



Rainfall Intensity Formulas

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Examples!

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List of 16 Rainfall Intensity Formulas

Rainfall Intensity

1) Intensity of Rain for Intensity Duration Curve



$$\mathrm{i_{idf}} = rac{\mathrm{K}}{\left(\mathrm{T_m} + \mathrm{b_m}
ight)^{0.8}}$$

 $0.248761 \mathrm{mm/h} = rac{100 \mathrm{mm/h}}{\left(20 \mathrm{min} + 10 \mathrm{min}
ight)^{0.8}}$

Open Calculator 2

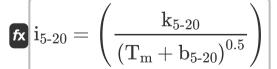
2) Intensity of Rain given Time Varying between 20 to 100 Minutes 🛂

 $\mathbf{f}_{\mathbf{x}} \mathbf{i}_{\mathrm{vt}} = \left(\frac{\mathbf{K}}{(\mathbf{T}_{\mathrm{m}} + \mathbf{b}_{\mathrm{m}})^{0.5}} \right)$

Open Calculator

$$ext{ex} \ 141.4214 ext{mm/h} = \left(rac{100 ext{mm/h}}{\left(20 ext{min} + 10 ext{min}
ight)^{0.5}}
ight)$$

3) Intensity of Rain when Time Varying between 5 to 20 Minutes 🗗



Open Calculator



4) Rainfall Intensity for Localities where Rainfall is Frequent



Open Calculator

$$\mathbf{k}_{ ext{freq_rain}} = \left(rac{k_{ ext{freq_rain}}}{\left(T_{ ext{m}} + b_{ ext{freq_rain}}
ight)^{0.5}}
ight)$$

$$ext{ex} \ 7.183345 ext{mm/h} = \left(rac{343 ext{mm/h}}{\left(20 ext{min} + 18 ext{min}
ight)^{0.5}}
ight)$$

5) Rainfall Intensity for Rain having Frequency of 1 Years 🗗

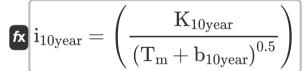


Open Calculator 2

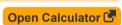
 \mathbf{f} $\mathbf{i}_{1 ext{year}} = \left(rac{\mathrm{K}_{1 ext{year}}}{\left(\mathrm{T}_{ ext{m}} + \mathrm{b}_{1 ext{vear}}
ight)^{0.5}}
ight)$

$$ext{ex} \ 10.91089 ext{mm/h} = \left(rac{500.0 ext{mm/h}}{\left(20 ext{min} + 15 ext{min}
ight)^{0.5}}
ight)$$





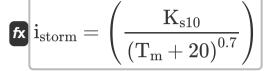
$$extbf{ex} 10.20621 ext{mm/h} = \left(rac{500 ext{mm/h}}{\left(20 ext{min} + 20.00 ext{min}
ight)^{0.5}}
ight)$$







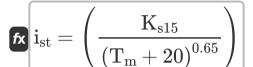
7) Rainfall Intensity for Storms having Frequency of 10 Years



Open Calculator 🚰

$$ext{ex} \ 10.36667 ext{mm/h} = \left(rac{1500 ext{mm/h}}{\left(20 ext{min} + 20
ight)^{0.7}}
ight)$$

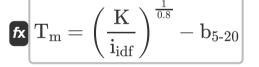
8) Rainfall Intensity for Storms having Frequency of 15 Years



Open Calculator

$$ext{ex} \ 15.77561 ext{mm/h} = \left(rac{1600 ext{mm/h}}{\left(20 ext{min} + 20
ight)^{0.65}}
ight)$$

9) Time given Intensity of Rain



Open Calculator

$$ext{ex} \ 21.37507 ext{min} = \left(rac{100 ext{mm/h}}{0.24 ext{mm/h}}
ight)^{rac{1}{0.8}} - 10.0 ext{min}$$



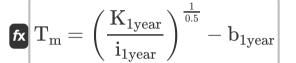
10) Time given Rainfall Intensity for Localities where Rainfall is Frequent

 $oxed{ an} T_{
m m} = \left(rac{{
m k}_{
m freq_rain}}{{
m i}_{
m freq_rain}}
ight)^{rac{1}{0.5}} - {
m b}_{
m freq_rain}$

Open Calculator 🗗

 $oxed{ex} 20.03541 ext{min} = \left(rac{343 ext{mm/h}}{7.18 ext{mm/h}}
ight)^{rac{1}{0.5}} - 18 ext{min}$

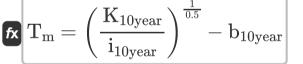
11) Time given Rainfall Intensity for Rain having Frequency of 1 Year



Open Calculator

 $ext{ex} 25.12734 ext{min} = \left(rac{500.0 ext{mm/h}}{10.19 ext{mm/h}}
ight)^{rac{1}{0.5}} - 15 ext{min}$

12) Time given Rainfall Intensity for Rain having Frequency of 10 Years



Open Calculator 🗗

 $extbf{ex} 20.00162 ext{min} = \left(rac{500 ext{mm/h}}{10.206 ext{mm/h}}
ight)^{rac{1}{0.5}} - 20.00 ext{min}$



13) Time given Rainfall Intensity for Storms having Frequency of 10 Years

 $ag{T_{
m m} = \left(rac{ ext{K}_{
m s10}}{ ext{i}_{
m storm}}
ight)^{rac{1}{0.7}} - 20}$

Open Calculator 🗗

\ 'storm /

$$ext{ex} 20.00188 ext{min} = \left(rac{1500 ext{mm/h}}{10.366 ext{mm/h}}
ight)^{rac{1}{0.7}} - 20$$

14) Time given Rainfall Intensity for Storms having Frequency of 15 Years

$$T_{
m m}=\left(rac{
m K_{s15}}{
m i_{st}}
ight)^{rac{1}{0.65}}-20$$

Open Calculator 🗗

$$oxed{ex} 20.01112 ext{min} = \left(rac{1600 ext{mm/h}}{15.77 ext{mm/h}}
ight)^{rac{1}{0.65}} - 20$$

15) Time in Minutes given Intensity of Rain

$$T_{
m m} = \left(rac{{
m k}_{5 ext{-}20}}{{
m i}_{5 ext{-}20}}
ight)^{rac{1}{0.5}} - 10$$

Open Calculator

$$0.333557 ext{min} = \left(rac{75 ext{mm/h}}{13.69 ext{mm/h}}
ight)^{rac{1}{0.5}} - 10$$



16) Time Varying between 20 to 100 Minutes given Intensity of Rain

$$\mathbf{f}_{m}$$
 $\mathbf{T}_{m}=\left(\left(rac{K}{i_{20 ext{-}100}}
ight)^{rac{1}{0.5}}
ight)-b_{m}$

Open Calculator 2

= $20.8642 ext{min} = \left(\left(\frac{100 ext{mm/h}}{18.0 ext{mm/h}} \right)^{\frac{1}{0.5}} \right) - 10 ext{min}$



Variables Used

- **b**_{10vear} Constant b when Rain having Frequency of 10 Year (*Minute*)
- b_{1vear} Constant b when Rain having Frequency of 1 Year (Minute)
- **b**₅₋₂₀ Constant b when Time Varying between 5 to 20 Min (*Minute*)
- bfreq rain Constant b when Rainfall is Frequent (Minute)
- **b**_m Empirical Constant b (Minute)
- i_{10vear} Rainfall Intensity for Rain Freq of 10 Years (Millimeter per Hour)
- i_{1vear} Rainfall Intensity for Rain Frequency of 1 Year (Millimeter per Hour)
- i₂₀₋₁₀₀ Intensity of Rain (Time between 20 to 100 Min) (Millimeter per Hour)
- **i**₅₋₂₀ Intensity of Rain (Time between 5 to 20 Min) (Millimeter per Hour)
- ifreq_rain Intensity of Rainfall where Rainfall is Frequent (Millimeter per Hour)
- iidf Intensity of Rain for Intensity Duration Curve (Millimeter per Hour)
- i_{st} Rainfall Intensity for Storms Freq of 15 Years (Millimeter per Hour)
- istorm Rainfall Intensity for Storms Freq of 10 Years (Millimeter per Hour)
- **i**_{vt} Intensity of Rain given Varying Time (Millimeter per Hour)
- **K** K Constant (Millimeter per Hour)
- K_{10year} K Constant when Rain having Frequency of 10 Year (Millimeter per Hour)
- K_{1year} K Constant when Rain having Frequency of 1 Year (Millimeter per Hour)





- k₅₋₂₀ K Constant when Time Varying between 5 to 20 Min (Millimeter per Hour)
- **k**_{freq rain} K Constant when Rainfall is Frequent (Millimeter per Hour)
- K_{s10} K Constant when Storm having Frequency of 10 Year (Millimeter per Hour)
- K_{s15} K Constant when Storm having Frequency of 15 Year (Millimeter per Hour)
- T_m Time in Minutes (Minute)





Constants, Functions, Measurements used

- Measurement: Time in Minute (min)

 Time Unit Conversion
- Measurement: Speed in Millimeter per Hour (mm/h)
 Speed Unit Conversion





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