

# CDOT PRECAST MANUFACTURERS QSM CHECKLIST

Manufacturer Name: \_\_\_\_\_ Date: \_\_\_\_\_

Plant Facility Name and Location: \_\_\_\_\_

Submitted By: \_\_\_\_\_ Phone number: \_\_\_\_\_

E-Mail: \_\_\_\_\_

Manufacturer Additional Comments:

Reference: 2022 CDOT Field Materials Manual, CP-11 (Precast Structures)

<https://www.codot.gov/business/designsupport/materials-and-geotechnical/manuals>

## 9. MANUFACTURER'S QUALITY SYSTEM MANUAL (QSM) (MINIMUM REQUIREMENTS)

- 9.1 On an annual basis, at a minimum of one month prior to producing any precast concrete structure for a CDOT project, one complete printed and bound original, and one complete electronic copy of the Manufacturer's Quality System Manual (QSM) shall be submitted for review and approval to CDOT's Product Evaluation Administrator (303) 398-6566 within the Staff Materials & Geotechnical Branch at 4670 North Holly Street, Unit A, Denver, Colorado 80216-6408. CDOT's approval of the QSM is intended only to indicate that the QSM is in conformance with the minimum QC requirements set forth in this Standard. Once the manufacturer is approved and on the Qualified Manufacturers List (QML), the QSM provisions will remain in effect for a maximum period of one calendar year, unless revisions are determined to be necessary by the Quality Control Manager or requested by CDOT, or if the manufacturer is decertified. If any revisions are made to the current year QSM, such revisions shall be submitted to CDOT in both printed and electronic format for review and approval. Guidelines for preparing a QSM may be available from the National Precast Concrete Association (NPCA) or the American Concrete Pipe Association (ACPA)
- 9.2 The Manufacturer's QSM may be maintained in electronic format. However, one or more copies of the QSM shall be maintained by the Manufacturer's QC Manager in a printed and bound format (3-ring binder or other). The QSM shall be available to all of the Manufacturer's employees. Each document in the QSM shall indicate its preparation date and all pages of the QSM shall be numbered. If a document is revised, the date of revision shall be indicated on the document and recorded in a table of revisions.

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YES/NO/NA

- 9.3 The Manufacturer's QSM shall be formatted to provide numbered sections which meet the following order, format, and content:..... \_\_\_\_\_
- 9.3.1 Manufacturer's quality policy or mission Statement endorsed by the company's Chief Executive Officer..... \_\_\_\_\_
- 9.3.1.1 The quality policy / mission statement shall indicate support of top management to enforce the QC requirements contained in the QSM..... \_\_\_\_\_
- 9.3.2 The QSM shall include the address and telephone numbers of applicable personnel at the manufacturing facility..... \_\_\_\_\_
- 9.3.3 The QSM shall include a brief listing and description of all the precast products being manufactured at the facility..... \_\_\_\_\_
- 9.3.4 The QSM shall present and define any significant terms used throughout the QSM..... \_\_\_\_\_
- 9.3.5 For all manufactured items addressed in the QSM, the applicable AASHTO, ASTM, or CDOT specification shall be identified..... \_\_\_\_\_
- 9.3.6 The QSM shall present the personnel structure established to implement the Manufacturer's quality system. The specific roles and responsibilities of all QC personnel shall be documented as follows:..... \_\_\_\_\_

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YES/NO/NA

- 9.3.6.1 The QSM shall contain an organizational chart. The chart shall indicate a clear separation between the QC personnel and the production personnel. The QC Manager shall be allowed direct access to top management, independent from production..... \_\_\_\_\_
  
- 9.3.6.2 Each facility shall have a Quality Control Manager who has the overall responsibility for implementing the requirements of the QSM. At least one QC Manager shall be on-site during production. The QC Manager shall review the established QC system annually in order to satisfy this requirement, or if changes in the manufacturing process(s) occur, or whenever technical or CDOT information indicate a trend in reduced quality..... \_\_\_\_\_
  
- 9.3.6.3 Each facility shall have at least one Quality Control Technician to perform QC sampling, testing, and inspection. At least one QC Technician shall be on-site during production. The QC Technicians shall be familiar with the tests they perform and have sufficient authority to assure corrective actions are carried out when necessary. The QSM shall indicate the line of authority of the QC Technicians, which shall demonstrate their authority to require corrective action. The QSM shall designate the certified QC Technicians at the facility and laboratory involved in the production or testing of the precast concrete structures..... \_\_\_\_\_
  
- 9.4 The QSM shall contain a description of the certifications required and attained and years of experience for each QC Manager and QC Technician. All QC sampling, testing, and inspection personnel shall be certified by ACI Concrete Field Technician Level 1 or higher. Plants certified by NPCA shall have at least one QC Manager and at least one QC Technician who has successfully completed the NPCA's Production and Quality School or ACPA's approved equivalent. The QSM shall also include periodic auditing of each QC technician's ability to satisfactorily perform the required tests. Retraining shall be provided when the test method is revised..... \_\_\_\_\_
  
- 9.5 The QSM shall provide for specific training for frontline production personnel in the safe and correct operating procedures implemented to ensure the required quality of all precast concrete structures..... \_\_\_\_\_
  
- 9.6 The Manufacturer shall maintain its own accredited or qualified laboratory to perform QC testing. The QSM shall include the address and telephone numbers of a designated backup accredited or qualified laboratory. The laboratory shall meet the minimum accreditations or qualifications obtained through one or more of the following programs depending on the casting process:..... \_\_\_\_\_

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YES/NO/NA

## 9.6.1 For “dry” cast plant laboratories:

9.6.1.1 National accreditation programs such as AASHTO Accreditation Program or American Association for Laboratory Accreditation..... \_\_\_\_\_

9.6.1.2 Either the Manufacturing industry’s American Concrete Pipe Association’s Q-Cast program or the National Precast Concrete Association Certification program..... \_\_\_\_\_

## 9.6.2 For “conventional”, “wet”, or “Self-Compacting” cast plant laboratories:

9.6.2.1 National accreditation programs such as AASHTO Accreditation Program or American Association for Laboratory Accreditation..... \_\_\_\_\_

9.6.2.2 The Manufacturing industry’s National Precast Concrete Association Certification program..... \_\_\_\_\_

9.7 The QSM shall contain an inventory of the major equipment used for sampling and testing along with associated calibration equipment used for each required test procedure..... \_\_\_\_\_

The QSM shall assign a unique identification number to each piece of testing equipment..... \_\_\_\_\_

### The QSM inventory for each major piece of equipment shall include the following information:

9.7.1 The name of each major piece of equipment, date placed in service, manufacturer, model and serial number. The QSM shall include the location where the instructions for use and operation of each major piece is stored if not included in the QSM..... \_\_\_\_\_

9.7.1.1 For each major piece of equipment, the QSM shall include the interval of calibration or verification, a reference to the calibration or verification procedures used, and the location where the current calibration or verification records are stored. The QSM shall describe the methods for ensuring that the calibration and verification procedures are performed at the specified intervals..... \_\_\_\_\_

9.8 The QSM shall identify all types of supplier delivered materials used for the production of precast concrete structures..... \_\_\_\_\_

9.8.1 The QSM shall contain a copy of the signed certification from each steel supplier that all steel products delivered to the manufacturer will be from products manufactured in the United States of America as stipulated in Section 6 of this Standard..... \_\_\_\_\_

9.8.1.1 The QSM shall include the manufacture’s process for tracking and submitting the Mill Test Reports on reinforcing steel permanently incorporated into each segment of precast concrete box culverts delivered to a CDOT project..... \_\_\_\_\_

9.8.2 The QSM shall contain a description of the specification requirements for all supplier delivered..... \_\_\_\_\_

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YES/NO/NA

- 9.8.3 The QSM shall contain a description of the certification and test reports delivered by the supplier and a location where these records are stored..... \_\_\_\_\_
- 9.8.4 The QSM shall include all QC testing of the supplied materials and shall contain a statement that no raw materials shall be used unless they are on the APL or they have been tested and meet all appropriate CDOT, AASHTO, or ASTM specifications..... \_\_\_\_\_
- 9.8.5 All supplier delivered materials shall be properly stored to prevent damage, contamination, or other alterations prior to use in production. The QSM shall include procedures for the adequate storage of supplied materials..... \_\_\_\_\_
- 9.9 The QSM shall describe the procedure and frequency for inspection and selection of material samples during production. Sampling shall be performed on a stratified random procedure in accordance with ASTM D 3665. All random QC sample locations shall be properly documented and these procedures shall be included in the QSM..... \_\_\_\_\_
- 9.10 The QSM shall contain descriptions and examples of the test report forms used by the manufacturer. The QSM shall identify the individual(s) responsible for maintaining all test records and reports along with the location where the reports are stored..... \_\_\_\_\_
- 9.10.1 The test reports shall be maintained and available for inspection for a minimum of three years..... \_\_\_\_\_
- 9.11 The QSM shall contain a description of the procedures used to identify and document all material or test results that do not conform to specification requirements. The QSM shall contain provisions for resolving non-conforming material or test results..... \_\_\_\_\_
- 9.12 The QSM shall include drawings, with dimensions, of the forms used to produce precast concrete structures for CDOT..... \_\_\_\_\_
- 9.12.1 Drawings and dimensions for precast modular concrete bridges will not be required with the QSM. However, they shall be submitted to Staff Bridge in accordance with Subsection 105.02 of the Standard Specifications..... \_\_\_\_\_
- 9.13 The QSM shall describe the method used to permanently mark the precast concrete structure in accordance with the appropriate AASHTO or ASTM standard..... \_\_\_\_\_
- 9.14 The QSM shall describe procedures used to properly handle, store, and ship precast concrete structures..... \_\_\_\_\_

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CDOT Reviewers Comments:

CDOT Reviewers Signature

Approving Engineer Comments:

CDOT Approving Engineer Signature