Dissolved Oxygen: How much is generated by a O2Tube system?

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Electrolysis Theory

Faradays Law: The quantity of electricity in coulombs (***q***) equals the number of equivalents oxidized or reduced (***n***) times the number of faradays (***F***). A faraday is 96,490 coulombs or a mole of electrons (6.023×10^{23} electrons. $q = nF$

Also, the quantity of electrical current in coulombs, ***q***, that passes through a conductor is proportional to both the current, ***I*** (amperes), and the length of time it flows. That is amperes (coulombs per second) times seconds gives coulombs, or $q = I (t_2 - t_1)$ where the current is steady and flows uniformly during the interval of time between t_1 and t_2. Assuming a constant current ***I***, this expression may be combined with Faradays law to give the relationship $q = I (t_2 - t_1) = nF$.

O2Tube Oxygen Production Assuming 100% Efficiency at 2 amps for 1 hour (3600 sec's)

Stoichiometry - The following reactions happen simultaneously:

1. O2Tube Cathode (Reduction) $2H_2O + 2e^- > H_2 + 2OH^-$

2. O2Tube Anode (Oxidation) $2H_2O > O_2 + 4H^+ + 4e^-$

Oxygen Production - $n = q/F$ = (2 amps)(3600 secs.) / 96,490coulombs/equiv.
n = 7200 coulombs / 96,490 coulombs/equiv.
n = 0.75 equiv.

The weight of oxygen oxidized (***m***) divided by the gram-equivalent weight of oxygen (m_{eq} , 15.9994 g/equivalent from periodic table) is the number of equivalents (***n***). $n = m / m_{eq}$

$m = n / m_{eq}$ = 0.75 equiv. / 15.9994 g/equiv.

m = 1.2 grams of oxygen (O)
or
m = 0.6 grams of stable oxygen (O_2)

The O2Tube 3 inch cell can be set to operate anywhere between 0.5 and 4.0 amps, therefore, the O2Tube 3 inch cell can be set to produce between 0.15 to 1.2 grams of O_2 per hour.