

## Topic Page: [electric current](#)

Definition: **current, electric** from *The Columbia Encyclopedia*

net movement or flow of electric charge from one point to another or across some boundary. See alternating current; direct current; electricity.

### Summary Article: **electric current**

From *The Hutchinson Unabridged Encyclopedia with Atlas and Weather Guide*

Flow of electrically charged particles through a conducting circuit due to the presence of a potential difference. The current at any point in a circuit is the amount of charge flowing per second; its SI unit is the ampere (coulomb per second).

Current carries electrical energy from a power supply, such as an electrical cell (battery), to the components of the circuit, where it is converted into other forms of energy, such as heat, light, or motion. It may be either direct current or alternating current.

**Heating effect** When current flows in a component possessing resistance, electrical energy is converted into heat energy. If the resistance of the component is  $R$  ohms and the current through it is  $I$  amperes, then the heat energy  $W$  (in joules) generated in a time  $t$  seconds is given by the formula:  $W = I^2Rt$ .

**Magnetic effect** A magnetic field is created around all conductors that carry a current. When a current-bearing conductor is made into a coil it forms an electromagnet with a magnetic field that is similar to that of a bar magnet, but which disappears as soon as the current is switched off. The strength of the magnetic field is directly proportional to the current in the conductor – a property that allows a small electromagnet to be used to produce a pattern of magnetism on recording tape that accurately represents the sound or data stored. The direction of the field created around a conducting wire may be predicted by using Maxwell's screw rule.

**Motor effect** A conductor carrying current in a magnetic field experiences a force, and is impelled to move in a direction perpendicular to both the direction of the current and the direction of the magnetic field. The direction of motion may be predicted by Fleming's left-hand rule (see Fleming's rules). The magnitude of the force experienced depends on the length of the conductor and on the strengths of the current and the magnetic field, and is greatest when the conductor is at right angles to the field. A conductor wound into a coil that can rotate between the poles of a magnet forms the basis of an electric motor.

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Electric current. (2018). In Helicon (Ed.), *The Hutchinson unabridged encyclopedia with atlas and weather guide*. Abington, UK: Helicon. Retrieved from [https://search.credoreference.com/content/topic/electric\\_current](https://search.credoreference.com/content/topic/electric_current)

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## Chicago

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## Harvard

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