NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

CONTOUR FARMING

(Ac.)

CODE 330

DEFINITION

Using ridges and furrows formed by tillage, planting and other farming operations to change the direction of runoff from directly downslope to around the hillslope.

PURPOSE

This practice is applied to achieve one or more of the following:

- Reduce sheet and rill erosion
- Reduce transport of sediment, other solids and the contaminants attached to them
- Increase water infiltration

CONDITIONS WHERE PRACTICE APPLIES

This practice applies on sloping land where annual crops are grown. For orchards, vineyards and nut crops use the practice Contour Orchard and Other Fruit Areas, (331).

CRITERIA

General Criteria Applicable to All Purposes

The effects of contour farming or cross slope faming will be determined using the current erosion prediction technology.

General Criteria Applicable to Cross Slope Farming

Cross slope farming is most effective on fields with undulating topography. Fields with undulating topography will be farmed across the slope, as close to perpendicular to the general land slope as practical.

The percent off contour shall be determined by evaluating effects using the current erosion technology.

General Criteria Applicable to Contour Farming

Contour farming is most effective on slopes between 2 and 10 percent. Contour farming is not well suited to rolling topography having a high degree of slope irregularity.

Minimum Row Grade. The cropped strips shall have sufficient row grade to ensure that runoff water does not pond and cause unacceptable crop damage. For soils with slow infiltration rates or crops sensitive to short-term ponded water conditions, row grades shall be designed with positive row drainage of not less than 0.2 percent.

Maximum Row Grade. The row grade shall be aligned as closely as possible to contour to achieve the greatest erosion reduction. The maximum row grade shall not exceed:

- one-half of the up-and-down hill slope percent used for erosion prediction and conservation planning or
- 2 percent, whichever is less.

Up to a 3 percent row grade is 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 at least 75% ground cover and/or significant roughness or shall be established to permanent field borders, but should not exceed

a row grade of 10%.

When the row grade reaches the maximum allowable design grade, a new baseline 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.

- **Row spacing greater than 10 inches.** The minimum ridge height shall be two inches during the period of rotation that is most vulnerable to sheet and rill erosion. Ridge height will be determined using the current approved erosion prediction technology.
- **Row spacing 10 inches or less.** The minimum ridge height shall be one inch for close-grown crops, such as small grains. Plant height shall be at least six inches high and the spacing between plants within the row shall not be greater than two inches during the time most vulnerable to sheet and rill erosion.

The minimum ridge height criteria are not required when Residue Management, No Till/Strip Till/Direct Seed (329) is used on the contour, if at least 50 percent surface residue is present between the rows after planting.

Stable Outlets. Surface flow from contoured fields shall be delivered to stable outlets, such as grassed waterways, field borders, water and sediment control basins or underground outlets for terraces and diversions.

Additional Criteria to Increase Water Infiltration

Row Grade. The maximum row grade shall not exceed 0.2%.

CONSIDERATIONS

General. Several factors influence the effectiveness of contour farming to reduce soil erosion. These factors include rainfall intensity, ridge height, row 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 the design.

Contour and cross 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 and in areas with 10-year, 24-hour rainfall of about 6.5 inches. Contour farming is not well suited to rolling topography having a high degree of slope irregularity because of the difficulty meeting row grade criteria. Cross slope farming is most effective for undulating topography. Contour and cross slope farming may need to be combined with other conservation practices to meet the goals of the conservation management system.

The practice is most effective on slopes between 100 and 400 feet long. On slopes longer than 400 feet, the volume and velocity of overland flow exceeds the capacity of the contour ridge to contain them. Increasing residue cover and roughness will change the vegetative cover-management conditions and decrease overland flow velocities, thus increasing the slope length at which this practice is effective. Increasing roughness alone is not sufficient to produce this effect.

The closer the row grade is to the true contour, the greater will be the erosion reduction.

Ridge height is created by the operation of tillage and planting equipment. The greater the ridge height, the more effective the operation is in slowing overland flow. The RUSLE2 Operations database contains the ridge height value for each field operation.

Turns with tillage and seeding equipment should be conducted to avoid leaving tillage marks up and down slope and collecting or concentrating runoff onto downhill slopes.

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.

Contour Farming. 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.

When the intersection of crop rows with the field edge is not perpendicular, a Field Border (386) may be needed to allow farm implements room to turn.

If using Residue and Tillage Management, Ridge Till on the contour, avoid crossing over ridged rows at correction areas because this will destroy the effectiveness of the ridges. Sod turn strips may be established if correction areas are unavoidable.

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

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. The plans shall include, as a minimum:

- Percent land slope used for conservation planning
- The minimum and maximum allowable row grades for the contour system
- A sketch map or photograph of the field showing the
    - ◊ approximate location of the baselines used to establish the system
    - ◊ location of stable outlets for the system

Specifications shall be recorded using approved specification sheets, job sheets, narrative statements in the conservation plan or other acceptable documentation.

OPERATION AND MAINTENANCE

Cross Slope Farming. This practice will be considered applied when the last tillage or plant operation, prior to the critical erosion period, is performed so it meets the requirements of this standard.

Implements will be operated to leave at least a one-inch ridge height going into the critical erosion period.

Contour Farming. 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 either is permanently in sod, established to an annual close-grown crop or has 75% or greater ground cover.

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.

Where utilized, renovate field borders as needed to maintain at least 65% ground cover.

Maintain adequate field border width to allow farm implements room to turn.

REFERENCES

Foster, G.R. Revised Universal Soil Loss Equation, Version 2 (RUSLE2) Science Documentation (In Draft). USDA-ARS, Washington, DC. 2005.

Renard, K.G., G.R. Foster, G.A. Weesies, D.K. McCool, and D.C. Yoder, coordinators. 1997. Predicting soil erosion by water: A guide to conservation planning with the Revised Universal Soil Loss Equation (RUSLE).U.S. Department of Agriculture, Agriculture Handbook 703.