

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE GENERAL SPECIFICATIONS
(Texas)**

**PUMPING PLANT
Code 533A
LIVESTOCK WATER SYSTEM – WINDMILL PUMPING UNITS
(No.)**

1. SCOPE

These construction specifications cover the materials and installation of the windmill pumping unit and windmill tower. They **do not** include the installation of the well.

2. PUBLIC AND PRIVATE UTILITIES

Utilities are defined to be overhead and underground power or communication lines, and pipelines. The contractor should conduct their own search and discovery for utilities in order to lessen or avoid potential damages. The owner/operator shall complete TX-ENG-80, UTILITIES INVENTORY prior to any ground disturbance and return it to a USDA-NRCS representative.

3. MATERIALS

- a. Pump Rod (Sucker Rod or Down-Hole Rod): The pump rod shall be a galvanized steel, hollow, airtight rod having a 1/2-inch or larger shaft diameter and integral couplings; or a solid steel rod having a 3/8-inch or larger shaft diameter and integral couplings; or a wood rod having a 1-1/8-inch or larger shaft diameter and integral couplings; or a fiberglass rod having a 5/8-inch or larger shaft diameter and integral couplings. Suitable adapters will be included when required to make connections to the cylinder plunger and the polished rod.
- b. Drop Pipe: The drop pipe shall consist of 21-foot joints of reamed galvanized steel pipe, threaded and complete, with long couplings having a quality equal to the pipe. The pipe shall be Schedule 40 and meet ASTM-A-53.
- c. Stuffing Box: When used, the stuffing box, with fitting cap, packing, and brass or steel rod, shall be heavy duty and meet the design dimensions and pressure rating. The piston rod (polished rod), stuffing box, and pump rod shall be compatible as to thread type and size.
- d. Polished Rod Assembly: When used, the polished rod assembly shall be a 3/4-inch-diameter polished steel core rod, fitted with a 24-inch-stroke-length brass or steel polished rod sleeve. The assembly will include a stuffing box having appropriate dimensions and suitable threaded adapters to fit the drop pipe and polished rod sleeve.
- e. Well Cylinder Assembly: The cylinder assembly shall be an open top, brass-lined galvanized or brass cylinder meeting the designed inside diameter, barrel length, and pump stroke. The cylinder assembly will include a three- or four-leather plunger with a stainless steel or brass ball valve and a matching single leather check with a stainless steel or brass ball valve.

- f. Pump Pole (Red Rod): The pump pole shall be of 2-inch by 2-inch redwood, or approved equal, and shall be straight and free from splits.
- g. Sanitary Well Seal: The well seal shall be a split-base, single-hole style that will fit the well casing and the drop pipe. The seal and its installation shall be capable of preventing pollutants from entering the well. The seal will be of suitable strength to support the specified drop pipe and cylinder weight, including a reasonable safety factor. The seal shall have an access tapping and plug.
- h. Concrete Pad: A concrete pad shall be constructed from 3,000-psi, 28-day compression strength concrete with a slump between 2 and 5-inches and maximum aggregate size of 2-1/2-inch for wells that can not be documented to meet the Texas Administrative Code; Title 16 Economic Regulation; Part 4 Texas Department of Licensing and Regulation (TDLR); Chapter 76 Water Well Drillers and Water Well Pump Installers Administrative Rules, <http://www.license.state.tx.us/wwd/wwdrules.htm>. The concrete shall be reinforced with 6-inch by 6-inch by 10-gage welded wire mesh.

4. **EQUIPMENT**

- a. Windmill Unit: The mill shall be complete (including oil) with sail wheel and tail assembly having automatic and hand-operated furl capacity. The mill shall be self-oiling, with replaceable bearings and parts. The size of the mill shall be as specified in the final USDA-NRCS design.
- b. Windmill Tower: The tower shall be a new Aeromotor, American West, Dempster, or Fiasa tower; or a tower constructed according to USDA-NRCS Standard Drawing No. _____; or a tower design certified, signed, and wet stamped by an engineer licensed to practice engineering in the State of Texas. Tower designs from engineers licensed to practice engineering in the State of Texas shall be submitted to USDA-NRCS for programmatic review and concurrence no less than 10 working days prior to the planned installation date. All towers shall be installed and anchored in accordance with the manufacturer's instructions and these specifications.

5. **INSTALLATION**

- a. Windmills: Components are to be compatible and function as a system. Upon completion of the installation, the fins are to be parallel to the tail and inactive.
- b. Setting of Tower and Mill: The tower anchor posts shall not be used as an anchor or fulcrum in lifting the windmill or tower. Extreme care shall be exercised in attaching the tower to the anchor posts. In the event the anchor posts are bent, sprung, or otherwise damaged during installation of the tower or mill, they shall be replaced at the Installer's expense.
- c. Alignment of Tower and Mill: Each tower and mill shall be set in a plumb vertical line over the centerline of the well casing. The Installer shall test the plumb of the installation by hanging a plumb bob from the pump rod connection of the windmill. When the tower is in acceptable alignment, the plumb bob will fall within the well casing, without touching it.
- d. Joints: Threaded joints shall be properly lubricated prior to final installation.

- e. Pump Pole (Red Rod): A pump pole of sufficient length shall be installed between the windmill and the pump in accordance with the manufacturer's instructions.
- f. Drop Pipe: The drop pipe shall be installed to the depth specified in the design and shall have the pipe ends reamed to remove burrs prior to installation. The well cylinder barrel shall be fitted to the drop pipe prior to insertion into the well. The drop pipe shall be fitted with a final coupling, short nipple, tee, and another short nipple, all above the well seal. The uppermost nipple shall be fitted with suitable fittings to receive the stuffing box if applicable. An automatic bleeder orifice valve will be installed in the drop pipe a minimum of 3-feet below the ground surface to drain that portion of the drop pipe to prevent damage by freezing.
- g. Polished Rod Assembly: When used, the polished rod, brass sleeve, and stuffing box shall be fitted and assembled in accordance with the manufacturer's instructions. The polished rod/pump rod/plunger assembly shall be raised a minimum of 3-inches, or at a distance that will accommodate the stroke length of the mill, above its lowest position in the well cylinder, and the guide stop shall be locked in this position.
- h. Pump Rod (Sucker Rod or Down-Hole Rod): The pump rod shall be installed to the depth specified in the design. The pump rod shall be properly fitted to the cylinder plunger and the polished rod if applicable. Rod sections shall be straight and true and in lengths of 12 to 21-feet, except the final top section will be shortened by removing a mid-shaft portion to achieve the proper overall pump rod length. The mid-shaft reconnection shall be achieved by threading and coupling, electric welding, or other approved method. When using a stuffing box, the final overall length shall be such as to expose approximately 4-inches of the polished rod brass sleeve above the stuffing box when in the low rod position.
- i. Well Cylinder Assembly: The well cylinder and check shall be properly assembled and fitted to the drop pipe in accordance with the manufacturer's instructions.
- j. Sanitary Well Seal: The well seal shall be fitted securely on the well casing and adjusted to insure a good seal and prevent pollutants from entering the well. Special attention shall be given to the installation of the seal to provide a suitable anchor for the suspension of the drop pipe.
- k. Concrete Pad: A 4-inch thick concrete pad shall be constructed that extends laterally outward from the well casing at least 2-feet in all directions. A minimum 6-inch layer of sand is required between the bottom of the concrete base and subgrade when the subgrade is a high clay soil subject to shrinking and swelling with wetting and drying. The concrete base shall be separated from the well casing by a plastic or mastic coating or sleeve to prevent bonding of the base to the casing and be sloped to drain away from the well. The concrete shall be finished with a smooth wood float and allowed to cure a minimum of 24-hours before the tower and windmill are erected. The top of the casing shall extend a minimum of 12-inches above the land surface (or 8-inches above the base). Concrete shall be in accordance with the above Item 3h.
- l. Testing: After the windmill and well equipment are installed, the Installer shall use the windmill to pump a minimum of 24-hours. The Installer shall check the windmill to see if the cylinder is functioning and not bottoming out, and that the windmill brake and other appurtenances are

functioning properly. Problems shall be corrected by the Installer. The Installer shall provide water storage facilities, if none are present at the site, to collect the pumped water.

- m. Sanitary Protection of Well: The Installer shall protect the well during the construction period to prevent vandalism, tampering, or seepage of contaminated water, petroleum products, or other contaminants into the well from the ground surface.
- n. Correcting Contamination: If the well becomes contaminated, or water with undesirable physical or chemical characteristics enters the well due to the neglect of the Installer, corrective work which includes the supplying of seals, sterilizing agents, or other materials as may be needed to prevent contamination of the aquifers will be the responsibility of the Installer.

6. CERTIFICATION

The Installer shall furnish the owner/operator a written certification (with a copy provided to USDA-NRCS) that the installed windmill unit, windmill tower, appurtenances, and installation conform to the requirements of this specification and to the Texas Administrative Code; Title 16 Economic Regulation; Part 4 Texas Department of Licensing and Regulation (TDLR); Chapter 76 Water Well Drillers and Water Well Pump Installers Administrative Rules, <http://www.license.state.tx.us/wwd/wwdrules.htm>. The certification shall also provide the name of the windmill unit manufacturer, its model and serial number, and the name of the windmill tower manufacturer. The Installer shall also certify that they are licensed by the State of Texas as a windmill installer.

7. GUARANTEE

The Installer shall provide the owner/operator a guarantee (with a copy provided to USDA-NRCS) that covers all equipment, materials and installation against any defective materials or workmanship, for a period of one year from the date of completion. If any equipment, materials or workmanship prove to be defective within one year, they shall be replaced or repaired by the Installer.

8. MEASUREMENT

Measurement of each windmill installation will be on a completed job basis. An onsite check of the completed windmill and installation will be performed by a USDA-NRCS representative.

9. CONSTRUCTION DETAILS

This construction specification, attached construction details and the requirement for completion of a TX-ENG-80, UTILITIES INVENTORY have been reviewed with me and I agree to install my windmill pumping unit according to these construction specifications.

Owner/Operator

Date