

## ***Hydrogen Water Fuel Cell Results (Using Kanarev's Data)***

Modern Electrolyzers consume 4.0 kWh per cubic meter of this gas. When one cubic meter of hydrogen is burnt, 3.58 kWh of energy is released.

One litre of hydrogen weighs 0.09 g; one litre of oxygen weighs 1.47 g. It means that it is possible to produce  $111.11/0.09 = 1234.44$  litres of hydrogen and  $888.89/1.47=604.69$  litres of oxygen from one litre of water. One gram of water contains 1.24 litres of hydrogen. Energy consumption for the production of 1000 litres of hydrogen is 4 kWh and for one litre 4Wh.

It is possible to produce 1.23 litres of hydrogen from one gram of water,  $1.23 \times 4 = 4.94\text{Wh}$  (17.78 kJ) is spent for hydrogen production from one gram of water.

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Instruments and Equipment used:

Experimental single cylinder low current WFC filled with tap water.

Stop watch. Scales type: Satrue model SB-200 200g, 0.1 gram steps; AVO Mk 9 Test Meter. Precision Gold mode, I Wgo20 Digital Test Meter. Racal Dana True RMS Voltmeter model 9300. Hameg Oscilloscope model 203-5. Tektronix 547 oscilloscope.

The water fuel cell was pulsed with a 6 kHz Square wave at 50:50 duty cycle.  
Duration of test: 60min

RMS Voltage  $V = 7.5$ ; Amperes  $I = 0.06$ ; Energy  $E$  (Wh) =  $V \times I \times (\text{min}/60) = 0.45$  Wh;

Mass of WFC in grams = 106.9, Mass change in grams  $m = 0.4$  g, Evaporating water mass  $m_e = 0.04$  g, Mass of water split into gasses,  $m - m_e = 0.36$  g.

Volume of released hydrogen =  $0.36 \times 1.24 = 0.45$  l. Energy content of hydrogen produced ( $W = 0.45 \times 3.58$ )= 1.61 Wh (5.8 kJ).

Energy 'Efficiency'  $\text{Energy Out/Energy In} \times 100\% = 1.61/0.45 \times 100\% = 358\%$

Energy 'Efficiency' (CoP) of this WFC is 3.58 or 'over-unity'

Date of Test : 15 June 2004

Done by D. Lawton