

567—49.10(455B) Types of well construction.**49.10(1) Drilled wells.***a. Non-bedrock wells.*

(1) Casing depth. In no case shall less than 20 feet of permanent solid casing be installed in wells drilled in unconsolidated materials. If the alluvial aquifer where the water is to be drawn from is covered by less than 40 feet of low permeability materials, the well screen shall be set at the bottom of the water-bearing aquifer or at least 60 feet from the surface. Deeper depths may be required if nitrate contamination is excessive. If more than 40 feet of low permeability materials are present above the aquifer, the casing shall extend down at least to the top of the aquifer.

(2) Grouting.

1. Grout shall be placed to a minimum depth of 40 feet or along the full length of the casing where less than 40 feet of casing is set. Grouting the full length of the casing below 40 feet may be necessary to isolate any contaminated water lenses or aquifers.

2. If a layer of low permeability material at least 5 feet thick is encountered less than 40 feet from the surface, the grout may be terminated no less than 5 feet below the top of this low permeability material, but in no case less than 20 feet from the ground surface.

3. Grout shall be placed in accordance with 49.11(3), except when driving casing. When driving casing, a cone-shaped depression or temporary outer casing that is filled with bentonite products must be maintained around the well casing. The bottom of the driven casing shall be equipped with a drive shoe.

(3) Annular space.

1. The borehole diameter shall be at least three inches greater than the outside diameter of the well casing to the minimum grouting depth.

2. When steel well casing pipe is installed using percussion methods, the annular space shall be at least five inches greater than the outside diameter of the well casing to a minimum depth of 25 feet.

(4) If the depth of casing is greater than 40 feet, the annular space below 40 feet may be filled with heavy drilling fluid taken from the borehole as long as the top 40 feet of annular space is properly grouted. In this case, the annular space below 40 feet shall be kept as small as possible to avoid settling.

b. Bored and augered non-bedrock wells with concrete, fiberglass, or clay tile casing. The casing shall be at least 18 inches in diameter and buried-slab construction is required.

(1) Casing.

1. The top of the concrete, fiberglass, or vitrified clay pipe casing shall be terminated not less than 10 feet below ground surface and extend to a minimum depth of 20 feet.

2. Casing shall be fitted with a reinforced concrete, fiberglass, or steel plate, into which a watertight steel or thermoplastic casing is firmly embedded in or connected to a pipe that is cast or welded into the plate.

3. The embedded casing shall be at least 5 inches in diameter and shall extend from the plate to not less than 12 inches above established grade or the 100-year flood level, whichever is higher.

4. A pitless adapter shall be installed below frost depth on newly installed plastic or steel casing.

(2) Grout. A 12-inch grout seal shall be poured over and around the plate.

(3) Annular space. The annular space between the steel or thermoplastic casing and the borehole shall be backfilled with clean compacted soil free of debris or large organic material. During the backfilling process, the earth shall be thoroughly tamped to minimize settling. Grading around the well shall then be accomplished in accordance with 49.9(2).

c. Bedrock wells.

(1) Casing depth. Casing shall extend to a depth of at least 40 feet and be seated in firm rock. When the uppermost bedrock consists of creviced limestone or dolomite that does not produce water, the casing shall extend through the creviced formation, be seated in firm rock, and be properly grouted.

(2) Grouting.

1. For bedrock wells, full-length grouting of the casing is strongly recommended. Grout shall be placed to a minimum depth of 40 feet in accordance with 49.11(3), except when driving casing using percussion or casing-hammer/rotary drilling.

2. When driving casing, a cone-shaped depression or temporary outer casing that is filled with bentonite products shall be maintained around the outside of the casing. The bottom of the driven casing shall be equipped with a drive shoe.

3. If a layer of low permeability material at least 5 feet thick is encountered less than 40 feet from the surface, the grout may be terminated no less than 5 feet below the top of this low permeability material, but in no case less than 20 feet from the ground surface.

4. Where local conditions warrant, the administrative authority may require more extensive grouting to protect any aquifer(s) that are penetrated.

(3) Annular space.

1. The borehole shall be at least three inches greater than the outside diameter of the well casing for the upper 40 feet or the minimum grouting depth.

2. When steel casing pipe is installed using percussion, or casing-hammer/rotary methods, the annular space shall be at least five inches greater than the outside diameter of the well casing to a minimum depth of 25 feet.

3. When bedrock wells are full-length pressure-grouted through the casing, the borehole diameter shall be three inches larger than the outside diameter of the casing for the minimum depth of at least 25 feet.

(4) If the depth of casing is greater than 40 feet, the annular space below 40 feet may be filled with heavy drilling fluid taken from the borehole as long as the top 40 feet of annular space is properly grouted. In this case, the annular space below 40 feet shall be kept as small as possible to avoid settling.

(5) In fractured rock, where circulation of slurry cannot be maintained, grouting may be done with bentonite chips. The chips shall be hydrated with one gallon of water per bag of bentonite.

49.10(2) *Driven, direct push, and sandpoint wells.* Well construction in sandy areas with a high water table is not recommended for potable water supplies. These types of wells shall meet the requirements of this chapter, except for casing depth and grouting requirements.

49.10(3) *Flowing artesian wells.*

a. Drilling operations shall extend into but not through the formation confining the water. The casing shall be installed and the annular space full-length pressure-grouted and allowed to set. After the grout is set, the drill hole shall be extended into the confined water-bearing formation.

b. Flow control from the well shall be provided by valved pipe connections or a receiving tank set at an altitude corresponding to that of the artesian head. Under no circumstances shall the water flow uncontrolled to waste.

c. A direct connection between the discharge pipe and a receiving tank, sewer, or other source of contamination is prohibited.

[ARC 9196C, IAB 5/14/25, effective 6/18/25]