

ON GRADE CONTOURING P SUBFACTOR VALUE  
ADJUSTED FOR FURROW GRADE

On Grade Contouring Subfactor Value	Ratio = $\frac{\text{Furrow Grade}}{\text{Profile Grade}}$									
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
0.04	0.34	0.47	0.57	0.65	0.72	0.78	0.84	0.90	0.95	1.00
0.06	0.36	0.48	0.57	0.65	0.72	0.79	0.85	0.90	0.95	1.00
0.08	0.37	0.49	0.58	0.66	0.73	0.79	0.85	0.90	0.95	1.00
0.10	0.38	0.50	0.59	0.67	0.74	0.80	0.85	0.90	0.95	1.00
0.12	0.40	0.51	0.60	0.68	0.74	0.80	0.86	0.91	0.95	1.00
0.14	0.41	0.52	0.61	0.68	0.75	0.81	0.86	0.91	0.96	1.00
0.16	0.43	0.54	0.62	0.69	0.75	0.81	0.86	0.91	0.96	1.00
0.18	0.44	0.55	0.63	0.70	0.76	0.82	0.87	0.91	0.96	1.00
0.20	0.45	0.56	0.64	0.71	0.77	0.82	0.87	0.92	0.96	1.00
0.22	0.47	0.57	0.65	0.71	0.77	0.82	0.87	0.92	0.96	1.00
0.24	0.48	0.58	0.66	0.72	0.78	0.83	0.88	0.92	0.96	1.00
0.26	0.49	0.59	0.67	0.73	0.78	0.83	0.88	0.92	0.96	1.00
0.28	0.51	0.60	0.67	0.74	0.79	0.84	0.88	0.92	0.96	1.00
0.30	0.52	0.61	0.68	0.74	0.79	0.84	0.89	0.93	0.96	1.00
0.32	0.54	0.62	0.69	0.75	0.80	0.85	0.89	0.93	0.97	1.00
0.34	0.55	0.64	0.70	0.76	0.81	0.85	0.89	0.93	0.97	1.00
0.36	0.56	0.65	0.71	0.76	0.81	0.86	0.90	0.93	0.97	1.00
0.38	0.58	0.66	0.72	0.77	0.82	0.86	0.90	0.93	0.97	1.00
0.40	0.59	0.67	0.73	0.78	0.82	0.86	0.90	0.94	0.97	1.00
0.42	0.60	0.68	0.74	0.79	0.83	0.87	0.91	0.94	0.97	1.00
0.44	0.62	0.69	0.75	0.79	0.84	0.87	0.91	0.94	0.97	1.00
0.44	0.63	0.70	0.76	0.80	0.84	0.88	0.91	0.94	0.97	1.00
0.48	0.64	0.71	0.76	0.81	0.85	0.88	0.92	0.95	0.97	1.00
0.50	0.66	0.72	0.77	0.82	0.85	0.89	0.92	0.95	0.97	1.00



RUSLE P SUBFACTOR VALUES FOR CONTOURING**Step 1. Gather appropriate information.**

- (a) Identify the 10-year storm erosivity (10-yr EI) value for the site. This value has been assigned for each county in the state.
- (b) Select the Cover-Management Condition using Table 11, "Cover Management Conditions".
- (c) Select the appropriate ridge height using Table 9, "Guidelines for Selecting Ridge Heights for Contouring with RUSLE".
- (d) Identify the hydrologic soil group for the selected profile soil.
- (e) Determine the slope length (L) and slope gradient (S) of the landscape profile, and grade along the furrows or rows.

**Step 2. Determine the P subfactor for contouring "on grade."**

- (a) Within the assigned 10-yr EI value, select the appropriate cover-management condition, ridge height, and hydrologic soil group in Table 10, "RUSLE Contour P Subfactor Tables for On Grade Condition".
- (b) Enter the selected table proceeding across the row for the hydrologic soil group and read the value in the column for the slope steepness. The resulting value is the P subfactor value for contouring "on grade" (0% furrow or row grade).

**Step 3. Adjust on grade contouring P subfactor for furrow or row grade.**

- (a) Calculate the ratio of the field's average furrow or row grade to its landscape profile slope (downhill slope) used to describe the field's topographic factor and round to the nearest 0.1. For ratio values less than 0.05 no adjustment is required.
- (b) For ratio values of 0.05 and larger, go to Table 12, pages 1 and 2, "Contouring P Subfactor Value Adjusted for Furrow Grade."
- (c) In the far left column of Table 12, pages 1 and 2, locate the on grade contouring subfactor value obtained from step 2 above. If the P subfactor value is an odd number, round up to the nearest even number. On the located row, move right to the column for the appropriate ratio of furrow grade to slope steepness of the landscape profile calculated in Step 3a. This value is the RUSLE P subfactor value for "off grade" contouring.

**Example****Step 1. Gather information.**

- (a) For the site near Huntsville (Madison Co.), Alabama, the 10-yr EI = 100.
- (b) When row cropped, clean tilled cotton is grown, the Cover-Management Condition is 6 from Table 11.
- (c) Ridges and furrows are 3 to 4 inches with cotton that is conventionally (clean) tilled with row cultivation. These are Moderate Ridges from Table 9.
- (d) Hydrologic soils group B.
- (e) Landscape profile grade = 4%, slope length = 100 feet. Furrow grade = 0.5%.

**Step 2. Determine the P subfactor for contouring "on grade."**

- (a) In Table 10, 10-yr Storm EI = 100, and Cover Management Condition 6, select the section for Moderate Ridges (3-4").
- (b) Find the row for hydrologic soils group B and the value in the intersected column for 4% slope. Read the P subfactor value of 0.39 for contouring "on grade".

**Step 3. Adjust contouring P subfactor for furrow or row grade.**

- (a) The furrow grade/slope grade ratio is calculated as  $\frac{0.5\%}{4\%} = 0.125$  rounded to 0.1.
- (b) Go to Table 12, pages 1 and 2, for correction to "on grade" contouring P subfactor.
- (c) Since Table 12 does not have a line for 0.39, round the value up to 0.40. Enter Table 12 with the on grade contouring P subfactor value of 0.40 and read across to the furrow grade/slope grade ratio of 0.1. The P subfactor value for "off grade" contouring is 0.59.

## RUSLE P SUBFACTOR VALUES FOR TERRACING

## Step 1. Gather information for use in RUSLE.

- (a) Determine the slope gradient of the landscape profile. Will it change with construction of terrace? If yes, determine new slope gradient.
- (b) Determine what supporting conservation practice will accompany the terraces, contouring or contour stripcropping.
- (c) Select the terrace horizontal spacing interval based on the state terrace standard to be used with Table 12, page 241, (see below) from DRAFT Agriculture Handbook 703, Predicting Soil Erosion by Water: A Guide to Conservation Planning With the Revised Universal Soil Loss Equation (RUSLE).
- (d) Decide whether terrace will have an open or closed outlet.
- (e) If an open outlet, decide channel grade of terrace at outlet end. If channel grade is 0.8 or greater, skip step 2, since the terrace P subfactor equals 1.0. Do proceed with step 3, however.

## Step 2. Determine terrace P subfactor.

- (a) Enter Table 12 (below). Select proper horizontal spacing interval range row. Read across to the selected outlet type. If it is an open outlet, then select the appropriate terrace channel grade range column. Read the P subfactor value at the row-column intersection.

## Step 3. Recalculate LS, if necessary.

- (a) If terrace horizontal spacing interval is less than landscape profile slope length, recalculate original LS value to reflect shorter slope length.
- (b) If significant earth moving will cause a change in landscape profile slope, use the new landscape slope.
- (c) Enter appropriate LS table and use the terrace interval for new slope length (L) and the new profile slope (S). This new LS value will be used to calculate soil loss for this selected profile.

- Step 4. Determine composite P factor for terracing when used in combination with contouring alone, or with contouring and stripcropping.
- (a) When terraces are used in conjunction with contouring, multiply terrace P subfactor times the contouring P subfactor to get the composite P factor.
  - (b) When terraces are used in conjunction with both contouring and stripcropping, multiply all three P subfactors together to get the composite P factor.

Terrace P Subfactor Values for Conservation Planning<sup>1</sup>

Horizontal terrace interval  feet	Terrace P Subfactor Values			
	Closed outlets <sup>2</sup>	Open outlets, with percent grade of <sup>3</sup>		
		0.1-0.3	0.4-0.7	>0.8
Less than 110	0.5	0.6	0.7	1.0
110-140	0.6	0.7	0.8	1.0
140-180	0.7	0.8	0.9	1.0
180-225	0.8	0.8	0.9	1.0
225-300	0.9	0.9	0.9	1.0
More than 300	1.0	1.0	1.0	1.0

<sup>1</sup>Multiply these values by other P subfactor values for contouring, stripcropping, or other supporting practices on interterrace interval to obtain composite P factor value.

<sup>2</sup>Values for closed-outlet terraces also apply to terraces with underground outlets and to level terraces with open outlets.

<sup>3</sup>Channel grade is measured on the 300 feet of terrace closest to the outlet or one-third of the total length, whichever distance is less.

## Example

## Step 1. Gather information.

- (a) Landscape profile = 4%. Will not change with construction of terrace.
- (b) Contouring will be used. Row grades will parallel to the terrace channel.
- (c) Horizontal spacing interval selected is 120 feet, slope length = 100 feet.
- (d) Open outlet selected. Terraces will outlet into grassed waterway.
- (e) Terrace channel grade will be 0.5%.

## Step 2. Determine P subfactor for Terracing.

- (a) In Tables 6-15, find horizontal interval range 110-140 feet and read across to Open Outlets, with percent grade of 0.4-0.7. The P subfactor value of 0.8.

## Step 3. Adjust LS value.

- (a) The horizontal terrace spacing interval = 120 feet. Because the terrace spacing interval is greater than the original slope length, no adjustment for slope length is needed.
- (b) No appreciable change in the landscape profile slope is expected. Continue to use 4%.
- (c) No adjustment in LS is needed.

## Step 4. Determine composite P factor.

- (a) Contour P subfactor is based on a 10 year EI = 100, Cover-Management Condition = 6, Moderate Ridges(3-4 inches), soil hydrologic group = B, and 0.5% row grade. The off-contour P subfactor is 0.59.
- (b) Multiply terrace P subfactor 0.8 times off-contour P subfactor 0.59. The product, 0.47, is the composite P factor.

## WORKSHEET FOR CALCULATION OF RUSLE P SUBFACTORS

P SUBFACTOR FOR CONTOURING

County \_\_\_\_\_

10 Year EI \_\_\_\_\_ (from assigned EI<sub>10</sub> value)

Soil Hydrologic Group \_\_\_\_ A, B, C, or D (from soil survey)

Downhill Slope \_\_\_\_\_% (from field measurement)

Grade along the Furrow \_\_\_\_% (from field measurement)

Ridge Height \_\_\_\_\_ Very Low, Low, Moderate, High,  
Very High (See Table \_\_\_\_\_)

Cover-Management Condition \_\_\_\_\_ 1 thru 7 (see Table \_\_\_\_)

To Calculate P Subfactor for Contouring:

- Step 1 Refer to field information above.
- Steps 2-3 Refer to appropriate EI<sub>10</sub> and ridge height tables.
- Step 4 See cover-management information above.
- Step 5 Adjust for cover-management condition.
- Step 6 Calculate ratio of furrow grade to downhill slope.
- Step 7 Select P subfactor from table.

## WORKSHEET FOR CALCULATION OF RUSLE P SUBFACTORS

P SUBFACTOR FOR TERRACES

County \_\_\_\_\_

10 Year EI \_\_\_\_\_ (from assigned EI<sub>10</sub> value)

Soil Hydrologic Group \_\_\_\_\_ A, B, C, or D (from soil survey)

Downhill Slope \_\_\_\_\_% (from field measurement)

Grade along the Terrace Channel \_\_\_\_\_% (from field measurement)

Ridge Height in Field \_\_\_\_\_ Very Low, Low, Moderate, High  
Very High (see Table \_\_\_\_\_)

Cover-Management Condition \_\_\_\_\_ 1 thru 7 (see Table \_\_\_\_\_)

Is Terrace Channel Outlet Open? \_\_\_\_\_ (surface outlet)  
Closed? \_\_\_\_\_ (underground outlet)

Horizontal Spacing Between Terraces \_\_\_\_\_ feet (field measurement)

[SKETCH AND LABEL THE TERRACE SYSTEM]

SHOW:           Width Between Terraces

                  Terrace Position on the Slope

                  Crop-Management Sequence

WORKSHEET FOR CALCULATION OF RUSLE P SUBFACTORS

P SUBFACTOR FOR STRIP CROPPING AND BUFFER STRIPS

County \_\_\_\_\_

10 Year EI \_\_\_\_\_ (from assigned EI<sub>10</sub> value)

Soil Hydrologic Group \_\_\_\_ A, B, C, or D (from soil survey)

Downhill Slope \_\_\_\_\_% (from field measurement)

Grade along the Furrow \_\_\_\_\_% (from field measurement)

Ridge Height in Each Strip \_\_\_\_\_ Very Low, Low, Moderate, High  
\_\_\_\_\_ Very High (see Table\_\_\_\_)  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Cover-Management Condition in each Strip \_\_\_\_ 1 thru 7 (See  
\_\_\_\_ Table \_\_\_\_)  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Width of each Strip \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

[SKETCH AND LABEL THE STRIP CROPPING OR BUFFER SYSTEM]

- SHOW:
- Width of Strips
  - Position on the Slope of Strip or Buffer
  - Crop Rotation and Management Sequences
  - Send to Conservation Agronomist for P-factor