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 condition
- Reduce soil particulate emissions
- 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 and other land where crops are planted.

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 traffic.

Livestock grazing crops or residues shall be controlled to eliminate deterioration of ridges and maintain appropriate amounts of cover to meet criteria below.

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

Stable Outlets. A stable outlet (grassed waterway or area in permanent vegetation) must exist where ridges direct runoff to areas of concentrated flow.

Additional Criteria to Reduce Sheet and Rill Erosion

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

10-Year Storm Erosivity Index (EI)[1]	Maximum Row Grade (%)[2]
<100	9
100 – 150	7
>150	6

[1] EI is the measurement of a storm's energy and intensity. A 10 year EI is the value of the energy and intensity of a storm likely to occur every 10 years in a given location. County EI values are located in the climate database in RUSLE2.

[2] Based on current NRCS water erosion prediction technology.

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

percent, use the maximum row grade for the next higher 10-year storm EI value.

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

After planting, the top of the ridge shall be maintained at least 3 inches higher than the furrow between the ridges.

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

The amount and orientation of residue needed to reduce erosion to the planned soil loss objective shall be determined using the current NRCS approved water erosion prediction technology. Calculations shall account for the effects of other practices in the management system.

Additional Criteria to Reduce Wind Erosion

Ridges and residues shall be oriented to achieve the planned soil loss objective. Calculations shall account for the effects of ridge height, spacing and orientation to the direction of erosive winds.

Wind erosion shall be determined using the current NRCS approved wind erosion prediction technology. Calculations shall account for the effects of other practices in the management system.

Additional Criteria to Maintain or Improve Soil Condition

An evaluation of the cropping system using the current NRCS approved Soil Conditioning Index (SCI) procedure shall result in a positive trend (>0).

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

Additional Criteria to Reduce Soil Particulate Emissions

The amount and orientation of residue needed and the amount of surface soil disturbance allowed to reduce wind erosion to the tolerable soil loss value (T) shall be determined using the current NRCS approved wind erosion prediction technology. Calculations shall account for the effects of other practices in the conservation management system.

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 6 inches.

Additional Criteria to Provide Food and Escape Cover for Wildlife

The amount of residue and height of stubble needed to provide cover for the target species shall be determined using the Oklahoma NRCS Upland Wildlife Habitat Management (645) standard and appropriate wildlife management guide.

CONSIDERATIONS

General - Removal of residue, such as by 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 using the Soil Tillage Intensity Rating (STIR) in RUSLE2.

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. Refer to the Oklahoma NRCS Nutrient Management (590), Pest Management (595), and Cover Crop (340) standards for additional guidance.

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 planted to permanent vegetation can assist in unobstructed turning, elimination of end rows and providing travel lanes for farming operations. Refer to the Oklahoma NRCS Field Border (386) standard for design guidance.

Leaving unharvested crop rows at intervals across the field can enhance the value of residue cover and food for wildlife.

Maintaining or Improving Soil Condition and Reducing CO_2 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.

CO_2 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 (1-3 inches) releases less CO_2 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 CO_2 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 CO_2 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. Nesting season generally occurs from May1 through June 30.

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 for establishment and operation of this practice shall be prepared for each field or treatment unit according to the Criteria and Considerations described in this standard. Specifications shall be recorded using approved specification sheets, job sheets, narrative statements in the conservation plan or other acceptable documentation.

OPERATION AND MAINTENANCE

No operation and maintenance requirements, national in scope, have been identified for this practice.

REFERENCES

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