

Audible sounds and ultrasonic waves are of the same physical nature; both are acoustic vibrations.

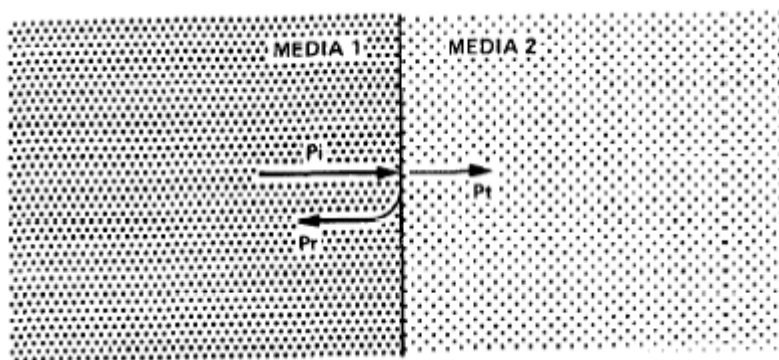
Ultrasonic energy incident upon an interface between two media of differing acoustic impedance (Z) may be partially or totally reflected or transmitted across the interface.

The proportion of signal reflected or transmitted can be determined from the acoustic impedances of the two media:

$$Z = \rho \times V$$

where ρ = material density

V = velocity



FOR ULTRASONIC WAVES AT NORMAL ANGLE TO THE INTERFACE, THE PERCENTAGE OF SIGNAL REFLECTED OR TRANSMITTED IS:

$$\text{REFLECTION} = P_i/P_r = (Z_2 - Z_1) / (Z_1 + Z_2)$$

$$\text{TRANSMISSION} = p_i/P_t = 2Z_2 / (Z_1 + Z_2)$$

P_i = INCIDENT PRESSURE

P_r = REFLECTED PRESSURE

P_t = TRANSMITTED PRESSURE

Acoustic properties of materials can be found here:

http://www.ondacorp.com/tecref_acoustictable.html