

Kansas Administrative Regulations

Kansas Department of Agriculture—Division of Water Resources

Article 40.—Design of Earth Dams

5-40-54. Control of seepage along a conduit.

(a) Each conduit through any portion of a dam below the elevation of the permanent pool shall be constructed to protect the dam from seepage along the conduit by means of cutoff collars or a drainage diaphragm. Cutoff collars may be used only on hazard class A dams that are class sizes one and two.

(b) Each drainage diaphragm shall meet all of the following design criteria:

(1) Be installed so that the largest face is perpendicular to the conduit;

(2) be sized as follows:

(A) If the conduit is circular, the diaphragm shall extend a minimum of two feet or three times the outside diameter of the conduit, whichever is greater, from the outside surface of the conduit horizontally and vertically upward. The diaphragm shall extend vertically downward a minimum of two feet from the outside surface of the conduit;

(B) if the conduit is rectangular, the diaphragm shall extend minimum of two feet or three times the vertical dimension of the conduit, whichever is greater, from the outside surface of the conduit horizontally and vertically upward. The diaphragm shall extend vertically downward a minimum of two feet from the outside surface of the conduit;

(C) a drainage diaphragm shall not be required to penetrate unweathered bedrock; and

(D) the diaphragm shall not be required to extend vertically upward to an elevation higher than the crest of the auxiliary spillway;

(3) have a dimension parallel to the conduit that is at least three feet thick;

(4) except as specified in subsection (d), be located downstream of the centerline of the dam, downstream of the cutoff trench, and far enough upstream of the toe so that there is a minimum of two feet of fill, measured perpendicular to the surface of the embankment, over the top of the diaphragm after settlement of the embankment; and

(5) have an outlet that provides positive drainage of the diaphragm to the stilling basin or other point below the downstream toe of the dam. The flow line of the outlet shall be no lower than one-half foot above the elevation of the outlet of the stilling basin.

(c) Except as specified in subsection (d), each cutoff collar shall meet all of the following design criteria:

- (1) Be constructed of the same or similar material as that of the conduit;
- (2) be attached to the conduit with a watertight seal;
- (3) be of sufficient size and number to increase the length of the seepage path by at least 15 percent;
- (4) be spaced at intervals of at least twice the vertical dimension of the largest collar being used;
- (5) be located along the conduit in that portion of the dam that will be saturated;
- (6) project a minimum of two feet beyond the outside wall of the conduit; and
- (7) be located no closer than two feet from any conduit joint.

(d) If cutoff collars or a drainage diaphragm is located in a zoned fill, the location shall be justified in the design report and established in accordance with sound engineering principles and commonly accepted engineering practices.

(e) If another drain included in the design meets the requirements for a diaphragm in subsection (b), that other drain may be considered to be the diaphragm required by subsection (a).

(f) If the applicant desires to use any other type of seepage control, the applicant shall demonstrate to the chief engineer that the proposed type of seepage control protects the dam from seepage along the conduit and meets the requirements of sound engineering principles and commonly accepted engineering practices.

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