

NATURAL RESOURCES CONSERVATION SERVICE
VIRGINIA 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:

- 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, minimum tillage, reduced 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

At least 30% of the soil surface must be covered by residue after planting. Residue will be from the previous crop, cover crop, or a combination of cover types.

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 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

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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.

Full width tillage which disturbs all of the soil surface is performed prior to and/or during planting. Tillage tools such as chisels, field cultivators, disks, sweeps, or blades are used. Weed control is accomplished with a combination of herbicides and/or cultivation.

The residue will not be windrowed.

Where pesticides are used, target them to specific problems. Pesticides will be used in accordance with the manufacturers' label. Refer to VPI and the local Extension Service recommendations. See the Virginia Conservation Practice Standard *Pest Management (Code 595A)*.

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 current approved erosion prediction technology. Partial removal of residue by means such as baling or grazing shall be limited in order to retain the amount needed. 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 current approved wind erosion prediction technology. Partial removal of residue by means such as baling or grazing shall be limited in order to retain the amount needed. 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 current approved soil conditioning index procedure. Partial removal of residue by means such as baling or grazing shall be limited in order to retain the amount needed. Calculations shall account for the effects of other practices in the conservation management system.

ADDITIONAL CRITERIA TO CONSERVE SOIL MOISTURE

To conserve soil moisture, a minimum quantity of 50 percent residue cover shall be maintained throughout the year. Residue shall be evenly distributed and maintained on the soil surface. Partial removal of residue by means such as baling or grazing shall be limited in order to retain the amount 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 values. Stubble shall be maintained standing over winter. Tillage shall be delayed until spring, in order to maintain waste grain on the soil surface during winter.

CONSIDERATIONS

Excess removal of plant residue by such means as baling or grazing often produces negative impacts on resources. These activities should not be performed without full evaluation of impacts on soil, water, animal, plants, and air.

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 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, use of irrigation, and adjustment of plant populations and row spacings. Narrow row spacings of 30 inches or less will provide a quicker crop canopy and aid with weed control.

Consider the soil adaptability for the conservation tillage types being evaluated.

Burndown herbicides applied at least 2 weeks prior to planting the next crop will kill the cover crop, weeds, and other vegetation that may compete with the crop and deplete the soil moisture necessary for crop germination and early plant growth.

Early spring planting should be delayed until the desired soil temperature is obtained.

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

Start any residue management system with adequate soil fertility and pH. A good way to begin with residue management is to incorporate agricultural lime and the other recommended nutrients in the fall, followed by a winter cover crop. Lime and fertility

levels should be properly maintained by using recommendations based on soil tests. 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.

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

Consider the need for other practices, in conjunction with mulch tillage, during the planning process. For example, consider the need for grassed waterways where erosion by concentrated flow is a problem. Terraces may be used to reduce the sheet and rill erosion to the required level.

Recommend appropriate measures to suppress or eliminate hard to control weeds such as Johnsongrass and bermudagrass before implementing a conservation tillage program. See the Virginia Practice Conservation Standard *Pest Management (Code 595)*.

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

Residue management provides many benefits to game and non-game species of wildlife. Among the benefits are:

1. Providing food above the soil surface
2. Providing cover for nesting
3. Providing protective winter cover
4. Reducing sedimentation and the delivery of agricultural chemicals in streams
5. Dilution of predator pressure.

Additional practice information will be documented on the Conservation Job Sheet *Mulch Till Residue Management*.

PLANS AND SPECIFICATIONS

Specifications for this practice shall be in accordance with the stated criteria and recorded in the conservation plan case file. The conservation plans and specifications are to be prepared for specific field sites based on this standard.

A Residue Management plan will be developed for all fields that utilize mulch till. The management of the mulch till system will be documented in the conservation plan.

The conservation plan shall include the following information:

1. Resources concern(s) to be treated
2. Field location, acreage, crop rotation, tillage sequence, and percent residue needed to address the identified resource concern(s)

Specifications shall be recorded using approved certification sheets, conservation practice job sheets, and narrative statements in the conservation plan, or other acceptable methods. The following information will be recorded:

1. Field location, tract number and field number
2. Acres of field
3. Cropping sequence
4. Residue type
5. Specify "mulch till"
6. The percent of the soil surface covered immediately after planting

OPERATION AND MAINTENANCE

No operation and maintenance requirements have been identified for this practice.

REFERENCES

1. Agriculture Handbook 703, Predicting Rainfall Erosion by Water: A Guide to Conservation Planning With the Revised Universal Soil Loss Equation (RUSLE).
2. Virginia Pest Management Guide, published by the Virginia Cooperative Extension Service (Most current publication, i.e., current year).
3. National Agronomy Handbook
4. Agriculture Handbook 346, Wind Erosion Forces in the United States and Their Use in Predicting Soil Loss.
5. "Conservation Tillage – A Check List for U. S. Farmers": Published by CTIC, 10/96.
6. "Crop Residue Management to Reduce Erosion and Improve Soil Quality-Southeast"; USDA-ARS Conservation Research Report #39.
7. "Crop Residue Management to Reduce Erosion and Improve Soil Quality-Appalachia and Northeast"; USDA-ARS Conservation Research Report #41.
8. Virginia Technical Note, Agronomy - Residue Management/Tillage #1 *Managing and Measuring Crop Residue*.

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Approved Practice Narratives

(Acre)

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329B D1 Residue Management,
Mulch Till: Plant all crops using a mulch tillage operation. Leave at least 30% of the soil surface covered, at the time of planting, with the residue of the previous crop or the cover crop.

tillage type may be used for planting small grains. For the mulch tilled crops, leave at least 30% of the soil surface covered, at the time of planting, with the residue of the previous crop or the cover crop.

329B D2 Residue Management,
Mulch Till: During the crop phase of the rotation, row crops will be planted into residue from the prior crop or cover crop. At least 30% of the soil surface will be covered immediately after planting.

329B D4 Residue Management,
Mulch Till: Plant grasses and/or legumes using mulch till planting methods. Leave at least 30% of the soil surface covered, at the time of planting, with the residue of the previous crop or the cover crop.

329B D3 Residue Management,
Mulch Till: Mulch till planting methods will be used for all crops, except small grains. Any

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