

GENERAL:

The scope of this document is to provide instruction for the installation of steam manholes.

DESIGN GUIDELINES:

1. General

- 1.1. All new manholes shall be fully dimensioned, and designed so as to contain that which is intended with additional room provided for accessibility to mechanical and electrical equipment, operation of equipment, accessibility for construction and future maintenance, including removal and replacement of valves and expansion joints. Work space allowance shall take into account insulation on lines.
- 1.2. Internal dimensions of steam manholes should never be smaller than 6' wide x 6' long x 7' high. Manhole shall have 12" minimum clearance from any pipe or piece of maintainable equipment to the top, bottom or side of manhole.
- 1.3. Manhole entry locations shall be coordinated to allow for full access to equipment and maintenance spaces.
- 1.4. All manholes shall have ladders. Manhole entry shall not be located in streets where possible.
- 1.5. Outside surfaces of all sub grade walls, roof and risers of new manholes shall be waterproofed as described in Section 336354 General Concrete Requirements – Waterproofing.
- 1.6. Manhole shall be made with reinforced concrete with smooth surfaces either cast or precast.
- 1.7. Manhole shall be vented by two openings: a 6" diameter vertical pipe installed outside of the manhole entering the manhole 6" off the floor, and a 6" diameter vent in manhole top. See drawing: "Construction Standard – Manhole Vent Detail."
- 1.8. Manholes shall have means of removing water either by gravity drain to daylight or storm sewer, or by mechanical pumping.
- 1.9. Sump pits for mechanical pumps shall have internal dimensions of 24"x24"x24".
- 1.10. Structural Steel and Anchor Bolts
 - 1.10.1. Miscellaneous structural steel, plates, etc. for pipe supports, guides and anchors in manholes shall be ASTM A36 of sizes and shapes needed. No tubular structural members allowed.
 - 1.10.2. All structural steel members and end plates shall be hot dipped galvanized. Any galvanizing damaged by welding or erection shall be cleaned, heated and repaired with lead free galvanized self-fluxing repair solder.. Surface preparation shall include power disk sanding the abraded or welded area to bright metal and heating to 600 degrees F.
 - 1.10.3. Miscellaneous plates and pipe used for supports/anchors shall be cleaned and painted with zinc rich paint.
 - 1.10.4. Expansion bolts and nuts used in connection with pipe support structures shall be hot dipped galvanized, "Kwik Bolt III" as manufactured by Hilti Inc., Tulsa OK, approved equal. All are to be installed per manufacturer's

written instructions.

1.11. Electrical Requirements

- 1.11.1. An electric service shall be provided for any manhole with a sump pump.
- 1.11.2. Aluminum conduit and XHHW wire shall be used for feeding receptacles and junction boxes, and galvanized steel receptacle boxes with stainless steel covers shall be used. See drawing: "Construction Standard – Sump Pump Installation."
- 1.11.3. Use NEMA 4X stainless steel junction boxes with stainless steel inner back panel and hinged gasketed door with "fast-operating" stainless steel clamps. Box shall be mounted to manhole wall on hot-dipped galvanized steel u-channel supports.

2. Installation

- 2.1. Formwork shall be constructed such that the finished concrete surfaces are free of any abrupt dimensional changes requiring extensive corrective work such as patching or grinding and that formed concrete will conform to dimensional tolerances. Steam System Anchor blocks for manholes. Steam thrust anchor block shall be poured integral to floor. Minimum 12" tall and 12" either side of base plate. hot dipped galvanized base plate to be cast into anchor block.
- 2.2. All rebar shall be covered with at least 2" concrete cover.
- 2.3. All manholes should be deep enough such that they can be waterproofed and covered with protective hardboard cover before landscaping is restored, or concrete sidewalks or drives are poured.
- 2.4. Do not install manhole in area where run off water will be routed in to manhole.
- 2.5. Welding and Brazing
 - 2.5.1. All welding, brazing, soldering and cutting work shall conform to applicable provisions of the following codes and requirements:
 - 2.5.1.1. American National Standards Institute (ANSI) B31.1 (latest) Power Piping and Addenda
 - 2.5.1.2. American Welding Society (AWS) D1.1 (latest) Structural Welding Code
 - 2.5.2. Welding and brazing shall be performed only by skilled welders. Welders, and welding and brazing procedures shall be qualified in accordance with Section IX of the ASME Boiler and Pressure Vessel Code. A record shall be maintained on the job showing the date and results of qualification test for each welder employed on the job. One certified copy of the qualification test for each welder so employed shall be furnished to the Owner's Representative.

3. Commissioning

- 3.1. Energy Management shall approve all finished work on the installation of manhole accessories.
- 3.2. All manholes shall be cleaned of all dirt, debris, insulation, welding rods, etc. and inspected by Owner's Representative before put in to service.