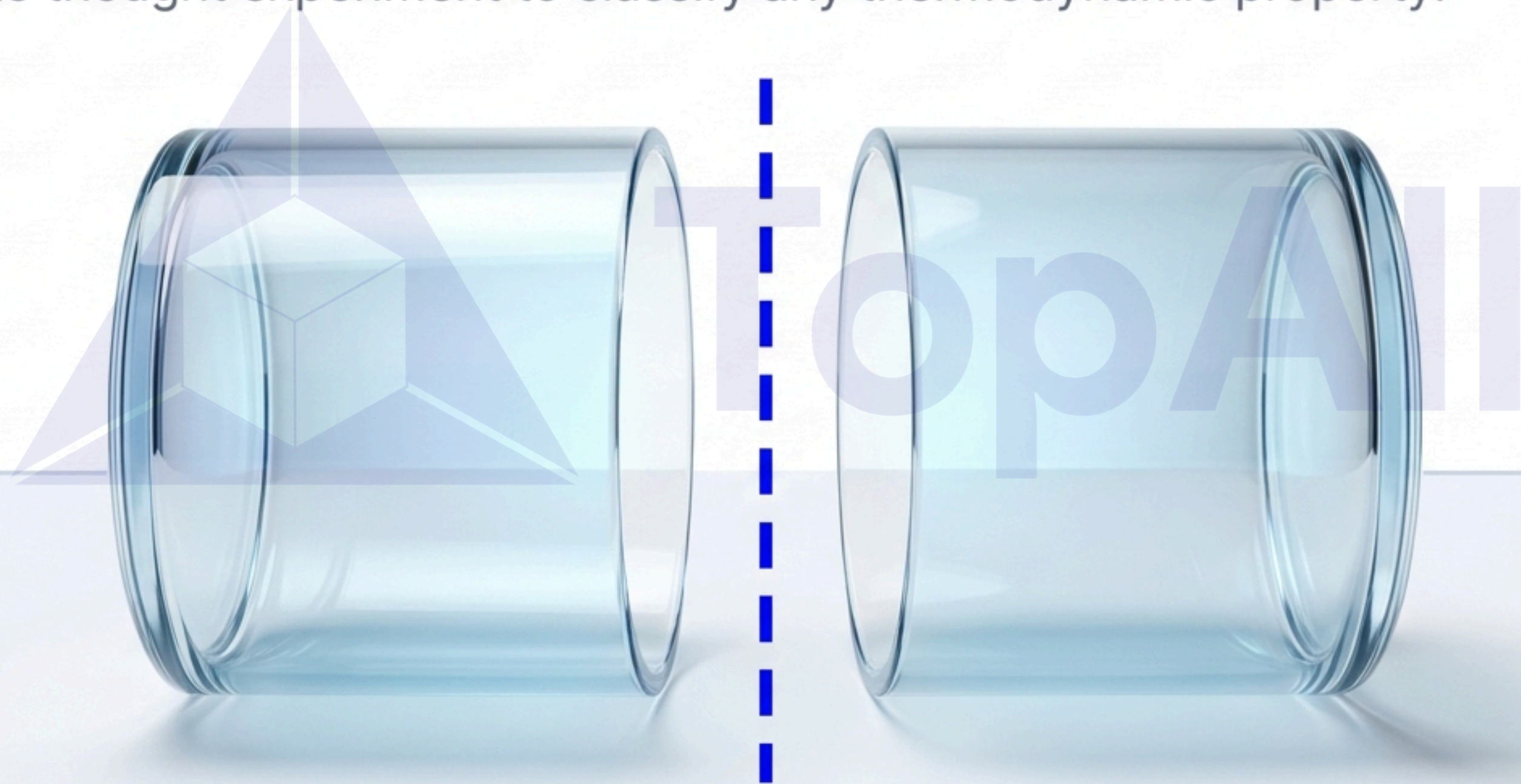


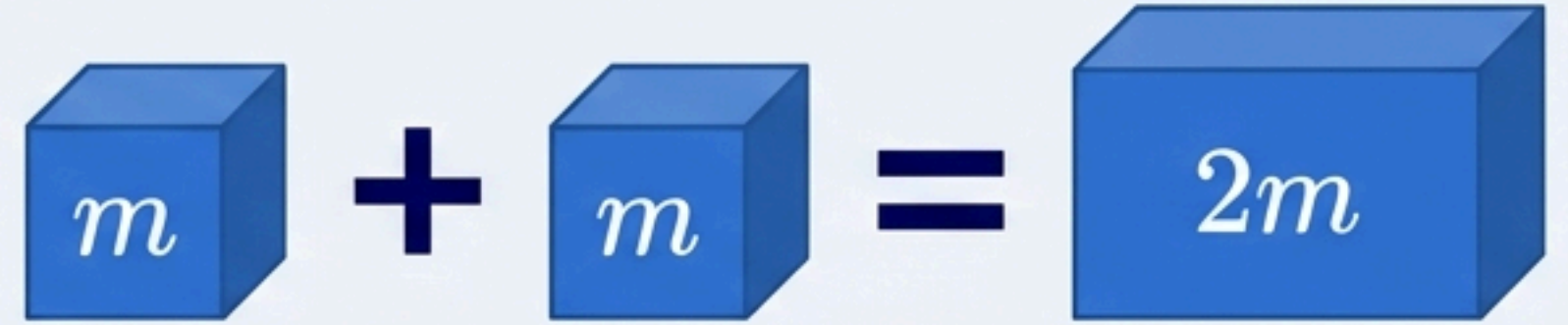
Cut the System in Half — What Changes?

The ultimate thought experiment to classify any thermodynamic property.



Extensive Properties

Depend directly on the quantity or size of matter present in the system. They are strictly **additive**.


$$m + m = 2m$$

Mass (m)

Volume (V)

Internal Energy (U)

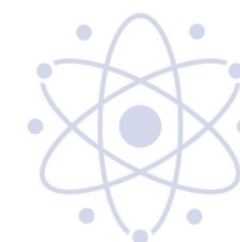
Enthalpy (H)

Heat capacity (C)



You've Learned the Theory. Let's Test Them Now.

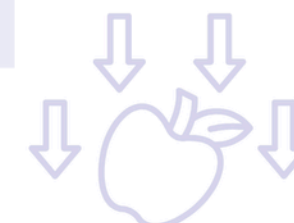
$$E=mc^2$$



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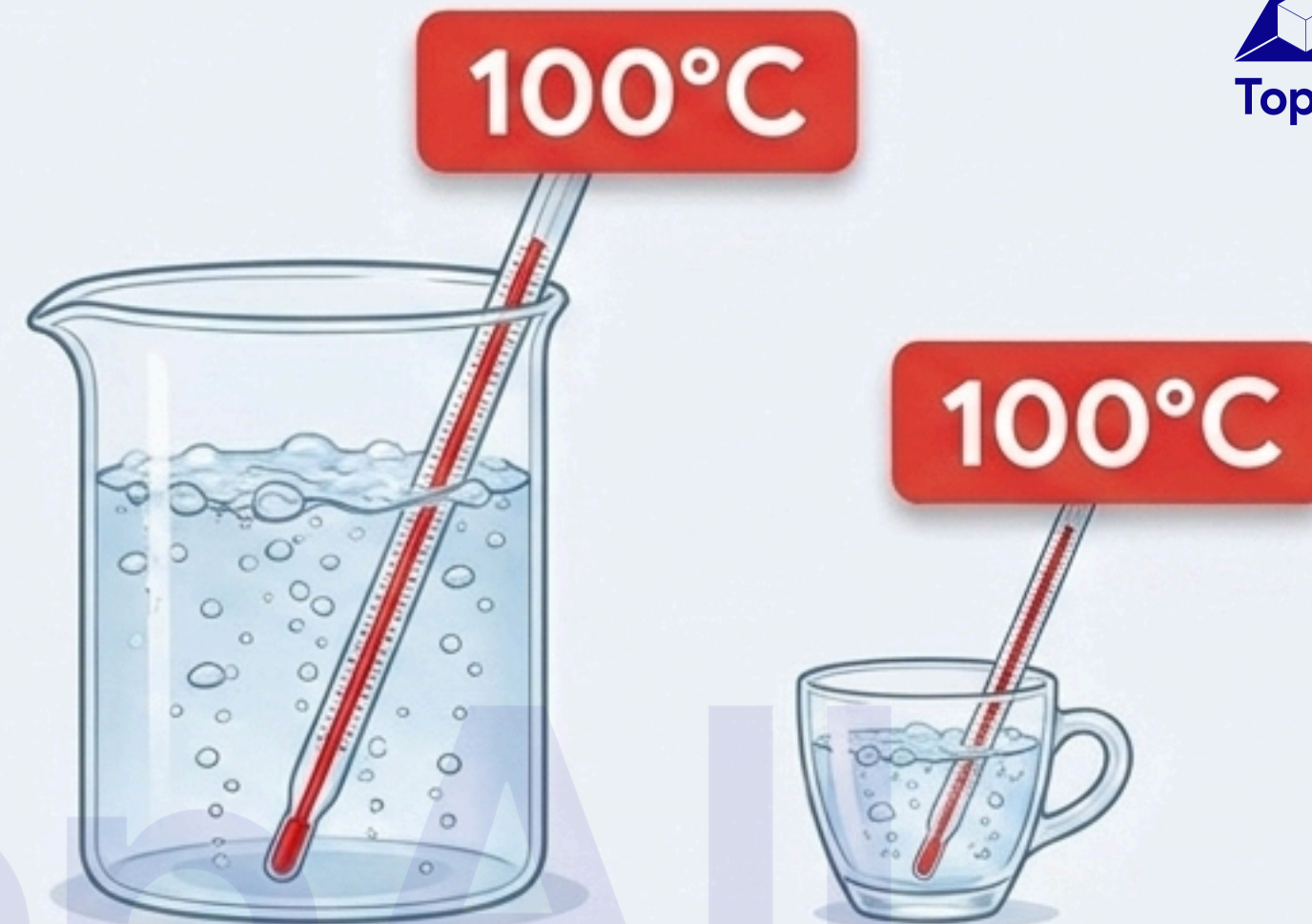


Key Highlights

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Intensive Properties

Strictly independent of the quantity or size of matter present. They are **non-additive**.

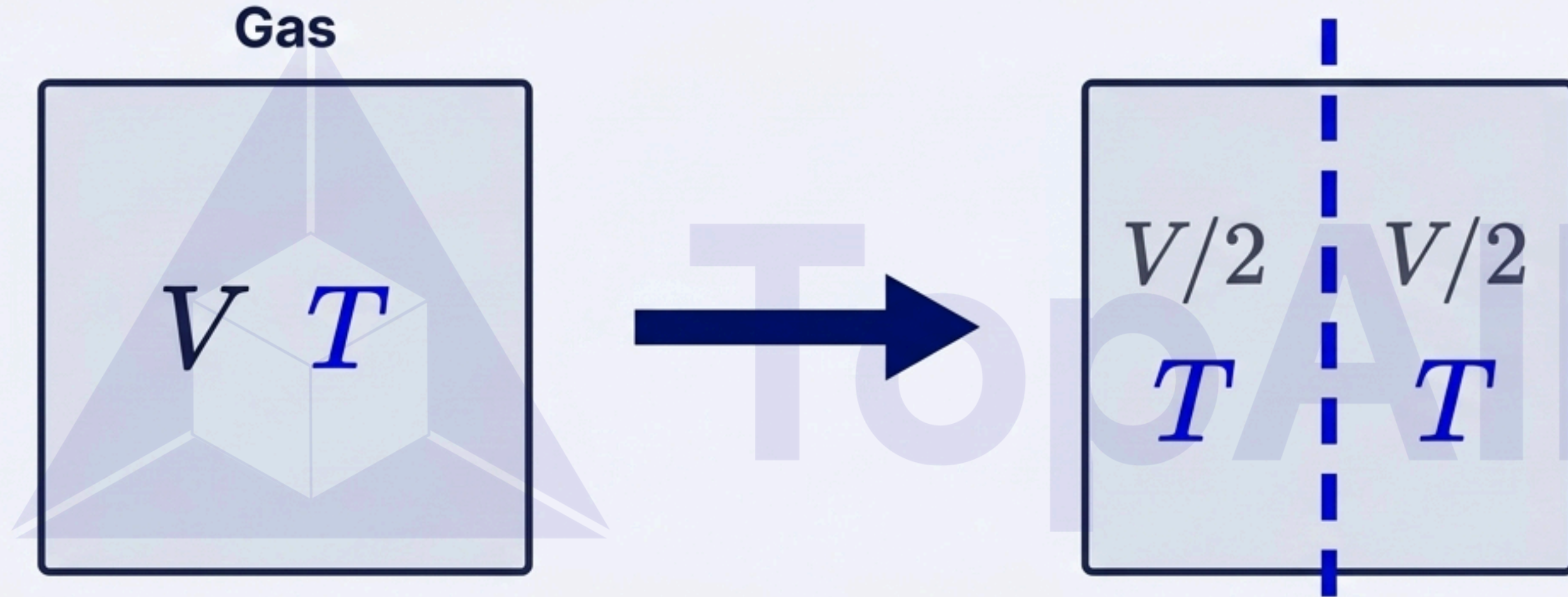


Temperature (T)

Pressure (p)

Density (ρ)

The Partition Test



Each half has volume $V/2$
→ **Extensive** (halved).

Temperature remains T
→ **Intensive** (unchanged).

Rapid Classification

Mass → **Extensive**

Density → **Intensive**

Enthalpy → **Extensive**

Pressure → **Intensive**

⚠ JEE Trap Alert: The Ratio Rule

The ratio of two extensive properties is always an **INTENSIVE** property.

$$\frac{\text{Extensive}}{\text{Extensive}} = \text{Intensive}$$

$$\text{Density} = \frac{\text{Mass}}{\text{Volume}} \quad (\text{Ext} / \text{Ext} = \text{Int})$$

$$\text{Molar Heat Capacity } (C_m) = \frac{\text{Heat Capacity}}{\text{moles}} \quad (\text{Ext} / \text{Ext} = \text{Int})$$

Key Takeaways

- ✓ Extensive = Depends on amount of matter (Mass, Volume, U , H).
- ✓ Intensive = Independent of amount of matter (Temperature, Pressure).
- ✓ Use the Partition Test (cut it in half) to logically deduce unknown properties in exam questions.
- ✓ The Ratio Rule: Molar properties ($X_m = X/n$) and specific properties are derived from ratios and are always Intensive.



You've Learned the Theory.

Now Let's Test It.

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