

USDA
NATURAL RESOURCES
CONSERVATION SERVICE
DELAWARE
CONSERVATION PRACTICE
STANDARD

RESIDUE MANAGEMENT;
MULCH TILL

CODE 329B
(Reported in Acres)

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 management system to support one or more of the following resource concerns:

- Reduce sheet and rill erosion.
- Reduce wind erosion.
- Maintain or improve soil organic matter content and tilth.
- Conserve soil 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 tillage for annually planted crops and to tillage for planting perennial crops.

CRITERIA

General Criteria Applicable to All Purposes

Loose residue to be retained on the field shall be uniformly distributed on the soil surface. Residue should be uniformly distributed during or immediately following harvest.

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

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

The number, sequence, and timing of tillage and planting operations, and the 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 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 (RUSLE) erosion prediction technology. Partial

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

values. Stubble shall be maintained standing over the winter. Tillage shall be delayed until spring, in order to maintain waste grain on the soil surface during the winter.

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

Additional Criteria to Maintain or Improve Soil Organic Matter Content and Tilt

Erosion shall be not exceed the soil loss tolerance (T).

The cropping sequence must contain at least 50% perennial crops or 50% high residue producing crops.

Low residue producing crops in the rotation shall be planted using a conservation tillage method that retains a minimum of 50% residue surface cover after planting.

Cover crops shall be used in the crop sequence where prior crop residues after harvest provide less than 50% surface cover.

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

Additional Criteria to Conserve Soil Moisture

A minimum of 50 percent residue surface cover shall be maintained throughout the year. Residue shall be evenly distributed and maintained on the soil surface. Partial removal by means such as baling or grazing shall be limited to retain the amount and distribution needed

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

PLANNING CONSIDERATIONS

Partial removal of plant residue by such means as baling or grazing may produce negative impacts on resources. The effects of residue removal shall be considered when evaluating the impacts on soil, water, air, plant, and animal resources. These activities should not be performed if the result is excess removal of plant residues.

Mulch till may be practiced continuously throughout the crop sequence, or may be managed as part of a residue management system which includes other tillage methods such as No-till.

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 row spacing.

Where improvement of soil tilth is a concern, use of undercutting tools will enhance accumulation of organic material in the surface layer. Soil organic matter content is also increased with the use of high residue producing crops and cover crops.

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

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.

OPERATION AND MAINTENANCE

Proper adjustment, operation, and maintenance of equipment is essential for successful implementation of this practice.

SUPPORTING DATA AND DOCUMENTATION

1. Identify resource concern(s) to be treated (see **PURPOSES**).
2. Ensure that field location, acreage, crop rotation, and percent residue needed to address identified resource concern(s) are recorded in the conservation plan.
3. Type(s) of tillage implements used.
4. Soil loss calculations if needed.

REFERENCES

1. Conservation Tillage Information Center, Conservation Tillage – A Check List for U.S. Farmers, 1996
2. Lamarca, Carlos Crovetto, Stubble Over the Soil: The Vital Role of Plant Residue in Soil Management to Improve Soil Quality, 1996.
3. Renard, K.G., G.R. Foster, G.A. Weesies, D.K. McCool, and D.C. Yoder, coordinators. Predicting Soil Erosion by Water: A Guide to Conservation Planning with the Revised Universal Soil Loss Equation (RUSLE). USDA Agricultural Handbook No. 703, 1997.
4. Natural Resources Conservation Service, Delaware RUSLE Manual (FOTG), March, 1995.
5. Natural Resources Conservation Service, National Agronomy Manual.
6. USDA, Agriculture Research Service, Conservation Research Report No. 41, Crop Residue Management To Reduce Erosion and Improve Soil Quality - Appalachia and Northeast, Washington, D.C., August, 1995.