

**NATURAL RESOURCES CONSERVATION SERVICE
MONTANA CONSERVATION PRACTICE SPECIFICATION
RESIDUE AND TILLAGE MANAGEMENT
NO TILL/STRIP TILL/DIRECT SEED (ACRE)**

CODE 329

PURPOSE: Residue management systems can be designed to accomplish one or more of the following:

- Reduce sheet and rill erosion
- Reduce wind erosion
- Improve soil organic matter content
- Reduce CO₂ losses from the soil
- Reduce energy use
- Increase plant-available moisture
- Provide food and escape cover for wildlife.

No till, strip till, and direct seeding are similar systems that can be described as managing the amount, orientation, and distribution of crop and other plant residue on the soil surface year around while limiting soil-disturbing activities to only those necessary to place nutrients, condition residue, and plant crops. No till or strip till systems do not include crops such as sugar beets that have soil disturbing activities at harvest. These crops would fall under mulch till systems (Code 345).

No till and direct seed systems leave residue undisturbed from harvest through planting except for narrow strips that cause minimal soil disturbance, such as injecting fertilizer. No till is also referred to as direct seeding and zero tillage.

Strip till systems often leave residue undisturbed from harvest through planting except for strips up to a third of the row width. These strips are cleared of residue or tilled for warming and drying purposes either before or during the planting operation. This practice is also referred to as row till or zone till.

CONSERVATION MANAGEMENT SYSTEMS

No till/strip till/direct seed residue management systems are established as a component of a resource management system. Crop rotation, pest management, nutrient management, various structures, and buffer practices are used in resource management planning to address natural resource concerns identified during the planning process.

PRACTICE SPECIFICATIONS

Practice specifications are provided to assure the residue management system meets the resource needs and producer's objectives. The specifications are based on the amount, timing, and orientation of crop residue left on the soil surface.

Specification MT329-2

GENERAL SPECIFICATIONS *APPLICABLE TO ALL PRACTICE PURPOSES*

- The Soil Tillage Intensity Rating (STIR) provides indication of soil quality based on the cropping system used. A lower number represents a healthier soil trend where a higher number means soil health is compromised. The STIR value shall include all field operations that are performed during the crop interval between harvest of the previous crop and harvest or termination of the current crop (includes fallow periods). The annual and rotational STIR value shall be no greater than 30 for the entire rotation.
- The required amount, timing, and orientation of residue will be in accordance with site-specific data based on soils, crops and tillage operations. Current wind and water erosion prediction technology will be used to establish minimum requirements that take into consideration supporting practices. Wind and/or water erosion must be held to the soil loss tolerance (T) for the entire rotation.
- Residue to be retained on the field must be uniformly distributed. Combines or other harvesting machines must be equipped with spreaders capable of distributing residue over at least 80 percent of the combine header width.
- Secondary removal of crop residue by baling or grazing is limited in order to retain the amount of residue needed to achieve the intended purpose(s). These activities should not be performed without full evaluation of impacts on soil, water, animal, plant, and air resources.
- Residue shall not be burned or distributed by full width tillage operations except for harrows designed to spread straw and germinate weeds with no soil disturbance.
- Planting implements should be equipped with coulters, knives and/or disk openers designed to cut through surface residue.
- Row disturbance from harvest through planting by nutrient injection, row cleaning, planting, or other operations will be minimal.
- Anhydrous injectors, manure injectors, and similar equipment may need to be modified to operate in high residue situations.
- Weed control techniques must be carefully planned and monitored, yet sufficiently flexible, to compliment the system.
- Nutrient management must be carefully designed and monitored on a regular basis to optimize production and minimize potential non-point source pollution.
- The current and planned rotation with crops, crop yields, all tillage operations, fertilizer and pest management, residue removal (if any) and other pertinent operations will be documented. The producer will fill out Jobsheet MT329-JS with planned stubble height at harvest of each crop. The planner will attach copies of the RUSLE2 or WEPS runs. Documentation will include the rotation, erosion rates, annual STIR and rotational SCI values for the benchmark and contracted crop rotation.
- Rotations shall provide for acceptable substitute crops for weather or economic reasons. Acceptable substitute crops should have similar properties for all identified resource concerns and must have an annual STIR rating equal or less than planned tillage and crop for that year.
- Any changes to the planned rotation and tillage must be approved prior to any site preparation or planting for the year of the deviation.

ADDITIONAL SPECIFICATIONS APPLICABLE TO THE FOLLOWING PURPOSES IDENTIFIED DURING PLANNING

Reduce Erosion from Wind and Water

- The amount and orientation of surface residue needed and the amount of surface soil disturbance allowed to reduce erosion to the planned soil loss objective shall be determined using the current approved water and/or erosion prediction technology (Wind Erosion Prediction System (WEPS) Method or RUSLE2) wind or water erosion must be held to the soil loss Tolerance (T).
- On sloping ground where water erosion is a concern, the row area formed during the planting operation shall be level with or above the row middles unless planting is on the contour.

Improve Soil Organic Matter Content

Maintaining adequate amounts of crop residue on the soil surface, minimized soil disturbing tillage practices, and proper nutrient management all factor into improving soil organic matter which is a good indicator of overall soil health. Adding diversity to the rotation with different type of crops (adding cool or warm season broadleaves or warm season grasses to a small grain rotation) should improve soil health. Adding low Carbon:nitrogen ratio crops such as a legume in a wheat rotation should promote soil microbial activity and improve soil health. Utilization of the soil conditioning index procedure must result in a positive trend for the proposed cropping system.

Reduce CO₂ Loss from the Soil

- The STIR value for all soil-disturbing activities shall be no more than 20.
- The Soil conditioning index procedure shall result in a positive trend.

Increase Plant Available Moisture

Reducing Evaporation:

- Residue shall be evenly distributed and maintained on the soil surface to retain soil moisture for crop use by enhancing infiltration and reducing evaporation. The STIR value for all soil-disturbing activities shall be no more than 20.
- To reduce evaporation from the soil surface during the time of evaporation losses, crop stubble height should be at least 10 inches for crops with a row spacing of less than 15 inches and at least 15 inches for crops with a row spacing of 15 inches or greater. For best results, these stubble heights should be present on at least 60 percent of the field.

Trapping Snow:

- To add soil moisture by trapping snow, crop stubble height going into the winter months should be at least 10 inches for crops with a row spacing of less than 15 inches and at least 15 inches for crops with a row spacing of 15 inches or greater. For best results, these stubble heights should be present on at least 50 percent of the field.
- Fall tillage operations (if any) shall leave the crop stubble in an upright position and shall be as close as possible to perpendicular to the direction of the prevailing winds during the winter.

Specification MT329-4

Provide Food and Cover for Wildlife

The Montana NRCS Wildlife Habitat Appraisal Guides will generally be used to evaluate wildlife habitat. Use Field Office Technical Guide (FOTG), Section IV, Practice Standard, Upland Wildlife Habitat Management (Code 645) for planning assistance and guidelines to provide food and cover for wildlife.