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Rainfall Intensity Formulas

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List of 16 Rainfall Intensity Formulas

Rainfall Intensity

1) Intensity of Rain for Intensity Duration Curve

Open Calculator

fx $$i_{idf} = \frac{K}{(T_m + b_m)^{0.8}}$$

ex $$0.248761\text{mm/h} = \frac{100\text{mm/h}}{(20\text{min} + 10\text{min})^{0.8}}$$

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

Open Calculator

fx $$i_{vt} = \left(\frac{K}{(T_m + b_m)^{0.5}}\right)$$

ex $$141.4214\text{mm/h} = \left(\frac{100\text{mm/h}}{(20\text{min} + 10\text{min})^{0.5}}\right)$$

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

Open Calculator

fx $$i_{5\text{-}20} = \left(\frac{k_{5\text{-}20}}{(T_m + b_{5\text{-}20})^{0.5}}\right)$$

ex $$13.69306\text{mm/h} = \left(\frac{75\text{mm/h}}{(20\text{min} + 10.0\text{min})^{0.5}}\right)$$

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4) Rainfall Intensity for Localities where Rainfall is Frequent

Open Calculator

fx $$i_{freq\_rain} = \left(\frac{k_{freq\_rain}}{(T_m + b_{freq\_rain})^{0.5}} \right)$$

ex $$7.183345\text{mm/h} = \left(\frac{343\text{mm/h}}{(20\text{min} + 18\text{min})^{0.5}} \right)$$

5) Rainfall Intensity for Rain having Frequency of 1 Years

Open Calculator

fx $$i_{1year} = \left(\frac{K_{1year}}{(T_m + b_{1year})^{0.5}} \right)$$

ex $$10.91089\text{mm/h} = \left(\frac{500.0\text{mm/h}}{(20\text{min} + 15\text{min})^{0.5}} \right)$$

6) Rainfall Intensity for Rain having Frequency of 10 Years

Open Calculator

fx $$i_{10year} = \left(\frac{K_{10year}}{(T_m + b_{10year})^{0.5}} \right)$$

ex $$10.20621\text{mm/h} = \left(\frac{500\text{mm/h}}{(20\text{min} + 20.00\text{min})^{0.5}} \right)$$

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7) Rainfall Intensity for Storms having Frequency of 10 Years

Open Calculator

$$i_{storm} = \left(\frac{K_{s10}}{(T_m + 20)^{0.7}} \right)$$

$$10.36667\text{mm/h} = \left(\frac{1500\text{mm/h}}{(20\text{min} + 20)^{0.7}} \right)$$

8) Rainfall Intensity for Storms having Frequency of 15 Years

Open Calculator

$$i_{st} = \left(\frac{K_{s15}}{(T_m + 20)^{0.65}} \right)$$

$$15.77561\text{mm/h} = \left(\frac{1600\text{mm/h}}{(20\text{min} + 20)^{0.65}} \right)$$

9) Time given Intensity of Rain

Open Calculator

$$T_m = \left(\frac{K}{i_{idf}} \right)^{\frac{1}{0.8}} - b_{5\text{-}20}$$

$$21.37507\text{min} = \left(\frac{100\text{mm/h}}{0.24\text{mm/h}} \right)^{\frac{1}{0.8}} - 10.0\text{min}$$

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

Open Calculator

fx $$T_m = \left(\frac{k_{freq\_rain}}{i_{freq\_rain}}\right)^{\frac{1}{0.5}} - b_{freq\_rain}$$

ex $$20.03541\text{min} = \left(\frac{343\text{mm/h}}{7.18\text{mm/h}}\right)^{\frac{1}{0.5}} - 18\text{min}$$

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

Open Calculator

fx $$T_m = \left(\frac{K_{1year}}{i_{1year}}\right)^{\frac{1}{0.5}} - b_{1year}$$

ex $$25.12734\text{min} = \left(\frac{500.0\text{mm/h}}{10.19\text{mm/h}}\right)^{\frac{1}{0.5}} - 15\text{min}$$

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

Open Calculator

fx $$T_m = \left(\frac{K_{10year}}{i_{10year}}\right)^{\frac{1}{0.5}} - b_{10year}$$

ex $$20.00162\text{min} = \left(\frac{500\text{mm/h}}{10.206\text{mm/h}}\right)^{\frac{1}{0.5}} - 20.00\text{min}$$

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

Open Calculator

fx $$T_m = \left(\frac{K_{s10}}{i_{storm}}\right)^{\frac{1}{0.7}} - 20$$

ex $$20.00188\text{min} = \left(\frac{1500\text{mm/h}}{10.366\text{mm/h}}\right)^{\frac{1}{0.7}} - 20$$

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

Open Calculator

fx $$T_m = \left(\frac{K_{s15}}{i_{st}}\right)^{\frac{1}{0.65}} - 20$$

ex $$20.01112\text{min} = \left(\frac{1600\text{mm/h}}{15.77\text{mm/h}}\right)^{\frac{1}{0.65}} - 20$$

15) Time in Minutes given Intensity of Rain

Open Calculator

fx $$T_m = \left(\frac{k_{5\text{-}20}}{i_{5\text{-}20}}\right)^{\frac{1}{0.5}} - 10$$

ex $$0.333557\text{min} = \left(\frac{75\text{mm/h}}{13.69\text{mm/h}}\right)^{\frac{1}{0.5}} - 10$$

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

Open Calculator

fx $$T_m = \left(\left(\frac{K}{i_{20\text{-}100}} \right)^{\frac{1}{0.5}} \right) - b_m$$

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

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Variables Used

- b_{10year} Constant b when Rain having Frequency of 10 Year *(Minute)*
- b_{1year} Constant b when Rain having Frequency of 1 Year *(Minute)*
- $b_{5\text{-}20}$ Constant b when Time Varying between 5 to 20 Min *(Minute)*
- b_{freq_rain} Constant b when Rainfall is Frequent *(Minute)*
- b_m Empirical Constant b *(Minute)*
- i_{10year} Rainfall Intensity for Rain Freq of 10 Years *(Millimeter per Hour)*
- i_{1year} Rainfall Intensity for Rain Frequency of 1 Year *(Millimeter per Hour)*
- $i_{20\text{-}100}$ Intensity of Rain (Time between 20 to 100 Min) *(Millimeter per Hour)*
- $i_{5\text{-}20}$ Intensity of Rain (Time between 5 to 20 Min) *(Millimeter per Hour)*
- i_{freq_rain} Intensity of Rainfall where Rainfall is Frequent *(Millimeter per Hour)*
- i_{idf} Intensity of Rain for Intensity Duration Curve *(Millimeter per Hour)*
- i_{st} Rainfall Intensity for Storms Freq of 15 Years *(Millimeter per Hour)*
- i_{storm} 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)*

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- $k_{5\text{-}20}$ 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

Check other formula lists

- **Channel Flow Time and Time of Concentration Formulas**
- **Peak Drainage Discharge Formula Formulas**
- **Rainfall Intensity Formulas**

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8/29/2024 | 9:05:53 AM UTC

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