

UNITED STATES DEPARTMENT OF AGRICULTURE
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.

PURPOSES

- ◆ Reduce sheet and rill erosion.
- ◆ Reduce wind erosion.
- ◆ Maintain or improve soil quality.
- Reduce energy use.
- ◆ 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 be maintained until planting with no additional disturbance except for normal weathering.

Residue shall not be burned.

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

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. Stable outlets must exist where ridges direct runoff to areas of concentrated flow. *Grassed waterways, water and sediment control basins, underground outlets,* or other suitable practices can be used to protect these areas.

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

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

¹ Based on existing water erosion prediction technology.

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.

Loose residues retained on the field shall be uniformly distributed on the soil surface. Combines shall be equipped with straw spreaders capable of redistributing residue over at least 80 percent of the working width of the header. Cultivation and

planting equipment designed to operate on ridges shall be used, such as cultivators equipped with ridge-building attachments, and planters equipped with ridge-planting attachments such as row-cleaning devices and guidance systems.

A minimum of 30 percent of the soil surface shall be covered by plant residue immediately following the planting of the crop. (Additional crop residue is often needed to reduce soil erosion levels to the soil loss tolerance ("T") value, increase soil organic matter content, improve water quality, and to meet other resource objectives.)

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.

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.

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. Partial removal of residue by means such as baling or grazing shall be limited to retain the amount needed.

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 tolerable soil loss value (T) or other soil loss objective shall be determined using the current approved wind erosion prediction technology. Calculations shall account for the effects of other practices in the conservation management system.

Additional Criteria to Maintain or Improve Soil Quality

An evaluation of the crop system using the current approved soil conditioning index procedure shall result in a positive trend. Partial removal of residue

by means such as baling or grazing shall be limited to retain the amount needed. Calculations shall account for the effects of other practices in the conservation management system.

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

Additional Criteria to Reduce Energy Use

Ensure the Soil Tillage Intensity Rating (STIR) for the single crop establishment and harvest is less than or equal to 42.

Additional Criteria To Modify Cool Wet Site Conditions

Ridge height prior to planting shall be at least 6 inches. After planting, the top of the ridge shall be maintained at least 3 inches higher than the furrow between the ridges.

Additional Criteria to Provide Food and Escape Cover for Wildlife

The amount of residue and height of stubble needed to provide cover during winter months shall be determined using an approved wildlife management plan. Residues shall not be removed unless it is determined by the habitat evaluation procedure that removal will not adversely affect habitat values. Stubble shall be maintained standing over winter.

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 which 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 Soil Tillage Suitability Rating.

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 populations and/or row spacings.

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.

Where improvement of soil tilth is a concern, 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.

Burndown herbicides should be applied at least two weeks prior to planting of the next crop to reduce competition from weeds and other vegetation for soil moisture and nutrients.

To achieve a desired crop stand good seed to soil contact is needed. Proper adjustment of planting equipment is required in all residue management systems.

Crop rotation of all crops (including cover crops) is needed to aid in pest control. Follow proper soil testing, nutrient management, Integrated Crop Management (ICM), and Integrated Pest Management (IPM) techniques.

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

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.

Follow NRCS state policy for considering cultural resources during planning and maintenance.

Maintaining or Improving Soil Condition 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 (1-3 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 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. Specifications shall be recorded using approved specification sheets, job sheets, narrative statements in the conservation plan, or other acceptable documentation.

Residue amounts will be determined using the line transect method as described in the National Agronomy Manual.

OPERATION AND MAINTENANCE

All pesticides used in residue management shall be labeled for their intended use and recommendations will be in accordance with the directions and guidelines of the Alabama Cooperative Extension System.

Residue amounts shall be determined using the line transect method as described in the National Agronomy Manual. Soil erosion calculations and the soil conditioning index shall be calculated with RUSLE II.

REFERENCES

ACES. Current Edition. Alabama Pest Management Handbook. Alabama Cooperative Extension System.

Adams, J.F; C.C. Mitchell; H.H. Bryant. 1994. Soil Test Fertilizer Recommendations for Alabama; Auburn University, Agronomy and Soils Department, Publication # 178,

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Renard, K.G., G.R. Foster, G.A. Weesies, D.K. McCool, and D.C. Yoder, coordinators. 1997. Predicting soil erosion by water: A guide to conservation planning with the Revised Universal Soil Loss Equation (RUSLE). U.S. Department of Agriculture, Agriculture Handbook No. 703.

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