



Ohio Administrative Code Rule 3745-34-54 Construction requirements.

Effective: December 12, 2024

(A) All existing and new class I hazardous waste injection wells shall be constructed and completed by owners and operators to do the following:

(1) Prevent the movement of fluids into or between USDWs or into any unauthorized zones.

(2) Permit the use of appropriate testing devices and work over tools.

(3) Permit continuous monitoring of injection tubing and long string casing as required pursuant to rule 3745-34-56 of the Administrative Code.

(B) All well materials used in the construction or repair of existing and new class I hazardous waste injection wells shall be compatible with fluids with which the materials may be expected to come into contact. All areas of a well that may come into contact with corrosive wastes shall be constructed of corrosion resistant materials. A class I injection well shall be deemed by the director to have compatibility as long as the materials used in the construction of the well meet or exceed the requirements of this rule.

(C) Casing and cementing of new wells.

(1) Casing and cement used in the construction of each newly drilled class I injection well or the repair of an existing class I injection well shall be designed for the life expectancy of the well, including the post-closure care period. The casing and cementing program shall be designed to prevent the movement of fluids into or between USDWs, and to prevent potential leaks of fluids from the class I injection well. In establishing casing and cementing requirements of the permit or the repair plan, the director shall consider the following information as required by rule 3745-34-59 of the Administrative Code:

(a) Depth to the injection zone.



- (b) Injection pressure, external pressure, internal pressure and axial loading.
 - (c) Hole size.
 - (d) Size and grade of all casing strings (wall thickness, diameter, nominal weight, length, joint specification and construction material).
 - (e) Corrosiveness of injected fluid, formation fluids and temperature.
 - (f) Lithology of injection and confining zones.
 - (g) Type or grade of cement.
 - (h) Quantity and chemical composition of the injected fluid.
- (2) One surface casing string shall, at a minimum, extend into the confining bed below the lowest formation that contains a USDW and be cemented by circulating cement from the base of the casing to the surface, using a minimum of one hundred twenty per cent of the calculated annular volume. The director may require more than one hundred twenty per cent when the geology or other circumstances warrant to protect underground sources of drinking water.
- (3) At least one long string casing, using a sufficient number of centralizers, shall extend to the injection zone and shall be cemented by circulating cement to the surface in one or more of the following stages:
- (a) Of sufficient quantity and quality to withstand the maximum operating pressure.
 - (b) In a quantity no less than one hundred twenty per cent of the calculated volume necessary to fill the annular space. The director may require more than one hundred twenty per cent when the geology or other circumstances warrant to protect underground sources of drinking water.
- (4) Circulation of cement may be accomplished by staging. The director may approve an alternative



method of cementing in cases where the cement cannot be recirculated to the surface, provided the owner or operator can demonstrate by using logs that the cement is continuous and does not allow fluid movement behind the well bore and it is still protective of underground sources of drinking water.

(5) Casings, including any casing connections, shall be rated to have sufficient structural strength to withstand, for the design life of the well the following:

(a) The maximum burst and collapse pressures that may be experienced during the construction, operation, and closure of the well.

(b) The maximum tensile stress that may be experienced at any point along the length of the casing during the construction, operation, and closure of the well.

(6) At a minimum, cement and cement additives must be of sufficient quality and quantity to maintain integrity over the design life of the well.

(D) Tubing and packer.

(1) All class I hazardous waste injection wells shall inject fluids through tubing with a packer, both designed for the expected service, set at a point approved by the director.

(2) In determining and specifying requirements for tubing and packer, the director shall consider the following factors, among others:

(a) Depth of setting.

(b) Characteristics of injection fluid (chemical content, corrosiveness, temperature and density).

(c) Injection pressure.

(d) Annular pressure.



(e) Rate (intermittent or continuous), temperature and volume of injected fluid.

(f) Size of casing.

(g) Tubing tensile, burst, and collapse strengths.

(3) At the written request of the operator, the director may approve the use of an alternative to the packer if the alternative method will reliably provide a comparable level of protection to underground sources of drinking water.