

Water Resources Department

Chapter 690

Division 210

WELL CONSTRUCTION STANDARDS

690-210-0005

Standards Apply to all Methods of Well Construction

(1) The following well construction standards apply to all methods of water supply well construction. The methods include, but are not limited to, drilling, driving, jetting, boring, and digging.

(2) Horizontal and Remediation wells shall be constructed under special standard approval only as described in OAR 690-200-0021.

(3) Additional standards will apply to some methods as specified in the following regulations.

Statutory/Other Authority: ORS 536.090 & 537.505 - 537.795

Statutes/Other Implemented: ORS 536.090 & 537.505 - 537.795

History:

WRD 7-2001, f. & cert. ef. 11-15-01

WRD 8-1993, f. 12-14-93, cert. ef. 1-1-94

WRD 13-1986, f. 10-7-86, ef. 11-1-86, Renumbered from 690-061-0216

WRD 9-1978, f. 12-12-78, ef. 1-1-79

690-210-0030

Placement of Water Supply Wells

(1) No person shall construct a water supply well:

(a) Within 50 feet of any septic tank; or

(b) Within 100 feet of a septic drainline or sewage disposal structure or facility; or

(c) Within 50 feet of a closed sewage or storm drainage system (except those in or underneath a building); or

(d) Within 50 feet of a confined animal feeding or holding area; or

(e) Within 50 feet of any animal waste holding area such as a pond or lagoon; or

(f) Within 100 feet of any sewage sludge disposal area; or

(g) Within 5 feet from a permanent structure or the roof, eaves or overhangs of a permanent structure. This includes decks or other additions to the structure that may hinder the ability of a drilling machine to get over the well. This does not include pump houses or other outbuildings that are easily moved; or

(h) Within 500 feet of a hazardous waste storage, disposal or treatment facility without written permission of the Director; or

(i) Within 25 feet of an underground or aboveground petroleum storage tank that is used for residential purposes; or

(j) Within 50 feet of an underground or aboveground petroleum storage tank that is used for commercial purposes.

(2) A new water supply well may be constructed at the site of an abandoned septic tank or drain field one year after the septic tank or drain field is taken out of use. The abandoned septic tank shall be pumped by a DEQ licensed sewage disposal business to remove all contents. Following pumping, the tank shall be filled with reject sand, bar run gravel or other material approved by the on site sub-surface sewage permitting agent. The delivery line between the building and the tank shall be permanently capped or filled with cement grout. A water supply well shall not be constructed through an abandoned septic tank or septic drain line. The new water supply well shall be located to meet other setbacks as directed in section (1) of this rule.

(3) Rain water gutter downspouts and drains are exempt from the setback requirements.

(4) The constructor should consider whether greater setback distances are required for the protection of the groundwater depending on the topography and local geology.

(5) To enable drilling equipment future access to the water supply well for alteration, repair, or abandonment, the property owner should maintain a minimum twenty-foot separation distance between the well and any power pole.

(6) Additional Oregon Health Authority setback standards apply to wells used for public water systems. See OAR 333-061-0050(2) or contact the Oregon Health Authority for more information.

Statutory/Other Authority: ORS 536.090 & 537.505 - 537.795

Statutes/Other Implemented: ORS 536.090 & 537.505 - 537.795

History:

WRD 5-2016, f. & cert. ef. 9-6-16

WRD 5-2015, f. & cert. ef. 7-1-15

WRD 7-2001, f. & cert. ef. 11-15-01

WRD 8-1993, f. 12-14-93, cert. ef. 1-1-94

WRD 7-1988, f. & cert. ef. 6-29-88

WRD 13-1986, f. 10-7-86, cert. ef. 11-1-86, Renumbered from 690-060-0015

WRD 9-1978, f. 12-12-78, cert. ef. 1-1-79

WRD 3. f. & cert. ef. 2-18-77

690-210-0060

Explosives

(1) If explosives are used in the construction of a water supply well, their use must be reported on the well report. The type and amount of explosive(s) used shall be reported.

(2) In no case shall explosives other than commercially developed gun perforators be detonated inside the well casing or liner pipe without written permission from the Director. The request shall include the type of explosive to be used, how it will be placed, and where it is to be placed. In no case shall an explosive charge be dropped down a well or used to sever installed well casing or liner pipe

Statutory/Other Authority: ORS 183, 536, 537 & 540

Statutes/Other Implemented: ORS 536.090 & 537.505 - 537.795

History:

WRD 7-2001, f. & cert. ef. 11-15-01

WRD 13-1986, f. 10-7-86, ef. 11-1-86, Renumbered from 690-061-0066

WRD 9-1978, f. 12-12-78, ef. 1-1-79

690-210-0065

Hydrofracturing

(1) If the water supply well is hydrofractured, the constructor shall so note on the well report. Information reported shall include methods and materials used, maximum pressure exerted on the formation, location of packers, initial and final static water level figures, as well as initial and final yield figures.

(2) In no case shall hydrofracturing allow commingling of waters within the well bore.

(3) The well shall not be hydrofractured within 20 feet of the bottom of the existing well casing.

(4) Clean sand or other materials (propping agents) approved by the Department may be injected into the well to hold the fractures open when the pressure is removed.

(5) All tools and propping agents shall be disinfected prior to placement into the well.

Statutory/Other Authority: ORS 536.090 & 537.505 - 537.795

History:

WRD 7-2001, f. & cert. ef. 11-15-01

WRD 8-1993, f. 12-14-93, cert. ef. 1-1-94

690-210-0070

Injection Wells

No water supply well subject to these rules shall be used for the injection of surface or ground waters, or chemically or thermally altered waters, unless the injection installation, well design, and receiving formations are approved by the Water Resources Department. For additional regulations on the use of wells for injection purposes, contact the Oregon Department of Environmental Quality.

Statutory/Other Authority: ORS 183, 536, 537 & 540

History:

WRD 7-2001, f. & cert. ef. 11-15-01

WRD 13-1986, f. 10-7-86, ef. 11-1-86, Renumbered from 690-060-0030

WRD 9-1978, f. 12-12-78, ef. 1-1-79

690-210-0100

Mineralized or Contaminated Groundwater

All formations which yield contaminated or mineralized water shall be adequately cased and sealed off to prevent contamination of the overlying or underlying water-bearing zones.

Statutory/Other Authority: ORS 183, 536, 537 & 540

History:

WRD 7-2001, f. & cert. ef. 11-15-01

WRD 7-1988, f. & cert. ef. 6-29-88

WRD 13-1986, f. 10-7-86, ef. 11-1-86, Renumbered from 690-061-0056

WRD 9-1978, f. 12-12-78, ef. 1-1-79

690-210-0130

Sealing of Wells in Unconsolidated Formations Without Significant Clay Beds

Water supply wells drilled into unconsolidated water-bearing strata overlain by unconsolidated materials, such as sand, silt, or gravel, without significant clay beds, shall have a watertight, unperforated well casing extending to a minimum of eighteen feet below land surface. An upper oversized drillhole, four inches greater in diameter than the nominal diameter of the casing, shall be constructed to a minimum depth of 18 feet. To prevent caving, a temporary surface casing, at least 18 feet in length, shall be used throughout the construction of the annular seal space. The annular space between the permanent well casing and the upper, oversized drillhole shall be completely full of grout in accordance with OAR 690-210-0310 thru 690-210-0360 after the permanent well casing is set into final position. The temporary surface casing shall be removed from the well as the annular space is filled. (See Figure 210-2)

[ED. NOTE: Figures referenced are available from the agency.]

Statutory/Other Authority: ORS 536.090 & 537.505 - 537.795

History:

WRD 5-2015, f. & cert. ef. 7-1-15

WRD 7-2001, f. & cert. ef. 11-15-01

WRD 8-1993, f. 12-14-93, cert. ef. 1-1-94

WRD 13-1986, f. 10-7-86, ef. 11-1-86, Renumbered from 690-061-0126

WRD 9-1978, f. 12-12-78, ef. 1-1-79

690-210-0140

Sealing of Water Supply Wells in Unconsolidated Formations with Significant Clay Beds

Water supply wells drilled into water-bearing intervals overlain by unconsolidated deposits of clay, or sand and gravel in which significant interbeds of clay are present, shall have a watertight, nonperforated, permanent well casing extending at least five feet into the clay interval overlying the water-bearing zone. In all cases, an upper oversize drillhole, at least four inches greater in diameter than the nominal diameter of the permanent well casing shall be constructed to this same depth. In the event that the subsurface materials penetrated by the upper drillhole cave, or tend to cave, an outer, temporary surface casing shall be used to case out casing materials throughout the construction of the oversize drillhole. If the clay interval is 13 feet or less below land surface, the watertight, nonperforated well casing and the upper, oversize drillhole shall extend to a minimum depth of 18 feet below land surface. If necessary to complete the well, the single, permanent well casing may be extended below the required sealing depth prior to sealing the well with grout. If preferred, a smaller diameter casing, liner, or well screen may be installed. The annular space between the permanent well casing and the upper, oversize drillhole shall be completely filled with grout in accordance with OAR 690-210-0310 through 690-210-0360 after the permanent well casing is set into final position. The temporary surface casing shall be removed from the well as the annular space is filled. (See Figure 210-3).

[ED. NOTE: Figures referenced are available from the agency.]

Statutory/Other Authority: ORS 536.090 & 537.505 - 537.795

Statutes/Other Implemented: ORS 183, 536, 537 & 540

History:

WRD 5-2016, f. & cert. ef. 9-6-16

WRD 5-2015, f. & cert. ef. 7-1-15

WRD 7-2001, f. & cert. ef. 11-15-01

WRD 8-1993, f. 12-14-93, cert. ef. 1-1-94

WRD 9-1978, f. 12-12-78, ef. 1-1-79, Renumbered from 690-061-0131

690-210-0150

Sealing of Water Supply Wells in Consolidated Formations

(1) Water supply wells drilled into a water-bearing rock formation overlain by clay, silt, sand, gravel, cobbles, or similar materials, shall be constructed in accordance with one of the following methods:

(a) Method 1 (Continuous Seal):

(A) An upper oversize drillhole, at least four inches greater in diameter than the nominal diameter of the permanent well casing to be installed, shall extend from land surface to at least five feet into solid, unfractured, consolidated rock overlying the water-bearing rock formation below a depth of 13 feet. Unperforated permanent well casing shall extend to this same depth.

(B) The annular space between the permanent well casing and the drillhole wall within the consolidated rock formation shall be filled with grout using an approved grout placement method.

(C) The upper annular space between the permanent well casing and the drillhole wall shall be filled with grout using an approved grout placement method from land surface to at least five feet into a clay interval below a depth of 13 feet.

(D) The annular space between the upper and lower sealing intervals shall be filled with grout using an approved grout placement method.

(E) A smaller diameter liner pipe or well screen may be installed to complete the well.

(F) If cement grout is placed by a suitable method from the bottom of the permanent well casing to land surface (Methods A, B, D, Appendix 210-3), the upper drillhole shall be at least two inches larger than the nominal diameter of the permanent well casing. (See Figure 210-4);

(b) Method 2 (Step-Down Casing/Inner Casing):

(A) An upper oversize drillhole, at least four inches greater in diameter than the upper permanent well casing to be installed, shall extend from land surface to at least five feet into a clay interval below a depth of 13 feet. If no clay interval is present, then the upper oversize drillhole shall extend to a minimum depth of 18 feet below land surface. In the event that the subsurface materials penetrated by the upper oversize drillhole cave, or tend to cave, an outer temporary surface casing at least 18 feet in length shall be used throughout the construction of the upper oversize drillhole to prevent caving.

(B) The upper Unperforated, permanent well casing shall be unperforated and shall extend to, and be driven into, solid, unfractured, consolidated rock overlying the water-bearing rock formation.

(C) A lower drillhole, at least as large as the inside diameter of the upper permanent well casing, shall be constructed at least five feet into solid unfractured consolidated rock overlying the water-bearing rock formation.

(D) A smaller diameter steel well casing, at least two inches smaller in diameter than the diameter of the upper permanent well casing, shall extend at least five feet into solid unfractured consolidated rock overlying the water-bearing rock formation and at least eight feet into the upper permanent well casing.

(E) The annular space between the upper oversize drillhole and the upper permanent well casing shall be completely filled with grout using an approved grout placement method after the upper permanent well casing is set into final position. ~~and the~~ The annular space between the smaller diameter lower

permanent well casing and the lower drillhole, shall be completely filled with cement grout using an approved grout placement method after the ~~upper permanent well casing and the~~ lower permanent well casing ~~are~~ is set into final position. The lower annular seal shall extend at least eight feet into the upper permanent well casing (See Figure 210-5);

(c) Method 3 (Under-Reaming):

(A) An upper oversize drillhole, at least four inches greater in diameter than the permanent well casing to be installed, shall extend from land surface to at least five feet into a clay interval below a depth of 13 feet. If no clay interval is present, then the upper oversize drillhole shall extend to a minimum depth of 18 feet below land surface. In the event that the subsurface materials penetrated by the upper oversize drillhole cave, or tend to cave, an outer temporary surface casing at least 18 feet in length shall be used throughout the construction of the upper oversize drillhole to prevent caving.

(B) A lower drillhole, at least two inches greater in diameter than the diameter of the permanent well casing to be installed, shall be constructed at least fifteen feet into solid, unfractured, consolidated rock overlying the water-bearing rock formation by under-reaming methods.

(C) Unperforated, permanent well casing shall extend to and be driven into solid, unfractured, consolidated rock overlying the water-bearing rock formation at the bottom of the under-reamed section following placement of the casing seal material.

(D) The annular space between the upper oversize drillhole and the permanent well casing shall be filled with cement grout using Method C or unhydrated bentonite. The annular space between the lower under-reamed drillhole and the permanent well casing shall be completely filled with grout applied under pressure in accordance with grout placement Method A, B, or D, in Appendix 210-3.

(E) Casing seals may not be placed in unconsolidated formation materials using the under-reaming method.

(2) In all cases, (Methods 1, 2, or 3, above), if materials penetrated by the upper oversize drillhole cave, or tend to cave, an outer temporary surface casing shall be used to case out all caving material throughout construction of the oversize drillhole. The temporary surface casing shall be withdrawn as the annular space is filled with grout.

[ED. NOTE: Figures and Appendices referenced are available from the agency.]

Statutory/Other Authority: ORS 536.090 & 537.505 - 537.795

Statutes/Other Implemented: ORS 183, 536, 537 & 540

History:

WRD 4-2018, minor correction filed 06/22/2018, effective 06/22/2018

WRD 5-2016, f. & cert. ef. 9-6-16

WRD 5-2015, f. & cert. ef. 7-1-15

WRD 7-2001, f. & cert. ef 11-15-01

WRD 8-1993, f. 12-14-93, cert. ef. 1-1-94

WRD 7-1988, f. & cert. ef. 6-29-88

WRD 13-1986, f. 10-7-86, ef. 11-1-86, Renumbered from 690-061-0136

WRD 9-1978, f. 12-12-78, ef. 1-1-79

690-210-0155

Additional Standards for Artesian Water Supply Wells

(1) Water supply wells penetrating into an artesian aquifer shall have an upper oversize drillhole at least four inches greater in diameter than the nominal diameter of the permanent well casing to be installed. Watertight unperforated casing shall extend and be sealed at least five feet into the confining interval immediately overlying the artesian water-bearing zone. In all cases, a minimum of 18 feet of casing and casing seal will be required. If cement grout is placed by a suitable method from the bottom of the casing (Methods A, B, or D, in Appendix 210-3 and Figure 210-1), the diameter of the upper oversize drillhole shall be at least two inches larger than the nominal diameter of the permanent well casing.

(2) To complete the well, inner casing, liner, or a well screen may be installed. When artesian pressures are encountered in the absence of a confining interval, casing and casing seal requirements shall be determined by the Director upon written application. In the alternative, the person constructing the well may construct the well in conformance with the minimum standards for artesian wells with a confining interval, set forth in section (1) of this rule.

(3) If an artesian water supply well flows at land surface, the well shall be equipped with a control valve and a watertight mechanical cap, threaded or welded, so that all flow of water from the well can be completely stopped.

(4) All flowing artesian wells shall be equipped with a pressure gauge placed on a dead- end line. A petcock valve shall be placed between the gauge and well casing. (See Figure 210-7).

(5) All flowing artesian water supply wells shall be tested for artesian shut-in pressure in pounds per square inch and rate of flow in cubic feet per second, or gallons per minute, under free discharge conditions. This data shall be reported on the well report.

[ED. NOTE: Figures & Appendices referenced are available from the agency.]

Statutory/Other Authority: ORS 183, 536, 537 & 540

Statutes/Other Implemented: ORS 183, 536, 537 & 540

History:

WRD 5-2016, f. & cert. ef. 9-6-16

WRD 5-2015, f. & cert. ef. 7-1-15

WRD 7-2001, f. & cert. ef. 11-15-01, Renumbered from 690-210-0120

WRD 13-1986, f. 10-7-86, cert. ef. 11-1-86, Renumbered from 690-061-0156, 690-061-0161, 690-061-0166, 690-061-0171 & 690-061-0176

WRD 9-1978, f. 12-12-78, cert. ef. 1-1-79

690-210-0160

Additional Standards for Filter Pack Wells with Surface Casing

If a permanent surface casing is installed in the construction of a filter pack well, a watertight, welded, steel plate at least 3/16 of an inch in thickness shall be installed between the inner production casing and the outer surface casing at the well head. A watertight fill port with threaded cap may be installed for the purpose of placing additional filter pack material in the well. (See Figure 210-8.)

[ED. NOTE: Figures referenced are available from the agency.]

Statutory/Other Authority: ORS 536.090 & 537.505 - 537.795

History:

WRD 7-2001, f. & cert. ef. 11-15-01

WRD 8-1993, f. 12-14-93, cert. ef. 1-1-94

WRD 13-1986, f. 10-7-86, ef. 11-1-86, Renumbered from 690-061-0141

WRD 9-1978, f. 12-12-78, ef. 1-1-79

690-210-0170

Additional Standards for Filter Pack Wells without Surface Casing

If a permanent surface casing is not installed in the construction of a filter pack well, and filler tubes are to be used, an oversize well bore having a nominal diameter of at least eight inches greater than the nominal diameter of the permanent well casing shall be constructed. If filler tubes are not to be used, an oversize well bore having a nominal diameter of at least four inches greater than the nominal diameter of the permanent well casing shall be constructed. A suitable plug shall be installed in the annular space between the filter pack material and the grout seal. A watertight fill pipe with threaded cap may be installed for the purpose of placing additional filter pack material in the well. The outside diameter of the fill pipe shall not exceed one-half the thickness of the grout seal surrounding the permanent well casing and shall be centered in the annular space. (See Figure 210-9.)

[ED. NOTE: Figures referenced are available from the agency.]

Statutory/Other Authority: ORS 536.090 & 537.505 - 537.795

History:

WRD 7-2001, f. & cert. ef. 11-15-01

WRD 8-1993, f. 12-14-93, cert. ef. 1-1-94

WRD 13-1986, f. 10-7-86, ef. 11-1-86, Renumbered from 690-061-0146

WRD 9-1978, f. 12-12-78, ef. 1-1-79

690-210-0180

Additional Standards for Driven or Jetted Wells

All drive point wells or jetted wells shall have nonperforated, watertight casing meeting the minimum specifications shown in Table 210-1 and extending a minimum distance of 18 feet below land surface. Drive casing greater than 3-1/2 inches shall comply with the minimum specifications in OAR 690-210-0190. An upper drillhole at least four inches greater in nominal diameter than the permanent casing shall extend at least 18 feet below land surface. The annular space shall be filled with grout. If temporary casing is used during construction, it must be removed during placement of the grout. (See Figure 210-10.)

[ED. NOTE: Tables and Figures referenced are available from the agency.]

Statutory/Other Authority: ORS 536.090 & 537.505 - 537.795

History:

WRD 7-2001, f. & cert. ef. 11-15-01

WRD 8-1993, f. 12-14-93, cert. ef. 1-1-94

WRD 7-1988, f. & cert. ef. 6-29-88

WRD 13-1986, f. 10-7-86, cert. ef. 11-1-86, Renumbered from 690-061-0186 & 690-061-0191

WRD 9-1978, f. 12-12-78, cert. ef. 1-1-79

690-210-0190

Steel Casing

(1) All steel casing installed shall be in new or like new condition, being free of pits or breaks, and shall meet or exceed the minimum American Society for Testing Materials (ASTM A-53A or B) specifications for steel pipe, for the sizes as set out in Table 210-2.

(2) All steel casing having a diameter larger than 20 inches shall have a wall thickness of at least 0.375 inch.

(3) Steel casing installed in a well greater than a nominal diameter of ten inches, having a wall thickness of 0.250 inch and meeting or exceeding ASTM A-53 A or B specifications must not exceed the following depth limitations (Diameter — Maximum Depth, respectively):

(a) 12 inches — 500 feet;

(b) 14 — 16 inches — 250 feet;

(c) 18 — 20 inches — 100 feet.

(4) Steel casings of other ASTM specifications shall not be used without written permission of the Director. A written request to use casing of other specifications shall be submitted to the Director. This request shall include a description of the casing specifications and the reason for its use.

[ED. NOTE: Tables & Publications referenced are available from the agency.]

[ED. NOTE: To view attachments referenced in rule text, click here to view rule.]

Statutory/Other Authority: ORS 536.090 & 537.505 - 537.795

History:

WRD 5-2015, f. & cert. ef. 7-1-15

WRD 7-2001, f. & cert. ef. 11-15-11

WRD 8-1993, f. 12-14-93, cert. ef. 1-1-94

WRD 7-1988, f. & cert. ef. 6-29-88

WRD 13-1986, f. 10-7-86, cert. ef. 11-1-86, Renumbered from 690-061-0006

WRD 9-1978, f. 12-12-78, cert. ef. 1-1-79

690-210-0200

Steel Casing Joints

All steel casing joints shall be welded or thread coupled and shall be water tight. If welded casing joints are used, the weld shall be a full penetrating weld at least equal in thickness to the wall thickness of the casing. Welded casing joints shall have a tensile strength equal to or greater than that of the casing.

Statutory/Other Authority: ORS 183, 536, 537 & 540

History:

WRD 7-2001, f. & cert. ef. 11-15-01

WRD 13-1986, f. 10-7-86, ef. 11-1-86, Renumbered from 690-061-0016

WRD 9-1978, f. 12-12-78, ef. 1-1-79

690-210-0210

Plastic Casing

(1) Plastic casing shall not be driven and may only be installed in an oversized drillhole.

(2) Plastic casing may only be installed after drilling has been completed. No drilling is allowed inside plastic casing.

(3) Such casing shall be of polymerized vinyl chloride (PVC), type 1120 or 1220, SDR 21 (Class 200) or SDR 26 (Class 160) or greater wall thickness, meeting the standards of the "National Sanitation Foundation" and the specifications of ASTM F-480 or ASTM D-2241-73 and D-1784-69. The well casing must be clearly marked by the manufacturer showing: nominal size, type plastic material, Standard Dimension Ratio

(SDR), ASTM designation, and National Sanitation Foundation seal of certified approval. The maximum depth to which this plastic casing may safely resist collapsing forces is a function of the "Standard Dimension Ratio" (SDR), i.e., the ratio of the outside diameter to the casing wall thickness. The maximum depths have been computed for readily available SDR and are cited as:

(a) SDR = 21 — Maximum Depth = 150 feet;

(b) SDR = 26 — Maximum Depth = 100 feet.

(4) If PVC casing is to be used, it shall be protected from physical and ultraviolet light damage using one of the following methods:

(a) By use of an upper protective steel casing meeting the requirements of OAR 690-210-0190. The protective steel casing shall be a minimum of 2" larger in diameter than the PVC casing and shall overlap the PVC casing. The protective steel casing shall extend at least six inches above the top of the plastic well casing and shall be sealed at least four feet into the ground within the annular seal and shall be fitted with a lid; or

(b) By use of a wellhead bunker. The bunker shall be made of concrete, hard plastic, fiberglass, wood or other structurally sound material that will protect the casing from both physical damage and ultraviolet light damage. The bunker shall completely surround the well and be fitted with a lid. The bunker shall be constructed so that access to the wellhead is maintained; or

(c) By other appropriate methods as approved in advance by the Water Resources Department.

(5) Pitless adaptors or units are not recommended in conjunction with PVC casing. If a pitless adaptor or unit is to be used, the constructor should take care that the weight of the pump and pump column do not exceed the strength of the casing.

[Publications: Publications referenced are available from the agency.]

Statutory/Other Authority: ORS 536.090 & 537.505 - 537.795

History:

WRD 7-2001, f. & cert. ef. 11-15-01

WRD 8-1993, f. 12-14-93, cert. ef. 1-1-94

WRD 13-1986, f. 10-7-86, ef. 11-1-86, Renumbered from 690-061-0031

WRD 9-1978, f. 12-12-78, ef. 1-1-79

690-210-0220

Plastic Casing Joints

All plastic casing joints shall be watertight. Either "bell" type, threaded, or coupling hubs are approved. Hub couplings shall be of material meeting the specifications for plastic casings as set forth in OAR 690-210-0210. Joints shall be made by solvent cement in accordance with manufacturer's directions. Newly assembled joints require careful handling until the initial set has taken place, which varies with the

temperature and the pipe size. The recommended initial set times are from manufacturer's recommendations (See Table 210-4).

[ED. NOTE: Tables referenced are available from the agency.]

Statutory/Other Authority: ORS 536.090 & 537.505 - 537.795

Statutes/Other Implemented: ORS 183, 536, 537 & 540

History:

WRD 5-2015, f. & cert. ef. 7-1-15

WRD 7-2001, f. & cert. ef. 11-15-01

WRD 8-1993, f. 12-14-93, cert. ef. 1-1-94

WRD 7-1988, f. & cert. ef. 6-29-88

WRD 13-1986, f. 10-7-86, ef. 11-1-86, Renumbered from 690-061-0036

WRD 9-1978, f. 12-12-78, ef. 1-1-79

690-210-0230

Inner Casing

Inner casing installed into a well must meet the minimum requirements of well casing (OAR 690-210-0190). The space between the two well casings shall be sealed so as to prevent the movement of water between the two casings. Inner casing installed in a well shall extend or telescope at least eight feet into the lower end of the well casing. The inner casing must be centered and must be a minimum of one inch smaller in diameter than the outer casing if an under reaming method system is used. If other methods are used, the inner casing must be a minimum of two inches smaller in diameter than the outer casing. The grout must be placed in a positive manner in accordance with method A, B, D, or E (see Appendix 210-3).

[ED. NOTE: Appendices referenced are available from the agency.]

Statutory/Other Authority: ORS 536.090 & 537.505 - 537.795

Statutes/Other Implemented: ORS 183, 536, 537 & 540

History:

WRD 5-2015, f. & cert. ef. 7-1-15

WRD 8-1993, f. 12-14-93, cert. ef. 1-1-94

WRD 13-1986, f. 10-7-86, cert. ef. 11-1-86, Renumbered from 690-061-0231

WRD 9-1978, f. 12-12-78, cert. ef. 1-1-79

690-210-0240

Casing Shall be Centered

In all instances, casings shall be centered in sealed intervals. Casing centralizers may be used to ensure centering. When sealing a well by Method E, casing centralizers shall be used. (See Figure 210-11, 1986)

[ED. NOTE: Figures referenced are available from the agency.]

Statutory/Other Authority: ORS 183, 536, 537 & 540

History:

WRD 7-2001, f. & cert. ef. 11-15-01

WRD 13-1986, f. 10-7-86, ef. 11-1-86

690-210-0250

Top Terminal Height

(1) The casing head or pitless unit of any well shall extend a minimum of 12 inches above the finished ground surface or pumphouse floor, and a minimum of 12 inches above the local surface runoff level. The ground surface immediately surrounding the top of the well casing or pitless unit should be graded so as to drain surface water away from the well. Without permission of the Director, no casing shall be cut off below land surface except to install a pitless unit or during permanent abandonment of a well.

(2) Application to the Director to reduce the top terminal height of casing shall include:

(a) A description of physical characteristics of the well site which make the requested change necessary; and

(b) A description of additional steps to be taken over and above the minimum standards in these rules which will assure adequate protection of the ground water resource.

(3) The Director may approve a reduction of the top terminal height of the casing only upon a determination that the additional precautions to be taken and specific physical characteristics of the site would prevent contamination of the ground water resource.

Statutory/Other Authority: ORS 536.090 & 537.505 - 537.795

History:

WRD 7-2001, f. & cert. ef. 11-15-01

WRD 8-1993, f. 12-14-93, cert. ef. 1-1-94

WRD 13-1986, f. 10-7-86, ef. 11-1-86, Renumbered from 690-061-0041

WRD 9-1978, f. 12-12-78, ef. 1-1-79

690-210-0260

Openings in the Casing

There shall be no opening in the casing wall between the top of the casing and the bottom of the required casing seal except for pitless adapters, measurement access ports, and grout nipples installed in conformance with these standards. In no case shall holes be cut in the casing wall for the purpose of

lifting or lowering casing into the well bore unless such holes are properly welded closed and watertight prior to placement into the well bore.

Statutory/Other Authority: ORS 183, 536, 537 & 540

History:

WRD 13-1986, f. 10-7-86, ef. 11-1-86, Renumbered from 690-061-0046

WRD 9-1978, f. 12-12-78, ef. 1-1-79

690-210-0270

Pitless Well Adapters and Units

Surface seal requirements for well casing set forth herein shall also apply when a pitless adapter or unit is installed in a well. The seal shall cover that interval occupied by the pitless case from the point of casing connection to land surface. A cement grout seal shall not be allowed within the pitless unit or pitless adaptor sealing interval. The pitless adapter or unit sealing interval shall be sealed with unhydrated bentonite as described in OAR 690-210-0330 and 690-210-0340. The pitless adapter or unit, including the cap or cover, pitless case and other attachments, shall be designed and constructed to be watertight to prevent the entrance of contaminants into the well from surface or near-surface sources. Pitless units shall be vented to the atmosphere. Refer to OAR 690-210-0210 if the pitless adaptor or unit is to be used in conjunction with PVC casing.

NOTE: Prior to installing pitless well adapters or units on public, community, municipal, or public utility water supply wells, contact the Department of Human Resources. (See references to Health Division regulation in Appendix 210-1).

[ED. NOTE: The Appendices referenced are available from the agency.]

[ED. NOTE: To view attachments referenced in rule text, click here to view rule.]

Statutory/Other Authority: ORS 536.090 & 537.505 - 537.795

Statutes/Other Implemented: ORS 183, 536, 537 & 540

History:

WRD 5-2015, f. & cert. ef. 7-1-15

WRD 7-2001, f. & cert. ef. 11-15-01

WRD 8-1993, f. 12-14-93, cert. ef. 1-1-94

WRD 7-1988, f. & cert. ef. 6-29-88

WRD 13-1986, f. 10-7-86, cert. ef. 11-1-86, Renumbered from 690-061-0051

WRD 9-1978, f. 12-12-78, cert. ef. 1-1-79

690-210-0280

Access Ports, Dedicated Measuring Tubes and Airlines

(1) All water supply wells , including wells that have been temporarily removed from service, temporarily abandoned due to a recess in construction, or temporarily abandoned before commencing service, shall be properly covered and shall be equipped with a usable access port with a minimum diameter of 1/2- inch for the purpose of determining the water level in the well at any time.

(2) Access ports shall be installed prior to the Water Supply Well Constructor removing the well drilling machine from the well site.

(3) Dedicated measuring tubes that meet the requirements of OAR 690-215-0060 are recommended to be installed on all water supply wells at the time of pump installation, pump repair, or pump replacement. Where required, dedicated measuring tubes shall be a minimum of 3/4-inch diameter schedule 40 PVC extending to the top of the pump (See Figure 200-5). The 3/4-inch diameter dedicated measuring tube may be reduced in size to 1/2-inch where it goes through the watertight well cap, but shall not be reduced in size over the length of the pipe.

(4) An airline is not a substitute for a required dedicated measuring tube and, if installed, must enter the well in a location other than the access port.

(5) Access ports, dedicated measuring tubes or airlines on all water supply wells shall be capped and be a minimum of twelve inches above finished ground surface or pumphouse floor (See Figure 210-12) (See Figure 200-5).

(6) Access ports, airlines and dedicated measuring tubes on all water supply wells shall be maintained by the landowner in a condition that will prevent contamination of the groundwater resource, and shall remain free from wire or other obstruction.

[ED. NOTE: Figures referenced are available from the agency.]

[ED. NOTE: To view attachments referenced in rule text, click here to view rule.]

Statutory/Other Authority: ORS 536.090 & 537.505 - 537.795

History:

WRD 5-2016, f. & cert. ef. 9-6-16

WRD 2-2008, f. 6-18-08, cert. ef. 7-1-08

WRD 7-2001, f. & cert. ef. 11-15-01

WRD 8-1993, f. 12-14-93, cert. ef. 1-1-94

WRD 13-1986, f. 10-7-86, ef. 11-1-86

690-210-0290

Liner Pipe

Liner pipe installed through caving formations and installed without driving, may be of lighter weight than specified by Table 210-2 under OAR 690-210-0190. Such lightweight pipe shall have a wall thickness equal to or greater than 0.188 inch. All liner pipe shall be of steel, in new or like new condition, being free of pits or breaks; or shall be of polymerized vinyl chloride (PVC) type 1220 or 1120 and SDR 26

(Class 160) or greater wall thickness. Liner pipe installed in a well shall extend or telescope at least eight feet into the lower end of the well casing. In the event that more than one string of liner pipe is installed, each string shall extend or telescope at least eight feet into the adjacent larger diameter liner pipe. Liner pipe shall be removable. Liner pipe may be welded or hooked onto the permanent well casing but shall not be permanently fixed to a well casing or borehole wall using packers or grout which would prohibit the liner's removal. (See Inner Casing, OAR 690-210-0230.)

Statutory/Other Authority: ORS 536.090 & 537.505 - 537.795

History:

WRD 7-2001, f. & cert. ef. 11-15-01

WRD 8-1993, f. 12-14-93, cert. ef. 1-1-94

WRD 7-1988, f. & cert. ef. 6-29-88

WRD 13-1986, f. 10-7-86, ef. 11-1-86, Renumbered from 690-061-0011

WRD 9-1978, f. 12-12-78, ef. 1-1-79

690-210-0300

Drill Cuttings or Chips

In no case shall drill cuttings or drill chips be used or allowed to fill, partially fill, or fall into the required sealing interval of a well during the construction or the completion of a well.

Statutory/Other Authority: ORS 183, 536, 537 & 540

History:

WRD 13-1986, f. 10-7-86, ef. 11-1-86, Renumbered from 690-061-0110

WRD 9-1978, f. 12-12-78, ef. 1-1-79

Repealed by WRD 9-1978, f. 12-12-78, ef. 1-1-79

WRD 3, f. & ef. 2-18-77

690-210-0310

Cement Grout

When using cement grout as the sealing material in a well, it must meet the following requirements:

(1) Cement grout used to seal a well shall be composed of a uniformly mixed slurry of Portland cement or High Early Strength Type III Portland cement and potable water, or High-alumina cement and potable water, mixed in the following proportions (Type of Cement — Gallons of Water Per Sack of Dry Cement, respectively):

(a) Portland Cement — 4-1/2 to 6;

(b) High Early Strength Type III Portland Cement — 5-1/2 to 6-1/2;

(c) High-alumina Cement — 4-1/2 to 6.

(2) Additives to increase fluidity, reduce shrinkage, or control time of set may be used in a cement grout mixture. Expanding agents such as aluminum powder may be used at a rate not exceeding 0.075 ounce (one level teaspoonful) per sack of dry cement. The powder shall not contain polishing agents. The addition of bentonite clay to a cement grout mixture is permissible but shall not in any case exceed five percent (5%) by weight of dry cement. Calcium chloride may be added to a Portland cement grout to accelerate the set but shall not exceed two pounds per sack of dry cement. High-alumina cement and Portland cement of any type shall not be mixed together for use in a well.

(3) Cement types other than those set forth herein shall not be used as a sealing material in a well except upon written approval of the Director of the Water Resources Department.

(4) In no case shall sand or aggregate be added to cement grout seal mixtures.

(5) The volume of sealing material required shall be calculated prior to seal installation. The calculated volume and actual volume used shall be reported on the water supply well report.

Statutory/Other Authority: ORS 183, 536, 537 & 540

History:

WRD 3-2014, f. & cert. ef. 11-25-14

WRD 7-2001, f. & cert. ef. 11-15-01

WRD 13-1986, f. 10-7-86, ef. 11-1-86, Renumbered from 690-061-0086

WRD 9-1978, f. 12-12-78, ef. 1-1-79

690-210-0315

Concrete

Concrete for use in the construction of a dug well, or for filling the annular space or well bore of a well, shall consist of clean, hard, and durable aggregate, and not less than five sacks of Portland cement per cubic yard of concrete. Concrete will be allowed only when the oversize drill hole is a minimum of eight inches larger in diameter than the well casing used in construction of the well. The maximum diameter of aggregate particles shall not exceed 1-1/2 inches, but, in any case, shall not exceed 1/5 or 20 percent of the minimum width of the space to be filled. The ratio of coarse aggregate to fine aggregate (Passing No. 4, U.S. Standard Sieve) shall be approximately 1-1/2 to 1 by volume, but, in any case, shall not exceed 2 to 1 nor be less than 1 to 2.

Statutory/Other Authority: ORS 183, 536, 537 & 540

History:

WRD 7-1988, f. & cert. ef. 6-29-88, Renumbered from 690-210-0430

WRD 13-1986, f. 10-7-86, ef. 11-1-86, Renumbered from 690-061-0211

WRD 9-1978, f. 12-12-78, ef. 1-1-79

690-210-0320

Methods of Placement of Cement Grout or Concrete

Cement grout or concrete used as a sealing material in a well shall be placed or forced upward from the bottom to completely fill the annular space to be grouted and shall be placed in one continuous operation without significant interruption. If temporary outer surface casing is used in the construction of the well, it shall be withdrawn as the grout or concrete is placed. (For acceptable methods of placement, see Appendix 210-3 and Figure 210-1, 1986).

[ED. NOTE: Figures and Appendices referenced are available from the agency.]

[ED. NOTE: To view attachments referenced in rule text, click here to view rule.]

Statutory/Other Authority: ORS 183, 536, 537 & 540

Statutes/Other Implemented: ORS 183, 536, 537 & 540

History:

WRD 1-2017, f. & cert. ef. 2-16-17

WRD 5-2016, f. & cert. ef. 9-6-16

WRD 5-2015, f. & cert. ef. 7-1-15

WRD 7-2001, f. & cert. ef. 11-15-01

WRD 7-1988, f. & cert. ef. 6-29-88

WRD 13-1986, f. 10-7-86, cert. ef. 11-1-86, Renumbered from 690-061-0021 & 690-061-0096

WRD 9-1978, f. 12-12-78, cert. ef. 1-1-79

690-210-0330

Unhydrated Bentonite

Unhydrated bentonite used in construction of casing seals for water supply wells shall be specifically designed for sealing wells and be within industry tolerances for dry western sodium bentonite. Bentonite shall be free of polymers that promote bacterial growth. Placement of the bentonite shall conform to the manufacturers specifications and result in a seal that is free of voids or bridges. Powdered bentonite and bentonite grout or slurry shall not be used as an annular seal material.

Statutory/Other Authority: ORS 536.090 & 537.505 - 537.795

History:

WRD 7-2001, f. & cert. ef. 11-15-01

WRD 8-1993, f. 12-14-93, cert. ef. 1-1-94

WRD 7-1988, f. & cert. ef. 6-29-88

WRD 13-1986, f. 10-7-86, ef. 11-1-86, Renumbered from 690-061-0087

690-210-0340

Method of Placement of Unhydrated Bentonite

(1) An upper oversize drillhole, four inches greater than the nominal inside diameter of the permanent well casing, shall be constructed to a minimum depth of 18 feet below land surface. The use of unhydrated bentonite as a casing seal shall not be allowed deeper than 200 feet below land surface. In the event that the materials penetrated by the oversize drillhole cave, or tend to cave, an outer temporary surface casing shall be used to case out the caving materials during construction of the oversize drillhole. The outer temporary surface casing shall be removed during seal installation and before completion of the well.

(2) In the event groundwater is encountered during the construction of the oversize drillhole, only unhydrated bentonite chips manufactured to be 3/8 inch to 3/4 inch, pellets or tablets shall be allowed in the water-filled portion of the annulus. A maximum of 50 feet of water may be present in the sealing interval. Unhydrated bentonite shall be screened across a minimum 1/4 inch mesh screen prior to being placed in the water-filled portion of the annulus to minimize the introduction of bentonite dust into the seal interval. Unhydrated bentonite shall not be used:

- (a) In the water-filled portion of a temporary casing; or
- (b) If there is any uphole flow in the annular seal interval.

(3) Unhydrated bentonite may only be used as an annular seal material below the water level in a well when the groundwater it comes in contact with does not exceed 800 parts per million (ppm) total dissolved solids (TDS).

(a) Unhydrated bentonite may be used as an annular seal material in water supply wells exceeding 800 ppm TDS if the bentonite manufacturer provides documentation that their product can be used in water that exceeds 800 ppm TDS.

(A) Prior Department approval is required before placement.

(B) The bentonite manufacturer's documentation and Department approval shall be submitted with the Water Supply Well Report as required in OAR 690-205-0210.

(b) In all cases, the TDS shall be reported on the Water Supply Well Report as required in OAR 690-205-0210.

(c) Regardless of the reported TDS, the quality of the water in the well shall not interfere with the proper hydration of bentonite.

(4) After placement of the permanent casing, the annular space shall be filled to land surface with bentonite. The annular space shall be kept full of bentonite to land surface while drilling or driving casing. A calibrated sounding tape with weight shall be used continuously in the sealing interval during bentonite placement to measure fill rate and to check for and break up possible bridges.

(5) Placement of bentonite shall conform to the manufacturer's specifications and result in a seal that is free of voids or bridges. Care shall be taken to minimize the introduction of bentonite dust into the sealing interval.

(6) The volume of sealing material required shall be calculated prior to seal installation. The calculated volume and actual volume used shall be reported on the water supply well report.

(7) Unhydrated bentonite chip, pellet or tablet annular seals shall be hydrated from land surface with potable water prior to removing the drilling machine from the well site. The hydration shall begin once all of the bentonite annular seal material has been placed and shall end when the annular seal interval refuses to take more water or after at least one annular space volume of water has been placed.

(8) Granular bentonite may only be used as an annular seal material in a dry annular space above the interval where water was first encountered. Granular bentonite shall not be screened or hydrated during placement.

(9) Pour rate shall be two minutes or slower per 50 pound sack in the water-filled portion of the annulus.

Statutory/Other Authority: ORS 536.090 & 537.505 - 537.795

History:

WRD 3-2014, f. & cert. ef. 11-25-14

WRD 7-2001, f. & cert. ef. 11-15-01

WRD 8-1993, f. 12-14-93, cert. ef. 1-1-94

WRD 13-1986, f. 10-7-86, ef. 11-1-86, Renumbered from 690-061-0097

WRD 12-1985, f. 12-6-85, ef. 12-7-85

690-210-0350

Resumption of Construction Following Placement of Cement Grout

The time needed for the final set of a cement grout mixture varies greatly in accordance with cement-water ratio and temperature. When cement grout is used to seal a well, construction should not resume until after the final set of the cement grout mixture. Performance of all cement grout seals shall be the responsibility of the person responsible for the construction of the well. Under no circumstances shall construction resume within six hours of the placement of the cement grout seal. Recommended periods of time for the final set are:

- (1) If Portland Cement is used — 72 hours;
- (2) If High Early Strength Type III Portland Cement is used — 48 hours;
- (3) If High-alumina Cement is used — 6 hours.

Statutory/Other Authority: ORS 183, 536, 537 & 540

History:

WRD 7-2001, f. & cert. ef. 11-15-01

WRD 13-1986, f. 10-7-86, ef. 11-1-86, Renumbered from 690-061-0101

WRD 9-1978, f. 12-12-78, ef. 1-1-79

690-210-0360

Movement of Casing after Cement Grouting

In no case shall the permanent well casing be moved or driven following the placement and initial set of the cement grout.

Statutory/Other Authority: ORS 183, 536, 537 & 540

History:

WRD 13-1986, f. 10-7-86, ef. 11-1-86, Renumbered from 690-061-0106

WRD 9-1978, f. 12-12-78, ef. 1-1-79

690-210-0370

Well Test

Upon completion, every well shall be tested for yield and drawdown either by bailing, pumping, or air testing for a period of not less than one hour. Any testing method that does not provide for drawdown measurements during testing is not an accurate or reliable test of yield.

Statutory/Other Authority: ORS 536.090 & 537.505 - 537.795

History:

WRD 7-2001, f. & cert. ef. 11-15-01

WRD 8-1993, f. 12-14-93, cert. ef. 1-1-94

WRD 13-1986, f. 10-7-86, ef. 11-1-86, Renumbered from 690-061-0081

WRD 9-1978, f. 12-12-78, ef. 1-1-79

690-210-0380

Disinfection of a Well

Prior to or after being placed in the well, pumping equipment, sand, gravel and well casing shall be thoroughly hosed or sluiced with water, and shall be disinfected with a solution containing at least 50 parts per million chlorine. All water introduced into a well during construction shall be clean and potable. Upon completion, the well and its equipment, including the interior of the well casing, shall be thoroughly swabbed and cleaned to remove all of the oil, grease, and foreign substances. The well and its equipment shall be disinfected by thoroughly agitating and mixing in the well a solution containing enough chlorine to leave a residual of 25 parts per million throughout the well after a period of 24 hours. Disinfection should also occur following the installation of pumping equipment. (See Chart Recommendations for Disinfection of Wells, Appendix 210-2).

NOTE: Other public agencies may have jurisdiction over the discharge of chlorine in certain areas. The constructor should contact the Oregon Department of Environmental Quality or the appropriate city public works department for further information.

[ED. NOTE: Appendices referenced are available from the agency.]

Statutory/Other Authority: ORS 536.090 & 537.505 - 537.795

Statutes/Other Implemented: ORS 183, 536, 537 & 540

History:

WRD 5-2015, f. & cert. ef. 7-1-15

WRD 7-2001, f. & cert. ef. 11-15-01

WRD 8-1993, f. 12-14-93, cert. ef. 1-1-94

WRD 7-1988, f. & cert. ef. 6-29-88

WRD 13-1986, f. 10-7-86, ef. 11-1-86, Renumbered from 690-061-0116

WRD 9-1978, f. 12-12-78, ef. 1-1-79

690-210-0390

Completion of Wells

A well constructor or permitted landowner constructing their own well shall not remove the drilling machine from a well site, unless it is immediately replaced by another drilling machine in operating condition prior to completion or abandonment of the water supply well in compliance with OAR 690-210-0005 through 690-220-0140.

Statutory/Other Authority: ORS 536.090 & 537.505 - 537.795

History:

WRD 7-2001, f. & cert. ef. 11-15-01

WRD 8-1993, f. 12-14-93, cert. ef. 1-1-94

WRD 13-1986, f. 10-7-86, ef. 11-1-86, Renumbered from 690-061-0121

WRD 9-1978, f. 12-12-78, ef. 1-1-79

690-210-0400

Construction of Dug Wells

Dug wells that are 21 feet or less in depth shall be sealed with grout from land surface to within three feet of the bottom of the well. Dug wells greater than 21 feet in depth shall be sealed with grout from land surface to a depth of at least 18 feet below land surface. In all cases a watertight surface curbing shall extend from a minimum of 12 inches above land surface and continue the entire length of the sealed interval. Open wells, sometimes called sumps, which exceed ten feet in average diameter and are

dug to a depth of ten feet or less are exempt from these construction requirements, but are subject to all the requirements covering the use of ground water (water right application).

Statutory/Other Authority: ORS 183, 536, 537 & 540

Statutes/Other Implemented: ORS 183, 536, 537 & 540

History:

WRD 5-2015, f. & cert. ef. 7-1-15

WRD 7-2001, f. & cert. ef. 11-15-01

WRD 13-1986, f. 10-7-86, ef. 11-1-86, Renumbered from 690-061-0196

WRD 9-1978, f. 12-12-78, ef. 1-1-79

690-210-0410

Buried Slab Construction

In a buried slab type well, the slab shall be at least 18 feet below land surface and shall be at least three inches in thickness. The slab shall be reinforced to withstand all stresses. The slab shall be sealed with cement grout at least one foot thick, and the well bore backfilled with grout in accordance with OAR 690-210-0300 through 690-210-0360. (See Figure 210-13).

[ED. NOTE: Figures referenced are available from the agency.]

Statutory/Other Authority: ORS 183, 536, 537 & 540

Statutes/Other Implemented: ORS 183, 536, 537 & 540

History:

WRD 5-2015, f. & cert. ef. 7-1-15

WRD 7-2001, f. & cert. ef. 11-15-01

WRD 13-1986, f. 10-7-86, ef. 11-1-86, Renumbered from 690-061-0206

WRD 9-1978, f. 12-12-78, ef. 1-1-79

690-210-0420

Surface Curbing

(1) The surface curbing required in OAR 690-210-0400 shall be of concrete, concrete tile, or steel. If concrete is used, the concrete wall thickness shall not be less than six inches. In the case of buried slab type wells, well casing meeting the minimum specifications given in 690-210-0190 through 690-210-0220 shall be used. (See Figure 210-13.)

(2) If precast concrete tile or steel casing is used for the surface curbing, the well diameter to the bottom of the surface curbing shall be eight inches greater than the outside diameter of the tile or steel,

and the annular space shall be completely filled with grout in accordance with OAR 690-210-0310 through 690-210-0340. (See Figure 210-13).

[ED. NOTE: Figures referenced are available from the agency.]

Statutory/Other Authority: ORS 183, 536, 537 & 540

Statutes/Other Implemented: ORS 183, 536, 537 & 540

History:

WRD 5-2015, f. & cert. ef. 7-1-15

WRD 7-2001, f. & cert. ef. 11-15-01

WRD 13-1986, f. 10-7-86, ef. 11-1-86, Renumbered from 690-061-0201

WRD 9-1978, f. 12-12-78, ef. 1-1-79