

📖 Topic Page: [impedance](#)

Definition: **impedance** from *The Hutchinson Unabridged Encyclopedia with Atlas and Weather Guide*
Total opposition of a circuit to the passage of alternating electric current. It includes the resistance R and the reactance X (caused by capacitance or inductance); the impedance can then be found using the equation $Z^2 = R^2 + X^2$.



Image from: [This simple electric circuit \(A\) represents a... in Philip's Encyclopedia](#)

Summary Article: **impedance**
From *The Columbia Encyclopedia*

in electricity, measure in ohms of the degree to which an electric circuit resists the flow of electric current when a voltage is impressed across its terminals. Impedance is expressed as the ratio of the voltage impressed across a pair of terminals to the current flow between those terminals. When a circuit is supplied with steady direct current, the impedance equals the total resistance of the circuit. The resistance depends upon the number of electrons that are free to become part of the current and upon the difficulty that the electrons have in moving through the circuit. When a circuit is supplied with alternating current, the impedance is affected by the inductance and capacitance in the circuit. When supplied with alternating current, elements of the circuit that contain inductance or capacitance build up voltages that act in opposition to the flow of current. This opposition is called reactance, and it must be combined with the resistance to find the impedance. The reactance produced by inductance is proportional to the frequency of the alternating current. The reactance produced by capacitance is inversely proportional to the frequency of the alternating current. In order for a source of electricity that has an internal impedance to transfer maximum power to a device that also has an impedance, the two impedances must be matched. For example, in the simple case of pure resistances, the resistance of the source must also equal the resistance of the device. Impedance matching is important in any electrical or electronic system in which power transfer must be maximized.

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Impedance. (2018). In P. Lagasse, & Columbia University, *The Columbia encyclopedia* (8th ed.). New York, NY: Columbia University Press. Retrieved from <https://search.credoreference.com/content/topic/impedance>



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