. Where necessary, assist the contractor in matching existing striping cycles.

Ensure employees working around thermoplastic material wear suitable personal safety equipment, long-sleeved shirts, and eye protection.

Verify the pavement is dry, clean, and the surface temperature is as specified before the contractor applies striping or markings.

Before the contractor applies thermoplastic check:

- Thermoplastic material is heated to the specified temperature range. Thermoplastic material heated to excessive temperatures can flash and splatter when exposed to air. Check the temperature gauges mounted on heating equipment for accuracy.
- The contractor applies primer to all surface substrates except for asphalt pavement less than 6 months old and follows the manufacturer's recommendation for application rate and how long it needs to dry.
- The pavement temperature and document the readings.

Check that recesses for double traffic stripes are constructed in a single pass, are primed, and are kept dry and free of debris. Verify that the thermoplastic traffic stripes and pavement markings are applied before the end of the same work shift.

Before the contractor applies paint, check and document the atmospheric temperature and expected weather conditions. Never allow the contractor to apply paint when rain, fog, or condensation could damage the freshly painted surface.

Verify that the paint temperatures do not exceed the specified maximums for solvent-borne or water-borne paints.

Ensure each coat of paint is applied in one pass of the striping machine.

When two coats of paint are required, verify the first coat of paint is dry before the second coat of paint is applied. The second coat of paint for centerline striping on 2-lane highways must be applied in the opposite direction of the first coat of paint.

Ensure the contractor uses two layers of glass beads for thermoplastic traffic stripes and pavement markings with enhanced wet-night visibility. The first layer must be high-performance glass beads and the second layer must be Type 2 glass beads.

Check traffic stripes for the correct width and edge definitions, lengths of gaps and individual stripes, alignment, direction of application, and correct superimposition of second coats.

Require the contractor to remove drips, overspray, improper markings, and material tracked by traffic.

Check that the applied thermoplastic material complies with thickness requirements.

Check application rates for glass beads and paint. Inspect the stripes to ensure that glass beads are spread uniformly and properly embedded. Verify that paint and glass beads are applied in the order specified for two-component painted traffic stripes and pavement markings. Assure the striping machine does not travel faster than 10 miles per hour during the application.

Check thermoplastic markings for workmanship as the markings are applied. Do not permit bumps resulting from overlaps in extruded materials. Check complete thermoplastic traffic stripe or thermoplastic pavement marking to ensure it is free of runs, bubbles, craters, drag marks, stretch marks, and debris.

After application, look for any damage to striping or marking and document any rejections. Ask the contractor to remove and replace existing retroreflective pavement markers coated or damaged by work activities.

Conduct and document a nighttime drive-through visual inspection to verify the retroreflectivity of the installed material. Notify the contractor immediately of any areas with deficient retroreflectivity. Require the contractor to measure the retroreflectivity of those areas using a retroreflectometer and correct any deficiencies. Obtain a copy of the measured retroreflectivity readings from the contractor.

4-8403B Rumble Strips

Ensure rumble strips are not constructed:

- On structures, approach slabs, or concrete weigh-in-motion slabs.
- At intersections.
- Bordering two-way left turn lanes, driveways, or other high-volume turning areas.
- Within 6 inches of any concrete pavement joint.

Verify rumble strips comply with the dimension requirements and are within 2 inches of the alignment shown on the plans. If not compliant, have the contractor replace them.

Ensure rumble strips in concrete pavement are constructed after the specified requirements for the concrete pavement are met.

Verify rumble strips in asphalt concrete pavement are constructed on the top layer and a fog seal coat is applied to ground areas.

Ensure residue is removed from the roadbed.

4-8403C Existing Markings

Ensure existing markings are removed:

- Without removing pavement to depth of more than 1/8 inch.
- Such that the old message cannot be identified.
- In rectangular areas if the grinding method is used.

Verify all residue is swept or vacuumed. Yellow marking residue must be handled, removed, and disposed of according to the lead compliance plan.

Ensure the contractor repairs, at no cost, any damage to the pavement and surfacing that results from removing traffic stripes and pavement markings, in accordance with Section 5-1.36, "Property and Facility Preservation," of the *Standard Specifications*.

4-8403C (1) Removal of Traffic Stripes and Pavement Markings

Yellow striping generally contains lead, so ensure special handling for removal and disposal. Usually, if this striping was identified in the contract, the special provisions would cover removal and disposal. However, if the special provisions do not identify special handling for removal of yellow striping, contact the district hazardous waste coordinator to determine if the striping needs to be tested.

Observe areas where traffic stripes or pavement markings have been removed. If conditions are such that, after contractual requirements for removal have been met, the resulting areas present a traffic hazard, order additional work to eliminate the hazard. Make your observations in the same conditions that public traffic will experience, such as driving during the night, on wet pavement, or in low sun angles.

4-8403C (2) Removal of Latent Traffic Stripes and Pavement Markings

In the past, removal of existing traffic stripes and pavement markings was not always required on projects before placement of new pavement surfacing. Thus, on some stretches of highway, old traffic stripes and pavement markings exist under layers of pavement. On pavement rehabilitation projects, underlying latent stripes and markings may become exposed as the contractor removes layers of pavement by grinding or during cold planing of the existing surface.

If latent traffic stripes or pavement markings are exposed during removal of the existing pavement, consider those latent traffic stripes or pavement markings a differing site condition. Review Section 4-1.06, "Differing Site Conditions (23 CFR 635.109)," of the *Standard Specifications*.

Ensure the contractor repairs any pavement damage and depressions in the existing pavement caused by the removal of latent traffic stripes and pavement markings.

Removal of the latent stripes and markings and the repair of the pavement damaged by their removal will be paid as extra work in accordance with Section 4-1.05, "Changes and Extra Work," of the *Standard Specifications*. When the depressions are smaller than 0.05 foot and are filled with overlay material during its placement, pay for the additional material at contract unit price for the overlay material.

4-8404 Level of Inspection

4-8404 Level of Inspection

Suggested levels of inspection for pavement markings:

- Benchmark inspection of layouts, temperatures, and equipment during placement of pavement markings.
- Immediate nighttime visual inspection of pavement marking retroreflectivity.

4-8405 Quality Control

4-8405 Quality Control

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

- Verify the contractor's testing of glass beads for arsenic and lead.
- Require that the contractor measure traffic stripe retroreflectivity for deficient areas identified during nighttime drive-through.
- Ensure the contractor calibrates the equipment for compliance with application rates for glass beads and paint.
- Witness the contractor's test section of two-component paint, 50-foot test stripe, and verify for homogeneous mixing of the two components, uniform bead distribution, wet film thickness, and curing time.
- Witness the contractor's 1-foot test section of thermoplastic stripe. Collect the test sample and submit it, with a sample identification form TL-0101, to the Chemical Testing Branch, Translab, 5900 Folsom Blvd., Sacramento, California 95819.

4-8406 Payment

4-8406 Payment

Measure the striping and markings according to the units and method specified in the *Standard Specifications* and the special provisions. Record the measurements in the daily reports and calculation sheets to support partial and final payments.

Measure the striping along the line of the traffic stripe without deductions for gaps. Use a measuring wheel or a vehicle-mounted electronic measuring device for these measurements.

Areas of the standard pavement markings shown in the *Standard Plans* may be used in the calculations to determine pay quantities. Make field measurements where the areas are variable, such as for limit lines of different lengths.

Rumble strips are paid by the length measured by the station along the length of the rumble strip without deductions for gaps between indentations.

Removal of traffic stripes is paid by the length with deductions for the gaps in broken traffic stripes and multiplied by a factor in accordance with Section 84-9.04, "Payment," of the *Standard Specifications*.

Section 2 Acceptance of Manufactured or Fabricated Materials and Products

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 IHS Spec's 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:

  http://onramp.dot.ca.gov/hq/esc/mets/structure_materials/

- *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, 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 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, and Buy America 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% melted and manufactured in the U.S.A."

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 ensure 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 ensure 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 that are 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 isoutside 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 ensure that all structural materials are listed, a list of materials necessary based on contract bid item is available at:

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

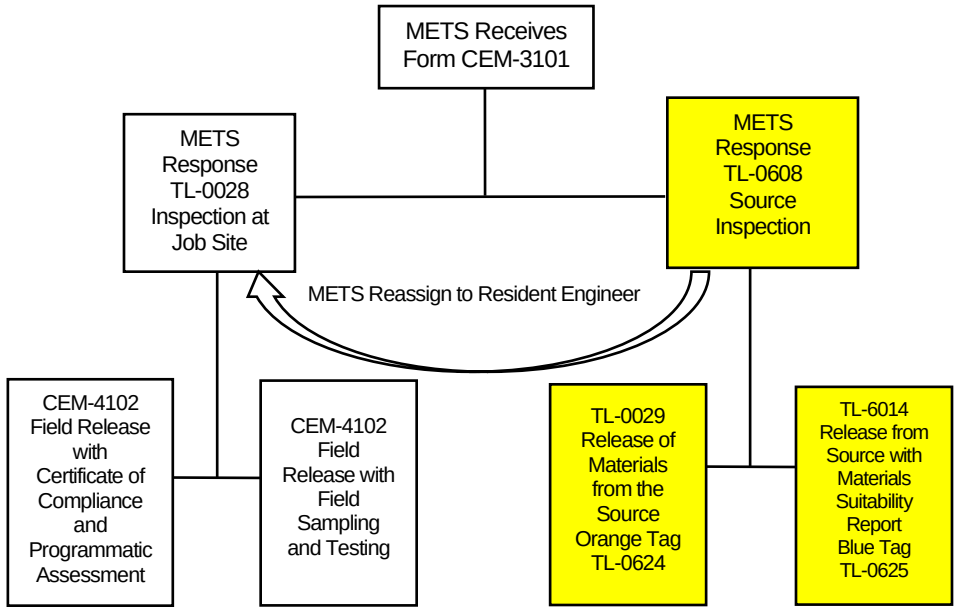
METS assigns personnel for sampling, testing, and inspecting manufactured materials and products, usually at the source of supply. Manufactured materials and products shown in Table 6-2.3, "Materials Accepted by Certificate of Compliance," in Section 6-203C, "Materials Accepted on the Basis of a Certificate 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 Jobsite"

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.

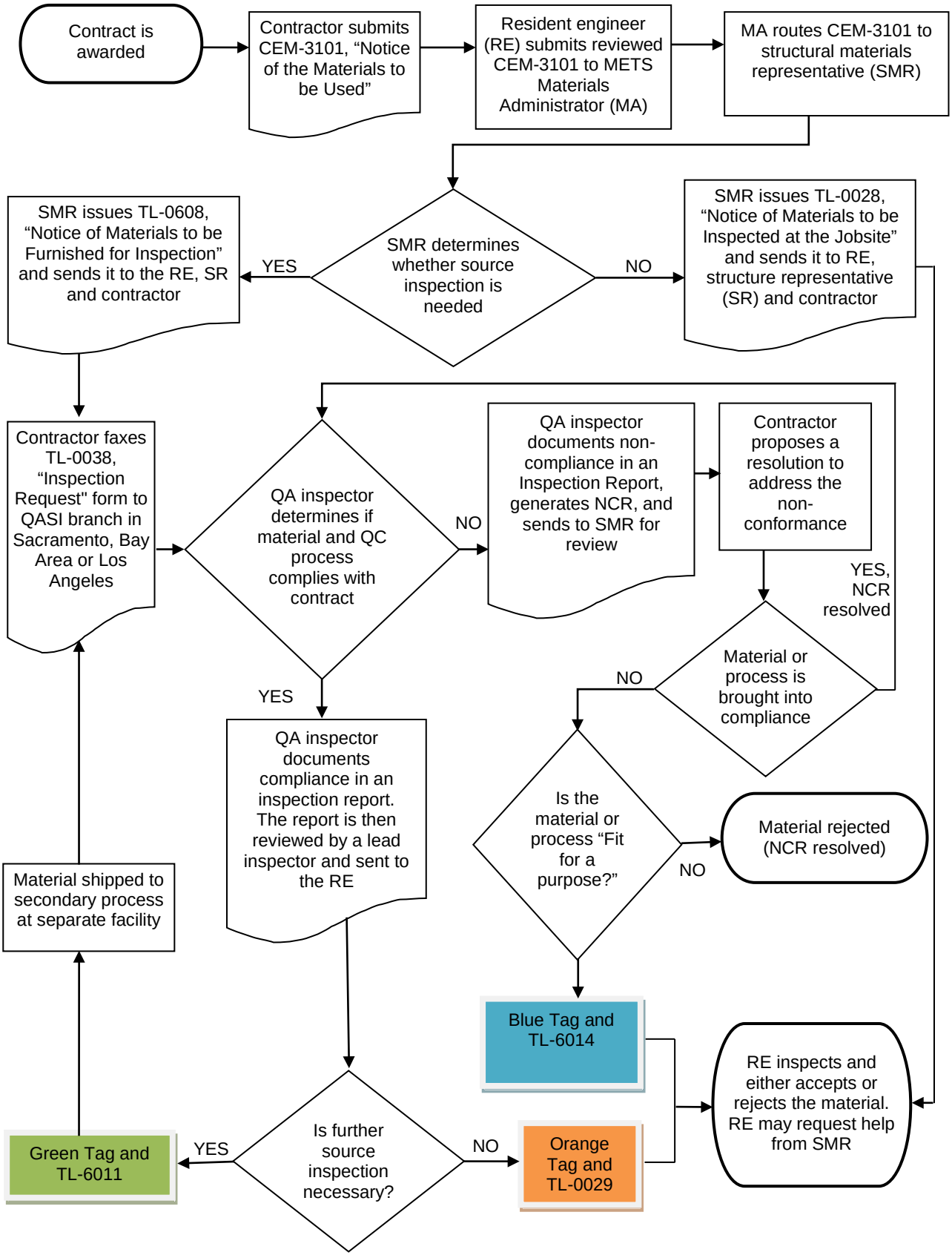
- Product on Authorized Material List.
- Certificate of compliance.
- Certificate of compliance with accompanying documents.
- Field inspection and release by the resident engineer.

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.

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, "Inspection of Fabricated and Manufactured Materials," 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 ensure timely inspection and release. For instance, light poles are manufactured at various 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 ensure 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 of this manual provides examples of types of field inspections for common materials.

The resident engineer may not receive the completed Form TL-0029 until after the materials have arrived at the job site. The resident engineer must ensure 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, and so on.
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 ensure 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, ensure 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 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 AC 58 and Caltrans. Augmentation/Revisions to ICBO AC 58.
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 and 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-componet 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 glued laminated 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 Method 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 Method 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 ensure 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.

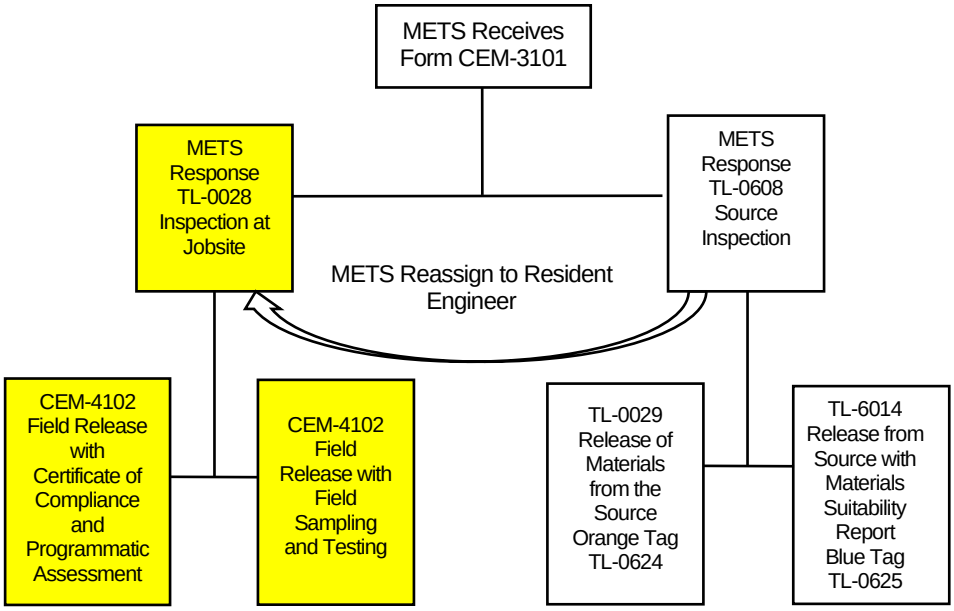
6-203C (7) Reinforcement

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 Jobsite."

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.