METHODS OF SAMPLING AND TESTING
MT 110-12
METHOD OF ACCEPTANCE FOR
REINFORCED CONCRETE PIPE AND OTHER PRECAST ITEMS
(*Montana Test Method)*

1 Scope

1.1 This procedure defines inspection responsibilities and verification processes applicable to all suppliers of pre-cast concrete pipe and associated items.

2 Referenced Documents

AASHTO

M 55 Steel, Welded Wire Reinforcement, Plain, for Concrete
M 85 Portland Cement
M 170 Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
M 206 Reinforced Arch Concrete Culvert, Storm Drain, and Sewer Pipe
M 207 Reinforced Elliptical Concrete Culvert, Storm Drain, and Sewer Pipe
M 259 Precast Reinforced Concrete Box Sections for Culvert, Storm Drains, and Sewers
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 347 Slump Flow of Self-Consolidating Concrete

ASTM

C361 Standard Specification for Reinforced Concrete Low-Head Pressure Pipe

MT Materials Manual

MT 101 Making and Curing Compressive and Flexural Strength Test Specimens in the Field
MT 108 Sampling and Certification of Portland Cement
MT 117 Making and Curing Concrete Compressive and Flexural Strength Specimens in the Field for Self-Consolidating Concrete (SCC)
MT 118 Method of Determining Air Content of Freshly Mixed Self Consolidating Concrete by the Pressure Method

MDT Construction Bureau

Manual for Culvert and Pipe Installation and Inspection

3 Definitions

ACPA – American Concrete Pipe Association
NPCA – National Precast Concrete Association

4 Inspection Process for ACPA and NPCA Certified Plants

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 and/or NPCA certification programs. An MDT Inspector will conduct a thorough inspection of each Certified Plant to verify compliance with these requirements. Plants meeting these requirements will be listed on the Qualified Products List.

4.1.1 Yearly

Inspection Checklist

- Verify ACPA and/or NPCA certification.
- Verify that certified manufacturing plants have a Quality Control Manual, applicable AASHTO, ASTM standards, organizational chart, and personnel training and qualification records.
- Verify that production and testing equipment has been properly calibrated according to the calibration requirements as stated in the Quality Control manual.
- Verify mix designs are approved.
- Verify that the manufacturers detailed design information meets MDT requirements.
- Verify that documents are maintained for all suppliers of materials for the months the plant is producing.
    - Admixture 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
- Verify that test reports are maintained per ACPA and/or NCPA testing frequencies for the following:
    - Absorption Test Results
    - Three Edge Bearing Test
- Conduct Monthly or Frequency Based Inspection outlined in Sec. 4.2
- Sample concrete cylinders and reinforcing steel for Department testing.
- Verify that any deficiencies recorded from the previous inspection have been addressed.

4.2 Monthly or Frequency Based

Approximately once a month, unless another frequency is defined, inspect the fabricating plant’s certification reports, test results, and other records from the previous inspection date to present. Ensure that the plant is ‘Buy America’ compliant for all steel products. Witness concrete cylinder testing is being performed correctly on certified equipment and meets MDT requirements.

Inspection Checklist

- Verify that any deficiencies recorded from the previous inspection have been addressed.
- Verify the following documentation has been maintained:
    - Buy America Certification
    - Cement Mill Reports
    - Sieve Analysis of Fine and Coarse Aggregates (once every 3 months)
    - Fly Ash Certifications
    - Other Cementitious Material Certifications and Test Reports
    - Cylinder Break Strength Results and Frequencies
- Verify fabricated cages and reinforcement conforms to MDT specifications.
- Verify a dimensional test report on one pipe size to ensure that they match the dimensions shown on the detailed drawings or AASHTO Standard Specifications.

- Observe or perform the following concrete tests:
    - Slump
    - Air Content
    - Temperature of the mix
    - Making of cylinders
    - Cylinder compression testing
    - Slump Flow (when applicable)
    - J Ring (when applicable)
    - Three Edge Bearing Test including Destructive Testing outlined in Section 4.3 (once every 3 months)

4.3 Observe destructive testing in the form of crushing precast pipe and other precast items in conjunction with the three edge bearing tests. Inspector will randomly select 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, FETS, and sound walls as directed by MDT.

5 Inspection Process for Non-Certified Plants

5.1 Inspect non-certified plants to confirm the products meet MDT specifications. Sample components i.e. concrete, reinforcing steel and other items. Check fabrication drawings and inspect the final product for quality. The plant's quality control program must be sufficient that MDT can confirm quality of materials and processes used. MDT level of inspection will vary according to Department needs.

- Verify personnel training and qualification records.
- Verify production and testing equipment has been properly calibrated.
- Verify mix designs are approved.
- Verify that the manufacturers detailed design information meets MDT requirements.
- Verify fabricated cages and reinforcement conforms to MDT specifications.
- Verify a dimensional test report on product to ensure that they match the dimensions shown on the detailed drawings or AASHTO Standard Specifications.
- Verify rate and frequency of testing is adequate and Quality Control records are maintained.
- Verify the following documentation has been maintained and required samples have been acquired:
    - Buy America Certifications and reinforcing steel samples
    - Cement Mill Reports
    - Aggregate samples for Sieve Analysis of Fine and Coarse Aggregates
    - Fly Ash Certifications
    - Other Cementitious Material Certifications and Test Reports
    - Cylinder Break Strength Results and Frequencies
    - Admixture Certifications
    - Gasket and Joint Sealant Material Certifications and Test Reports
- Observe or perform the following concrete tests:
    - Slump
    - Air Content
    - Temperature of the mix
    - Making of cylinders
    - Cylinder compression testing
    - Slump Flow (when applicable)
    - J Ring (when applicable)
    - Concrete Absorption
    - Three Edge Bearing Test or verification of test results

- Verify concrete cylinders are made and tested periodically to represent the concrete placed in all items.

- Concrete items other than concrete pipe will be entered on Form 19A. These items, together with pipe too large to test, are represented by cylinder tests as outlined above.

6 Mark of Inspection

6.1 Products manufactured at a certified plant will not carry the mark of inspection. Non-certified manufacturers of concrete pipe and other concrete items must notify MDT when producing products for a project so that inspection arrangements can be made. All concrete products produced by a non-certified plant must carry a mark of inspection. (see Figure 1). This will be stamped on each section of product, by the inspector, where it will be clearly visible. The circle M indicates the product was inspected. Final acceptance will be made in the field.

6.2 If a product is to be rejected in the field, place an X next to the product identification stamp. 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.



Figure 1
CIRCLE M STAMP