

**CITY OF KANSAS CITY, MISSOURI**

**SUPPLEMENT TO**

**APWA STANDARD SPECIFICATIONS AND DESIGN CRITERIA  
SECTION 2500 SANITARY SEWERS**

This is Kansas City, Missouri supplement to Section 2500, Sanitary Sewers (December 16, 1992) APWA Standard Specification and Design Criteria. The following additions, deletions and/or revisions are adopted for use and shall become a part of Section 2500 for use within Kansas City, Missouri.

Copies of this Supplement may be obtained from the permit counter on the 18th floor of City Hall.

Section headings and changes from APWA are **highlighted** for clarity. Changes made in this supplement are marked by an asterisk, “\*”.

2503 MATERIALS

2503.2 Subsection 2503.2.6 shall be revised to read as follows:

2503.2.6 Type PSM polyvinyl chloride (PVC) Sewer Pipe and Fittings: 6 through 15 inch diameter pipe and fittings shall conform to ASTM D 3034 and pipe having diameter 18 through 27 inch shall conform to ASTM F 679 except as otherwise specified herein.

- a. General: Furnish maximum pipe lengths normally produced by the manufacturer except for fittings, closures and specials.
- b. Materials: The pipe shall be made of PVC plastic having a cell classification of 12454 B or 12454 C or 13364 B as defined in ASTM D 1784.
- c. Design: Pipe shall have an integral bell and spigot joint. Wall thickness shall be SDR 35, **or SDR 26 for ASTM D 3034 pipe. Wall thickness shall be SDR 21 for ASTM D 2241 pipe. Wall thickness shall be T-1 for ASTM F 679 pipe.** If for any reason the depth of cover on SDR 35 pipe becomes greater than 15 feet, the contractor shall immediately notify the design engineer.
- d. Joints: Joint tightness shall conform to ASTM D 3212. Joints shall be push-on type only with the bell-end grooved to receive a gasket. Elastomeric seal (gasket) shall have a basic polymer of synthetic

rubber conforming to ASTM F 477. Natural rubber gaskets will not be accepted.

- e. Fittings: Fittings defined as tee (T) or wye (Y) connections suitable for assembly to four (4) inch or six (6) inch building service lines shall be bell-end with a minimum wall thickness conforming to SDR 35 and shall be furnished by the pipe manufacturer. A special design is required for service connections 8 inches and larger. Saddle tees or wyees will not be permitted during sewer main installation.

2503.3 Subsection 2503.3.2 shall be revised to read as follows:

2503 .3 .2 Bedding Aggregate: All material used for crushed stone pipe bedding shall be **three-eighth (3/8") inch clean limestone aggregate meeting the following gradation:**

<u>SIEVE SIZE GRADATION</u>	<u>PERCENT PASSING</u>
3/8"	100
# 4	30-45
#10	0-4

2506 INSTALLATION:

2506.2 Subsection 2506.2.5 shall be revised to read as follows.

2506.2.5 Pipe Embedments: All pipe embedment shall conform to Class B, **First Class Modified**, unless otherwise specified. Installation shall be in strict conformance with instructions for the appropriate Class being utilized.

All Class A concrete embedments for rigid conduits shall begin and end at a pipe joint.

2509 TESTING

2509.5 Subsections 2509.5.1.c and d shall be revised to read as follows.

\*2509.5.1c The mandrel shall be hand pulled **without any mechanical assistance**, by **one of** the Contractor's **personnel** through all flexible sewer lines. Any sections of sewer not passing the mandrel test shall be uncovered and the Contractor, at no additional cost to the Owner, shall **re-bed** or replace the sewer to the satisfaction of the Engineer. These repaired sections shall be re-tested.

2509.5.1.d The testing shall be conducted after final trench backfill.

D and L Dimensions For  
9 Arm Mandrel

<u>Nominal Diameter</u>	<u>L (Min)</u>	<u>ASTM 3034 SDR 35</u>	<u>ASTM 3034 SDR 26</u>	<u>ASTM 2241 SDR 21</u>	<u>ASTM 679 T-1 Wall</u>
8"	8"	7.52"	7.37"	7.41"	—
10"	10"	9.40"	9.21"	9.24"	—
12"	12"	11.19"	10.96"	10.96"	—
15"	15"	13.70"	13.42"	—	—
18"	18"	—	—	<b>15.47"</b>	<b>16.76"</b>
21"	21"	—	—	—	<b>19.74"</b>
24"	24"	—	—	<b>20.63"</b>	<b>22.21"</b>
<b>27"</b>	<b>27"</b>	—	—	<b>---</b>	<b>25.03"</b>

**The above dimensions were determined using the following formula:  
.95 x (Average O.D. - 2 x min. wall thickness)**

2510 MANHOLES AND SPECIAL STRUCTURES:

2510.3 Subsection 2510.3.5.a shall be revised to read as follows:

\* 2510.3.5.a Wall thickness not less than one-twelfth (1/12) of inside diameter **plus one (1) inch or five (5) inches**, whichever is greater.

2510.3 The following Subsections 2510.3.5.g., h. and i. shall be added:

2510.3.5.g **Both the bell and spigot ends of the manhole sections shall be primed with a liquid primer that is compatible with the bitumastic sealants, Kent-Seal, Ram-Nek, E-Z Stick or approved equal.**

\* 2510.3.5.h **Reducing sections may be used at six (6) feet or more above the invert.**

\* 25103 5.i **Eccentric cone sections shall be used unless noted otherwise on the project plans.**

2510.3 Subsection 25 10.3.8 shall be revised to read as follows:

\* 2510.3.8 Iron Castings: Casting shall conform to the requirements of ASTM A 48, **Class 35 B, ASUTO M396 and KCMO Standard MH-RC**. Castings shall be clean and without surface defects which will impair serviceability. Plugging or filling of holes or other defects will not be permitted. Parting fins and pouring gates shall be removed.

- a. **Rings and Covers:** Rings and covers shall meet the following minimum requirements and **Kansas City Standard MH-RC**.
- (1) Bearing surfaces between the ring and cover shall be machine finished or ground to assure interchangeability and non-rocking fit in any position.
  - (2) Provision shall be made for opening, such as concealed pick holes (s).
  - (3) Bolt-down type manhole rings shall be anchored to the manhole walls with not less than four (4) three-fourths (3/4) inch (**M18x2.5**) diameter steel bolts embedded a minimum of **four (4) inches, (100 mm), plus or minus one-half (1/2) inch, (10 mm), into the cone section of the manhole**, except where the entire ring is embedded in a concrete top slab.
  - \* (4) Rings and bolt-down covers shall be provided with machined surfaces, O-ring **or T-ring** gaskets **and cam locks**. **Camlock** bolt heads shall fit flush or below the top of the cover. The O-ring **or T-ring** rubber gasket shall be neoprene or other synthetic **material**, sixty (60) plus or minus five (5) hardness when measured by ASTM D 2240 type durometer.

b. **Steps:**

- (1) Cast-Iron Steps: Cast iron steps **are not allowed**.
- (2) Steel core, plastic coated steps (Note: the wording remains unchanged)

2510.6 Subsection 2510.6.1.c shall be revised and Subsection 2510.6.1.d added as follows:

- \* 2510.6.1 c. Poured-in-place bases shall have a minimum thickness of eight (8) inches. When poured-in-place bases are used, the invert shall be poured monolithically with the base. The bottom wall sections shall be embedded in the base section a minimum of three (3) inches. The bottom precast wall section shall not be set upon a previously poured base. Solid concrete blocks shall be used for supporting and leveling the wall section prior to pouring the base.

**Base thickness may be reduced to six (6) inches when it is poured on solid rock which meets the approval of the Engineer.**

**d. Poured-in-place bases shall extend to the first joint from the manhole when reinforced concrete and vitrified clay pipe is used without flexible joints as specified in Sections 2503.2.7.c and 2503.2.8.b**

\* 2510.6.3.c **Waterproofing: Apply coal-tar coating after the mortar coating has set forty-eight (48) hours. Minimum dry thickness of the coal-tar coating shall be 14.0 mils. Do not backfill until the coal-tar has set. Repair all damaged tar coating prior to final backfill. The joint between the manhole and the casting shall be wrapped in accordance with 2510.6.4.f.**

2510.6.4 Subsection 2510.6.4.d shall be revised to read as follows, and subsections 2510.6.4.e and 2510.6.4.f shall be added.

\* 2510.6.4.d **Construction: Precast sections shall be cleaned of all dirt, grass, and other deleterious matter. Seal each joint of adjustment rings and castings with a double bead of pre-formed bitumastic joint sealant. Seal each joint of manhole riser sections with a single bead of preformed bitumastic joint sealant.** Sections shall be placed such that steps are aligned but without rotation or damage to sealant integrity. Lift holes shall be patched **and the area between the pipe and precast section packed** with non-shrink grout.

\* 2510.6.4.e **Waterproofing: A coal-tar coating shall be applied to the exterior of all precast manhole sections, flat top sections, and adjustment rings. Application of the coal-tar coating shall be made after inspection and approval of the manhole sections and adjustment rings by the Public Works Engineering division materials and testing laboratory. The minimum dry thickness of the coal-tar coating shall be 14.0 mils. Backfill shall not be made until the coating shall be made prior to backfill.**

\*2510.6.4.f **Adjustment Ring Wrap: All adjustment rings shall be covered with an adhesive wrap of elastomeric and/or rubber materials (minimum thickness 0.065 inch), as approved by the Engineer. The wrap shall overlap the joint between the bottom of the casting and the upper adjustment ring and be continuous to the joint between the lower ring and manhole. The minimum overlap of a joint shall be 1 inch. The surface of the adjustment rings and the joints shall be primed with material compatible with the manufacturers recommendations.**

2510.6.8 Subsection 2510.6.8 shall be revised to read as follows:

\*2510.6.8 Inverts: Inverts shall be structural concrete and steel-troweled to produce a dense, smooth finish **and joint with the pipes, which shall project inside the manhole at all points, but not more than 6 inches at any point.** The invert channel shall be “U” shaped in cross section and extend upward one-half of the inside pipe diameter **if the pipe diameter is less than 18 inches. If the pipe diameter is 18 inches or greater, the “U” shaped invert shall extend upward for the full inside pipe diameter.**

2510.9 Subsection 2510.9.2 and 2510.9.3 shall be revised to read as follows:

2510.9.2 General: **All manholes shall be tested for infiltration and inflow.**

2510.9.3 Infiltration and Inflow testing: **All manholes shall be vacuum tested in the presence of the Engineer.**

**The vacuum test shall consist of properly sealing the manhole openings, applying a vacuum equivalent to ten inches of mercury, and measuring the time the manhole will hold an acceptable level of vacuum. The vacuum test shall be performed in accordance with the following procedures:**

- a. **Each manhole shall be tested after backfilling to, at least, the level of the bottom adjustment ring.**
- b. **The vacuum test shall include testing of the seal between the cast iron frame and the concrete cone, slab or top adjustment ring.**
- c. **All pipes entering the manhole shall be plugged at least eight inches into the sewer pipe. The plug must be inflated at a location beyond the manhole/pipe gasket.**
- d. **All plugs shall be adequately braced to prevent the plug or pipe from being dislodged and drawn into the manhole.**
- e. **A vacuum of at least ten and one-half inches of mercury shall be drawn on the manhole. Shut the valve on the vacuum line to the manhole and disconnect the vacuum line. Open the vacuum line valve and adjust the vacuum to ten inches of mercury.**

- f. The pressure gage shall be liquid filled having a 3.5-inch diameter face with a reading from zero to thirty inches of mercury. The test equipment shall be capable of having two gages connected. The gage supplied with the test equipment shall match the reading of a gage furnished by the Public Works Department. The gage reading is to be verified on each project.
- g. The time for the vacuum reading to drop from ten inches of mercury to nine inches of mercury must be equal to or greater than the following values for the manhole to be considered as passing the vacuum test:

Manhole Depth	Time (minutes)
10 feet or less	2
10.1 to 15 feet	2.5
15.1 to 25 feet	3

- h. If a manhole fails the vacuum test the manhole shall be uncovered and the leak repaired by patching the exterior of the manhole. The manhole shall then be backfilled and re-tested.

**The vacuum testing of manholes shall be done prior to air testing the sewer lines that enter or exit the manhole.**

This Supplement shall become effective July 1, 1998. It supersedes all previous supplements to this section.

Approved and adopted as Official Document No. 980221 this 27 day of MAY, 1998.

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