



Drops per minute (DPM) - Worksheet

Drops per minute (DPM) is used to calculate the IV flow rate of a given volume. When administering intravenous via a gravity line, the rate of flow is determined using drops per minute. This measure is calculated based on the total volume of the administered liquid, total time in hours and drop factor of the giving set. For these calculations, you need knowledge about **Unit conversion**, **Fractions**, **Long division**, **Long multiplication**, and **Decimals**.

Formula:

$$\text{Drops per minutes} = \frac{\text{Total volume (mls)}}{\text{Time (hrs)}} \times \frac{\text{Drop factor}}{60}$$

Drop factor

Drop factor is the number of drops required to have any volume of 1 ml. It is an important factor in calculating the drops per minute. Depending on the administration set the drop factor may vary. If it is a Macro drip set with a bigger drop, it could have 10, 15 or 20 gtts/ml, on the other hand a Micro drip set administers smaller drops and the drop factor is 60 gtts/ml.

Time remaining

If we know the DPM and drop factor, and the volume remaining to administer, it is possible to calculate the time remaining.

Formula:

$$\frac{\text{Volume remaining (mls)}}{\text{DPM}} \times \frac{\text{Drop factor}}{1}$$

Example

The total volume to be given is 500 ml. The time over which this is to be given is 8 hours. The drop factor is 20. How many drops per minute will be delivered?

Answer

Total volume = 500 ml

Total time to administer = 8 hours



Drop factor = 20

So, Drops per minute (DPM) =

$$\frac{500}{8} \times \frac{20}{60} = \frac{10,000}{480} = 20.83$$

Including unit conversion

To calculate the DPM, the volume unit needs to be millilitre and time needs to be in hours. If the information is given in any other unit, they would need to be converted before calculating DPM.

Example

The total volume to be given is 2.5 L. The time over which this is to be given is 360 minutes. The drop factor is 60. How many drops per minute will be delivered?

Answer

Total volume = 2.5 L = (2.5 × 1000) = 2500 mls

Time = 90 minutes = $\frac{360}{60}$ = 6 hours

Drop factor = 60

So, Drops per minute (DPM) =

$$\frac{2500}{6} \times \frac{60}{60} = \frac{2500}{6} = 416.66$$

With the Infusion rate

Instead of giving the total time, the question may have the infusion rate. In that case you'd need to calculate the time first and then calculate the DPM.

We know,

$$\text{Infusion Rate (ml/hr)} = \frac{\text{Volume (ml)}}{\text{Time (hr)}}$$

$$\text{So, Time (hr)} = \frac{\text{Volume (ml)}}{\text{Infusion rate (ml/hr)}}$$

Example

The total volume to be given is 250 ml. The time over which this is to be given at is 25ml/hr. The drop factor is 20 on a macro drip giving set. How many drops per minute will be delivered?



Answer

Total volume = 250 ml

Infusion rate= 25 ml/hr

Drop factor= 20

So, Time (hr) = $\frac{250}{25} = 10$ hrs

So, Drops per minute (DPM) =

$$\frac{250}{10} \times \frac{20}{60} = \frac{5000}{600} = 8.33$$

Another method

From DPM formula we can see that this already includes infusion rate.

$$\frac{\text{Total volume (mls)}}{\text{Time (hrs)}} \times \frac{\text{Drop factor}}{60}$$

↓
Infusion rate

Hence, we can write the formula like this,

$$\text{Drops per minutes} = \text{Infusion rate (ml/hr)} \times \frac{\text{Drop factor}}{60}$$

$$\text{So, DPM} = 25 \times \frac{20}{60} = \frac{500}{60} = 8.33$$

Time remaining

Example

A macro drip giving set with the drop factor of 15 is administering 40 drops per minute (calculated when set up). The volume remaining is 120 ml. How long will this take (in minutes)?

Answer

Drop factor = 15

DPM = 40

Volume remaining = 120 ml

So, Time remaining =

$$\frac{120}{40} \times \frac{15}{1} = 45 \text{ minutes}$$



Practice Exercises

Question 1

The total volume to be given to a client is 280 ml. The time over which this is to be given is 4 hours. The drop factor is 60. How many drops per minute will be delivered?

Question 2

750 mls of normal saline over 6 hours needs to be administered using a set which delivers 20 drops per ml, at what rate should the infusion be given in DPM?

Question 3

The total volume 3 L to be given to a client in 6 hours. The drop factor is 15. How many drops per minute will be delivered?

Question 4

The total volume to be given is 1500 ml over 480 minutes using a macro drip giving set with 15 drop factor. How many drops per minute will be delivered?

Question 5

The total volume to be given is 950 ml at 120ml/hr. The infusion will be delivered via a micro drip giving set. How many drops per minute will be delivered?

Question 6

The volume remaining is 2.25 Litre. The drop factor on the set is 60. The drops per minute (calculated when set up) is 200. How many minutes will this take?