

◆ Q = Flow Rate

It refers to the **volume of fluid that passes through a cross-section per unit time, based on the Hagen–Poiseuille law** describing laminar flow in a cylindrical tube.

- **The volume of fluid passing through a cross-section per unit time**
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◆ Meaning in the Formula

$$Q = \frac{\Delta P \times D^4}{L \times \eta} \times K$$

This formula is **derived from the Hagen–Poiseuille law**, which defines the relationship between pressure, viscosity, and geometric parameters governing laminar flow through a capillary tube.

In this equation, **Q** represents the following parameters:

Symbol Meaning		Description
Q	Flow rate	The speed or quantity of liquid passing through the capillary or flow restrictor under a constant pressure difference (ΔP), according to the Hagen–Poiseuille law
ΔP	Pressure difference	The pressure difference between the inside of the balloon reservoir and the outlet (patient side)
D	Diameter	The internal diameter of the flow restrictor
L	Length	The length of the flow restrictor
η (eta)	Viscosity	The viscosity of the solution
K	Constant	A constant determined by the unit system and the geometry of the flow path

◆ Typical Units

Parameter	Unit	Description
Q (Flow rate)	mL/h	millilitres per hour
ΔP (Pressure difference)	Pa or mmHg	Pascal or millimetres of mercury
D (Diameter)	m	metres
L (Length)	m	metres
η (Viscosity)	Pa·s	Pascal-second

◆ Meaning of Q in Neofuser®

In the **Neofuser®** system, the flow rate (Q) is determined **based on the Hagen–Poiseuille law**, by the following parameters:

- the **pressure (ΔP)** generated inside the **medical-grade silicone balloon**,
- the **length (L)** and **inner diameter (D)** of the **flow restrictor**, and
- the **viscosity (η)** of the drug solution.

Therefore:

💧 Q represents the numerical value that indicates **how fast the Neofuser® pump delivers the medication to the patient**,
in accordance with the **Hagen–Poiseuille law governing laminar flow dynamics**.