

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

RESIDUE MANAGEMENT, MULCH TILL

(Acre)

CODE 329B

DEFINITION

Managing the amount, orientation and distribution of crop and other plant residue on the soil surface year-round, while growing crops where the entire field surface is tilled prior to planting

PURPOSES

This practice may be applied as part of a conservation system to support one or more of the following purposes.

- Reduce sheet and rill erosion
- Reduce wind erosion
- Maintain or improve soil organic matter content and tilth
- Conserve soil moisture
- Manage snow to increase plant available moisture
- 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 methods commonly referred to as mulch tillage, or chiseling and disking. It applies to stubble mulching on summer fallowed land, to tillage for annually planted crops, and to tillage for planting perennial crops.

CRITERIA

General Criteria Applicable to All Purposes Named Above

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

Residue shall not be burned.

Tillage implements shall be equipped to operate through plant residues without clogging, and to maintain residue on or near the soil surface by undercutting or mixing.

Planters, drills or air seeders shall be equipped to plant in residue distributed on the soil surface or mixed in the tillage layer.

The number, sequence and timing of tillage and planting operations and selection of ground-engaging components, shall be managed to achieve the planned amount, distribution and orientation of residue after planting or at other essential time periods. Acceptable alternative tillage sequences shall be initially determined by a residue budget using locally applicable data on residue production by crops and residue reduction by tillage machines.

Further adjustments shall be made as needed during the tillage sequence based on field measurements of remaining residue.

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

Tillage operations shall be limited to methods that leave residue on the surface and maintain the planned cover conditions.

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 of residue needed to reduce erosion. Calculations shall account for the effects of other practices in the conservation management system.

Additional Criteria to Maintain or Improve Soil Organic Matter Content

The amount of residue and the number and type of tillage operations 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 of residue needed to reduce erosion. Calculations shall account for the effects of other practices in the conservation management system.

Additional Criteria to Conserve Soil Moisture

A minimum quantity of 50 percent residue cover shall be maintained throughout the year. Residues shall be evenly distributed and maintained on the soil surface.

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

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 in any case.

Stubble shall be maintained in a standing orientation over winter to trap and retain snow. Loose residue may be removed providing that the remaining residue is left standing. Fall tillage operations shall be limited to undercutting tools such as blades, sweeps or deep tillage implements such as rippers or subsoilers in order to maintain stubble in a standing condition through the months when snow occurs.

Additional Criteria to Provide Food and Escape Cover for Wildlife

The amount of residue and height of stubble needed to provide cover shall be determined using an approved habitat evaluation procedure. Residues shall not be removed unless it is determined by the habitat evaluation procedure that removal would not adversely affect habitat values.

Stubble shall be maintained standing over winter. Delay tillage until spring to maintain waste grain on the soil surface during winter.

CONSIDERATIONS

Excessive removal of plant residues by baling or grazing can produce negative impacts on resources. These activities should not be performed without a full evaluation of impacts on soil, water, air, plant and animal resources.

Mulch till may be practiced continuously throughout the crop sequence or may be managed as part of a residue management system that includes other tillage methods such as no till. 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 residue can be enhanced by selection of high residue-producing crops, use of cover crops, and adjustment of plant populations and row spacing.

Where improvement of soil tilth is a concern, use of undercutting tools will enhance accumulation of organic material in the surface layer.

The effectiveness of stubble to trap snow increases with stubble height.

Leaving rows of unharvested crop standing at intervals across the field can enhance the value of residues for wildlife habitat.

PLANS AND SPECIFICATIONS

Plans and 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 sections of this standard. Specifications shall describe the requirements for applying this practice to meet the intended purpose.

Record practice specifications on the Mulch-Till Residue Management, 329B Conservation Practice Job Sheet, 1998.

OPERATION AND MAINTENANCE

No operation and maintenance requirements national in scope are 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