

CERTIFICATE AND ORDER  
FOR FILING  
**PERMANENT**  
ADMINISTRATIVE RULES WITH THE SECRETARY OF STATE

I HEREBY CERTIFY that the attached copy is a true, full and correct copy of PERMANENT rule(s) adopted on November 19, 1993  
(Date)

by the Water Resources Commission  
(Department)

(Division)

to become effective January 1, 1994  
(Date)

The within matter having come before the Water Resources Commission  
(Department)

(Division)

after

all procedures having been in the required form and conducted in accordance with applicable statutes and rules and being fully advised in the premises:

Notice of Intended Action published in Secretary of State's Bulletin: NO  YES  Date Published: September 1, 1993

NOW THEREFORE, IT IS HEREBY ORDERED THAT the following action be taken: (List Rule Number(s) or Rule Title(s) on Appropriate Lines Below)

Adopted:  
New Total Rules)

Amended:  
Existing Rules)

OAR 690-200 through OAR 690-235, "Water Supply Well Construction and Maintenance Rules" and OAR 690-240, "Monitoring Well Construction and Maintenance Rules"

Repealed:  
Total Rules Only)

Administrative Rules of the Water Resources Department  
(Department)

(Division)

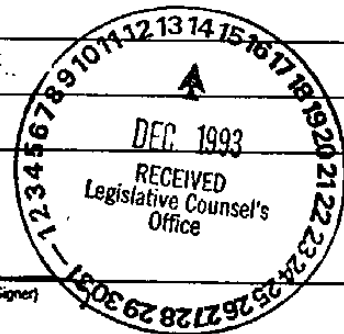
DATED this 14 day of December, 19 93

By:

*M. D. [Signature]*

(Authorized Signer)

Title: Director



Statutory Authority: ORS 536.090 and 537.505 through 537.795

Chapter(s) \_\_\_\_\_, Oregon Laws 19 \_\_\_\_\_ or

House Bill(s) \_\_\_\_\_, 19 \_\_\_\_\_ Legislature; or Senate Bill(s) \_\_\_\_\_, 19 \_\_\_\_\_ Legislature

Subject Matter: Water Supply and Monitoring Well Construction Rules. Ground Water Advisory Committee Rules. These rules pertain to proper construction, maintenance and abandonment techniques to be used related to water supply and monitoring wells. Division 235 provides guidance to the Ground Water Advisory Committee.

For Information Contact: Rob Carter/Beth Patrino  
(Rule Coordinator)

Phone: 378-8455 (exts. 296/299)

## DIVISION 210

### WELL CONSTRUCTION STANDARDS

#### Standards Apply to All Methods of Well Construction

690-210-005

- (1) The following well construction standards apply to all methods of 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 690-210-015.**
- (3) Additional standards will apply to some methods as specified in the following regulations.

#### Special Standards

690-210-015

- (1) **Site conditions may require specific design, construction, and abandonment procedures that differ from the water supply well construction rules. Site conditions may not permit adherence to minimum well setback distances. Alternative technologies not addressed in these rules may also exist which could be effectively utilized in the construction of a water supply well. The constructor must request in writing, and receive written approval from the Director to use methods or materials that do not meet water supply well construction standards prior to completion or abandonment of the well. The proposed methods or materials shall provide at least the same level of resource protection as that which is provided by these rules.**
- (2) **The written request for special standards shall include:**
  - (a) **Name of the bonded water supply well constructor;**
  - (b) **Location of the well by township, range, section, and 1/4, 1/4 section;**
  - (c) **Name and address of the project site;**
  - (d) **The distance to the nearest well and septic tank or drainfield;**
  - (e) **The reasons that conformance to the rules and regulations for water supply wells cannot be met;**

(f) A diagram and written description showing the proposed water supply well design, construction, or abandonment; and,

(g) The start card/well identification number, if applicable.

### **Regulations of Other Agencies May Also Apply**

690-210-020 **Certain** wells constructed under these rules [by some methods] may not produce water of suitable quality for use as public, community, municipal, or public utility supplies. Regulations administered by other agencies may apply in addition to those in this chapter (See Appendix 1 [1, Part II]).

### **Placement of Wells**

690-210-030

(1) No person shall construct a well within 50 feet of any septic tank; 100 feet of a **septic drainline** or sewage disposal area; 50 feet of a closed sewage or storm drainage system; 50 feet of a confined animal feeding or holding operation or animal waste holding pond, lagoon, or other animal waste storage site; 100 feet of any sewage sludge disposal area; or 500 feet of a hazardous waste storage, disposal or treatment unit without written permission of the Director. **Rain water gutter downspouts and drains are exempt from the above setback requirements.** The constructor should consider whether greater distances are required for the protection of the groundwater depending on the topography and local geology.

(2) A new 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. In no event shall a well be constructed through an abandoned septic tank or drain line. The new well shall be located to meet other setbacks as directed in section (1) of this rule.

[(3) Application to the Director for permission to construct a well closer than the setback distances stated in section (1) of this rule shall include:

(a) A description of physical characteristics of the site which makes such location 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 to the groundwater resource.

(4) The Director may approve location of a well closer than the setback distances stated in section (1) of this rule only upon a determination that the additional precautions to be taken and specific physical characteristics of the site allow the proposed location without threat of cross-contamination of the groundwater resource.]

{adopted 2-18-77; amended: 1-1-79; renumbered from 690-60-015 11-1-86; 6-24-88}

#### **Water Used Must be Potable**

690-210-040 All water used in the construction, alteration, repair or abandonment of a well shall be potable.

{adopted 11-1-86}

#### **Organic Materials**

690-210-050 Organic materials which foster or promote undesired organic growth or have the potential to degrade water quality shall not be employed in the construction of a well. This includes, but is not limited to, brans, hulls, grains, starches and proteins.

{adopted 1-1-79; amended: renumbered from 690-61-076 11-1-86; 6-24-88}

#### **Explosives**

690-210-060

(1) If explosives are used in the construction of a well, their use must be reported on the well report form (well log). Information which shall be included is the type and amount of explosive used.

(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 they will be placed, and where they are 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.

{adopted 1-1-79; amended: renumbered from 690-61-066 11-1-86}

#### **Hydrofracturing**

690-210-065

(1) If the well is hydrofractured, the constructor shall so note on the well report.

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**Information reported shall include methods and materials used, maximum pressure exerted on the formation, location of packers, 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 (propants) approved by the Department may be injected into the well to hold the fractures open when the pressure is removed.**

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

### **Injection Wells**

690-210-070 No well subject to these rules shall be used for the injection of surface or groundwaters, 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.

{adopted 1-1-79; amended: renumbered from 690-60-030 11-1-86}

### **Commingling of Waters**

690-210-080 In no case shall a well be constructed to allow commingling or leakage of groundwater within an individual well by gravity flow or artesian pressure from [different groundwater] **one aquifer to another. See definition of aquifer.** [aquifers associated with different geologic units. However, groundwater entering from different depths in the same geologic unit may be combined provided the waters are similar as to potentiometric head, temperature and mineral content.]

{adopted 1-1-79; amended: renumbered from 690-61-061 11-1-86}

### **Perched Groundwater**

690-210-090 Wells drawing water from perched zones must be constructed to prevent the waste of this type of groundwater.

{adopted 1-1-79; amended: renumbered from 690-61-059 11-1-86}

(5) All flowing artesian 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.

{adopted 1-1-79; amended: renumbered from 690-61-156, 690-61-161, 690-61-166, 690-61-171 & 690-61-176 11-1-86}

### **Sealing of Wells in Unconsolidated Formations Without Significant Clay Beds**

690-210-130

(1) Wells drilled into unconsolidated water-bearing strata overlain by unconsolidated materials, such as sand, silt, or [sand and] gravel, without significant clay beds, shall have a watertight, unperforated well casing extending at least five (5) feet below the top of the water table. If the water table is thirteen (13) feet or less below land surface, a watertight, nonperforated, permanent well casing shall extend to a minimum depth of eighteen (18) feet. An upper oversize drillhole, four (4) inches greater in diameter than the nominal diameter of the casing, shall be constructed to a minimum depth of eighteen (18) feet. To prevent caving, a temporary surface casing, at least eighteen (18) feet in length, shall be used throughout the construction of the annular seal space.

(2) The annular space between the permanent well casing and the temporary surface casing or drillhole wall shall be completely filled and sealed from a depth of at least eighteen (18) feet to land surface with grout in accordance with rules 690-210-300 through 690-210-360 after the permanent well casing is set into its final position. The temporary surface casing shall be removed as the annular space is filled with grout. (See Figure 3, 1986.)

{adopted 1-1-79; amended: renumbered from 690-61-126 11-1-86}

### **Sealing of Wells in Unconsolidated Formations With Significant Clay Beds**

690-210-140 Wells drilled into water-bearing strata 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 (5) feet into a clay or other impermeable stratum overlying the water-bearing zone. In all cases, an upper oversize drillhole, at least four (4) 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 caving materials throughout the construction of the oversize drillhole. If the clay or other impermeable stratum is thirteen (13) feet or less below land surface, the watertight, nonperforated well casing and the upper, oversize drillhole shall extend to a minimum depth of eighteen (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, [perforated] 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 rules 690-210-310 through 690-210-360 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 4, 1986.)

{adopted 1-1-79; amended: renumbered from 690-61-131}

### **Sealing of Wells in Consolidated Formations**

690-210-150

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

(a) Method 1 - An upper drillhole, four (4) 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 (5) feet into solid, uncreviced, consolidated rock overlying the water-bearing rock formation below a depth of thirteen (13) feet. Unperforated permanent well casing shall extend to this same depth. The annular space between the casing and the drillhole wall within the rock formation shall be filled with [cement] grout. The upper annular space between the casing and the drillhole wall shall be filled from land surface to at least five (5) feet into an impermeable clay stratum below a depth of thirteen (13) feet. The annular space between the upper and lower required cement grout sealing intervals shall be filled with an impermeable sealing material [or cement grout]. If necessary to complete the well, a smaller diameter well casing, liner pipe, or well screen may be installed. If cement grout is placed by a suitable pump from the bottom of the casing to land surface (Methods A, B, D, Appendix 3), the upper drillhole shall be at least two (2) inches larger than the nominal diameter of the casing. (See Figure 5, 1986.)

(b) Method 2 - An upper drillhole, four (4) inches greater in diameter than the permanent well casing to be installed, shall extend from land surface to at least five (5) feet into an impermeable clay stratum below a depth of thirteen (13) feet. Unperforated, permanent well casing shall extend to and shall be driven into solid, uncreviced, consolidated rock overlying the water-bearing rock formation. A lower drillhole, equal in diameter to the inside diameter of the upper permanent well casing, shall be constructed at least five (5) feet into solid uncreviced rock overlying the water-bearing formation. A smaller diameter casing, at least two (2) inches smaller in diameter than the diameter of the upper permanent well casing, shall extend at least five (5) feet into the lower drillhole and at least eight (8) feet into the upper permanent well casing. The annular space between the upper oversize drillhole and the permanent well casing, and the annular space between the smaller diameter lower

casing and the lower drillhole, shall be completely filled with grout in accordance with rules 690-210-300 through 690-210-360 after the permanent well casing and the lower casing are set into final position. (See Figure 6, 1986.)

(c) Method 3 - An upper drillhole, four (4) inches greater in diameter than the permanent well casing to be installed, shall extend from land surface to at least five (5) feet into an impermeable clay stratum below a depth of thirteen (13) feet. A lower drillhole, at least two (2) inches greater in diameter than the diameter of the permanent well casing, shall be constructed at least five (5) feet into solid, uncreviced, consolidated rock by under-reaming methods. Unperforated, permanent well casing shall extend to and be driven into solid, uncreviced, consolidated rock at the bottom of the under-reamed section following placement of the sealing material. The annular space between the upper oversize drillhole and the upper permanent well casing shall be filled with cement grout using Method C or bentonite grout. The annular space between the lower under-reamed drillhole wall and the permanent well casing, shall be completely filled with grout applied under pressure in accordance with the appropriate Method A, B or D, in Appendix 3. (See Figures 2, 1986 and 7, 1986.)

(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.

{adopted 1-1-79; amended: renumbered from 690-61-136 11-1-86; 6-24-88}

#### **Additional Standards for [Sealing of] Filter Pack Wells with Surface Casing**

690-210-160 If a permanent surface casing is installed in the construction of a filter pack well, a [well bore having a nominal diameter of at least four (4) inches greater than the nominal diameter of the permanent surface casing shall extend from land surface to at least five (5) feet into a clay or other impermeable formation overlying the water-bearing zone. Unperforated watertight casing shall extend to this same depth and the annular space between the well bore and the surface casing shall be filled with grout. If the clay or other impermeable formation is at or near land surface, a minimum of eighteen (18) feet of unperforated casing shall be installed. A] watertight, welded, steel plate at least three-sixteenths (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 [pipe] with threaded cap may be installed for the purpose of placing additional filter pack material in the well. (See Figure 8, 1986.)

{adopted 1-1-79; amended: renumbered from 690-61-141 11-1-86}



## **Additional Standards for [Sealing of] Filter Pack Wells Without Surface Casing**

690-210-170 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 (8) 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 (4) inches greater than the nominal diameter of the permanent well casing shall be constructed.** [shall extend from land surface to at least five (5) feet into a clay or other impermeable formation overlying the water-bearing zone. Unperforated watertight casing shall extend to this same depth and the annular space between the well bore and the permanent casing shall be completely filled with grout. If the clay or other impermeable formation is at or near land surface, the upper oversize drillhole and unperforated, permanent well casing shall extend to a minimum depth of eighteen (18) feet below land surface.] A suitable **plug [packer]** 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 9, 1986.)

{adopted 1-1-79; amended: renumbered from 690-61-146 11-1-86}

## **Additional Standards for Driven or Jetted Wells**

690-210-180 All drive point wells or jetted wells shall have nonperforated, watertight pipe meeting the minimum specifications shown in [Appendix 2,] Table V and extending a minimum distance of eighteen (18) feet below land surface. Drive pipe greater than three and one-half (3 1/2) inches shall comply with the minimum specifications in Rule 690-210-190. An upper drillhole at least four (4) inches greater in nominal diameter than the permanent production pipe shall extend at least eighteen (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 11, 1986.)

{adopted 1-1-79; amended: renumbered from 690-61-186 & 690-61-191 11-1-86; 6-19-88}

## **Steel Casing**

690-210-190

(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 and Materials (ASTM) A-53 A or B [(ASTM A-120)]** specifications for steel pipe, for the sizes as set out in Table III.

(2) All steel casing having a diameter larger than twenty (20) inches shall have a wall

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thickness of at least .375 inch.

(3) Steel casing installed in a well greater than a nominal diameter of ten (10) inches, having a wall thickness of .250 inch and meeting **or exceeding ASTM A-53 A or B** [ASTM A-120] specifications must not exceed the following depth limitations (Diameter -Maximum Depth, respectively):

- (a) 12 inches - **500** [250] feet;
- (b) 14-16 inches - **250** [150] 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.

**Publications:** The publication(s) referred to or incorporated by reference in this rule are available for reference in the office of the Water Resources Department.

{adopted 1-1-79; amended: renumbered from 690-61-006 11-1-86; 6-24-88}

#### **Steel Casing Joints**

690-210-200 All steel casing joints shall be welded or screw coupled and shall be watertight. 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.

{adopted 1-1-79; amended: renumbered from 690-61-016 11-1-86}

#### **Plastic Casing**

690-210-210

- (1) Plastic casing shall not be driven and shall 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), meeting the standards of the "National Sanitation Foundation" and the specifications of ASTM F-480 or ASTM D-2241-73 and ASTM

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:

- (1) SDR = 21 - Maximum Depth = 150 feet.
- (2) 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 690-210-190. 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.**

**(b) By use of a concrete bunker. The bunker shall completely surround the well and be fitted with a lid.**

**(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: The publication(s) referred to or incorporated by reference in this rule are available for reference in the office of the Water Resources Department.

{adopted 1-1-79; amended: renumbered from 690-61-031 11-1-86}

### **Plastic Casing Joints**

690-210-220 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 rule 690-210-210. 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 Appendix 2,] Table IV).

{adopted 1-1-79; amended: renumbered from 690-61-036 11-1-86; 6-24-88}

### **Inner Casing**

690-210-230 Inner casing installed [to prevent leakage of undesirable water] into a well must meet the minimum requirements of well casing (690-210-190). The space between the two well casings shall be sealed [pressure grouted] 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 (8) feet into the lower end of the well casing.** The inner casing must be centered and must be a minimum of one [two] inches 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 3)

{adopted 1-1-79; amended: renumbered from 690-61-231 11-1-86}

### **Casing Shall Be Centered**

690-210-240 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 1, 1986.)

{adopted 11-1-86}

### **Top Terminal Height**

690-210-250

(1) The casing head or pitless unit of any well shall extend not less than twelve (12) inches above the finished ground surface or pumphouse floor, and not less than twelve (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. No casing shall be cut off below land surface except to install [a basement offset or] a pitless unit, or during permanent abandonment of a well without permission of the Director.

(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 to the groundwater 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 groundwater resource.

{adopted 1-1-79; amended: renumbered from 690-61-041 11-1-86}

### **Openings in the Casing**

690-210-260 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.

{adopted 1-1-79; amended: renumbered from 690-61-046 11-1-86}

### **Pitless Well Adapters and Units**

690-210-270 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** [required] 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 690-210-330 and 340.** 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 690-210-210 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 1 [III]).

{adopted 1-1-79; amended: renumbered from 690-61-051 11-1-86; 6-24-88}

### **Access Ports and Airlines**

690-210-280 All wells shall be equipped with a usable access port with a minimum diameter of 1/2 inch [3/4 inch]. In addition, an airline with a pressure gauge adequate to determine the water level in the well at any time may be installed. If an airline is installed, it must enter the well in a location other than the access port. If the well constructor does not install a pump in the well, the landowner will be required to provide the access port. (See Figure 17, 1986.)

{adopted 11-1-86}

### **Liner Pipe**

690-210-290 Liner pipe installed through caving formations and installed without driving, may be of lighter weight than specified by Table III under rule 690-210-190. Such lightweight pipe shall have a wall thickness equal to or greater than .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, SDR 21 (Class 200), or SDR 26 (Class 160). Liner pipe installed in a well shall extend or telescope at least eight (8) 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 (8) 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 690-210-230.)

{adopted 1-1-79; amended: renumbered from 690-61-011 11-1-86; 6-24-88}

### **Drill Cuttings or Chips**

690-210-300 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.

{adopted 1-1-79; amended: renumbered from 690-61-110 11-1-86}

### **Cement Grout**

690-210-310 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 .075 ounce (1 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 (5) percent by weight of dry cement. Calcium chloride may be added to a Portland cement grout to accelerate the set but shall not exceed two (2) 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.

{adopted 1-1-79; amended: renumbered from 690-61-086 11-1-86}

### **Concrete**

690-210-315 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 (5) sacks of Portland cement per cubic yard of concrete. Concrete will be allowed only when the oversize drill hole is a minimum of 8 inches larger in diameter than the well casing used in construction of the well. The maximum diameter of aggregate particles shall not exceed one and one-half (1 1/2) inches, but, in any case, shall not exceed one-fifth (1/5) or twenty (20) percent of the minimum width of the space to be filled. The ratio of coarse aggregate to fine aggregate (Passing No. 4, US Standard Sieve) shall be approximately one and one-half (1 1/2) to one (1) by volume, but, in any case, shall not exceed two (2) to one (1) nor be less than one (1) to two (2).

{adopted 1-1-79; amended: renumbered from 690-61-211 11-1-86; 6-24-88; renumbered from 690-210-430}

### **Methods of Placement of Cement Grout or Concrete**

690-210-320 Cement grout or concrete used as a sealing material in a well shall be placed or forced upward from the bottom of the 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 procedure, see Appendix 3 and Figure 2, 1986.)

{adopted 1-1-79; amended: renumbered from 690-61-021 & 690-61-096 11-1-86; 6-24-88}

### **Unhydrated Bentonite [Grout]**

690-210-330 **Unhydrated** bentonite used in construction of surface casing seals for wells shall be within industry tolerances for [6 to 8 mesh,] dry [granular] western sodium **granule**,

pellet, or chip bentonite. The bentonite shall be free of polymers. **Powdered bentonite shall not be used.**

{adopted 12-7-85; amended: renumbered from 690-61-087 11-1-86}

#### **Method of Placement of Unhydrated Bentonite [Grout]**

690-210-340

(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 eighteen (18) feet. **THE USE OF UNHYDRATED BENTONITE [GROUT] AS A SURFACE CASING SEAL SHALL NOT BE ALLOWED BELOW FIFTY (50) [TWENTY-FIVE (25)] FEET FROM LAND SURFACE.** In the event that the subsurface materials penetrated by the oversize drillhole cave, or tend to cave, an outer temporary surface casing shall be used to case out the casing materials throughout construction of the oversize drillhole. The temporary surface casing shall be removed before completion of drilling.

(2) [The annular space shall] In the event water is present or encountered during the construction of the oversized drillhole, **only bentonite chips or tablets shall be allowed in the sealing interval. Granular bentonite shall be used if the annular space is dry [not be used as grout material]. A maximum of twenty-five (25) feet [be free] of water may be within the sealing interval. Bentonite smaller than 3/8 inch shall not be allowed below the static water level in the sealing interval.**

(3) After placement of the permanent casing, the annular space shall be filled to land surface with [granular] bentonite [, in a dry condition]. The annular space **should [shall]** be kept full while drilling or driving casing. **A sounding or tamping tool shall be run in the sealing interval during pouring to measure fill-up rate and to break up possible bridges or cake formation.** [The annular space shall be tamped while placing bentonite to prevent bridging.]

(4) **Pour rate shall be three minutes or slower per 50 lb. sack in the water-filled portion of the annulus.**

{adopted 12-7-85; amended: renumbered from 690-61-097 11-1-86}

#### **Resumption of Construction Following Placement of Cement Grout**

690-210-350 The time of the final set for 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 in any way 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. Recommended periods of time of 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.

{adopted 1-1-79; amended: renumbered from 690-61-101 11-1-86}

### **Movement of Casing After Cement Grouting**

690-210-360 In no case shall the permanent well casing be moved or driven following the placement and initial set of the cement grout.

{adopted 1-1-79; amended: renumbered from 690-61-106 11-1-86}

### **Well Test**

690-210-370 **Upon completion**, every well shall be tested for yield and drawdown for a period of not less than one hour either by bailing, pumping, or air testing. Any testing method that does not provide for drawdown measurements during testing is not an accurate or reliable test of yield.

{adopted 1-1-79; amended: renumbered from 690-61-081 11-1-86}

### **Disinfection of a Well**

690-210-380 Every new, altered, or reconditioned **water supply** well including pumping equipment, sand, or gravel used in filter pack wells and a well casing standing above the water table, shall be thoroughly hosed or sluiced with water, and shall be disinfected with a solution containing at least fifty (50) parts per million chlorine before being placed in the well. All water introduced into a well during construction shall be clean and potable. 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 upon completion of the well's construction. Following the completion of a **water supply** well, and again after the pumping equipment has been installed, 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 twenty-five (25) parts per million throughout the well after a period of twenty-four (24) hours. (See Chart Recommendations for Disinfection of Wells, Appendix 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.**

{adopted 1-1-79; amended: renumbered from 690-61-116 11-1-86; 6-24-88}

## **Completion of Wells**

690-210-390 A well constructor or permitted landowner constructing his 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:

- (1) Completion of the well in compliance with rules 690-210-005 through 690-210-420 and a watertight seal, threaded or welded cap placed on the well in accordance with rule 690-220-005; or
- (2) Completion of the well in compliance with rules 690-210-005 through 690-210-430 and a pump installed; or
- (3) Abandonment of the well in compliance with rules 690-220-030 through 690-220-140.

{adopted 1-1-79; amended: renumbered from 690-61-121 11-1-86}

## **Construction of Dug Wells**

690-210-400 All dug wells greater than twelve (12) feet in depth shall be constructed with a watertight surface curbing extending from a minimum of twelve (12) inches above land surface to a depth of eighteen (18) feet below land surface. In the case of wells ranging from twelve (12) to twenty-one (21) feet in depth, water tight surface casing shall extend to within three (3) feet of the bottom of the well. Open wells, sometimes called sumps, which exceed ten (10) feet in average diameter are exempt from these construction requirements, but are subject to all the requirements covering the use of groundwater (water right application).

{adopted 1-1-79; amended: renumbered from 690-61-196 11-1-86}

## **Buried Slab Construction**

690-210-410 In a buried slab type well, the slab shall be at least eighteen (18) feet below land surface and shall be at least three (3) inches in thickness. The slab shall be reinforced to withstand all stresses. The slab shall be sealed with cement grout at least one (1) foot thick, and the well bore backfilled with grout or concrete in accordance with rules 690-210-300 through 690-210-360 and with 690-210-430. (See Figure 12, 1986.)

{adopted 1-1-79; amended: renumbered from 690-61-206 11-1-86}

## **Surface Curbing**

690-210-420

- (1) The surface curbing required in rule 690-210-400 shall be of concrete, concrete tile, or

steel. If concrete is used, the concrete wall thickness shall not be less than six (6) inches. In case of buried slab type well, well casing meeting the minimum specifications given in rule 690-210-190 through rule 690-210-220 shall be used. (See Figure 12, 1986.)

(2) If precast concrete tile or steel casing are used for the surface curbing, the well diameter to the bottom of the surface curbing shall be eight (8) inches greater than the outside diameter of the tile or steel, and the annular space shall be completely filled with grout or concrete. (See Figure 12, 1986.)

{adopted 1-1-79; amended: renumbered from 690-61-201 11-1-86}

### **[Special Temporary Standards for Repair, Maintenance and Delays in Completion of New Well Construction**

690-210-510

(1) An authorization for special temporary standards from adopted uniform standards for construction and maintenance of wells may be granted by the Director for a specified time period not to exceed one year. A request for such temporary special standard shall be in writing from the landowner drilling their own well with a well construction permit or the bonded constructor, and shall include at a minimum:

- (a) The intended use of the well;
- (b) The location of the well;
- (c) The name and address of the owner;
- (d) The location of and distance to the nearest well, septic tank and drainfield (if none are in within 500 feet, so indicate);
- (e) The unusual conditions existing at the well site that create the need for special standards;
- (f) The reasons that adherence to or compliance with the rules and regulations for minimum standards will not result in a satisfactory well;
- (g) The proposed standards that the well constructor or landowner constructing the well believes will be adequate for the particular well;
- (h) A diagram showing the pertinent features of the proposed well design and construction; and

(i) The date by which the well will be brought into full compliance with the minimum standards.

(2) A copy of the approved special temporary standards shall be attached to each copy of the well report completed by the constructor for the subject well. The constructor shall note on the attachment or on the well report how and when the well was brought into full compliance with the minimum standards.

(3) Authorization for temporary standards for maintenance and repair, but not for new well construction, may be extended by the Director if good cause is shown by the well constructor.

{adopted 11-1-86; amended: 6-24-88}}