

62-532.500 Water Well Construction Standards.

The following minimum standards shall apply to the construction, repair, and abandonment of water wells in the State unless exempted by a water management district rule with the concurrence of the Department. Operation requirements for public water systems are included in Chapter 62-555, F.A.C., and operation requirements for limited use public water systems, multifamily water systems, and private water systems are included in Chapter 64E-8, F.A.C.

(1) Well Casing, Liner Pipe, Coupling, and Well Screen Requirements.

(a) Well casing, liner pipe, coupling, and well screen shall be new or in like new condition. Such well casing, liner pipe, coupling, or well screen shall not be used unless free of breaks, corrosion and dents, is straight and true, and not out of round. Welded or seamless black or galvanized steel pipe or casing, or stainless steel pipe or casing, or approved types of nonmetallic pipe shall be used for well casing or liner pipe. All well casing shall conform to one of the following standards: American Society for Testing and Materials (ASTM) A53/A53M-99b (1999), A135-01 (2001), A252-98 (1998), A589-96 (1996), or American Petroleum Institute (API) 5L-2000 (2000). Well casing that conforms to any of the aforementioned ASTM or API standards shall also conform to the 2000 American National Standard Institute for Welded and Seamless Wrought Steel Pipe (ANSI/ASME B36.10M-2000). All well casing shall be stenciled with the applicable standard, or proper documentation of manufacturer specifications must be supplied to the permitting authority upon request. Copies of these standards may be obtained from the American Society for Testing and Materials, 100 Barr Harbor Drive, P. O. Box C700, West Conshohocken, PA 19428-2959; the American Petroleum Institute, 1220 L Street NW, Washington, DC 20005-4070; and the American National Standards Institute, 1819 L Street NW, Washington, DC 20036, respectively.

(b) Black or galvanized steel casing installed by driving shall not have less than the dimensions and weights specified below.

Nominal Size (in.)	Outside Diameter (in.)	Wall Thickness (in.)	Plain End Weight (lbs./ft.)
1.25	1.660	.140	2.27
1.5	1.900	.145	2.72
2	2.375	.154	3.65
3	3.5	.216	7.58
3.5	4.000	.226	9.11
4	4.5	.237	10.79
5	5.563	.258	14.62
6	6.625	.280	18.97
8	8.625	.277	24.70
10	10.750	.307	34.24
12	12.750	.330	43.77
14-30		.375	
more than 30		.500	

Note: A 4 inch nominal size casing with a wall thickness of .188 inches and a plain end weight of 8.66 pounds/foot may be used if it conforms to standard API 5L-2000, Grade B, 60 KSI tensile strength. Other casing that meets these minimum tensile strength standards shall be acceptable. For example, A53/A53M-99b, Grade B, may also be substituted.

(c) Black or galvanized steel casing or liner pipe set into place without driving shall not have less than the dimensions and weights specified below.

Nominal Size (in.)	Outside Diameter (in.)	Wall Thickness (in.)	Plain End Weight (lbs./ft.)
1.25	1.660	.140	2.27
1.5	1.900	.145	2.72
2	2.375	.154	3.65
2.5	2.875	.203	5.79
3	3.500	.188	6.65

3.5	4.000	.188	7.65
4	4.500	.188	8.66
5	5.500	.188	10.79
6	6.625	.188	12.92
8	8.625	.188	16.94
10-16		.250	
>16		.375	

(d) Stainless steel pipe used for casing or liner pipe shall be Schedule 10S of the American National Standards Institute (ANSI/ASME B36.19M-1985), or stronger classification.

(e) Polyvinyl Chloride (PVC) pipe may be used for well casing, liner pipe, and well screens. Any PVC pipe used for well construction or repair shall at a minimum meet the specifications for Schedule 40 or Standard Dimension Ratio (SDR) 21. The appropriate water management district shall require the use of stronger PVC casing if necessary to protect the integrity of the well.

(f) The Department shall approve a well casing or liner pipe not otherwise specified in paragraphs 62-532.500(1)(a) through (e), F.A.C., if the applicant makes a showing, certified by a professional engineer, to justify that such use would provide an equivalent material strength and durability. The following material has been approved pursuant to this procedure: DNS Well-Cor, Allied Tube and Conduit, A Division of Grinnel Corporation, 1440 Massaro Boulevard, Tampa, Florida, 33619.

Nominal	Outside	Wall
Size	Diameter	Thickness
(in.)	(in.)	(in.)
1.25	1.638	.085
2	2.360	.095
4	4.466	.150

(g) Well casing, liner pipe, coupling, and well screens used for potable water well construction or repair shall conform to 2008 NSF International Standard/American National Standard NSF/ANSI 14-2008e, Plastics Piping System Components and Related Materials, or NSF International Standard/American National Standard NSF/ANSI 61-2008, Drinking Water System Components – Health Effects, both of which are adopted and incorporated by reference herein. Copies of these copyrighted standards may be obtained from NSF International, P. O. Box 130140, Ann Arbor, MI 48113-0140.

(h) Steel well casing and liner pipe shall be joined in a watertight manner by threaded couplings, electrical welding methods, or other methods approved by the appropriate water management district which provide equivalent protection. PVC pipe shall be joined by solvent bonded couplings, threaded couplings, heat welding, or other methods approved by the appropriate water management district which provide equivalent protection.

(i) Nonmetallic and stainless steel well casing or liner pipe shall not be installed by driving unless prior approval is obtained from the appropriate water management district based on a demonstration that the integrity of the well casing or liner pipe will be maintained. For well casing or liner pipe installed by driving, the casing or pipe shall not butt together inside threaded couplings unless the joint is electrically welded so as to be completely watertight. A drive shoe is required for use on casing or pipe installed by driving unless prior approval is obtained from the appropriate water management district based on a demonstration that a drive shoe is not necessary to maintain the integrity of the casing or pipe.

(2) Geothermal well heat exchanger pipe and fitting materials shall meet the standards and specifications in the document Closed-Loop/Geothermal Heat Pump Systems Design and Installation Standards, Revised Edition 2008, published by the International Ground Source Heat Pump Association, Oklahoma State University, which is adopted and incorporated by reference herein. In addition, the reference Closed-Loop/Ground-Source Heat Pump Systems Installation Guide, 1988, Oklahoma State University, is excellent and is included here as a guidance document. Copies of all of these references may be obtained from the International Ground Source Heat Pump Association, Oklahoma State University, 374 Cordell South, Stillwater, OK 74078-8018.

(a) All geothermal well heat exchanger pipe and fitting materials shall be stenciled with the applicable standard, or proper documentation of manufacturer specifications must be supplied to the permitting authority upon request.

(b) The Department or the permitting authority shall approve geothermal well heat exchanger pipe and fitting materials not meeting the standards and specifications in the document adopted in subsection 62-532.500(2), F.A.C., if the applicant makes a showing, certified by a professional engineer, to justify that such use would provide an equivalent material strength and durability.

(3) Well Construction Criteria.

(a) Well casings, which are seated into unconsolidated earth material, shall extend from the upper terminus of the well to the well screen. The well screen shall be attached to the casing with a watertight seal.

(b) Well casings that are seated into a rock layer or other consolidated earth material, shall be continuous and shall extend from the upper terminus of the well to no less than the top of the uppermost consolidated unit. Wells constructed of telescoping casings shall be considered as a continuous casing provided the grout requirements are met. The lower terminus of the well casing shall extend to or below the water level of the aquifer intended to supply water to the well or receive fluids from the well. In addition, all caving zones below the uppermost consolidated unit shall be cased.

(c) Geothermal wells shall be grouted in accordance with subparagraph 62-532.500(3)(i)6., F.A.C.

(d) For public water system wells using telescoped casing, the casing shall be overlapped by not less than 20 feet when increases or reductions occur in casing size, unless another footage is approved by the appropriate water management district or permitting authority. Not less than two centralizing spacers shall be used in the overlapped sections, and the annular space in the overlapped sections shall be completely sealed with cement grout.

(e) Prevention of Interchange of Water and Loss of Artesian Pressure. All water wells shall be properly designed and constructed to prevent an interchange of water between water bearing zones that may result in deterioration of the quality of water in one or more water bearing zones, or will result in a loss of artesian pressure. If a well cannot be properly completed to prevent such an unauthorized interchange of water between water bearing zones or to prevent a loss of artesian pressure, the well shall be abandoned and plugged in accordance with this chapter or other directions from the permitting authority, which are appropriate for the hydrogeologic conditions encountered.

(f) In the construction, repair, or abandonment of a water well, caution shall be taken to maintain the work site so as to minimize the potential entrance of contaminants into the bore hole and the ground water resource.

(g) Only water from a potable water source shall be used in the construction, repair or abandonment of a water well, including water for cleaning of well materials, drilling equipment, and water used to mix drilling fluids.

(h) Use of Explosives. The use of dynamite or other high-grade explosives in the construction or repair of water wells is prohibited.

(i) Grouting and Sealing.

1. All well casings seated into a consolidated formation shall be seated or sealed with neat cement grout.

2. Except as provided in 3. below, wells with driven casing into natural earth or a bore hole equal to or smaller in diameter than the outside diameter of the casing shall be sealed by adding dry bentonite to the casing string at land surface and allowing that material to be carried down the outside of the casing as the casing is driven to completion. Dry bentonite shall be applied to maintain a grout seal around the casing.

3. In the construction of water wells with driven casing, for limited use commercial public water systems, limited use community public water systems, public water systems, potable water wells permitted pursuant to Chapter 62-524, F.A.C., and water wells serving bottled water plants, the minimum acceptable seal shall be accomplished by undercutting or under-reaming the last five feet of the hole before seating the casing. A minimum of one foot of such enlarged hole must be into the consolidated formation in which the casing will be seated. The entire enlarged portion of the hole shall be filled with cement grout, and then the casing shall be driven through the cement grout and seated into the enlarged one-foot portion of the consolidated formation. The uppermost 20 feet of casing shall be sealed with no less than a two-inch nominal thickness of cement grout. No other minimum seal shall be acceptable unless approved by the appropriate water management district or delegated permitting authority as providing equivalent protection to the resource.

4. For any part of a well casing with an outside diameter of four inches or larger intended to be installed in a bore hole which is larger in diameter than the inside diameter of the casing, the annular space shall be filled from bottom to top with not less than a nominal two-inch thickness of neat cement grout. For well casings with an outside diameter of less than four inches, intended to be installed in a bore hole which is larger in diameter than the inside diameter of the casing, the minimum grout thickness shall be a nominal one inch thickness of neat cement grout. The casing shall be centered in the bore hole prior to grouting. In those cases where, during grouting operations, circulation of the grout is lost so that the annular space being grouted cannot be filled in one continuous operation, a tremie pipe shall be installed in the annular space to a point immediately above the zone of lost circulation and the annulus shall be bridged at that point by sand or other approved material introduced through the pipe. Grouting of the annular space shall be completed using the tremie pipe or other equivalent method approved by the permitting authority.

5. Any district may grant individual exceptions or, with the concurrence of the Department, may exempt any areas of that

district from the requirements of cement grouting the annular space between the well casing and bore hole wall of that part of a well which penetrates an unconsolidated formation upon demonstration that:

a. The unconsolidated formation material is of such a caving nature that upon stopping the circulation of drilling fluid through the well the aquifer material will immediately cave into and fill up the annular space between the well casing and bore hole wall.

b. A flow space is not created by such construction that will allow any movement of waters along the outside of the well casing which did not naturally occur prior to construction of the well.

6. Except as provided in subparagraph 5. above, grouting and sealing of water wells shall be accomplished by the practices and methods recommended by Appendix C of American Water Works Association (AWWA) Standard A100-97 (1997), AWWA Standard for Water Wells, and grouting and sealing of geothermal wells shall be accomplished by the practices and methods recommended by the Vertical Geothermal Heat Pump Systems Engineering Design and Field Procedures Manual, published by the International Ground Source Heat Pump Association, First Edition 2000, Oklahoma State University, which are adopted and incorporated by reference herein. Copies of these recommended practices and methods may be obtained from the American Water Works Association, 6666 West Quincy Avenue, Denver, CO 80235; and the International Ground Source Heat Pump Association, Oklahoma State University, 374 Cordell South, Stillwater, OK 74078-8018, respectively.

7. Alternate grouting methods and materials providing equivalent protection shall be approved in writing by the permitting authority. Alternatives to the grouting methods described in subparagraphs 1.-6. above, must be requested for use from the permitting authority as part of the construction permit application, or once construction begins only in situations where the methods in the rules are not working. In either situation, a detailed explanation of what and why alternate methods are requested must be provided. Alternate grout materials (other than neat cement grout) must be requested in the construction permit application, or once construction begins only when neat cement grout is not providing or will not provide as good a seal as the alternate materials.

(4) Top of the Well.

(a) Well Covers.

1. Whenever there is an interruption in work on the well, such as overnight shutdown, the well opening shall be sealed with a tamper resistant cover.

2. Except for those areas of a district designated by the Department with the concurrence of the permitting authority, any well in which pumping equipment is installed seasonally or periodically shall, whenever pumping equipment is not installed, be capped with steel or reinforced concrete cover, or valve.

3. Any cased well equipped with permanently installed pumping equipment shall have that pumping equipment and any necessary piping installed through a well seal.

4. Any unused well shall be capped in a watertight manner with a threaded, welded, or bolted cover or valve.

(b) Upper Terminus.

1. At the time of well construction, all wells shall be accessible at the upper terminus of the well casing for inspection, servicing, and testing.

2. For private and multi-family water system wells and irrigation wells, the upper terminus of the well casing shall project at least 12 inches above finished grade. Where a potential physical structure or traffic hazard may be present or where a potential public health threat exists, the upper well casing terminus may be placed in an appropriate enclosure terminating at finished grade. The enclosure shall be designed to allow vertical access to the upper well casing terminus for maintenance and inspection and provide for gravity drainage of the enclosure. The upper well casing terminus shall be constructed to a point 18 inches or less below finished grade. The upper well casing terminus shall be sealed with a water tight seal to prevent the entrance of surface water and contaminants into the well.

3. For limited use commercial public water system wells and limited use community public water system wells constructed on or after April 1, 2002, the upper terminus of the well casing shall project at least 12 inches above the concrete apron around the well.

4. For public water system wells constructed on or after April 1, 2002, the upper terminus of the well casing shall project at least 12 inches above the pump house floor, pump pit floor, or concrete apron around the well.

5. For public water system wells, limited use commercial public water system wells, and limited use community public water system wells constructed on or after April 1, 2002, located at sites subject to flooding, the upper terminus of the well casing shall project at least 12 inches above the 100-year flood elevation and 100-year wave-action elevation. Where it is not practicable to comply with this requirement, the water management district or delegated permitting authority shall allow exceptions on a case-by-case basis provided the upper terminus of the well casing is fitted with a watertight seal.

6. Public water system wells, limited use commercial public water system wells, and limited use community public water system wells, shall be equipped with a sealable opening that will allow introduction of disinfectants and measurement of static water level and drawdown or artesian pressure.

(c) Well Aprons. For public water system wells, limited use commercial public water system wells, and limited use community public water system wells constructed on or after April 1, 2002, not located within a pump house or pump pit, a concrete apron at least six feet by six feet and at least four inches thick shall be centered around the well. The bottom surface of the concrete apron shall be constructed on top of the finished grade, and the top surface of the concrete apron shall be sloped to drain away from the well casing.

(d) Flowing Wells. If the well flows at land surface, control shall be provided by valved pipe connections, watertight pump connections, or receiving reservoirs set at an altitude corresponding to the artesian head.

(5) Plugging. All abandoned wells shall be plugged by filling them from bottom to top with neat cement grout or bentonite and capped with a minimum of one foot of neat cement grout. An alternate method providing equivalent protection shall be approved in writing by the Department or the permitting authority.

Rulemaking Authority 373.309 FS. Law Implemented 373.309, 373.313, 373.316 FS. History—New 8-17-74, Formerly 17-21.10, 17-21.100, Amended 7-30-89, 3-11-92, Formerly 17-532.500, Amended 3-28-02, 10-7-10.