

PART 512 – CONSTRUCTION

Subpart A – General Information

MT512.0 Introduction

A. Changes to the drawings and specifications during construction shall be approved by a qualified person with the appropriate job approval authority after receiving concurrence from the landowner or sponsor. Changes shall be documented in accordance with Part 512, Subpart F “As-Built.”

B. As-built quantities shall be field verified and checked before certification for government payments. Quantity computations shall be checked, signed, and dated.

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Subpart D – Quality Assurance Activities

MT512.30 General

A. Quality assurance (construction inspection) plans shall be prepared and implemented for Class V-VIII jobs. A qualified person with the appropriate job approval authority shall determine the degree of inspection required to ensure that the conservation practice meets NRCS standards and specifications. The responsible line officer shall ensure that appropriate personnel are assigned and scheduled to fulfill the inspection requirements.

B. Quality assurance (construction inspection) plans shall also be prepared and implemented for Class IV and above waste storage facilities, and all other jobs deemed appropriate by the Area Engineer or qualified person approving the design, drawings, and specifications.

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MT512.32 QA Procedures

D. Electrical Inspections

(1) NRCS personnel shall not inspect or approve the wiring service to electrical pumps, motors, or other electrical machinery. The NRCS is not qualified to perform this function, but it is still responsible for ensuring that the conservation practice meets the intended life span. The NRCS is also responsible for ensuring that the installation and operation of the practice is safe. To fulfill these obligations, the NRCS requires a state electrical inspection. Either the owner transfers the electrical permit to a properly licensed electrician who arranges an electrical inspection, or the owner performs the electrical work and arranges an electrical inspection. The inspection request shall cover electrical service from the meter to the machine, which includes buried wire and electrical panel work on each end.

(2) Before practice installation, the owner shall log onto the Montana Department of Labor and Industry website and apply for a state electrical permit. After a permit is secured, the owner should call the state electrical inspector and arrange for a timely inspection(s).

(3) The permit number and electrical inspector's name shall be documented on the NRCS Form MT-ENG-533 by the owner or the NRCS before the practice is technically certified for the release of program funds. The permit application can be verified on the same website by clicking on "Permit Search." The state is required by law to service all permit holders with an electrical inspection.

(4) In some circumstances, the timing of an electrical inspection could delay cost-share payments and create undue financial hardship. The practice can be technically certified for payment upon verification of the electrical permit application (number).

(5) The State Electrical Inspector will place a green sticker on the meter or service panel with the permit number, date, and signature. A yellow sticker means that a modification is required, and a red sticker means that the power must be shut down.

a) Exceptions: (i) Electrical inspections are not required for the direct replacement of pumps and motors where the existing service has not been altered. (ii) Electrical inspections are not required for the installation of UL-listed solar pump packages. This situation is often confused with "premise wiring" in which a solar collection array is wired to an AC system that is not part of the solar package; where there are voltage regulators and current control systems to combine two distinct systems. UL-listed packages include the pump, array, and controller with no AC connections or backup.

(6) Tribal members are exempt from state electrical permits on the reservation. However, tribal members are encouraged to apply for a voluntary electrical permit (inspection) from the state. A resolution may need to be adopted by the tribal council to allow a state inspector on the reservation for the purpose of quality assurance and safety. If a state electrical inspection is not possible, the practice can be technically certified if the work has been inspected by an electric cooperative or the work has been completed by a licensed (Master) electrician.

(7) Non-tribal members on tribal lands are not exempt from Montana Statute 50-60-602 which requires electrical permits.

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MT 512.33 Inspection of Manufactured Tanks

A. Manufactured tanks (precast concrete, fiberglass, plastic, or steel) used for cisterns, well pits, and agricultural waste storage shall be determined to be watertight and structurally sound by structural analysis or performance testing. These determinations shall account for hydrostatic pressure, lateral earth pressure, overburden, and surcharge.

(1) A structural analysis shall be performed by an NRCS engineer with the proper Job Approval Authority or sealed by a registered Professional Engineer (PE).

(2) A performance test shall be completed by the tank manufacturer in accordance with the applicable specifications of the American Society of Testing and Materials (ASTM). The testing shall be documented with photos and test results.

B. Performance Testing. Tanks are typically tested for two conditions (a) water tightness, and (b) structural strength. Vacuum testing can verify adequacy for both conditions in the same test cycle. Vacuum testing can be used by NRCS in Montana for acceptance of small manufactured tanks of various materials. The following procedures were developed from ASTM C 1227-07c “Standard Specifications for Precast Concrete Septic Tanks.”

(1) Test Preparation

a) A tank of sufficient age shall be tested (typically >28 days for concrete). The tank shall be inspected for visual defects, irregularities, cracks, air pockets, or honeycombs. Defects shall be noted and recorded. As a safety precaution, the tank shall be located and tested at a safe distance from anything that can be damaged or injured, or in an area that is contained.

b) The tank shall be assembled and sealed at the joints in a manner representative of the field conditions. In no circumstance shall sealant be used to influence the test, except for sealer that is normally provided in the tank manufacturing process.

c) Once the tank is assembled all entries into the tank shall be sealed except the opening through which the equipment draws a vacuum. If the top of the tank is rough a sealant may be used under the test plate.

d) Testing apparatus typically includes a cover plate, 20 feet of air hose, two large dial pressure gages, and a venturi pump. The venturi pump typically runs off of the manufacturer’s air compressor.

(2) Test Procedures (Water Tightness – Method a or b may be used)

a) To perform the water test, seal the tank, fill to 2 inches into the top opening and let stand for 24 hours for absorption. Refill the tank to 2 inches into the top opening. The tank is approved if the water level is held without leakage for one hour.

b) To perform the vacuum test, seal the empty tank and slowly apply a vacuum to 4 inches of mercury (100 millimeters). The tank is approved if 90 percent of the vacuum is held for two minutes. If the gage drops, the tank shall be inspected for leaks. Leaks are commonly located at tank joints and entry seals. If leaks occur at these locations the tank shall be re-sealed and tested again. Soapy water may be sprayed on the inside of the tank to indicate the location of any leaks. Under no circumstance shall anyone be allowed inside the tank to inspect for leaks during the test.

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(3) Structural Strength

Performance testing requires the manufacturer to demonstrate adequacy by physically applying loads to the product. The load applied is specified as 1.5 times the anticipated actual load.

The test for structural integrity is typically performed immediately following the vacuum test for water tightness. If the water tightness test is successful, gradually increase the vacuum to the level listed below which corresponds to the anticipated field condition. The vacuum may be released immediately after the required pressure is achieved. The tank passes if there is no cracking or failure.

Vacuum pressure requirements for specific installation conditions are listed below. Vacuum pressures are given for loads that may be expected from well-drained backfill around a 6’-6” tank height with 2 feet of soil cover over the top. A live load is NOT considered. Installations that vary significantly from those described in this procedure will require additional analysis to determine the vacuum pressure requirements.

Backfill	Required Vacuum (inches Hg)
Clean Sand and Gravel	6.5
Clayey Soil	9.1

(4) Test Verification

After the test is performed a thorough inspection of the tank, both inside and out, shall be performed to check for cracks and deformations. Photographs showing the location and size of cracks shall be documented along with the Test Verification Data Sheet below. The photographs and records shall be submitted to the NRCS for review and acceptance.

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Test Verification Data Sheet (Fill in as appropriate for the type of tank.)

Manufacturer: _____ Test Date: _____

Address: _____ Report By: _____

City, State, Zip: _____

Tank Description (Attach detailed drawings and include end wall and sidewall photos.)

Model Number: _____ Volume and/or Working Capacity: _____

Manufacturer's Date: _____

Outside Dimension: Length _____ Width _____ Height _____

Member Thickness: Top Slab _____ Base Slab _____ Walls _____

Seam: Mid _____ Top _____

(If top seam, does it cover slab interlock with top of wall? _____ Yes _____ No

Reinforcing Steel

Rebar: Grade 40 _____ Grade 60 _____ None _____

Wire Fabric: Smooth (ASTM A185) _____ Deformed (ASTM A497) _____ None _____

Installation Condition: Sand _____ Native Material _____

Compacted _____ Loose _____

Water Tightness Test

Trial Number	Start Pressure	Start Time	Finish Time	End Pressure	% Required Vacuum

Structural Integrity Test

Trial Number	Pressure Required	Pressure Achieved	Comments

(Describe any cracking or failure)

I certify that the test performed on the precast concrete tanks (drawings/photos attached) manufactured by: _____ meet or exceed the design by performance test requirements of ASTM C-1227, Standard Specification for Precast Concrete Septic Tanks.

Company Representative

Date

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