

**NATURAL RESOURCES CONSERVATION SERVICE  
CONSERVATION PRACTICE STANDARD**

**MANURE TRANSFER**

(no.)  
CODE 634

**DEFINITION**

A manure conveyance system using structures, conduits, or equipment.

**PURPOSE**

To transfer plant and animal wastes through a hopper or reception pit, a pump (if applicable), and a conduit to;

A waste storage/treatment facility;

A loading area; and

To agricultural land for final utilization. This includes application of manure or other plant and animal wastes to the utilization area.

**CONDITIONS WHERE PRACTICE APPLIES**

The manure transfer component is a part of a planned Comprehensive Nutrient Management System.

Where flowable plant and/or animal waste is generated by plant and/or animal production or processing; and a conveyance system is necessary to transfer waste from the source to a storage/treatment facility and/or a loading area, and/or from storage/treatment to an area for utilization.

**CRITERIA**

Criteria for all purposes

**Laws and regulations.** This practice must conform to all federal, state, and local laws and regulations. Laws and regulations of particular concern include those involving water rights, land use, land disturbed by construction, pollution control, property easements, wetlands, preservation of culture resources, and endangered species.

**Structures** - All structures, including those which provide a work area around pumps, will be designed to withstand the anticipated static and dynamic loading. The structure shall

withstand earth and hydrostatic loading in accordance with Practice Standard 313, Waste Storage Facility. The minimum thickness of component elements of concrete structures shall also be in accordance with Practice Standard 313. When needed, covers shall be designed to support the anticipated dead and live loads.

Reception pits shall be sized to contain at least one full day of manure production.

Openings to structures to receive manure from alley scrape collection shall be a minimum of nine square feet with one dimension no smaller than four feet. The opening shall be equipped with a grate designed to support the anticipated loads.

When curbs are needed in conjunction with structures, they shall be constructed of either concrete, corrosion resistant metal, or pressure treated wood. Curbs shall be of sufficient height to insure total waste flow into the structure and be adequately anchored.

**Pipelines** - Design of pipelines shall be in accordance with Practice Standard 430, Irrigation Water Conveyance. The minimum pipeline capacity from collection facilities to storage/treatment facilities shall be the maximum flow anticipated on a daily basis. The minimum pipeline capacity from storage/treatment facilities to utilization areas shall insure the storage/treatment facilities can be emptied within the time limits stated in the management plan for manure utilization. Pipelines shall be designed to have a minimum of two feet per second and a maximum of six feet per second velocity except where waste is transferred in a gravity (sewer type) system; in which case velocities can be reduced if a minimum of five feet of pressure head is provided on the pipe system.

Clean-out access shall be provided for gravity (sewer type) pipelines at a maximum interval of 200 feet for lines carrying non-bedded manure. For pipelines carrying bedded manure the

Conservation practice standards are reviewed periodically and updated if needed. The current version of this standard is on our eFOTG web site available at [www.sd.nrcs.usda.gov](http://www.sd.nrcs.usda.gov) or may be obtained at your local Natural Resources Conservation Service.

maximum interval shall be 150 feet. Gravity pipelines shall not have horizontal curves or bends except minor deflections (less than 10 degrees) in the pipe joints unless special design considerations are used.

**Other Conduits** - Concrete lined ditches shall be designed in accordance with Practice Standard 428A, Irrigation Water Conveyance-Nonreinforced Concrete Ditch and Canal Lining. A minimum design velocity of 1.5 feet per second shall be used.

**Pumps** - Pumps installed for waste transfer shall meet the requirements of Practice Standard 533, Pumping Plant for Water Control. Pumps shall be sized to transfer manure at required system head and volume. Type of pump shall be based on the consistency of the waste. Pump installation design shall be based on manufacturer's recommendations.

**Safety** - The system design shall consider the safety of humans and animals during construction and operation.

Open structures shall be provided with covers or barriers such as gates, fences, etc. Ventilation and warning signs shall be provided for waste transfer systems as necessary to warn of the danger of entry and to reduce the risk of explosion, poisoning, or asphyxiation.

Pipelines from enclosed buildings shall be provided with a water-sealed trap and vent or similar devices where necessary to control gas entry into buildings.

Gravity discharge pipes used for emptying a storage/treatment facility shall have a minimum of two gates or valves, one of which shall be manually operated.

Tractors or other vehicles used to tow manure spreaders or tank wagons shall be sized to reduce the danger of roll-over.

#### **CRITERIA IN SUPPORT OF THE PURPOSE OF LAND APPLICATION**

Waste shall be applied to the utilization area in amounts and at a time consistent with the waste management plan and Practice Standard 633, Waste Utilization, or Practice Standard 590, Nutrient Management.

Sprinklers or sprinkler systems shall be designed in accordance with Practice Standard 442, Irrigation System Sprinkler. Sprinkler system design capacity shall be adequate to

apply the required volume of waste at a rate and uniformity that shall prevent runoff and meet the nutrient needs of the plants. Nozzle size shall be appropriate for the consistency of the waste applied. Sprinkler applied, waste, shall normally contain less than two percent solids unless provisions are made for straining or filtering before application, or big gun type nozzles are used.

Manure spreaders and/or tank wagons shall have adequate capacity to insure the emptying of storage/treatment facilities within appropriate time periods as stated in the system operation and maintenance plan.

Gated pipe and other appurtenances used in conjunction with gravity application shall be designed to insure uniform application amounts.

#### **CONSIDERATIONS**

Utilization of topography to generate head to reduce pumping requirements; economics (including design life), overall waste management system plans, and health and safety factors; possible contamination of domestic water systems and ground water; loading and unloading of equipment in the vicinity of the waste transfer components; subsurface conditions, i.e., depth to bedrock, water table, etc.; when applicable, compatibility to joint use of waste transfer with irrigation system design requirements; system for flushing pipelines with clean water; provisions for cleaning out solids deposition in ditches; pipe pressure rating adjustments required based on waste temperature; corrosion resistance and water tightness in the selection of pipe material and joints; need for appropriate check valves, anti-siphon protection, and open air breaks; sanitation needs of all conveyance equipment that leaves the farm in order to prevent the spread of disease; potential for salt deposits in smaller diameter pipe.

#### **PLANS AND SPECIFICATIONS**

Plans and specifications for installing waste transfer systems shall be in accordance with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

#### **OPERATION AND MAINTENANCE**

Operation and maintenance shall be in accordance with the requirements specified in

the overall operation and maintenance plan required by the applicable Practice Standard 313, Waste Storage Facility, or 359, Waste Treatment Lagoon.

## **REFERENCES**

Pump and equipment manufacturer's literature

Technical Release 25 – Design of Open Channels

South Dakota Engineering Field Manual for Conservation Practices

Design Manual Concrete Pipe – American Concrete Pipe Association

Handbook of PVC Pipe Design and Construction – Uni-Bell PVC Pipe Association

Pipeline Installation – Amster Howard 1999