

## Intravenous Infusion Calculations

**Drip Rates** — is when the infusion volume is calculated into drops.

**The formula for the Drip Rate:**

$$\text{Drip Rate} = \frac{\text{Volume (mL)}}{\text{Time (h)}} .$$

### Example 1

A patient is ordered to receive 1 000 mL of intravenous fluids to run over 8 hours. Calculate the drip rate.

**Solution:**

$$\begin{aligned} \text{Volume} &= 1\,000 \text{ mL} . \\ \text{Time} &= 8 \text{ hours} . \end{aligned}$$

Substituting in the formula gives:

$$\text{Drip Rate} = \frac{1\,000 \text{ mL}}{8 \text{ h}} = 125 \text{ mL/h} .$$

Therefore, the patient will receive 125 mL of fluids per 1 hour.

**Note:** When the drip rate is given in minutes, convert the minutes to hours by dividing the required minutes by 60 (since 60 minutes in one hour).

### Example 2

Convert 30 minutes to hours.

**Solution:**

Write as fraction to give:

$$\frac{30}{60} = 0.5 \text{ hour} .$$

### Calculation of drips rates in drops per minute (dpm)

There are two standard giving sets of drip rates:

1. Macro Drop Factor — drop size is normally 20 drops in 1 mL.
2. Micro Drop Factor — drop size is normally 60 drops in 1 mL.

**The formula to calculate drip rates in drops per minute (dpm):**

$$\text{Drip Rate (dpm)} = \frac{\text{Volume of IV fluid (mL)}}{\text{Time to run (h)}} \times \frac{\text{Drop Factor (drops/mL)}}{60 \text{ (min/h)}} .$$

## Example 2

A patient is to receive 1 L of Hartmann's solution over the next 12 hours. What is the rate of infusion in drops per minute (dpm), if the drop factor is 60 drops per mL.

**Solution:**

$$\begin{aligned}\text{Volume} &= 1\,000 \text{ mL, since } 1 \text{ L} = 1\,000 \text{ mL.} \\ \text{Time} &= 12 \text{ hours.} \\ \text{Drop Factor} &= 60 \text{ drops per mL.}\end{aligned}$$

Substituting these values into the drip rate formula gives:

$$\text{Drip Rate (dpm)} = \frac{1\,000 \cancel{\text{ mL}}}{12 \cancel{\text{ h}}} \times \frac{\cancel{60} \text{ drops/ mL}}{\cancel{60} \text{ min/ h}} = 83.833 \approx 84 \text{ drops/minutes.}$$

**The formula to calculate how many hours will it take for the IV to complete before it runs out is:**

$$\text{Time (hours)} = \frac{\text{Volume (mL)}}{\text{Drip Rate (mL/hour)}}.$$

## Example 3

The volume of the fluid is 1 000 mL and the IV pump set at 62 mL/hour. How long will it take for the fluid to run?

**Solution:**

$$\begin{aligned}\text{Volume} &= 1\,000 \text{ mL.} \\ \text{Time} &= 62 \text{ mL/hour.}\end{aligned}$$

Substituting these values into the formula gives:

$$\text{Time (hours)} = \frac{1\,000 \cancel{\text{ mL}}}{62 \cancel{\text{ mL/hour}}} \approx 16 \text{ hours.}$$

## Other resources

- Brotto and Rafferty (2016)
- Reid-Searl, Dwyer, Moxham, and Reid-Speirs (2007)
- Online resources at [Study Support](#);
- Arrange a consultation with a Mathematics Learning Advisor.

## References

- Brotto, V., & Rafferty, K. (2016). *Clinical dosage calculations for Australia and New Zealand* (2nd ed.). South Melbourne, Australia: Cengage Learning.
- Reid-Searl, K., Dwyer, T., Moxham, L., & Reid-Speirs, J. (2007). *Nursing student's maths & medications survival guide*. Frenchs Forest, Australia: Pearson.