

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

WATERING FACILITY

(No.)

CODE 614

DEFINITION

A device (tank, trough, or other watertight container) for providing animal access to water.

PURPOSES

To provide watering facilities for livestock and/or wildlife at selected locations in order to:

- Protect and enhance vegetative cover through proper distribution of grazing
- Provide erosion control through better grassland management, or
- Protect streams, ponds, and water supplies from contamination by providing alternative access to water.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all land uses where there is a need for new or improved watering facilities.

CRITERIA

The watering facility shall have adequate capacity to meet the water requirements of the livestock and/or wildlife. Storage volume must be included as necessary to carry over between periods of replenishment.

Storage. Where water supplies are dependable and livestock are checked daily, troughs or fountains with little water storage capacity may be used. Watering facilities must provide the daily water requirement of the livestock and provide access to the entire herd (including young animals) within a four (4) hour period.

Needed storage can be provided in a central storage facility, drinking facilities, or a combination. Storage provided in drinking facilities is preferred over central storage, unless

central storage can be fully utilized by gravity flow.

The total daily minimum water requirements for livestock are as follows:

<u>Livestock Type</u>	<u>Daily Water Use*</u> (per day per head)	
	<u>Gallons</u>	<u>Liters</u>
Beef Cattle & Horses	12 - 17	45-64
Cow & Small Calf	20	76
Dairy Cattle	25	95
Sheep & Goats	2	8
Hogs	2	8
Other	1 per 100 lbs. body wt.	1 per 11 kg. body wt.

*Add 10% for evaporation and spillage losses if needed.

Minimum storage capacities shall be based on the following:

1. Automatic electric pumps on dependable wells, springs, artesian wells, or central storage facilities will provide total daily water requirements in a four (4) hour period. Total minimum daily water will be supplied by adding total gallons stored at the drinking location to the gallons delivered by the pipeline in a four (4) hour period at the design flow rate.
2. When wind or solar powered pumps are utilized, remote storage facilities with a minimum three (3) day capacity will be required. If the site is remote and not checked regularly, the storage may be increased to seven (7) days.
3. Water sources or power supplies other than described above will be evaluated on an individual basis.

Livestock Water Distribution. Location of the facilities shall be planned in conjunction with the prescribed grazing plan. Stock watering

facilities should be located so travel distance between forage and dependable water is not more than shown in the following table.

MAXIMUM DISTANCE FROM FORAGE TO WATER

<u>Topography</u>	<u>Miles</u>	<u>Kilometers</u>
Flat	0.75 - 1.0	1.2 - 1.6
Gentle	0.50 - 1.0	0.8 - 1.6
Rough	0.25 - 0.50	0.4 - 0.8

Drainage and Overflow. The site shall be well drained. Drainage measures shall be provided as needed. Areas adjacent to the watering facility that will be trampled by livestock must provide firm footing and provide adequate drainage. A minimum 6 foot wide apron area around the tank perimeter must be concrete or must receive regular maintenance using pit run sand/gravel/rock, or other appropriate nonpolluting, durable materials.

Automatic water level control and/or overflow facilities shall be provided as appropriate. Overflow pipes must carry overflow to a stable outlet, and must be 2 inch nominal diameter or larger. Remove excess or overflow water from the drinking facility area to avoid boggy conditions or foundation failure at the site. A cleanout/drain shall be provided when practicable. The watering facility including valves, pipes and appurtenances shall be protected from damage by freezing, ice, livestock, and other hazards.

Durability. Watering facilities must be designed to prevent movement of empty tanks. All plumbing components must be protected from livestock damage. All tanks shall be placed on stable soil. It is recommended that watering facilities be designed to prevent entry of livestock.

The design and materials must have a life expectancy of at least 10 years and meet or exceed the planned useful life of the installation. All designs shall meet industry standards for the material being used.

Shade. When a roof or shade is placed over the watering facility, the structure must be designed for appropriate wind and snow loads and shall be durable and able to withstand anticipated livestock and wildlife activities.

Concrete. Type I or II cement, air entrained 3,000 pounds per square inch (psi) concrete

minimum compressive strength shall be specified for concrete structures.

All reinforced concrete floors shall have minimum #3 bars at 12 inches. Floors for steel rim tanks shall extend a minimum of 2 feet beyond the periphery of the tank and shall be set on a sand or fine gravel base at least 2 inches thick.

Metal. Metal tanks shall have sturdy reinforced rims and must be protected from rapid destruction by corrosion. Metal rims set in concrete must be coated with plastic or asphalt based sealant to protect the metal where the steel rim and concrete floor join. Metal tanks with a steel bottom shall be secured with posts and cross bracing or other suitable methods to provide a secure installation. Coat the outside of the bottom and side below grade with plastic or asphalt based sealant to protect the metal. Metal tanks with largest dimension less than 10 feet must be 18 gauge or heavier. Larger tanks must be 16 gauge or heavier. Cathodic protection may be needed for service length requirements.

Fiberglass. Fiberglass tanks shall have a minimum thickness of 3/16 inch, and shall be secured with posts and cross bracing or other suitable methods to provide a secure installation. Fiberglass tanks shall be made of ultraviolet resistant materials or shall have a durable coating to protect the structure from deterioration due to sunlight. Fiberglass tanks shall be set on a firm base, sand or fine gravel if available.

Tires. Design drawings of acceptable used heavy equipment tire tanks, with concrete or steel plate floors, are available from the local NRCS. Other rubber tire tank designs shall be prepared by an engineer and approved on a case-by-case basis. Note that overflow and cleanout/drain pipes may not be feasible with tire tank designs. Siphoning may be required to drain, and overflow pipe may not be practical for all installations.

Other Materials. Other materials may be used where long service life will be provided. Use of manufactured materials must follow the manufacturer's recommendations or a design prepared by an engineer.

Frost Resistant Tanks. Frost resistant tanks may have various configurations, using a variety of materials. Tanks exposed to freezing without added heat are not frost proof, they are frost

resistant. Success depends on water turnover rate (how fast water is used, livestock numbers). For tanks with continuous flows (spring or artesian well), mount the outlet near the inlet to help prevent freezing.

Strength, bury depth, and earth load resistance will follow manufacturer's recommendations and local conditions. Non-standard designs shall be prepared by an engineer.

Connection to Pipeline. Appurtenances to join sections to pipe or provide tank hook-ups must provide leak free seals and be structurally equivalent to the pipe used.

CONSIDERATIONS

This practice may adversely affect cultural resources and must comply with General Manual 420, Part 401.

Topography should be evaluated to minimize trail and overflow erosion.

Watering facilities should be accessible to small animals. Escape ramps for birds and small animals should be installed.

Consider providing winter protection for livestock.

PLANS AND SPECIFICATIONS

Plans and specifications for installing watering facilities shall meet this standard and describe requirements needed to achieve the purpose.

Plans will be guided by Chapter 5, Engineering Field Handbook, and National Engineering Manual, Parts 541 and 542.

Standard plans, manufacturer's plans and drawings, or designs by an engineer will be used. All non-standard plans shall require approval by the State Conservation Engineer on a case-by-case basis.

OPERATION AND MAINTENANCE

An Operation and Maintenance (O&M) plan specific to the type of installed watering facility shall be provided to the landowner. The plan shall include the following:

Remove debris, algae, sludge or other materials that may restrict inflow or outflow.

Check for and repair leaks.

Maintain automatic water level controls.

Protect adjacent areas and outlet from erosion.

Inspect operation of the outlet pipe.

Provide guidance for winter operation.

Algae, sludge, and other accumulations should be addressed in areas with known problems. North Dakota State Health Department and United States Environmental Protection Agency rules and regulations are to be followed when recommending and/or using chemicals.

REFERENCES

Engineering Field Handbook

National Engineering Manual

Manual of Steel Construction, American Institute of Steel Construction

Timber, National Design Specification for Wood, American Forest and Paper Association

Concrete, ACI 318, American Concrete Institute

Masonry, Building Code Requirement for Masonry Structures, ACI 530, American Concrete Institute