

SECTION 33 05 13
MANHOLES AND CATCH BASINS

PART 1 GENERAL

1.01 REFERENCES

- A. The following is a list of standards that may be referenced in this section:
1. ASTM International (ASTM):
 - a. A36, Standard Specification for Carbon Structural Steel.
 - b. A48, Standard Specification for Gray Iron Castings.
 - c. A123, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - d. A167, Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - e. A240, Standard Specification for Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels.
 - f. A536, Standard Specification for Ductile Iron Castings.
 - g. A615/A615M, Standard Specification for Rail-Steel Deformed and Plain Bars for Concrete Reinforcement.
 - h. B139, Standard Specification for Phosphor Bronze Rod, Bar, and Shapes.
 - i. C14, Standard Specification for Concrete Sewer, Storm Drain, and Culvert Pipe.
 - j. C387, Standard Specification for Packaged, Dry, Combined Materials for Mortar and Concrete.
 - k. C443, Standard Specification for Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.
 - l. C478, Standard Specification for Precast Reinforced Concrete Manhole Sections.
 - m. C923, Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals.
 - n. D4101, Standard Specification for Propylene Plastic Injection and Extrusion Materials.
 - o. F593, Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
 - p. F594, Standard Specification for Stainless Steel Nuts.

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1.02 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:
 - a. Precast Manholes and Catch Basins: Details of construction.
 - b. Precast Base, Cones, and Top Slab Sections: Details of construction.

B. Informational Submittals:

1. Precast Manhole Sections: Manufacturer's results of tests performed on representative sections to be furnished.
2. Certified load test data for precast manhole steps.

PART 2 PRODUCTS

2.01 PRECAST MANHOLES

A. Riser Sections:

1. Minimum 48 inches in diameter.
2. Fabricate in accordance with ASTM C478.
3. Minimum Wall Thickness: 4 inches or 1/12 times inside diameter, whichever is greater.
4. Top and bottom shall be parallel.
5. Joints: Tongue-and-groove or confined groove with mortar.

B. Cone Sections and Top Sections:

1. Provide eccentric cones unless flat top section shown on Drawings.
2. Same wall thickness and reinforcement as riser section.
3. Top and bottom shall be parallel.
4. Flat tops shall be H20 load rated.

C. Base Sections and Base Slab:

1. Base Sections: Base slab integral with sidewalls.
2. Fabricate in accordance with ASTM C478.

D. Extensions:

1. Concrete grade rings; maximum 6 inches high.
2. Fabricate in accordance with ASTM C478.

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E. Preformed Plastic Gaskets:

1. Hamilton Kent of Nevada, Sparks, NV; Kent-Seal No. 2, or equal.

F. Polypropylene Steps:

1. Fabricate from minimum 1/2 inch, Grade 60, steel bar meeting ASTM A615/A615M.
2. Polypropylene encasement shall conform to ASTM D4101.
3. Minimum Width: 13 inches, center-to-center of legs.
4. Embedment: 3-1/2-inch minimum and 4-1/2-inch minimum projection from face of concrete at point of embedment to center of step.
5. Cast in manhole sections by manufacturer.
6. Load Test: Capable of withstanding ASTM C478 vertical and horizontal load tests.

G. Source Quality Control:

1. All test specimens shall be mat tested and meet permeability test requirements of ASTM C14.
2. Conduct tests at point of manufacture prior to delivery of any section.
3. Sections to be tested will be selected at random from stockpiled material to be supplied for the Project.

2.02 CATCH BASINS

A. Riser Sections:

1. Fabricate according to ASTM C478.
2. Minimum wall thickness: As shown.
3. Top and bottom shall be parallel.
4. Joints: Tongue-and-groove or confined groove with mortar.

B. Top Sections:

1. Same wall thickness and reinforcement as Riser Sections.
2. Top and bottom shall be parallel.
3. Flat ops shall be H2O load rated.

C. Base Sections and Box Slab:

1. Base sections: Base slab integral with sidewalks.
2. Fabricate in accordance with ASTM C478.

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D. Extensions:

1. Concrete grade adjustments: Maximum 6 inches high.
2. Fabricate in accordance with ASTM C478.

E. Preformed Plastic Gaskets:

1. Hamilton Kent of Nevada, Sparks, NV; Kent-Seal No. 2, or equal.

F. Polypropylene Steps:

1. Fabricate from minimum 1/2 inch, Grade 60, steel bar meeting ASTM A615/A615M.
2. Polypropylene encasement shall conform to ASTM D4101.
3. Minimum Width: 13 inches, center-to-center of legs.
4. Embedment: 3-1/2-inch minimum and 4-1/2-inch minimum projection from face of concrete at point of embedment to center of step.
5. Cast in manhole sections by manufacturer.
6. Load Test: Capable of withstanding ASTM C478 vertical and horizontal load tests.

G. Source Quality Control:

1. All test specimens shall be mat tested and meet permeability test requirements of ASTM C14.
2. Conduct tests at point of manufacture prior to delivery of any section.
3. Sections to be tested will be selected at random from stockpiled material to be supplied for the Project.

2.03 FRAMES AND COVER

A. Castings:

1. Tough, close-grained gray iron, sound, smooth, clean, free from blisters, blowholes, shrinkage, cold shuts, and defects.
2. Cast Iron: ASTM A48 Class 30B.
3. Ductile Iron: ASTM A536, Grade 60-40-12.
4. Plane or grind bearing surfaces to ensure flat, true surfaces.

B. Catch Basins:

1. Neenah Frame R-3077, Grade Type L.
2. Approved equal.

C. As shown.

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2.04 MORTAR

- A. Standard premixed in accordance with ASTM C387, or proportion one part portland cement to two parts clean, well-graded sand that will pass a 1/8-inch screen.
- B. Admixtures: May be included but do not exceed the following percentages of weight of cement:
 - 1. Hydrated Lime: 10 percent.
 - 2. Diatomaceous Earth or Other Inert Material: 5 percent.
- C. Mix Consistency:
 - 1. Tongue-and-Groove Type Joint: Such that mortar will readily adhere to pipe.
 - 2. Confined Groove (Keylock) Joint: Such that excess mortar will be forced out of groove and support is not provided for section being placed.

2.05 CLEANOUT FRAMES AND COVERS

- A. Castings:
 - 1. Tough, close-grained gray iron, sound, smooth, clean, free from blisters, blowholes, shrinkage, cold shuts, and defects.
 - 2. Cast Iron: ASTM A48, Class 30B.
 - 3. Ductile Iron: ASTM A536, Grade 65-40-12.
 - 4. Plane or grind bearing surfaces to ensure flat, true surfaces.
- B. Covers: True and seat within frame at all points.

2.06 IMPORTED PIPE BASE

- A. Furnish as specified in Section 31 23 23.15, Trench Backfill.

2.07 FLEXIBLE JOINTS

- A. Manufacturers:
 - 1. "Kor-N-Seal" flexible rubber boot with stainless steel accessories as manufactured by NPC, Inc., Milford, New Hampshire.
 - 2. "Z-LOK XP" or "A-LOK" flexible connectors as manufactured by A-LOK Products, Inc., Tullytown, PA.

PART 3 EXECUTION

3.01 GENERAL

- A. Remove and keep all water clear from the excavation during construction and testing operations.
- B. Place imported pipe base material on undisturbed earth; thoroughly compact with a mechanical vibrating or power tamper.

3.02 EXCAVATION AND BACKFILL

- A. Excavation: As specified in Section 31 23 16, Excavation.
- B. Backfill: As specified in Section 31 23 23.15, Trench Backfill.

3.03 INSTALLATION OF PRECAST MANHOLES AND CATCH BASINS

- A. Concrete Base:
 - 1. Precast:
 - a. Place on compacted imported base material.
 - b. Properly locate, ensure firm bearing throughout, and plumb first section.
- B. Sections:
 - 1. Carefully inspect precast manhole sections to be joined.
 - 2. Thoroughly clean ends of sections to be joined.
 - 3. Do not use sections with chips or cracks in the tongue.
 - 4. Locate precast steps in line with each other to provide a continuous vertical ladder.
- C. Mortar Joints:
 - 1. Thoroughly wet joint with water prior to placing mortar.
 - 2. Place mortar on groove of lower section prior to section installation.
 - 3. Fill joint completely with mortar of proper consistency.
 - 4. Trowel interior and exterior surfaces smooth on standard tongue-and-groove joints.
 - 5. Prevent mortar from drying out and cure by applying an approved curing compound or comparable approved method.
 - 6. Do not use mortar mixed for longer than 30 minutes.
 - 7. Chip out and replace cracked or defective mortar.
 - 8. Completed Manholes: Rigid and watertight.

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- D. Preformed Plastic Gaskets (In lieu of mortar joints):
 - 1. Use only pipe primer furnished by gasket manufacturer.
 - 2. Install gasket material in accordance with manufacturer's instructions.
 - 3. Completed Manholes shall be rigid and watertight.
- E. Rubber Gasketed Joints: Install in accordance with manufacturer's instructions.
- F. Extensions:
 - 1. Provide on manholes in streets or other locations where a subsequent change in existing grade may be likely.
 - 2. Install to height not exceeding 12 inches.
 - 3. Lay grade rings in mortar with sides plumb and tops level.
 - 4. Seal joints with mortar as specified for sections, and make watertight.

3.04 MANHOLE INVERT

- A. Construct with smooth transitions to ensure an unobstructed flow through manhole. Remove sharp edges or rough sections that tend to obstruct flow.
- B. Where full section of pipe is laid through manhole, break out top section as shown and cover exposed edge of pipe completely with mortar. Trowel mortar surfaces smooth.

3.05 MANHOLE FRAMES AND COVERS

- A. Set frames in bed of mortar with mortar carried over flange as shown.
- B. Set tops of covers flush with surface of adjoining pavement or ground surface, unless otherwise shown or directed.

3.06 MANHOLE PIPING

- A. Flexible Joints:
 - 1. Provide in pipe not more than 1-1/2 feet from manhole walls.
 - 2. Where last joint of pipe is between 1-1/2 and 6 feet from manhole wall, provide flexible joint in manhole wall.

3.07 CONNECTIONS TO EXISTING MANHOLES

- A. Core drill existing manhole bases.

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- B. Clean all surfaces and apply a bonding agent.
- C. Regrout to provide smooth flow into and through manholes.
- D. Provide diversion facilities and perform work necessary to maintain flow during connection.

END OF SECTION