METHODS OF SAMPLING AND TESTING
MT 110-24
METHOD OF ACCEPTANCE FOR
REINFORCED CONCRETE PIPE AND OTHER PRECAST ITEMS
(*Montana Test Method)*

1 Scope

This procedure defines inspection requirements and verification processes for all suppliers of precast concrete pipe and other precast concrete products. Plant inspections will be conducted by an MDT Inspector or designated representative.

2 Referenced Documents

AASHTO

M 85 Portland Cement
M 170 Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
M 206 Reinforced Concrete Arch Culvert, Storm Drain, and Sewer Pipe
M 207 Reinforced Concrete Elliptical Culvert, Storm Drain, and Sewer Pipe
M 259 Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains, and Sewers
M 336 Steel Wire and Welded Wire, Plain and Deformed, for Concrete Reinforcement
T 22 Compressive Strength of Cylindrical Concrete Specimens
T 24 Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
T 119 Slump of Hydraulic Cement Concrete
T 152 Air Content of Freshly Mixed Concrete by the Pressure Method
T 309 Temperature of Freshly Mixed Portland Cement Concrete
T 345 Passing Ability of Self-Consolidating Concrete (SCC) by J-Ring
T 347 Slump Flow of Self-Consolidating Concrete

ASTM

C361 Standard Specification for Reinforced Concrete Low-Head Pressure Pipe
C497 Method of Testing Concrete Pipe and Tile

MT Materials Manual

MT 101 Making and Curing Compressive and Flexural Strength Test Specimens in the Field
MT 117 Making and Curing Concrete Compressive and Flexural Strength Specimens in the Field for Self-Consolidating Concrete (SCC)

3 Definitions

ACPA – American Concrete Pipe Association
NPCA – National Precast Concrete Association
PCI – Prestressed Concrete Institute

4 Inspection Process for Certified Plants on the Qualified Products List

4.1 Each participating manufacturer must maintain sufficient procedures and documentation to assure that their products are manufactured and tested in accordance with the guidelines of ACPA, NPCA, and/or PCI certification programs. An MDT Inspector will conduct a thorough inspection of each Certified Plant to verify compliance with these requirements.

4.1.1 Annual Inspection

Certified plants listed on MDT's Qualified Products Lists will be inspected annually.

The inspector will verify the following items.

- ACPA, NPCA, and/or PCI certification.
- The Quality Control Manual and applicable AASHTO and ASTM standards, organizational chart, and personnel training and qualification records.
- Production and testing equipment has been properly calibrated according to the calibration requirements as stated in the Quality Control Manual.
- Mix designs have been approved.
- Documents are maintained for all suppliers of materials for the months the plant is producing.
    - Cementitious Materials and Admixtures Certifications
    - Gasket and Joint Sealant Material Certifications and Test Reports
        - Verify 12" to 33" have been sampled/tested at 1/300 frequency
        - Verify 36" and larger have been sampled/tested at 1/100 frequency
- Test reports are maintained per ACPA, NCPA, and/or PCI testing frequencies for the following.
    - Absorption Test Results (ASTM C497 Method of Testing Concrete Pipe and Tile)
    - Three-Edge Bearing Test (ASTM C497 Method of Testing Concrete Pipe and Tile)
- Reinforcing steel used on MDT projects must come from sources identified on the Qualified Products List and meet Buy America requirements (Specifications §106.09 and 23 CFR 635.410).

The inspector will also conduct the following.

- Witness or perform concrete cylinder sampling and testing.

4.1.2 Monthly or Frequency Based

Approximately once a month, unless another frequency is defined, certified plants will be inspected to verify certification reports, test results, and other records from the previous inspection date to present.

The inspector will verify the following items.

- Any deficiencies recorded from the previous inspection have been addressed.
- Ensure that the plant meets Buy America requirements (Specifications §106.09 and 23 CFR 635.410) for all steel products.
- The following documentation has been maintained.
    - Buy America Certification
    - Cementitious Material and Admixture Certifications and Test Reports
    - Sieve Analysis of Fine and Coarse Aggregates (once every 3 months)
    - Cylinder Break Strength Results and Frequencies
- Fabricated cages and reinforcement conform to MDT specifications.

- A dimensional test report on one pipe size to ensure that dimensions match MDT Detailed Drawings or AASHTO Standard Specifications.

The inspector will also conduct the following:

- Witness concrete cylinder testing and verify cylinder testing is being performed correctly on certified equipment by ACI certified technicians and meets MDT requirements.

- Observe or perform the following concrete tests.

Test	Test Method
Slump	AASHTO T 119 Slump of Hydraulic Cement Concrete
Air Content	AASHTO T 152 Air Content of Freshly Mixed Concrete by the Pressure Method
Temperature	AASHTO T 309 Temperature of Freshly Mixed Portland Cement Concrete
Cylinders	MT 101 Making and Curing Compressive and Flexural Strength Test Specimens in the Field MT 117 Making and Curing Concrete Compressive and Flexural Strength Specimens in the Field for Self-Consolidating Concrete (SCC)
Cylinder Testing	AASHTO T 22 Compressive Strength of Cylindrical Concrete Specimens
Slump Flow (when applicable)	AASHTO T 347 Slump Flow of Self-Consolidating Concrete
J-Ring (when applicable)	AASHTO T 345 Passing Ability of Self-Consolidating Concrete (SCC) by J-Ring
Three-Edge Bearing	ASTM C497 Method of Testing Concrete Pipe and Tile

- Observe destructive testing in the form of crushing precast pipe and other precast items in conjunction with the three-edge bearing tests. The Inspector will randomly select a precast pipe sample to be tested. Verify the size, amount, and origin of the reinforcing steel. Coring and random inspections will be performed on Concrete Box culverts and miscellaneous precast items such as cutoff walls, cattle guard bases, flared end terminal sections (FETS), and sound walls as directed by MDT.

5 Inspection of Out-of-State Certified Plants on the Qualified Products List

Inspection of out-of-state certified plants that produce precast products infrequently for MDT will only be inspected during production. At the beginning of production, the inspector will follow the inspection procedures for the annual inspection provided in Section 4.1.1. Then during the remainder of production, the inspector will inspect the plant monthly in accordance with Section 4.1.2.

6 Final Field Inspection

6.1 Final inspection and acceptance will be made in the field in accordance with MDT's Culvert and Pipe Installation and Inspection Manual.

6.2 If a product is to be rejected in the field, place an X on the product. This mark indicates that the product is rejected for all MDT projects. If the product requires repairs, but is not necessarily rejected, mark areas requiring repair to clearly designate and track what needs correction prior to acceptance.

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