



SALINAS

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**CITY OF SALINAS
PUBLIC WORKS DEPARTMENT**

QUALITY ASSURANCE PROGRAM (QAP)

Approved By:

Date:

Stamp:

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1. GENERAL

The City of Salinas' (City) Quality Assurance Program (QAP) has been developed by the City to provide guidelines for testing of construction materials and assurance that the materials incorporated into the construction projects are in conformance with the contract specifications. The City's QAP is updated a minimum of every five years to address changes to project specifications, materials, and updates to the testing methods. The QAP is incomplete without Attachment 1 through 3.

Variations for Projects On or Off the SHS

The requirements of a QAP depend whether the project is on or off the SHS.

Projects OFF the State Highway System (SHS), follow the QAP outlined in this document

Projects ON the State Hwy System, follow the QAP outlined in Caltrans manual, Section 2.3 QAP Requirements for projects on the SHS:

QAP Documents

These QAP documents are to be used:

- The California Department of Transportation (Caltrans) Construction Manual
- Construction Manual Supplement for Local Agency RE's per LAPM chapter 16.11
- Local Assistance Structure Representatives Guidelines per LAPM chapter 16.11
- The Caltrans Independent Assurance (IA) Manual

The Caltrans Construction Manual provides the frequency of acceptance testing and outlines the acceptance testing program. The Caltrans IA Manual details the Caltrans Independent Assurance Program to be followed that has been approved by FHWA.

These manuals are available at the following websites:

<https://dot.ca.gov/programs/construction/construction-manual>

<https://dot.ca.gov/-/media/dot-media/programs/construction/documents/policies-procedures-publications/construction-manual/cm-supplement-lare-a11y.pdf>

<https://dot.ca.gov/programs/construction/publications>

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

Plans and Specifications

Caltrans and local agency projects on the SHS are required to use Caltrans approved plans specifications.

Test Methods

On Caltrans (CT) and local agency projects on the SHS, CT methods are required to be

followed. All CT methods are available at the following website:

[California Tests \(CT\) | Caltrans](#)

2. **DEFINITION OF TERMS**

Quality Assurance Program (QAP): A sampling, testing and inspection program to provide assurance that the materials and workmanship incorporated into the project conform to the contract specifications.

The main elements of a QAP are a Material Acceptance Program and an Independent Assurance Program that meets the criteria in 23 CFR 637

Acceptance Testing	Testing of project materials to determine compliance with the contract specification criteria.
Certificate of Compliance	A signed document from the material manufacturer committing that the delivered goods meet the contract specifications.
Independent Assurance Program (IAP)	A program that verifies that acceptance testing is being performed correctly by certified testers using accredited laboratories and calibrated equipment.
Materials Acceptance Program	Sampling, testing, inspection, and certification of project materials to determine compliance with the contract specifications.
Quality Assurance Program (QAP)	A program that will ensure materials and workmanship incorporated into the project conform to the contract specifications. The main elements of a QAP are the Material Acceptance Program and the Independent Assurance Sampling and Testing Program.
Source Inspection	Sampling, testing, and/or inspection of manufactured or prefabricated structural materials at a location other than the job site, generally at the manufactured location.

3. **MATERIALS ACCEPTANCE PROGRAM**

Material incorporated into the work is accepted by one or more of the following methods, as specified in the contract specifications and this document:

Field Sampling and Acceptance Testing

Manufacturer's Certificate of Compliance

Source Inspection and Testing

Visual Inspection

Field Sampling and Acceptance Testing:

- Acceptance sampling and testing are performed by certified materials personnel.
- Acceptance testing is performed utilizing accredited materials laboratories and properly calibrated equipment.
- Certifications and accreditations are specific to the tests being performed.
- A materials testing results log is maintained for any test method performed more than once on a project.
- Test results for materials incorporated into the work are to be in compliance with the contract specifications.
- Actions taken regarding material with failing test results will be fully documented, including details documenting remove/replace, rework/re-test, and deduction/change order.
- Justification will be provided for any failing material allowed to remain in-place.

Acceptance Sampling and Testing Locations / Frequencies:

- Sample and testing locations and frequencies are to be in accordance with the contract specifications.
- If not specified in the contract documents, sampling and testing locations / frequencies are shown in Attachment 1: Acceptance Sampling and Testing Frequencies.
- When sampling products such as Portland Cement Concrete, cement-treated base, hot mix asphalt, or similar materials, sampling is varied with respect to the time of the day, in so far as possible, in order to *avoid a predictable sampling routine*.

Acceptance Test Methods

- The test methods used are as specified in the contract documents. If not specified, testing is done with the California Tests (CT) Method.
- For a material specified to comply with a property shown in the following table, testing is performed utilizing the noted test method(s):

Test Property	Test
Relative compaction	CT 216 & CT 231
Sand Equivalent	CT 217
Resistance (R-Value)	CT 301
Grading (sieve analysis)	CT 202
Durability Index	CT 229
Cleanness Value	CT 227

Test Methods equivalents to the test listed above require written approval.

Acceptance Materials Testing Laboratory

- Acceptance testing will be performed as applicable by one or more of the following:
 - a) Consultant Materials Testing Laboratory
 - b) Other as specified and authorized by City of Salinas – Public Works Department

- The materials laboratory is under the responsible management of a California Registered Engineer with experience in sampling, inspection, and testing of construction materials.
- The Engineer will certify the results of all tests performed by laboratory personnel under the Engineer's supervision.
- The Materials Laboratory is properly accredited.
- The Materials Laboratory testing personnel are appropriately certified.
- Testing equipment is properly calibrated.
- Materials Laboratories will comply with Section IV. Independent Assurance Program (IAP) of this document.

Reporting Acceptance Test Results

- Submit the laboratory test results reports to the Resident Engineer (RE) as soon as possible by email or telephone.
- Copies of the complete material test result reports, including data and calculation sheets, are provided to the RE in accordance with the following timetable:

If the material is sampled ...	and the test performed is ...	submit results to the RE within ...
at the material plant	Sieve Analysis or Sand Equivalent (SE) or Cleanness Value (CV)	24 hours
at the jobsite	Compaction and/or maximum density	24 hours
	Sieve Analysis or Sand Equivalent (SE) or Cleanness Value (CV)	72 hours
	R value or Asphalt extraction	96 hours

Acceptance Testing Summary Logs

- The RE maintains a testing summary log for each test method performed on the project utilizing Attachment 2: Test Result Summary Log.
 - Test results Summary Log shall include, at minimum, the following:
 - Name and ID Number of the Test Method Performed
 - Date Tested
 - Name of Tester
 - Location Approximate Quantity of Material Represented by the Test
 - Required Passing Result
 - Actual Test Result
 - Resolution of any Failing Results
- The logs are used by the RE to track that:
 - Sampling is performed at the required frequencies.
 - Acceptance tests are performed at the required frequencies.

- Tester certifications are current and on file.
- All failing tests have been mitigated and documented.

Manufacturer’s Certificate of Compliance:

- Various manufactured materials may be accepted for incorporation into the work without sampling or testing, based on the following:
 - Visual examination of material is performed
 - Supplier has furnished similar material with a history of having met specifications
 - Manufacturer certification that materials comply with contract specifications
 - The products, materials, or assemblies do not involve structural integrity or safety to the public
- Where required by the contract specifications, the contractor must submit a certificate of compliance and comply with Buy America certification requirements as applicable.
- Where required by the contract, the contractor must attach test data or other documents to the certificate of compliance.
- The RE may perform sampling and testing on such materials at any time.
- Certificates of compliance must:
 - Be submitted by the Contractor before the material is incorporated into the work;
 - Accompany the material to the job site.
 - Identify the lot (or heat) number for each lot delivered;
 - Include the contract number;
 - Include test data and other documents when required.
 - State that the material complies with the contract specifications; and
 - Be signed by the producer of the material.

List of Materials Accepted by Certificate of Compliance

- This agency uses the Caltrans 2023, Caltrans 2024, and 2008 City of Salinas Standard Specifications.
- In accordance with the Caltrans 2023, Caltrans 2024, and 2008 the materials listed in **Attachment 3** may be accepted by Certificate of Compliance
- This list may be supplemented or amended by the contract Special Provisions or Technical Provisions.

Source Inspection and Testing

- Some manufactured or pre-fabricated structural materials will be inspected or tested prior to arrival at the jobsite, generally at the manufacturer’s location (a.k.a. source inspected.)
- Structural items categorized as “catastrophic consequences of failure” or “significant safety concern” may be source inspected. Materials that might be source inspected include structural steel, precast pre-stressed concrete girders and pilings; RCP greater than 60”, joint seals, bearing pads, lighting and signal poles, sign structures, electrical items.

- The RE may reject source inspected material at the job site if deemed not acceptable, including:
 - Material damage in shipment or installation;
 - Defective material (source inspection is usually a random sampling and may not have checked 100% of the material.)
- One or more of the following materials laboratories will be used to perform source inspection and testing:
 - a. Consultant Materials Testing Laboratory
 - b. Other as specified and authorized by City of Salinas – Public Works Department

Acceptance of Minor Quantities Without Testing (Visual Inspections)

General:

- Relatively minor quantities of construction materials may be accepted without testing.
- The following 3 conditions must be met:
 1. Visual examination of the material is performed.
 2. The manufacturer or supplier has recently furnished similar materials found to be satisfactory using normal sampling and testing requirements.
 3. The manufacturer (or supplier in the case of HMA or concrete) provides certification that the material furnished complies with the contract specifications.

Approximate quantities that may be accepted by visual inspection:

- Aggregates other than for use in Portland Cement Concrete, not to exceed:
 - 100 tons per day, nor
 - 500 tons per project
- Bituminous mixtures (example: HMA), not to exceed:
 - 50 tons per day, nor
 - If project total is less than 500 tons, sample at engineer’s discretion
- Bituminous material (example: Liquid Asphalt), not to exceed:
 - 100 gallons per project

4. INDEPENDENT ASSURANCE PROGRAM (IAP)

General:

- The IAP verifies that:
 - Sampling and testing procedures are being performed correctly.
 - All acceptance testing (AT) performed on the project uses an accredited laboratory and certified testing personnel.
 - All testing equipment is in good condition and properly calibrated.
- A complete review of AT shall be performed by IAP personnel, or an independent materials laboratory chosen by the agency, when unresolved discrepancies related to poor correlation between acceptance tester’s results and other test results occur.

- The IAP duties, including certification of testers and qualification of lab, shall be executed by:
 - a) Local Agency designated IAP person (Assigned by City Engineer)
 - b) Caltrans (for CT test methods only)
 - c) Consultant (this consultant shall be different from AT consultant)
- Independent assurance samples and tests are not to be used for determining compliance with contract requirements.
- Testing with only ASTM/AASHTO material testing will require the LPA hire a separate laboratory to perform independent assurance (see LAPM 16.11.2: Independent Assurance (IA) Program).

Laboratory Accreditation:

- The Acceptance Testing (AT) materials laboratory must participate and comply with one or more of the following Correlation Testing Programs:
 - a. AASHTO resource (formerly AMRL)
 - b. Cement and Concrete Reference Laboratory (CCRL)
 - c. Caltrans' Reference Samples Program (RSP)
- The Acceptance Testing Laboratory accreditation occurs annually or per issuance agency.
- A copy of the current laboratory accreditation certificate shall be kept in the project records.

Tester Certification:

- Sampling and testing personnel are certified for a maximum of 5 years by one or more of the following Personnel Certification Programs:
 - CT METS IA Representative (at JTCP or outside of JTCP for other tests methods)
 - American Concrete Institute
 - National Institute of Certification of Engineering Technologies
 - Other nationally recognized organization: _____
- This agency designated and qualified IA person (Independent Assurance Person may not perform Acceptance Testing)
- Proficiency tests are performed for testers to be certified on Sieve Analysis, Sand Equivalent, and Cleanness Value tests. All other types are witness tests.
- A copy of each tester's current and applicable certifications is kept in the project files.

Equipment Calibration:

- Laboratory testing equipment shall be:
 - Capable of performing the tests required.
 - Be in good working order.
 - Be calibrated at least once each year, and more frequently if required by test method or manufacturer's recommendation.

- Be calibrated by impartial means using devices of accuracy traceable to the **National Institute of Standards and Technology**.
- Have a *decal* firmly affixed to each piece of equipment showing:
 - Equipment Identification Number
 - Calibration Date
 - Calibration Expiration/Due
 - Calibrator Name/Company Name

5. RESIDENT ENGINEER’S CERTIFICATION OF PROJECT MATERIALS:

1. The RE shall complete and sign LAPM Exhibit 17-G, “Materials Certificate” of the Local Assistance Procedures Manual (LAPM), upon completion of a federal-aid project,
2. The form shall explain and justify all materials incorporated into the work which did not conform to specifications, including changes by virtue of contract change orders.
3. The form shall be filed in the project records.
4. The form shall be included in the Report of Expenditures submitted to the Caltrans District Local Assistance Engineer.

6. PROJECT QAP RECORDS:

Project construction files shall be organized and indexed, and will include the following items:

- Copy of Quality Assurance Plan
- Certificates of Proficiency
- Certificate of Accreditation for Testing Laboratory
- Notice of Materials to be Used
- Acceptance Testing Summary Logs and Test Results
- Certificates of Compliance (Buy America certification requirements as applicable; see LAPM)
- Source inspection records and reports
- Final Materials certification

All project records will be available in a single location for inspection by auditors and reviewers:

- At any time during the project
- For three years following the date of the final project voucher

ATTACHMENTS

ATTACHMENT NO. 1:	Sampling and Testing Frequencies Table
ATTACHMENT NO. 2:	Exhibit 16-Z2 Acceptance Testing Results Summary Log
ATTACHMENT NO. 3:	Exhibit 16T Materials Accepted by Certificate of Compliance

Sampling and Testing Frequency Table
for projects OFF the SHS

<i>Sample for Local Agency QAPs</i>			
Sampling and Testing Frequency Table <i>for projects OFF the SHS.</i>			
HOT MIX ASPHALT (HMA) / ASPHALT CONCRETE (AC)			
Quality Characteristic	Test Method	Minimum Sampling and Testing Frequency	Location/Time of Sampling
Aggregate Gradation (Sieve)	CT 202	1 Per 1000 Tons or Part Thereof ; Minimum 1 per day during production/placement of at least 300 tons per day.	At Plant Per CT 125 (a)
Sand Equivalent	CT 217		
Asphalt Binder Content	CT 382		Loose Mix Behind Paver Per CT 125
In-Place Density and Relative Compaction (Nuclear)	Nuclear (b) CT 375 or ASTM D2950 (c)	1 Per 1000 Tons or Part Thereof ; Minimum 1 per day during production/placement of at least 300 tons per day. (b)	Random Locations Per CT 375 (c)
Theoretical Maximum Specific Gravity and Density (Rice)	CT 309	1 Per Day During Production/Placement of At Least 300 Tons Per Day	Loose Mix Behind Paver Per CT 125
HMA Moisture Content	CT 226 or CT 370		
Stabilometer Value (d)	CT 366		
Asphalt Binder	Sample per Section 92	Sample 1 min. per day for production over 300 tons per day; See (f) regarding testing.	At Plant Per CT 125
Smoothness	12-foot Straightedge	As necessary to confirm contract compliance.	Final Pavement Surface

- (a) Exact tonnage of sample location to be determined by Random Sampling Plans
- (b) Compaction determined by Nuclear Density Device. Core testing required if compaction fails the nuclear test
- (c) Correlation between core densities and nuclear device required only if compaction fails the nuclear test
- (d) Report the average of 3 tested briquettes from a single split source
- (e) Use CT 309 to determine maximum theoretical density in lieu of CT 308 or CT 367 calculated maximum theoretical density
- (f) No testing required unless warranted by concern; sample and store until completion of project

SUBGRADE (DISTURBED BASEMENT SOIL) OR EMBANKMENT

Quality Characteristic	Test Method	Minimum Sampling and Testing Frequency	Location/Time of Sampling
Maximum Density and Relative Compaction	CT 216/CT 231	1 Min. Test per 5000 sq ft under vehicle traveled way and shoulder 1 Min. Test Per 300 linear foot under sidewalk	Random locations as determined by the Engineer in place after compaction.

AGGREGATE BASES AND SUBBASES, IMPORTED BORROW

Quality Characteristic	Test Method	Minimum Sampling and Testing Frequency	Location/Time of Sampling
Sieve Analysis	CT 202	1 Min. Test Per Material Source	Sample from site stockpile/plant prior to placement.
R-Value	CT 301		
Sand Equivalent	CT 217		
Maximum Density and Relative Compaction	CT 216/CT 231	1 Min. Test per 5000 sq ft	Random locations as determined by the Engineer in place after compaction.

STRUCTURE BACKFILL, SELECT BACKFILL

Quality Characteristic	Test Method	Minimum Sampling and Testing Frequency	Location/Time of Sampling
Sieve Analysis	CT 202	1 Min. Test Per Material Source	Sample from site stockpile/plant prior to placement
R-Value	CT 301		
Sand Equivalent	CT 217		
Maximum Density and Relative Compaction	CT 216/CT 231	1 Min. Test Per 2 Vertical Lifts of Placement	Random locations as determined by the Engineer in place after compaction.

PORTLAND CEMENT CONCRETE (PCC) - STRUCTURAL AND SIGNAL/LIGHTING FOUNDATIONS

COARSE AGGREGATE			
Quality Characteristic	Test Method	Minimum Sampling and Testing Frequency	Location/Time of Sampling
Sieve Analysis	CT 202	1 min. test per 500 cu yds and per each material source ; 1 min. test on smaller projects; If bridge, 1 min. set per separate pour per abutment/pier/deck.	Sample from site stockpile/plant prior to placement
Cleanness Value	CT 227		

FINE AGGREGATE			
Quality Characteristic	Test Method	Minimum Sampling and Testing Frequency	Location/Time of Sampling
Sieve Analysis	CT 202	1 min. test per 500 cu yds and per each material source ; 1 min. test on smaller projects; If bridge, 1 min. set per separate pour per abutment/pier/deck.	Sample from site stockpile/plant prior to placement
Sand Equivalent	CT 217		

WET MIX			
Quality Characteristic	Test Method	Minimum Sampling and Testing Frequency	Location/Time of Sampling
Slump/Penetration	CT 533	2 per day	Sample from truck/work site
Cylinders	CT 539/540	1 min. set of 3 per day; If bridge, 1 min. set per separate pour of abutment/pier/deck.	

Exhibit 16-Z2 Acceptance Testing Results Summary Log

Test Method Name: _____

Test Method Number: _____

Project Name: _____

Contract Number: _____

Test Number	Date Sampled	Name of Sampler or Tester		Production		Test Results			Remarks
		Tester Certification on file?		Location (Stations, depths, etc)	Production Quantity Represented	Required Result	Actual Result	Pass/Fail	
1									
2									
3									
4									
5									
6									
7									
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