

Kansas Administrative Regulations

Kansas Department of Agriculture—Division of Water Resources

Article 40.—Design of Earth Dams

5-40-50. Pipes.

(a) Each pipe under or through an embankment shall meet the following requirements:

(1) Be capable of withstanding the external load without buckling, cracking, being damaged, or being deformed. The minimum internal diameter of the pipe shall not be reduced by more than the pipe manufacturer's stated allowable, long-term pipe deflection limit and in no case by more than five percent;

(2) be designed to adequately resist flotation;

(3) be impervious to water, with watertight joints and seams;

(4) except for drawdown pipes, be installed with sufficient slope to provide adequate drainage, with a minimum average slope of one percent after settlement. No pipe shall have an adverse grade through any section of pipe;

(5) if the pipe is installed in conjunction with a riser on a high-impact dam, be placed to insure that the requirements of paragraph (a)(4) are met and that all pipe sections are properly aligned after settlement of the foundation and consolidation of the embankment;

(6) have the discharge end extended a sufficient distance beyond the downstream toe of the dam to avoid erosion to the dam;

(7) be adequately supported at the discharge end to prevent deflection when the pipe is flowing full; and

(8) if the pipe is a primary spillway, be sized to evacuate 95 percent of the detention storage in 14 or fewer days.

(b) Steel cylinder-reinforced concrete pipe shall be acceptable for use in any dam if the design computations, plans, and specifications related to the placement of the pipe meet the minimum requirements of the manufacturer.

(c) In applying the provisions of subsections (c), (e), and (f), the depth of fill over the top of each pipe shall be measured from the top of the embankment after settlement has occurred. Reinforced concrete pipe shall be acceptable for use in a low-impact dam if less than 30 feet of fill will be placed over the pipe and if the design computations, plans, and specifications related to the placement of the pipe meet the minimum requirements of the manufacturer.

(d) Each metal pipe shall be coated with a protective coating adequate to prevent corrosion for the planned life of the dam, or the design report shall include an estimate of the expected life of the pipe, the expected life of the dam, and a plan for replacement of the pipe when it no longer functions as designed.

(e) Corrugated metal pipe shall be acceptable for use in any hazard class A or B dam if no more than 25 feet of fill is placed over the pipe.

(f)(1) Polyvinyl chloride pipe shall be acceptable for use in any dam if the maximum fill over the pipe does not exceed the depth specified in the following table:

Standard dimension ratio (SDR)	Maximum fill over top of pipe (feet)
SDR 17 and thicker	35
SDR 18	31
SDR 21	23
SDR 25	18
SDR 26	16
SDR 28	14

A pipe with walls thinner than SDR 28 shall not be used.

(2) Polyvinyl chloride pipe shall not be placed in high-plasticity soils.

(3) Each portion of polyvinyl chloride pipe that will be exposed to sunlight shall be protected as recommended by the manufacturer of the pipe or shall be encased in a protective material.

(g) Pipe materials other than those described in subsections (b) through (f) may be used if the applicant demonstrates that all of the following criteria are met:

(1) The pipe material, accounting for any protective measures that will be taken, has a minimum expected life of 25 years if exposed to sunlight or buried in soil with the same characteristics of the soil to be used to construct the dam.

(2) All of the pipe manufacturer's design recommendations are met by the plans and specifications for the dam and are documented in the design report.

(3) All of the pipe manufacturer's recommendations for bedding, supporting, and installing the pipe are included in the specifications for construction of the dam, except those specifications that are demonstrated in the design report to be inapplicable in the construction of the proposed dam.

(4) The design report includes an estimate of the life of the pipe, the life of the dam, and a plan to replace the pipe when it no longer functions as designed if the design life of the pipe is less than that of the dam.

(5) The design report demonstrates that the proposed placement and use of the pipe will meet the requirements of sound engineering principles and commonly accepted engineering practices.

(h) If the estimated life of a pipe is less than the estimated life of the dam, the permit shall contain the condition that the pipe shall be replaced when the pipe no longer functions properly.

(Authorized by K.S.A. 2006 Supp. 82a-303a; implementing K.S.A. 2006 Supp. 82a-302 and 82a-303a; effective May 18, 2007.)

***** Authenticated Kansas Administrative Regulation *****