

Intravenous (IV) Fluid Administration Calculations

Common abbreviations used in IV administration	
Term	Abbreviation
Intravenous	IV
Piggy-back	PB
Drop/drops	gtt/gtts
Hour	hr
Minutes	min
Drops per minute	gtts/min
Drops per milliliter	gtts/mL
Milliliters per hour	mL/hr
Water	H ₂ O, W
5% dextrose water	D ₅ W
10% dextrose water	D ₁₀ W
Normal saline (0.9%)	NS
One half normal saline (0.45%)	$\frac{1}{2}$ NS
Ringer's Lactate solution	RS
Lactated Ringer's solution	LS

An IV infusion set is used to administer fluids and medications directly into the blood stream. Infusion or flow rates are adjusted to the desired drops per minute by a clamp on the tubing. The flow rate is calculated by the nurse in drops per minute (gtts/min). To calculate this, one must know the **administration set drop factor**, which is a **constant**.

Macro drip tubing administers a larger drop and may be used for **10 gtts/mL, 15 gtts/mL or 20 gtts/mL**.

Micro drip tubing administers **60 gtts/mL**.

These are called **drop factors**. The drop factor is the number of drops contained in 1 milliliter.

Calculation of IV drip rates: IV Infusion Rates Formula

$$\frac{\text{Amount of fluid (mL)}}{\text{Total time of infusion (min)}} \times \text{Drop factor (gtts/mL)} = \text{IV infusion rate (gtts/min)}$$

Note: drops are always rounded to the nearest whole number.

Example:

The physician has ordered D₅W 1200 milliliters in 12 hours using 15 drops per milliliter infusion rate. What is the IV infusion rate in drops per minute?

Given:

Amount of fluid: 1200 mL

Total time of infusion: 12 hrs

Administration set drop factor: 15 gtts/mL

IV infusion rate: ? gtts/min

Step 1: Convert 12 hours into minutes.

$$12 \text{ hrs} \times 60 \text{ min/hr} = 720 \text{ min}$$

Step 2: Use the formula above to calculate the IV infusion rate.

$$\begin{aligned} \text{IV infusion rate} &= \frac{1200}{720} \times 15 \\ &= \frac{1200}{720} \times \cancel{15} (1) \\ &\quad (48) \\ &= \frac{1200 (\div 12)}{48 (\div 12)} \\ &= \frac{100}{4} \\ &= 25 \end{aligned}$$

Therefore, the IV infusion rate is 25 drops per minute.