

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD
RESIDUE AND TILLAGE MANAGEMENT**

RIDGE TILL

(Ac.)

CODE 346

DEFINITION

Managing the amount, orientation, and distribution of crop and other plant residues on the soil surface year-round, while growing crops on pre-formed ridges alternated with furrows protected by crop residue.

PURPOSE

- Reduce sheet and rill erosion.
- Reduce wind erosion.
- Maintain or improve soil quality.
- Reduce energy use.
- Manage snow to increase plant-available moisture.
- Modify cool wet site conditions.
- Provide food and escape cover for wildlife.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all cropland.

This practice includes tillage and planting methods commonly referred to as ridge till or ridge planting. It does not include no-till planting on ridges, or bedding or listing operations that bury crop residues.

CRITERIA

General Criteria Applicable to All Purposes

Following crop harvest, residues shall remain on the surface until planting with no additional disturbance except for normal weathering.

Ridge height shall be maintained throughout the harvest and winter seasons by controlling equipment and livestock traffic.

After planting, residues shall be maintained in the furrows until the ridges are rebuilt by cultivation. Ridges shall be rebuilt to their design height and shape during the last row cultivation.

Stable Outlets. A stable outlet must exist where ridges direct runoff to areas of concentrated flow.

Maximum Row Grade. Row grades shall not exceed those given in the following table.

10-Year Storm Erosivity Index (EI)	Maximum Row Grade (%) ¹
<100	9
100 – 150	7
>150	6

¹ Based on current RUSLE2 climate database.

Use the row grade limitation for next higher 10-year storm EI value:

- If sprinkler irrigation is used with this practice; or
- Where residue cover is less than 30 percent, use the maximum row grade for the next higher 10-year storm EI value.

Additional Criteria to Reduce Sheet and Rill Erosion

Soil and residue removed from the top of the ridge shall be moved into the furrow between the ridges.

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact your Natural Resources Conservation Service [State Office](#), or visit the [electronic Field Office Technical Guide](#).

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After planting, the top of the ridge shall be maintained at least three inches higher than the furrow between the ridges.

The ridge top shall be shaped to direct runoff to the protected furrow area.

When used in a system to reduce sheet and rill erosion, the critical slope shall not exceed lengths determined using the current approved water erosion prediction technology.

Calculations shall account for the effects of other practices in the conservation management system.

Revised Universal Soil Loss Equation (RUSLE2) is the current South Dakota (SD) NRCS approved erosion prediction technology for sheet and rill erosion.

http://fargo.nserl.purdue.edu/rusle2_dataweb/RUSLE2_Index.htm

Additional Criteria to Reduce Wind Erosion

Ridges shall be designed using current wind erosion prediction model and must account for the effects of ridge height, spacing, and orientation to the direction of erosive winds.

The amount and orientation of residue needed and the amount of surface soil disturbance allowed to reduce wind erosion to the planned soil loss using the current approved wind erosion prediction technology.

Calculations shall account for the effects of other practices in the conservation management system.

The Wind Erosion Prediction System (WEPS) is the current SD NRCS approved erosion prediction technology for wind erosion.

<http://www.weru.ksu.edu/nrcs/wepsnrcs.html>

Additional Criteria to Maintain or Improve Soil Quality

An evaluation of the cropping system using the current approved soil conditioning index (SCI) procedure shall result in a positive trend.

Calculations shall account for the effects of other practices in the conservation management system.

RUSLE2 and WEPS include the current NRCS recognized procedure for estimating SCI values.

Cultivation to rebuild ridges shall be done using tools that maintain residues in the surface layer.

Additional Criteria to Reduce Energy Use

The Soil Tillage Intensity Rating (STIR) for the crop interval shall be less than or equal to 42.

Additional Criteria to Manage Snow to Increase Plant-Available Moisture

During the time that significant snowfall is expected to occur, the minimum distance between the bottom of the furrow and the top of the stubble shall be:

- at least 10 inches for crops with a row spacing of less than 15 inches;
- at least 15 inches for crops with a row spacing of 15 inches or greater.

If this minimum distance cannot be achieved, ridges shall be oriented not to exceed 45 degrees from perpendicular to the prevailing wind direction during periods of expected snowfall.

Additional Criteria to Modify Cool Wet Site Conditions

Ridge height prior to planting shall be at least six inches.

Additional Criteria to Provide Food and Cover for Wildlife

Determine residue duration, amount, orientation, and stubble height needed to provide adequate food and cover for target species using an approved habitat evaluation procedure.

Use the approved habitat evaluation procedure, SD-CPA-19, Wildlife Habitat Quality Rating Worksheet.

CONSIDERATIONS

General - Removal of residue, such as by burning, baling or grazing, can have negative impacts on resources. These activities should not be performed without full evaluation of

impacts on soil, water, animal, plants, and air resources.

Ridge till may be practiced continuously throughout some crop sequences, or may be managed as part of a residue management system that includes other tillage and planting methods such as mulch till or no till. In mixed systems, ridges must be periodically re-established. Selection of acceptable tillage methods for specific site conditions may be aided by an approved STIR.

Alignment of ridges on the contour will aid management of runoff and sheet and rill erosion.

Production of adequate amounts of crop residues necessary for the proper functioning of this practice can be enhanced by selection of high residue producing crops and crop varieties in the rotation, use of cover crops, and adjustment of plant population and/or row spacing.

Since row cultivation is typically used for weed control and to reform ridges, this practice has the potential to reduce herbicide requirements.

A field border (see 386) planted to permanent vegetation can assist in unobstructed turning, elimination of end rows, providing travel lanes for farming operations, and can provide habitat for beneficial insects and pollinators.

When providing technical assistance to organic producers, residue management, and tillage activities should be consistent with the USDA Agricultural Marketing Service National Organic Program standard.

Maintaining or Improving Soil Quality and Reducing CO₂ Loss from the Soil -

Continuous ridge planting will allow organic material to accumulate in the surface horizon. Reconstruction of ridges in the same row area year after year will maximize organic matter buildup and biological activity in the row.

CO₂ loss is directly related to the volume of soil disturbed, the intensity of the disturbance and the soil moisture content and soil temperature at the time the disturbance occurs:

- Shallow soil disturbance (one to three inches) releases less CO₂ than deeper operations;
- When deep soil disturbance is performed, such as by subsoiling or fertilizer injection, make sure the vertical tillage slot created by these implements is closed at the surface;
- Planting with a single disk opener no-till drill will release less CO₂ than planting with a wide-point hoe/chisel opener air seeder drill;
- Soil disturbance that occurs when soil temperatures are below 50°F will release less CO₂ than operations done when the soil is warmer.

Soil compaction may be reduced by controlled traffic, in which wheel traffic from all operations is limited to the area between designated rows or traffic areas.

Providing Food and Escape Cover for Wildlife - Avoid disturbing standing stubble or heavy residue during the nesting season for ground-nesting species.

Forgoing fall shredding or tillage operations will maximize the amount of wildlife food and cover during critical winter months.

Leaving rows of unharvested crop standing at intervals across the field or adjacent to permanent cover will enhance the value of residues for wildlife food and cover. Leaving unharvested crop rows for two growing seasons will further enhance the value of these areas for wildlife.

PLANS AND SPECIFICATIONS

Specifications shall include:

- field number and acres;
- purposes(s) for this practice;
- crops where this practice will be used;
- the type and timing of soil disturbing operations;
- estimated surface residue following each operation.

Specifications for establishment and operation of this practice shall be prepared for each field or treatment unit according to the Criteria, Considerations, and Operation and Maintenance described in this standard.

- Plan specifications shall be recorded using approved practice specification sheets and additional documents listed as documentation requirements for this conservation practice (SD-DR-346).

OPERATION AND MAINTENANCE

Evaluate/measure the crop residues cover and orientation and ridge height for each crop to ensure the planned amounts and orientation, conservation practice purposes and client objectives are being achieved.

Adjust management as needed to either plan a new residue amount or orientation; or adjust the planting, tillage/cultivation, or harvesting equipment and update the practice specification documentation.

REFERENCES

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