

**NATURAL RESOURCES CONSERVATION SERVICE
VIRGINIA CONSERVATION PRACTICE STANDARD
RESIDUE MANAGEMENT, SEASONAL**

(Ac.)

CODE 344

DEFINITION

Managing the amount, orientation, and distribution of crop and other plant residues on the soil surface during a specified period of the year, while planting annual crops on a clean-tilled seedbed, or when growing biennial or perennial seed crops.

PURPOSES

- Reduce sheet and rill erosion.
- Reduce soil erosion from wind.
- Improve soil condition.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all cropland that uses full-width clean tillage to establish crops.

Seasonal residue management includes managing residues of annual crops from crop harvest or termination until the residue is buried by tillage for seedbed preparation.

The intent of this practice is to (a) encourage farmers who plant clean-till crops to delay tillage until just before planting in order to keep the soil protected for as long as possible and (b) to ensure adequate residue is present during the pre-tillage period to provide that protection.

It also includes the management of residues from biennial or perennial seed crops from the time of seed harvest until regrowth begins the next season.

CRITERIA

General Criteria Applicable to All Purposes

1. The residue management period begins when one crop is harvested or terminated and ends when tillage begins ahead of planting the next crop. In the case of biennial or perennial seed crops, the

residue management period begins at harvest and ends when regrowth begins the next season.

2. Delay all full-width tillage and residue burial until no more than two weeks ahead of planting the clean-till crop.
3. Residues shall be uniformly distributed over the entire field during the residue management period. Combines or similar harvesting machines used prior to the residue management period shall be equipped with spreaders capable of redistributing residues over at least 80 percent of the working width of the header.
4. Residues shall not be burned.
5. Tillage operations during the residue management period shall be limited to undercutting using blades or wide sweeps that minimize residue flattening or burial.

Additional Criteria to Reduce Sheet & Rill Erosion and/or Wind Erosion

Throughout the residue management period, the soil surface must be protected by an overall average of at least 30% residue cover, as determined using the line transect method.

In some cases, higher residue levels may be needed during one or more residue management periods to achieve the site-specific soil loss objective for the overall cropping system. In these cases, use the current version of the applicable soil erosion prediction technology (e.g., Revised Universal Soil Loss Equation, Version 2 (RUSLE2) for sheet & rill erosion) as the basis for planning more aggressive targets for residue cover.

In other cases, it may be possible to achieve the site-specific sheet & rill soil loss objective for the overall cropping system with less than 30% residue cover during one or more residue management periods. In these cases, plan residue targets below 30% only if complete

analysis of the cropping system using RUSLE2 indicates that overall soil loss objectives can still be met.

Additional Criteria to Improve Soil Condition

Throughout the residue management period, the soil surface must be protected by an overall average of at least 60% residue cover, as determined using the line transect method.

In some cases, higher residue levels may be needed during one or more residue management periods to achieve the site-specific soil condition / soil organic matter management objective for the overall cropping system. In these cases, use the current Soil Conditioning Index (SCI) procedure as the basis for planning more aggressive targets for residue cover.

In other cases, it may be possible to achieve the site-specific soil condition / soil organic matter management objective for the overall cropping system with less residue during one or more residue management periods. In these cases, plan residue targets below 60% only if complete analysis of the cropping system using the SCI procedure indicates that overall soil organic matter management objectives can still be met.

Use the following to guide interpretation of Soil Conditioning Index (SCI) results for purposes of implementing these additional criteria:

- A cropping system predicted to maintain soil organic matter content should have an SCI score of 0.00 or greater.
- A cropping system predicted to improve soil organic matter content should have an SCI score of +0.25 or greater.

See "Considerations" for SCI targets for higher levels of performance.

CONSIDERATIONS

General

This practice is intended to apply primarily in situations where an interval of one or more months (typically the entire winter) will elapse between harvest or termination of one crop and clean-till planting of the next crop. However, it can apply to any situation in which residue burial is delayed until two weeks or less ahead of planting.

Seasonal residue management may be practiced continuously throughout the crop

rotation, or may be used occasionally in a rotational tillage system that includes planting methods other than clean tillage.

Extending the residue management period (i.e., delaying tillage and residue burial until less than two weeks before planting) should be encouraged whenever possible.

When planting into a clean-tilled seedbed, completing tillage and planting in a single operation, or performing primary tillage no more than three days before planting, can minimize exposure to erosion or loss of moisture for germination.

Adopting complementary practices can significantly improve the conservation performance of cropping systems involving clean tillage. Key complementary practices are crop rotation and cover cropping.

Soil compaction prevention should be recommended as a way to reduce the need for tillage. Key strategies for compaction prevention include:

- Staying off wet ground.
- Minimizing axle loads (e.g., keep haul trucks out of the field,) and minimizing tire-to-soil contact pressure (e.g., keep road tires out of the field).
- Minimizing the percentage of the field tracked over time (e.g., use controlled traffic to keep tires in the same tracks on every pass).

Whenever tillage is used, special emphasis should always be placed on delaying tillage operations until soil is sufficiently dry. Tilling wet soil causes compaction, cloddiness, and significant damage to soil structure.

Adopting practices that result in reductions in tillage and/or increases in residue may trigger the need for adjustments to nutrient and pest management practices. Maintaining a diverse crop rotation will often facilitate such adjustments.

Leaving one or two rows of unharvested crop standing at intervals across the field can enhance the value of residue for wildlife habitat.

Reducing Sheet & Rill and/or Wind Erosion

Increasing residue cover beyond the minimum targets in this standard should be encouraged, even if soil loss and SCI objectives are met by a lower residue level.

Production of adequate amounts of crop residues necessary for this practice can be enhanced by selection of high-residue producing crops, use of cover crops, etc.

Living vegetation as well as dead plant material may be counted towards meeting the minimum cover targets in this standard.

Maintaining or Improving Soil Condition

Use the following as a guide for setting Soil Conditioning Index (SCI) targets above +0.25, which is the minimum target under this standard for soil organic matter improvement:

Soil Conditioning Index (SCI) Score	Performance Level – Soil Organic Matter Improvement
+0.25 to +0.49	Minimum
+0.50 to 0.74	Intermediate
+0.75 or greater	Optimum

Minimizing soil disturbance can enhance soil quality in ways that are not fully accounted for by SCI. Soil Tillage Intensity Rating (STIR) provides a useful measure of soil disturbance to complement SCI. Strive to minimize soil disturbance, with a STIR value of 10 or less representing an optimum to strive for.

PLANS AND SPECIFICATIONS

Specifications for implementation of this practice shall be prepared for each field or CMU (Conservation Management Unit).

Customize the language and level of detail in specifications as needed for each particular case. Focus above all on providing the client with the practical guidance needed to effectively put the practice on the ground.

Specifications shall be recorded and conveyed to the client using approved job sheets and/or narrative statements in the conservation plan.

Specifications shall at a minimum include all of the following elements:

1. A list of the field(s) and/or CMU(s) where seasonal residue management will be implemented.
2. A list of the purpose(s) for which the standard is being implemented (sheet & rill erosion, wind erosion, etc.).
3. A description of the planned crop rotation that indicates when and how often in the cropping sequence seasonal residue management will occur.
4. A statement of the five general criteria that must be achieved in all cases where this practice is implemented
5. A description of targets for residue cover during the residue management period(s) based on additional criteria in the standard and plan objectives.
6. A description of additional limits, if any, on timing and intensity of residue burial operations following residue management period(s), based on additional criteria in the standard and plan objectives.
7. In those cases where analysis of the overall cropping system is used to adjust residue cover targets during seasonal residue management periods, a description of any complementary practices (crop rotation, cover crops, etc.) that must be carried out in order to achieve overall planned conservation objectives.

In those cases where site-specific analysis of the overall cropping system is used to adjust residue cover targets, document planned conservation objectives as well as inputs and outputs for the relevant decision-support tools (RUSLE2, SCI procedure, etc.). This is especially important when planned residue cover targets are less protective than those recommended in relevant additional criteria (i.e., 30% for erosion reduction, 60% for soil condition).

REFERENCES

- Brady, N.C., and R.R. Weil. 2008. The Nature and Properties of Soils. 14th Edition.
- Magdoff, Fred and H. van Es. 2009. Building Soils for Better Crops. 3rd Edition.
- Reeder, R., et al. 2000. Conservation Tillage Systems and Management: Crop Residue Management with No-till, Ridge-till, Mulch-till, and Strip-till, 2nd Ed. Midwest Plan Service.

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