



HOW A FUEL CELL WORKS

PureCell® System

A fuel cell is an electrochemical device that combines hydrogen fuel and oxygen from the air to produce electricity, heat and water. Fuel cells operate without combustion, so they are virtually pollution-free. Since the fuel is converted directly to electricity and heat, a fuel cell's total system efficiency can be much higher than internal combustion engines, extracting more energy from the same amount of fuel. The fuel cell itself has no moving parts — making it a quiet and reliable source of power.

Inside the PureCell® System



1 Fuel Processor (Reformer)

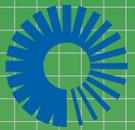
The Fuel Processor reforms the fuel (natural gas) to hydrogen gas to feed the Fuel Cell Stack.

2 Fuel Cell Stack

Hydrogen gas and air are combined in an electrochemical process that produces Direct Current (DC) power, pure water and heat. The byproduct water is utilized in the operation of the power plant. The usable heat is available for meeting other facility energy requirements (e.g., hot water, space heating, air conditioning and cooling).

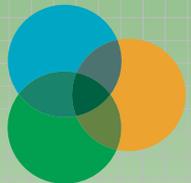
3 Power Conditioner

The DC power provided by the Fuel Cell Stack is conditioned to provide high quality Alternating Current (AC) power output.



UTC Power

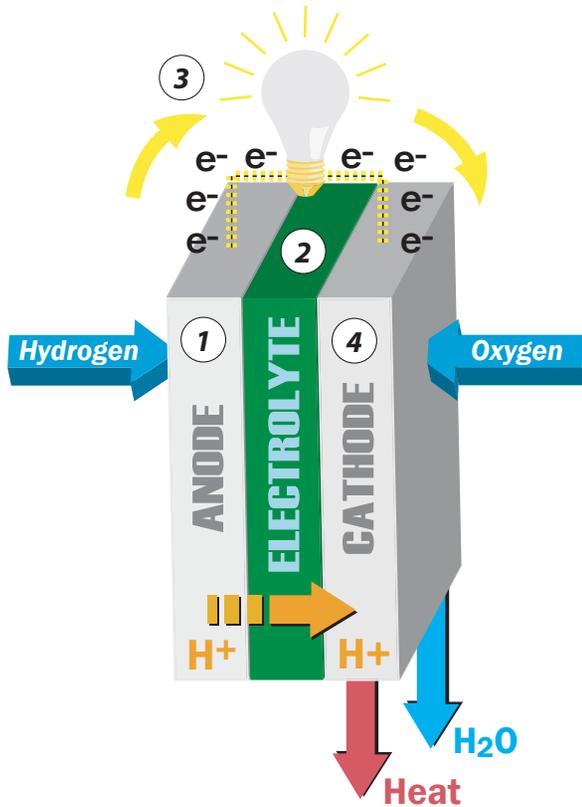
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The fuel cell is composed of an anode (a negative electrode that provides electrons), an electrolyte in the center, and a cathode (a positive electrode that accepts electrons).

Inside the Fuel Cell



1 Anode

As hydrogen flows into the fuel cell anode, a catalyst layer on the anode helps to separate the hydrogen atoms into protons (hydrogen ions) and electrons.

2 Electrolyte

The electrolyte in the center allows only the protons to pass through the electrolyte to the cathode side of the fuel cell.

3 External Circuit

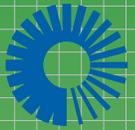
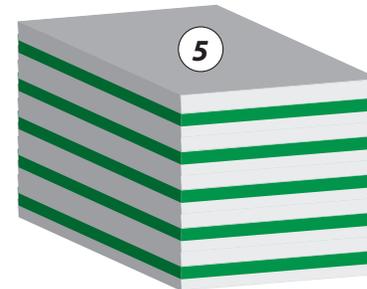
The electrons cannot pass through this electrolyte and, therefore, must flow through an external circuit in the form of electric current. This current can power an electric load.

4 Cathode

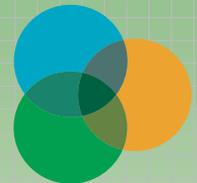
As oxygen flows into the fuel cell cathode, another catalyst layer helps the oxygen, protons, and electrons combine to produce pure water and heat.

5 Fuel Cell Stack

Individual fuel cells can be combined into a Fuel Cell "Stack" to increase the total electrical output.



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