

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

**PUMPING PLANT**

**LIVESTOCK WATER SYSTEM – ELECTRIC SUBMERSIBLE PUMPING UNITS  
(No.)  
Code 533B**

**1. SCOPE**

These construction specifications cover the materials and installation of electric submersible pumping units of 2 horsepower or less. They **do not** include the installation of the well.

**2. PUBLIC AND PRIVATE UTILITIES**

Utilities are defined to be public or private, overhead and underground power or communication lines, and any pipelines. The landowner\operator\contractor shall conduct their own search and discovery for utilities in order to lessen or avoid potential damages, injuries or loss of life. During planning, the owner\operator should complete a TX-ENG-80A UTILITIES INVENTORY to document known utilities. The owner\operator or their representative shall complete TX-ENG-80B, COOPERATOR CONFIRMATION OF THE ONE-CALL UTILITY SAFETY SYSTEM to comply with State law prior to any ground disturbance and return it to a USDA-NRCS representative.

**3. QUALITY CONTROL**

Quality Control of all materials and construction procedures is the responsibility of the landowner and contractor. NRCS will make periodic review(s) of the work for the benefit of the agency which will include the final construction check.

**4. EQUIPMENT**

- a. Submersible Pump and Motor: The pump and motor shall be capable of delivering the required daily capacity at the total head shown in the construction details. The pump and motor shall have minimum 2 year warranty.
- b. Electrical Components: All electric components including lightning arrestors and grounding shall be provided according to manufacturer's recommendations.
- c. Drop Pipe: The drop pipe, not to exceed 2 inch nominal size, shall be one of the following:
  - (1) Galvanized steel drop pipe consisting of joints of reamed galvanized 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. The total pumping head shall not exceed 72% of the pressure rating of the pipe.

- (2) Polyvinyl chloride (PVC) pipe shall be PVC 1120, Schedule 80 or 120 conforming to ASTM-D-1785. Total Pumping Head shall not exceed 72% of the pressure rating of the pipe. The pipe shall have threaded couplings have a strength equal to or exceeding the pipe.

Polyethylene (PE) pipe shall comply with one of the following specification: ASTM-D-2239 (SIDR-PR) or ASTM-D-3035 (SDR-PR). Polyethylene (PE) pipe fittings shall conform to manufacturer's recommendations. The pipe and fittings shall have a pressure rating equal to or greater than the following:

- a. For a total pumping head of 0 to 100 feet the minimum pressure rating shall be 125 psi.
- b. For a total pumping head greater than 100 feet the minimum pressure rating shall be 200 psi. The minimum of 3/16" diameter type 304 stainless steel cable shall be used to support the pump. Total pumping head shall not exceed 72% of the pressure rating of the pipe and shall not exceed 450'.

All drop pipe shall meet NSF requirements.

- (3) Check Valves: Check valve(s) shall be spring-loaded, stem or cage poppet-style.
- (4) Torque Arrestors: Torque arrestor(s) shall be constructed of PVC or rubber material and field adjustable to hold pump centered in well. Stainless steel clamps shall be used to securely fasten the torque arrestor to the drop pipe.

## 5. **INSTALLATION**

- a. Pump: The installation of the pump, motor, drop pipe and other pump accessories shall conform to [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](http://www.license.state.tx.us/wwd/wwdrules.htm) Administrative Rules, <http://www.license.state.tx.us/wwd/wwdrules.htm>.
- b. Electrical Components: The controller, electronic components, lightning arrestors, grounding rods, and wiring shall be installed in accordance with NEC requirements and manufacturer's recommendations.
- c. Conductors (Power Cable):
  - (1) Splicing: The power cable shall be furnished in one continuous length within the well where possible. A maximum of two water tight electrical splices within the well will be allowed. Splices may be completed using water tight wire connections or water proof taping.
  - (2) Clamps: A stainless steel clamp may be used below each drop pipe joint to tie the power cable to the drop pipe. The installer shall protect the cable at each stainless steel clamp with a 3 inch long piece of polyethylene plastic, split on one side and placed around the drop pipe. Clamps shall be spaced a maximum of 22' apart.

- (3) *Tapings*: Four turns of ¾ inch plastic tape at each joint can be substituted for the stainless steel clamps specified above in (2). However, the Installer shall also tie the power cable to the drop pipe with four turns of ¾ inch plastic tape equally spaced between joints not to exceed 10-feet. Maximum spacing between tapings shall be 10 feet.
- d. Check Valves: Average spacing shall be 200 feet (not equally spaced) and a check valve shall be installed a maximum of 21' above the pump provided an internal check valve is not present in the pump. If needed for water quality protection a horizontal check valve will be installed in the discharge pipe.
- e. Centering Guides: Install centering guides at a maximum of 42' apart throughout the entire drop pipe.
- f. Torque Arrestor: If plastic drop pipe is used a minimum of three torque arrestors shall be installed. Place one immediately above the pump, one 10 feet above the pump and another 20 feet above the pump.
- g. Flow Testing: After installation is complete, the Installer shall operate the pump for a period of 1 hour. The Installer shall also provide facilities for the safe discharge of the test water.
- h. Sanitary Protection of Well: The installer shall protect the well during construction period to prevent vandalism, tampering, or seepage of contaminated water, petroleum products or other contaminants into the well from the ground surface.

## 6. **CERTIFICATION**

The Installer shall furnish the owner/operator a written certification (with a copy provided to USDA-NRCS) that the installed submersible unit, appurtenances, and groundwater protection conform 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/www/wwdrules.htm>.

The certification shall also provide the name of the pump unit manufacturer and model, the hp of the pump, pump setting depth, and drop pipe size & material details. The Installer shall also certify that they are licensed by the State of Texas as a pump installer unless exempted by TAC 16, Chapter 76, Section 76.300.

## 7. **GUARANTEE**

The Installer shall provide the landowner a written guarantee (cc to USDA-NRCS) that all equipment, materials and installation against any defective materials or workmanship, for a period of one year from the date of completion.

## 8. **MEASUREMENT**

Measurement of each solar powered pumping unit installation will be on a completed job basis. An onsite check of the completed installation with pump operating will be performed by a USDA-NRCS representative.

**9. CONSTRUCTION DETAILS**

- a. The pumping capacity shall be \_\_\_\_\_ gpm at a total head of \_\_\_\_\_ ft.
- b. The pump installer shall provide a manufacturer's pump curve certifying that the installed pump will meet the required operating conditions.
- c. Other specific items to job installation:

Attachments:  
Certification sheet  
TX-ENG-80B  
O&M Plan

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

\_\_\_\_\_  
*Owner/Operator*

\_\_\_\_\_  
*Date*