

GLOSSARY

- alkaline fuel cell:** Fuel cell using alkali (a type of soluble salt) as the electrolyte. Operates at 650 C. First developed for NASA. Uses pure hydrogen and oxygen.
- anode:** The negative electrode or terminal of a fuel cell.
- base load:** The normal, relatively constant demand for energy on a given system.
- bottoming cycle:** A means to increase the thermal efficiency of an electric generating system by converting some waste heat into electricity rather than discharging all of it to the environment.
- British thermal unit (Btu):** The amount of heat required to raise the temperature of 1 pound of water 10 F under stated conditions of temperature and pressure. It is the standard unit for measuring quantity of heat energy.
- Carnot cycle:** An ideal heat engine cycle in which the sequence of operations forming the working cycle consists of isothermal expansion, adiabatic expansion, isothermal compression, and adiabatic compression back to its initial state. An ideal Carnot cycle engine converts heat into work with the maximum theoretical efficiency.
- catalyst:** A substance that changes the rate of a reaction without itself undergoing any net change; a substance that induces catalysis.
- cathode:** The positive electrode or terminal of a fuel cell.
- carbon monoxide shifter:** Used in processing fuel. Transforms carbon monoxide (CO) to carbon dioxide (CO₂).
- closed Brayton cycle:** An external combustion gas turbine engine. Potential propulsion system for future ships.
- cogeneration:** Production of electrical (or mechanical) energy and thermal energy from the same primary energy source.
- controller:** In a fuel cell system, controls supplemental power during the startup operations, stack cooling and **gas** flow during power and hold operations, and close-down operations. Uses temperature, gas flow, and other sensors and microprocessors to perform its functions.
- distillate fuel:** The lighter fuels distilled off during the refining process. Includes Nos. 1 and 2 heating oils, diesel fuels, and No. 4 fuel oil.
- electrochemical:** Chemical action employing a current of electricity to cause or to sustain the action.
- electrode:** Reactive materials, such as metals and metal oxides, attached to grids that conduct electricity.
- electrolyte:** A conducting medium in which the flow of electric current takes place by the migration of ions.
- flashpoint:** The lowest temperature at which the vapors arising from a liquid surface can be ignited by an open flame.
- fuel processor:** Same as reformer. Converts a stock fuel to a hydrogen-rich gas for use in fuel cells. Also removes impurities.
- fuel cell **stack**:** A stack of individual fuel cells connected in parallel to provide the desired total power.
- heat rate:** A measure of thermal efficiency, generally expressed as Btu per kilowatt-hour.
- inverter:** A device for converting direct current to alternating current.
- kilowatt:** A unit of power equal to 1,000 watts.
- life-cycle cost:** The accumulation of all funds spent for the purchase, installation, operation, and maintenance of a system over its useful life. The accumulation generally includes a discounting of future costs to reflect the relative value of money over time.
- load:** The energy tapped from any power source. In the electric industry, the amount of electric power delivered or required at any specified point or points in the system.
- load following:** A utility power generator used to cope with swings in the load.
- megawatt:** One million watts, or 1,000 kilowatts.
- molten carbonate fuel cell:** Fuel cell using molten carbonate as the electrolyte. Operating at from 6000 to 7000 C. Able to use a variety of fuels. Internal reforming potential.
- oxidant:** A chemical element or compound that is capable of gaining electrons, i.e., of being reduced.
- peak-shaving:** A type of utility powerplant operated only when the need for additional power is temporarily high.
- phosphoric acid fuel cell:** Fuel cell using phosphoric acid as the electrolyte. Operates at 1500 to 200° C.
- power conditioner:** Receives electrical power from the fuel cell stack and converts it to match the required output.
- power density:** The amount of power per unit of cross-sectional area.
- reformer:** Same as fuel processor. Converts a stock fuel to a hydrogen-rich gas for use in fuel cells. Also removes impurities.
- sintering:** The agglomeration of solids at temperatures below their melting point, usually as a consequence of heat and pressure.

solid oxide fuel cell: Fuel cell using solid oxide as the electrolyte. Operates at temperatures close to 1,000° C.

Less developed than phosphoric acid fuel cells.

solid polymer electrolyte fuel cell: Fuel cell using solid polymer as the electrolyte.

steam turbine: A machine powered by high pressure steam and used to drive mechanical apparatus. It has a rotary motion in contrast to a reciprocating motion.

Stirling cycle: An external combustion engine under development. Has the ability to use any heat source. Prospects for high efficiency. A potential propulsion system for future ships.

thermal inertia: The tendency for a heat machine to generate heat at the same level at all times.

thermal signature: The heat trace that may be detected from an energy source, such as a submarine.

thermal transient: Abrupt changes in temperature due to sudden changes in load.

watt: A unit of power that equals 1 absolute joule per second. It is analogous to horsepower or foot-pounds per minute of mechanical power. One horsepower is equivalent to approximately **746** watts.