

Unit - 4
→ B.Sc Sem - II

Laplace's Correction

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$\gamma P = \frac{M \Delta T}{M \Delta C}$

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$$\text{or } \gamma P = \frac{\text{Increase in Pressure}}{\text{Volume Strain}}$$

$$= E_a$$

where E_a = adiabatic elasticity of the gas

Putting $E = \gamma P$ in the Newton's formula for the velocity of sound in gaseous medium

$$v = \sqrt{\frac{E}{\rho}}$$

we get, $v = \sqrt{\frac{\gamma P}{\rho}}$

Here, it is the required Laplace formula or corrected Newton's formula for the velocity of sound in gaseous medium.

The value of γ for air is 1.41 as per Laplace formula.

The velocity of sound in air at N.T.P will be

$$V_0 = \sqrt{\frac{1.41 \times 76 \times 13.6 \times 980}{0.001293}}$$

$$= 332.35 \text{ meter/second}$$

This velocity is in close agreement with the experimental value.

This is Laplace Correction.