Important Soil Loss Equation Formulas PDF



Formulas Examples with Units

List of 17

Important Soil Loss Equation Formulas

Evaluate Formula (

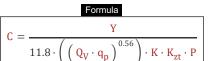
Evaluate Formula

Evaluate Formula 🕝

Evaluate Formula 🕝

1) Modified Universal Soil Loss Equation Formulas (

1.1) Crop Management Factor given Sediment Yield from Individual Storm Formula 🕝



Example with Units

$$0.61 = \frac{135.7332 \,\mathrm{kg}}{11.8 \cdot \left(\left(19.5 \,\mathrm{m}^3 \cdot 1.256 \,\mathrm{m}^3/\mathrm{s} \,\right)^{0.56} \right) \cdot 0.17 \cdot 25 \cdot 0.74}$$

1.2) Peak Rate of Runoff given Sediment Yield from Individual Storm Formula 🕝

$$q_p = \frac{\left(\frac{Y}{11.8 \cdot K \cdot K_{zt} \cdot C \cdot P}\right)^{\frac{1}{0.56}}}{Q_V}$$



$$q_{p} = \frac{\left(\frac{Y}{11.8 \cdot K \cdot K_{zt} \cdot C \cdot P}\right)^{\frac{1}{0.56}}}{O_{V}} \qquad \boxed{1.256 \, m^{3}/s \, = \frac{\left(\frac{135.7332 \, kg}{11.8 \cdot 0.17 \cdot 25 \cdot 0.61 \cdot 0.74}\right)^{\frac{1}{0.56}}}{19.5 \, m^{3}}}$$

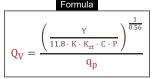
1.3) Sediment Yield from Individual Storm Formula C

 $Y = 11.8 \cdot \left(\left(Q_{V} \cdot q_{p} \right)^{0.56} \right) \cdot K \cdot K_{zt} \cdot C \cdot P$

Example with Units

$$135.7332 \,\mathrm{kg} \, = 11.8 \cdot \left(\, \left(\, 19.5 \,\mathrm{m^3} \, \cdot 1.256 \,\mathrm{m^3/s} \, \right)^{0.56} \, \right) \cdot 0.17 \cdot 25 \cdot 0.61 \cdot 0.74$$

1.4) Storm Runoff Volume given Sediment Yield from Individual Storm Formula 🕝





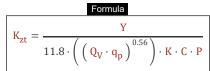
1.5) Support Cultivation Practice given Sediment Yield from Individual Storm Formula 🕝

$$P = \frac{Y}{11.8 \cdot \left(\left. Q_{V} \cdot q_{p} \right. \right)^{0.56} \cdot K \cdot K_{zt} \cdot C}$$

Example with Units

$$0.74 = \frac{135.7332 \,\mathrm{kg}}{11.8 \cdot \left(19.5 \,\mathrm{m}^3 \cdot 1.256 \,\mathrm{m}^3 / \mathrm{s}\right)^{0.56} \cdot 0.17 \cdot 25 \cdot 0.61}$$

1.6) Topographic Factor given Sediment Yield from Individual Storm Formula 🕝



Example with Units

$$25 = \frac{135.7332 \, kg}{11.8 \cdot \left(\, \left(\, 19.5 \, m^3 \, \cdot \, 1.256 \, m^3 / s \, \, \right)^{\, 0.56} \, \right) \cdot 0.17 \cdot 0.61 \cdot 0.74}$$

2) Universal Soil Loss Equation Formulas

2.1) Cover Management Factor given Soil Loss per unit Area in unit Time Formula 🕝

Evaluate Formula (

Evaluate Formula (

Evaluate Formula

2.2) Equation for Topographic Factor Formula C

Evaluate Formula

$$K_{zt} = \left(\left(\frac{\gamma}{22.13} \right)^{m} \right) \cdot \left(65.41 \cdot \sin \left(\theta \right)^{2} + 4.56 \cdot \sin \left(\theta \right) + 0.065 \right)$$

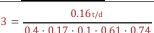
$$36.4393 = \left(\left(\frac{4 \text{m}}{22.13} \right)^{0.2} \right) \cdot \left(65.41 \cdot \sin(45)^2 + 4.56 \cdot \sin(45) + 0.065 \right)$$

2.3) Rainfall Erosivity Factor Formula C

Formula

Example with Units $R = \frac{A}{K \cdot L \cdot S \cdot C \cdot P} \left| \quad \right| \ 0.4022 = \frac{0.16 \, t/d}{0.17 \cdot 0.1 \cdot 0.6 \cdot 0.61 \cdot 0.74}$ Evaluate Formula C

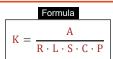
2.4) Slop Steepness Factor given Soil Loss per unit Area in unit Time Formula 🕝



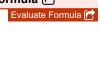
2.5) Slope Length Factor given Soil Loss Per Unit Area in Unit Time Formula 🕝 Evaluate Formula (



2.6) Soil Erodibility Factor given Soil Loss Per Unit Area in Unit Time Formula 🕝



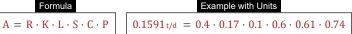
Formula Example with Units
$$K = \frac{A}{R \cdot L \cdot S \cdot C \cdot P} \qquad 0.1709 = \frac{0.16 t/d}{0.4 \cdot 0.1 \cdot 0.6 \cdot 0.61 \cdot 0.74}$$



Evaluate Formula (

2.7) Soil Loss Per Unit Area in Unit Time Formula 🕝

Formula
$$A = R \cdot K \cdot L \cdot S \cdot C \cdot P$$





2.8) Support Practice Factor given Soil Loss per Unit Area in Unit Time Formula 🕝





2.9) Rainfall Erosivity Factor Formulas 🕝

2.9.1) Kinetic Energy of Storm given Rainfall Erosion Index Unit Formula 🗂

$$K_{E} = EI_{30} \cdot \frac{100}{I_{30}}$$

Formula Example with Units
$$K_E = EI_{30} \cdot \frac{100}{I_{30}}$$
 $100 \text{ J} = 0.0025 \cdot \frac{100}{15 \text{ cm/min}}$

2.9.2) Maximum 30 Minutes Rainfall Intensity given Rainfall Erosion Index Unit of Storm Formula C







2.9.3) Rainfall Erosion Index Unit of Storm Formula

Formula

Example with Units

Evaluate Formula 🕝

 $\text{EI}_{30} = \, \text{K}_{\text{E}} \cdot \frac{\text{I}_{30}}{100}$

 $0.0025 = 100 \text{J} \cdot \frac{15 \, \text{cm/min}}{100}$

Variables used in list of Soil Loss Equation Formulas above

- A Soil Loss Per Unit Area in Unit Time (Ton (metric) per Day)
- · C Cover Management Factor
- El₃₀ Rainfall Erosion Index Unit
- I₃₀ Maximum 30-Minutes Rainfall Intensity (Centimeter per Minute)
- . K Soil Erodibility Factor
- **K**_F Kinetic Energy of the Storm (Joule)
- K₇₁ Topographic factor
- L Slope Length Factor
- m Exponent Factor
- P Support Practice Factor
- q_p Peak Rate of Runoff (Cubic Meter per Second)
- Q_V Runoff Volume (Cubic Meter)
- R Rainfall Erosivity Factor
- S Slope-Steepness Factor
- Y Sediment Yield from an Individual Storm (Kilogram)
- V Field Slope Length (Meter)
- θ Angle of Slope

Constants, Functions, Measurements used in list of Soil Loss Equation Formulas above

- Functions: sin, sin(Angle)
 Sine is a trigonometric function that describes the ratio of the length of the opposite side of a right triangle to the length of the hypotenuse.
- Measurement: Length in Meter (m)
 Length Unit Conversion
- Measurement: Weight in Kilogram (kg)
 Weight Unit Conversion
- Measurement: Volume in Cubic Meter (m³)
 Volume Unit Conversion
- Measurement: Speed in Centimeter per Minute (cm/min)
 Speed Unit Conversion
- Measurement: Energy in Joule (J)
 Energy Unit Conversion
- Measurement: Volumetric Flow Rate in Cubic Meter per Second (m³/s)
 Volumetric Flow Rate Unit Conversion
- Measurement: Mass Flow Rate in Ton (metric)
 per Day (t/d)

 Mass Flow Rate Unit Conversion

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 Formulas

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• 🛂 Divide fraction 🕝

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