Acoustic resistence

Acoustic impedance (inaccurately sometimes called *acoustic resistance*) is a physical quantity that describes the acoustic properties of an environment. It is calculated as the ratio of the effective value of the acoustic pressure (p_{ef}) and the effective value of the acoustic velocity, i.e. the speed of the oscillatory movement of the particles of the environment caused by the sound wave v_{ef}. It is a generalized term, therefore it is also used to interpret the phenomenon at wavelengths other than acoustic ones (e.g. ultrasonic,...)

$$z = \frac{p_{ef}}{v_{ef}}$$ (Pa·s·m^{-1})

The effective values of sound pressure and wave speed can be calculated from the maximum values according to the relation:

$$p_{ef} = \frac{\sqrt{2}}{2} p_{max} \doteq 0.7\, p_{max}$$

respectively

$$v_{ef} = \frac{\sqrt{2}}{2} v_{max} \doteq 0.7\, v_{max}$$

Refraction and reflection of passing acoustic waves can occur at the interface of two environments with different acoustic impedance. This is exactly what ultrasound diagnostics uses.

- another calculation: **Z = ρ. c** (Pa.s/m), where ρ – substance density, c – phase speed of propagation in the given substance

Links

Related Articles

- Ultrasound
- Properties of Sound