

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

RESIDUE MANAGEMENT, RIDGE TILL

(Acre)

CODE 329C

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

This practice may be applied to support one or more of the following purposes.

- Reduce sheet and rill erosion
- Reduce wind erosion
- Maintain or improve soil organic matter content
- 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 grown. This standard 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 and any secondary residue removal (baling or grazing), residues shall remain on the surface until planting with no additional disturbance except for normal weathering. Maintain ridge height throughout the harvest and winter seasons by controlling equipment or livestock traffic.

After planting, maintain residues in the furrows until the ridges are rebuilt by cultivation. Rebuild ridges to their original height and shape during the last row cultivation.

Loose residues to be 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 such as cultivators with ridge-building attachments and planters with ridge-planting attachments shall be used.

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 the maximum listed for the corresponding 10-year EI.

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

¹ Based on existing 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.

Additional Criteria to Reduce Sheet and Rill Erosion

The amount of residue needed to reduce erosion within the soil loss tolerance (T), or any other planned soil loss objective, shall be determined using the Revised Universal Soil Loss Equation, Version 2 (Rusle 2).

Partial removal of residue, such as baling or grazing, shall be limited to retain the amount needed to assure adequate protection.

Planting and fertilizer placement shall disturb no more than one-third of the row width. Move soil and residue removed from the top of the ridge into the furrow between the ridges.

After planting, maintain the top of the ridge at least 3 inches higher than the furrow between the ridges. The ridge shall be shaped to prevent erosion along the row by directing runoff to the protected furrow area.

Additional Criteria to Reduce Wind Erosion

The amount and orientation of residue needed to reduce erosion within the soil loss tolerance (T), or other planned soil loss objective, shall be determined using the Excel Wind Erosion Equation, Colorado Field Version.

Partial removal of residue by means such as baling or grazing shall be limited to retain the amount needed. Wind erosion calculations shall account for the effects of ridge height, spacing and direction of ridges.

Additional Criteria to Maintain or Improve Soil Organic Matter Content

The amount of residue needed to achieve the desired soil condition shall be determined using the Revised Universal Soil Loss Equation, Version 2 (Rusle 2), Soil Conditioning Index. 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 Manage Snow to Increase Plant-Available Moisture

Stubble shall be left standing as high as possible by the harvesting operation, but not less than 6 inches. Stubble shall remain standing over winter to trap and retain snow.

If a 6-inch stubble height cannot be achieved orient ridges not to exceed 45 degrees from perpendicular to the prevailing wind direction during periods of expected snow cover.

Additional Criteria to Modify Cool Wet Site Conditions

Ridge height prior to planting shall not be less than 6 inches.

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 wildlife management plan that removal will not adversely affect habitat values. Stubble shall remain standing over winter.

CONSIDERATIONS

Burning of plant residue or excess removal of by such baling or grazing can produce negative impacts on resources. These activities should not be performed without a full evaluation of the impacts on soil, water, air, plant and animal 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 soil tillage suitability rating.

Production of adequate amounts of crop residues can be enhanced by selection of high-residue producing, use of cover crops and adjustment of plant population and row spacing.

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

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.

Limit wheel traffic from all operations to the area between designated rows or traffic areas to decrease soil compaction.

Field Borders planted to permanent vegetation can assist in unobstructed turning, elimination of end rows and in providing travel lanes for farming operations.

Not harvesting crop rows at intervals across the field can enhance the value of residue cover and food for wildlife.

PLANS AND SPECIFICATIONS

Prepare plans and specifications for establishment and operation of this practice for each field or treatment unit according to the Criteria, Considerations and Operation and Maintenance sections of this standard.

Specifications shall describe the requirements for applying this practice to meet the intended purpose.

Record practice specifications 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

Colorado Field Office Technical Guide, Section I. Agronomy Technical Note No. 81. 1992. Residue Cover as Affected By Tillage. USDA, Natural Resources Conservation Service. Lakewood, CO.

Colorado Field Office Technical Guide, Section I. Agronomy Technical Note No. 79 (rev. 2). 1992. Crop Residue Production and Management for Resource Protection. USDA, Natural Resources Conservation Service. Lakewood, CO.

Revised Universal Soil Loss Equation, Version 2, 2004. USDA NRCS, Washington DC. http://fargo.nserl.purdue.edu/rusle2_dataweb/RUSLE2_Index.htm

Colorado Field Office Technical Guide, Section I, Erosion Prediction, Excel Wind Erosion Equation (WEQ) Colorado Guidance Document. 2003. USDA, NRCS, Lakewood, CO. http://efotg.nrcs.usda.gov/references/public/CO_CO_Excel_WEQ_Guidance.pdf