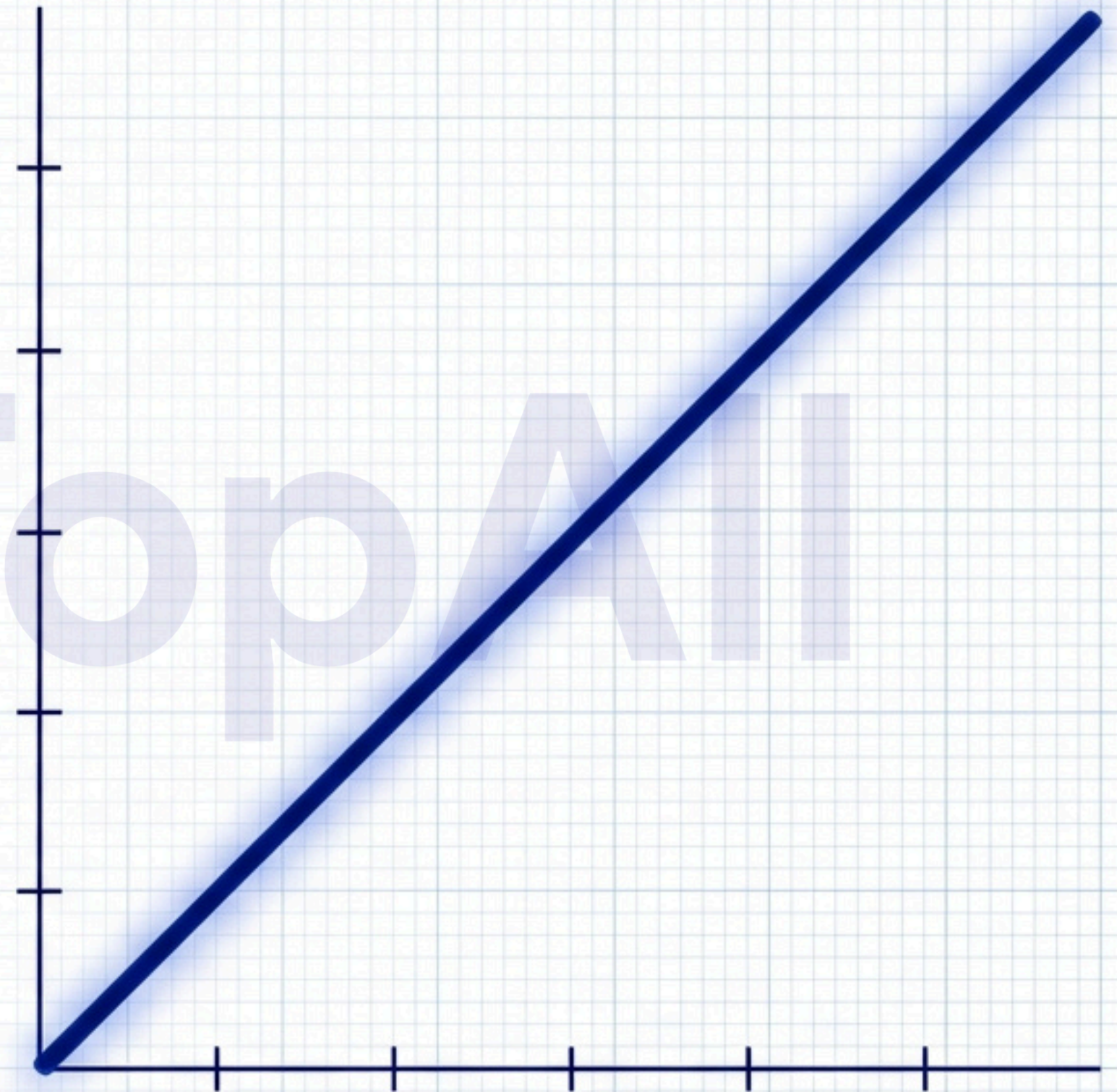


8.3 Hooke's Law

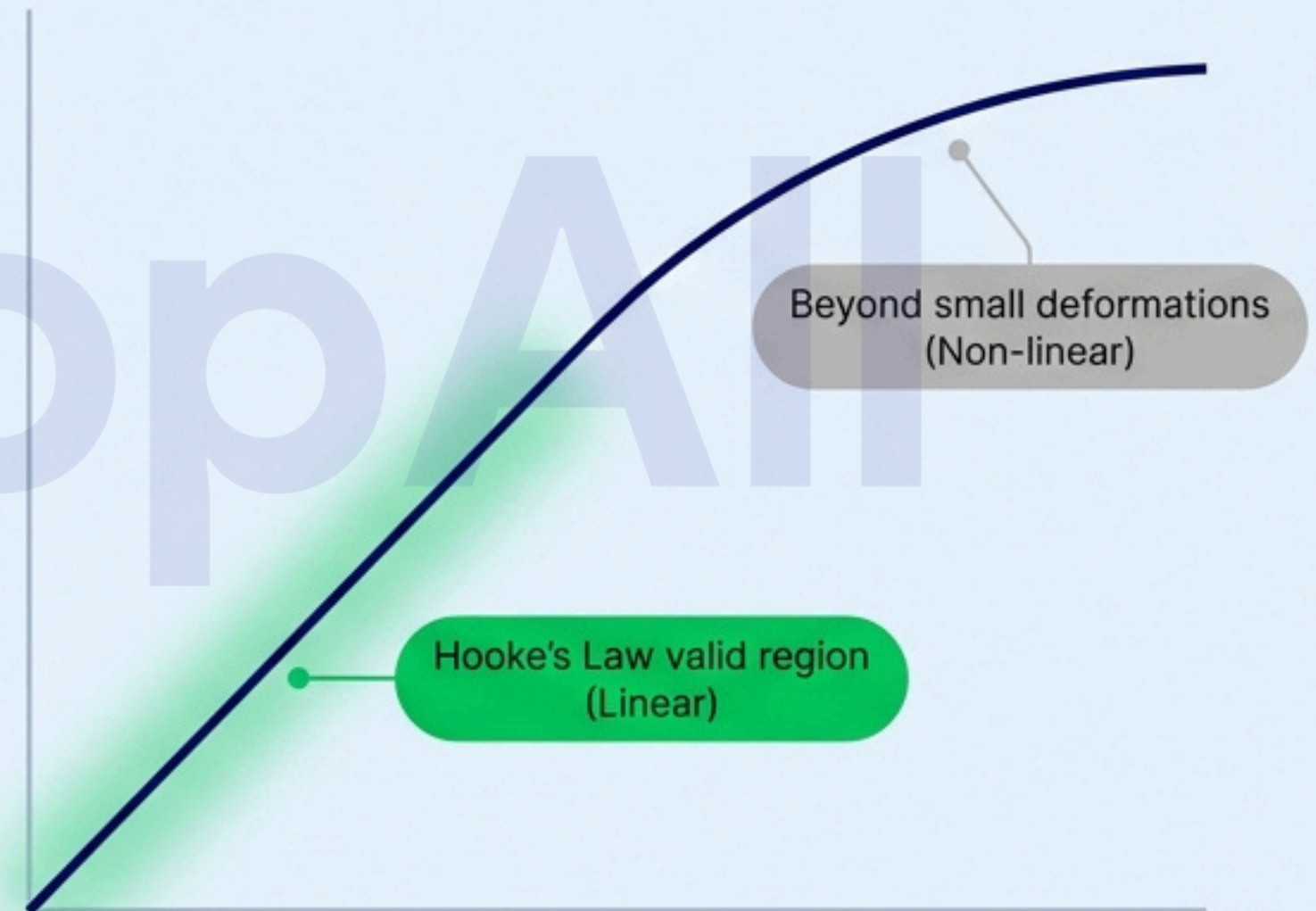
The Physics of Elasticity
and Proportionality



The Big Idea: Proportionality

[Condition Applies] For small deformations only.

**Stress is
proportional
to strain.**



Formula Focus

[Key Formula]



stress $\propto$ strain

mathematically
translates to...

stress = $k \times$ strain

Variable Input



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

$$E=mc^2$$



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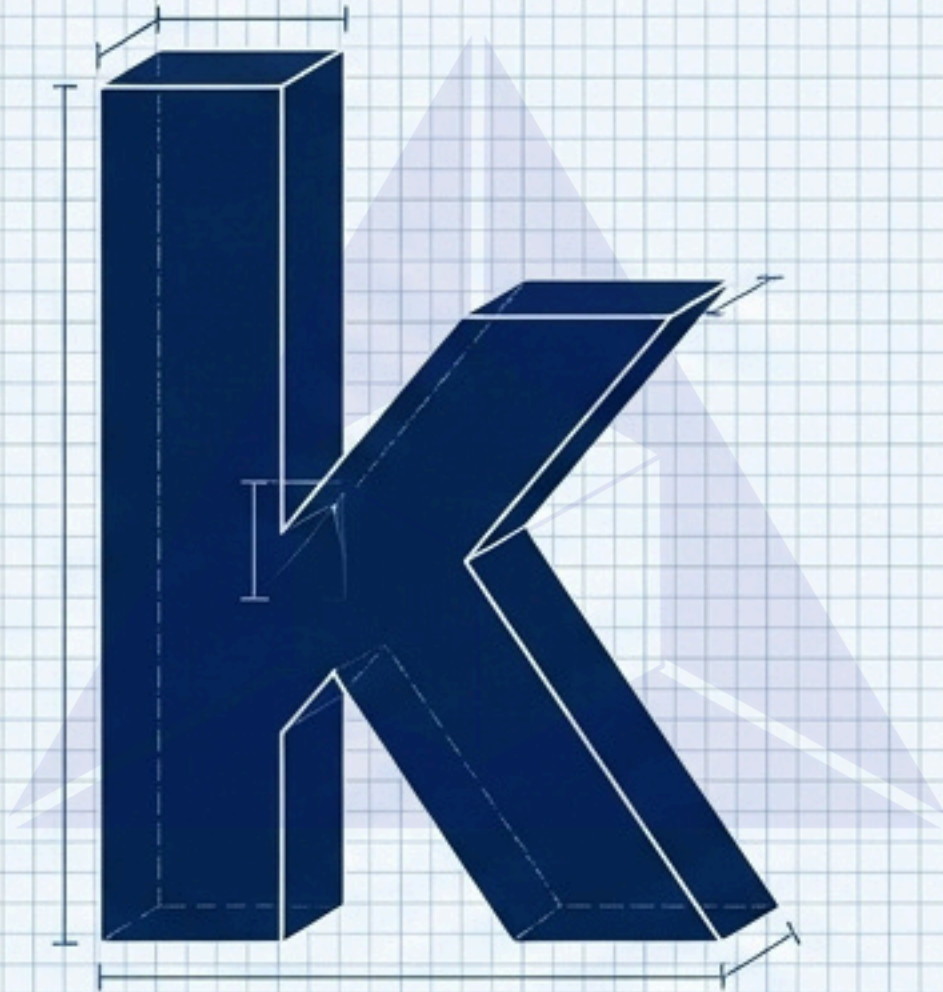
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Key Highlights

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What does 'k' mean?



Identity

Proportionality Constant

Formal Name

Modulus of Elasticity

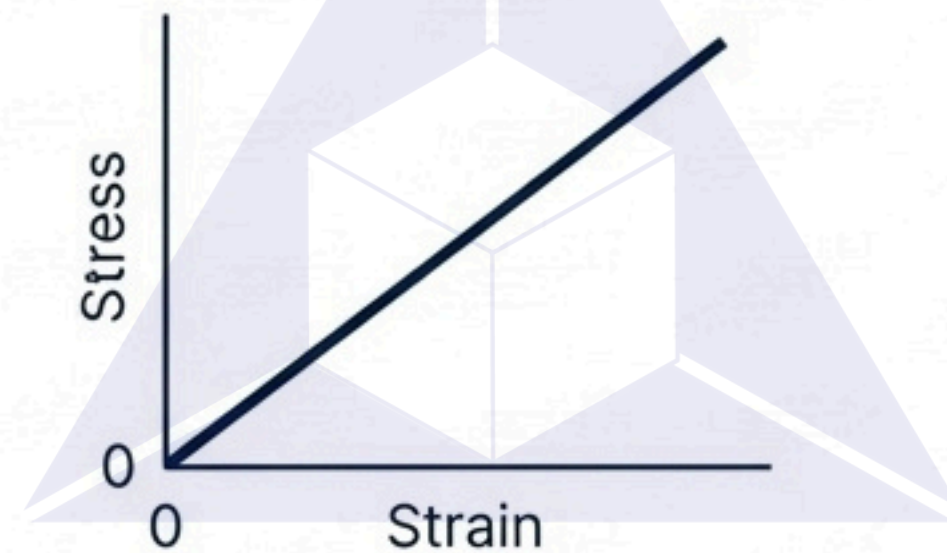
[Exam Takeaway]

The value of k is a defining characteristic of the specific material being deformed.

Where Hooke's law works — and where it doesn't

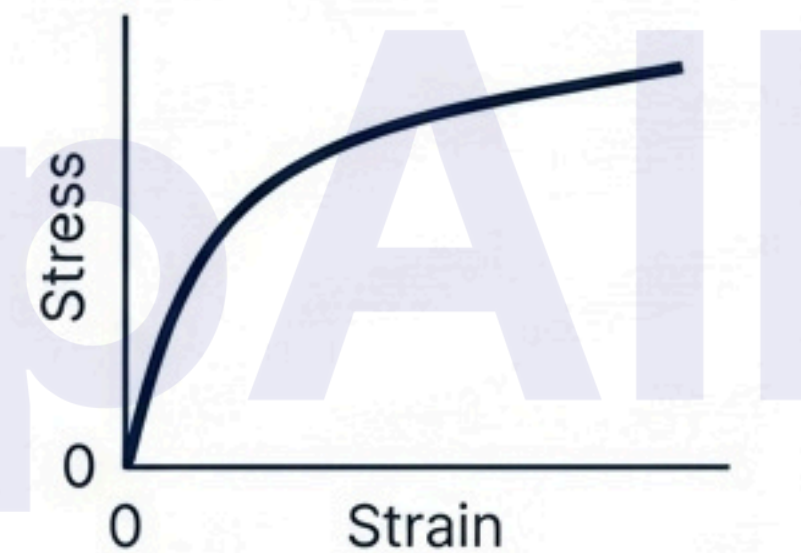
Hooke's Law is an empirical law, not a universal truth.

Follows the Rule



Linear Relation. Found in most standard materials under small deformations.

Breaks the Rule



Non-linear Relation. Some materials do not exhibit this linear relationship at all.

[Concept Check] Always verify the material type; do not blindly apply the linear formula to elastomers.

Final Exam Memory Cues

[Rapid Revision]



The Concept

Stress $\propto$ Strain

Valid for small
deformations only.



The Formula

stress = $k \times$ strain

k = modulus of elasticity.



The Boundary

Empirical law.

Some materials do not
show a linear relation.



You've Learned the Theory.

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