

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

CONTOUR FARMING

(Acre)

CODE 330

DEFINITION

Tillage, planting, and other farming operations performed on or near the contour of the field slope.

PURPOSES

- ◆ To reduce sheet and rill erosion.
- ◆ To reduce transport of sediment and other water-borne contaminants.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies on sloping land where crops are grown.

Contour farming is most effective on slopes between 2 and 10 percent. This practice will be less effective in achieving the stated purpose(s) on slopes exceeding 10 percent. Contouring has almost no effect on erosion on slopes exceeding 25%. The practice is not well suited to rolling topography having a high degree of slope irregularity because of the difficulty meeting row grade criteria.

CRITERIA

General Criteria Applicable to All Purposes

Minimum Row Grade

Row grades for soil hydrologic groups C or D or for crops sensitive to less than 48 hours of

ponded water shall be designed with positive row drainage of not less than 0.5 percent.

Maximum Row Grade Guidelines

The row grade guidelines shall be aligned as closely as possible to the contour to achieve the greatest erosion reduction. The maximum grade of guidelines shall not exceed 2 percent or one half of the up and down hill slope percent used for erosion prediction, whichever is less. Up to 3 percent row grade may be permitted within 150 feet of the approach to a *grassed waterway, field border* or other stable outlet.

Headlands or end rows that are steeper than the maximum row grade criteria stated above shall have a cover-management condition no greater than 3 or established to permanent field borders. Cover-Management Conditions are described in **Appendix 1**.

When the row grades reach the lesser of 4% or ½ the field, a new guideline shall be established up or down slope from the last contour line and used for layout of the next contour pattern. All tillage and planting operations will follow the contour line established.

Minimum Ridge Height

The ridge height shall be designed to reduce soil erosion compared to that of rows oriented up and down the slope. As a minimum, this practice shall be designed to achieve a 0.5-2 inch ridge height during the period of the rotation that is most vulnerable to soil erosion. Ridge height design will be determined using on site conditions and the Revised Universal Soil Loss Equation.

The minimum ridge height criteria is not required for close-grown crops, such as small grains, when runoff is reduced compared to that of rows planted up and down the slope. As a minimum, plant height shall be at least 6 inches high and the spacing between plants within the row shall not be greater than 2 inches.

The minimum ridge height criteria is not required where the practice *residue management, no-till/strip-till* is used on the contour if at least 50 percent surface residue is present between the rows after planting.

Critical Slope Length

A contour farming layout shall not occur on a hill slope that is longer than the critical slope length, unless supported by other practices (e.g., *terraces, diversions*) that either reduce slope length below the critical length or reduce overland flow velocities. Increasing residue cover and roughness will change the vegetative cover-management conditions and decrease overland flow velocities. Increasing roughness alone is not sufficient to reduce the critical slope length.

The computation of critical slope length shall be determined using the Revised Universal Soil Loss Equation (RUSLE).

Stable Outlets

All runoff from contouring shall be delivered to stable outlets, such as *grassed waterways, field borders, water and sediment control basins, or underground outlets for terraces and diversions*.

CONSIDERATIONS

Prior to design and layout, obstruction removal and changes in field boundaries or shape should be considered, where feasible, to improve the effectiveness of the practice and the ease of performing farming operations.

If using *residue management, ridge-till* on the contour, avoid crossing over ridged rows at correction areas. Consider sod turn strips if correction areas are unavoidable.

Ridge height may vary throughout the year as a result of tillage, planting, some harvest

operations, hipping, row cultivation, and weathering. Use of the variable ridge height may be needed in some areas.

The width of correction areas, and the distance between baselines, should be adjusted for equipment operation widths.

Grassed waterways, water and sediment control basins, underground outlets, or other suitable practices should be used to protect areas of existing or potential concentrated flow erosion.

Where row length in any one direction exceeds 500 feet, ridge height and row grades will need to be designed to ensure water flows to a stable outlet.

There are several factors that impact the effectiveness of contour farming to reduce soil erosion. These factors include: 10-year storm EI_{10} value, ridge height, furrow grade, slope steepness, soil hydrologic group, cover and roughness, and the critical slope length. Cover and roughness, row grade, and ridge height can be influenced by management and provide more or less benefit depending on design.

Contour farming may need to be used in combination with other conservation practices to meet the goals of the conservation management system.

PLANS AND SPECIFICATIONS

Specifications for establishment and operation of this practice shall be prepared for each field 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

Perform all tillage and planting operations parallel to contour baselines or *terraces, diversions, or contour buffer strip* boundaries where these practices are used, provided the applicable row grade criteria are met.

Where *terraces, diversions, or contour buffer strips* are not present, maintain contour

markers on grades that, when followed during establishment of each crop, will maintain crop rows at designed grades. Contour markers may be field boundaries, a crop row left untilled near or on an original contour baseline, or other readily identifiable, continuous, lasting marker. All tillage and planting operations shall be parallel to the established marker. If a marker is lost, re-establish a contour baseline within the applicable criteria set forth by this standard prior to seedbed preparation for the next crop.

Farming operations should begin on the contour baselines and proceed both up and down the slope in a parallel pattern until patterns meet. Where field operations begin to converge between two non-parallel contour baselines, establish a correction area that is

either permanently in sod, established to an annual close-grown crop, or is in cover-management condition 3. Where contour row curvature becomes too sharp to keep machinery aligned with rows during field operations, establish sod turn strips on sharp ridge points or other odd areas as needed.

Renovate *field borders* as needed to maintain at least 65 percent ground cover. Maintain adequate field border width to allow farm implements room to turn.

REFERENCES

Predicting Soil Erosion by Water: A Guide to Conservation Planning With the Revised Universal Soil Loss Equation (RUSLE); Agriculture Handbook Number 703.

APPENDIX 1

TABLE 1 - COVER MANAGEMENT CONDITIONS

Select the cover management condition that best describes the condition during the 1/4 of the year when rainfall and runoff are most erosive and the soil is most susceptible to erosion. Since the P factor effects are approximate, no provision is made for varying the cover-management condition class during the year.

Description of cropland cover-management conditions used in RUSLE for estimating P-factor values.

Code 1. Established meadow.	In this condition, the grass is dense and runoff is very slow, about the slowest under any vegetative condition. When mowed and baled, this condition is condition 2.
Code 2. 1st year meadow, hay.	In this condition, the hay is a mixture of grass and legume just before cutting. The meadow is a good stand of grass that is nearing the end of the first year. When mowed and baled, this condition becomes a condition 4 for a short time.
Code 3. Heavy cover and/or very rough.	Ground cover for this condition is about 75 to 95%. Roughness would be like that left by a high clearance moldboard plow on a heavy textured soil. Roughness depressions would have the appearance of being 7 inches deep and deeper. Vegetative hydraulic roughness would be like that from a good legume crop, such as lespedeza, that has not been mowed.
Code 4. Moderate cover and/or rough.	The ground cover for this condition is about 40 to 65%. This roughness would be like that left by a moldboard plow in a medium textured soil. Depressions would have the appearance of being about 4 to 6 inches deep. Vegetative hydraulic roughness would be much like that produced by winter small grain at full maturity.
Code 5. Light cover and/or moderate roughness.	Ground surface cover is between 10 to 35% and the surface roughness is like that left by the first pass of a tandem disk over a medium texture soil that has been moldboard plowed. This roughness could also be much like that left after a chisel plow through a medium textured soil at optimum moisture conditions for tillage. Roughness depressions would have the appearance of being on the order of 2 to 3 inches deep. In terms of hydraulic roughness produced by vegetation, this condition is much like that produced by spring small grain at about three fourths maturity.

TABLE 1, cont. - COVER MANAGEMENT CONDITIONS

Code 6. No cover and/or minimal roughness.	This condition is very much like the condition typically found in row cropped fields after the field has been planted and exposed to a moderately intense rainfall. Ground cover is less than about 5% and the roughness is that characteristic of a good seedbed for corn or soybeans. The surface is rougher than that of a finely pulverized seedbed for seeding vegetables or grass.
Code 7. Clean-tilled, smooth, fallow.	This condition is essentially bare, with a cover of 5% or less. The soil has not had a crop grown on it in the last 6 months or more. Much of the residual effects of previous cropping has disappeared. The surface is smooth, much like the surface that develops on a very finely pulverized seedbed exposed to several intense rainfalls. This condition is found in fallowed and vegetable fields, or in newly sown lawns and hay fields.

**Table 2 - GUIDELINES FOR SELECTING RIDGE HEIGHTS
FOR CONTOURING WITH RUSLE**

Select the ridge height that best describes the condition during the 1/4 of the year when rainfall and runoff are most erosive and the soil is most susceptible to erosion.

1. VERY LOW (0.5 - 2 in.) RIDGES

- Plants not closely spaced, but with a perceptible ridge height
- No-till planted row crops
- Fields that have been rolled, pressed or dragged after planting
- Conventionally drilled crops when erosive rains occur during or soon after planting
- Clear seeded hay that leaves a very low ridge

2. LOW (2 - 3 in.) RIDGES

- No-till drilled crops
- Mulch tilled row crops
- Conventionally planted row crops with no row cultivation
- Conventionally drilled small grain when erosive rains are uniformly distributed throughout the year
- Winter small grain when runoff from snowmelt occurs during winter and early spring
- Transplanted crops, widely spaced

3. MODERATE (3 - 4 in.) RIDGES

- Conventionally (clean) tilled row crops with row cultivation
- High yielding winter small grain crops when erosive rains are concentrated in the late spring after plants have developed a stiff, upright stem
- Transplanted crops that are closely spaced and/or in narrow rows

4. HIGH (4 - 6 in.) RIDGES

- Ridge tilled crops with high (4-6") ridges during periods of erosive rain

5. VERY HIGH (Greater than 6 in.) RIDGES

- Ridge tilled crops with very high (6+") ridges during periods of erosive rains
- Hipping, bedding or ridging with very high ridges during periods of erosive rains