SOLID OXIDE ELECTROLYZER

SOEC
Background
FuelCell Energy’s Solid Oxide Electrolyzer Cell (SOEC) is designed to produce hydrogen at 90 percent electrical efficiency and can reach 100 percent efficiency when using excess heat. The module's compact design and quiet operation makes it easy to site near energy sources. To complement renewables and optimize hydrogen production, the plant is designed to rapidly ramp up and down to follow changes in energy supply and consumer demand. The hydrogen produced can be stored long-term and transported, allowing energy from wind, solar, and nuclear to be available on demand.

Specifications subject to change without notice. All specifications quoted at initial operation.

Hydrogen
Production Rate ________________ ~600 kg/day
Pressure_______________ 14.7 psia (1 bar(a))*

Performance (With and Without Heat Input)
Efficiency (HHV) With Heat ________________ 100%
Electricity Consumption With Heat______ 39.4 kWh/kg
Efficiency (HHV) No Heat________________ 90%
Electricity Consumption No Heat______ 43.8 kWh/kg
Efficiency levels are +/- 2%.

Product Composition
H₂_________________________ 99% dry basis, by volume

Purification and compression options available.
N₂_________________________ ~1% dry basis, by volume

Ramping (Increasing or Decreasing)
0% - 100% load ________________ 10% per minute

Optional Customer Steam Supply for Higher Efficiency (Saturated or Superheated)
Recommended Temperature Range________________________ 259 - 295 °F (126 - 146 °C)
Recommended Pressure Range____________________________ 20.0 - 47.1 psig (1,379 - 3,254 mbar)
Recommended Flow Rate Range____________________________ 340 - 570 lb/hr (154 - 258 kg/hr)

*Optional compression is available and will add 2 to 4 kWh/kg power consumption depending on pressure level.

Module Dimensions (W x L x H)
Width: 8’ Length: 40’ Height: 10’
Width: 2.43m Length: 12.19m Height: 3.04m
There are two modules in a standard configuration.

Electrical Input
Plant Power Input ________________ 1.1 MW
Voltage (3-phase)__________ 480 V (400 V Option)
Frequency_______________ 60 Hz (50 Hz Option)

Water
Water Conductivity________________________ < 1 µS/cm
Treatment options available for lower quality water.
Nominal Consumption______ 1 gpm (5,451 SLPD)
Drainage for Maintenance_____ 46 gallons (174 L)

Sound Levels
Standard _____ < 72 db(A) @ 10 Feet (Option < 65)

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