

**NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATIONS**

WATER WELL

1. Scope

The work shall consist of all construction operations and furnishing all material for the complete installation of the water well according to the construction plans.

2. Location

Location of the water well shall be as specified in the construction plans or as staked in the field

3. Alignment

Drilled vertical wells shall be round, plumb, and aligned to permit satisfactory installation and operation of a pump of the proposed size and type at the greatest anticipated depth of setting.

4. Casing Materials

Plastic or steel pipe casings can be used in drilled wells. Only steel pipe casings shall be used in driven wells.

Plastic casings shall be made of polyvinyl chloride (PVC) and shall conform to the requirements specified in American Society for Testing and Materials (ASTM) F 480. Plastic pipe manufactured for water or irrigation pipelines may be used if the quality of the pipe equals or exceeds that specified in ASTM F 480. Other PVC pipe material specifications that conform to ASTM F 480 and may be used for well casing include ASTM D 1785 (Schedules 40 and 80 pipe) and ASTM D 2241 (standard dimension ratio [SDR] pipe).

Steel well casings shall equal or exceed the requirements specified in ASTM A 589. Steel pipe manufactured for other purposes can be used if the quality of the pipe equals or exceeds that specified in ASTM A 589.

5. Joints

Joints for well casings shall have adequate strength to carry the load due to the casing length and still be watertight or shall be mechanically supported during installation to maintain joint integrity. Such mechanically supported casings shall terminate on firm material that can adequately support the casing.

6. Gravel Pack

If gravel packing is used, it shall have the gradation and thickness specified in the design and shall be carefully placed to prevent segregation and bridging. Gravel pack material shall extend a minimum of 10 feet above the top of the perforated or screened section and shall extend through the length of the water-bearing formation.

7. Installation

In consolidated formations, the casing shall extend from the ground surface through the overburden material to an elevation of at least 2 feet into the consolidated material.

In unconsolidated formations, the casing shall extend from the ground to the screen.

For artesian aquifers, the casing shall be sealed into the overlying impermeable formations to retain the artesian pressure.

If a water-bearing formation known to contain or suspected of containing poor quality water is penetrated, the formation shall be sealed to prevent infiltration of poor quality water into the well and the developed aquifer.

The well casing and screen shall be installed concentrically in the borehole. Casing guides shall be used where necessary. The borehole of all drilled wells shall be large enough to provide an annular space of at least 3 inches around the casing.

Any water used for drilling shall be disinfected before use. Gravel used for filter packing shall be disinfected by immersing the gravel in a chlorine solution containing not less than 200 milligrams per liter (mg/l) of available chlorine before placement in the annular space around the well casing. Constructed or reconstructed wells shall be disinfected by adding sufficient hypochlorite solution to them to produce a concentration of not less than 100 mg/l of available chlorine when mixed with the water in the well. The pump, casing, screen, and pump column shall be washed with a solution containing not less than 200 mg/l of available chlorine.

8. Development

The well shall be developed until it stops producing detrimental quantities of solid particles when the continuous discharge rate is approximately 20 percent greater than the anticipated normal production rate.

9. Protection

All wells shall be cased to a height of 12 inches or greater above the ground surface to prevent the entry of surface and near-surface water.

Wells shall be sealed by grouting the annular space between the casing and the borehole from ground level to a minimum depth of 20 feet or to a minimum depth of 5 feet into the first clay or shale layer, whichever is greater. If a pitless well adapter or unit is being installed, the grouting shall start below the point at which the pitless well adapter or unit attaches to the well casing and shall continue the same minimum depth. Any variance from this requirement must be approved by the Kansas Department of Health and Environment (KDHE) and the Natural Resources Conservation Service (NRCS). Grouting materials include cement, neat cement, bentonite, and other suitable materials approved by KDHE. The casing shall be surrounded at the ground surface by a 4-inch thick concrete slab extending at least 2 feet in all directions. A sanitary well seal shall be installed at the top of the well casing to prevent entry of contaminants or other objectionable material. Any pumping plants installed directly over the well casing shall include airtight and watertight seals between the top of the casing and the gear or pump head, pump foundation, or pump stand.

Waters from 2 or more aquifers shall be separated from each other by sealing the borehole between the aquifers with grout.

10. Plugging

Any borehole or well abandoned during a construction operation covered by these specifications shall be plugged according to the regulations of KDHE and any other applicable agency, including groundwater management districts. A copy of any required forms, logs, or reports shall be provided to NRCS as part of the checkout documentation and certification. [Conservation Practice Standard 351, Water Well Decommissioning](#), is applicable to such an abandoned well.

11. Workmanship

The well casing pipe, couplings, and screens shall be homogeneous throughout and shall be free of visible cracks, holes, foreign materials, or other injurious defects. The well casing pipe, couplings, and screens shall be as uniform in color, density, and other physical properties as is commercially possible.

12. Markings

The well casing pipe shall be marked according to the ASTM specifications for the material used.

Markings on plastic well casing shall include the following information, spaced at intervals of not more than 5 feet:

- a. Nominal well casing size (example: 5")
- b. Well casing standard dimension ratio (example: SDR 21)
- c. Type of plastic well casing material (examples: PVC, SR)
- d. The wording "well casing" followed by the impact classification (example: IC-3)
- e. Designation ASTM F 480, including year of issue
- f. Manufacturer's name or trademark
- g. Manufacturer's code for resin manufacture, lot number, and date of manufacture

Markings on PVC pipe used for well casing shall include the following information, spaced at intervals of not more than 5 feet:

- a. Nominal pipe size (example: 5")
- b. Type of PVC material in accordance with the designation code (example: PVC 1120)—In some applications, the cell classification may be listed (example: 12454C). This can be related to the designation code.
- c. Schedule and pressure rating (example: SCH. 40 200 PSI) or standard dimension ratio and pressure rating (example: SDR 21 200 PSI)
- d. ASTM designation with which the pipe complies (examples: Schedule pipe - ASTM D 1785, SDR pipe - ASTM D 2241)
- e. Manufacturer's name or trademark and code

13. Certification

Markings on material identifying the manufacturer and indicating compliance with appropriate specifications can be accepted as evidence that the material meets the requirements of this standard. If the material does not bear these markings, the manufacturer shall certify that it complies with the requirements of this standard. The state conservation engineer, however, can request tests supporting this certification.

The contractor shall provide NRCS a completed copy of KDHE Form WWC-5, Water Well Record, as part of the certification. All aspects of well construction and development shall be certified by a licensed water well contractor as adhering to this specification and to all appropriate rules and regulations of KDHE. These requirements also apply to reconstruction and/or plugging operations associated with the job.

14. Construction Details