Horsepower Calculations

Internal Combustion Chamber Pressure

amount of HP to be developed	200	400	700
amount of kW 1HP= .745 kW	149	298	521.5
amount of Btu/hr 1kW= 3400 Btu/hr	506600	1013200	1773100
Efficiency	0.75	0.75	0.75
amount of H2 lb/hr needed H2 has 60,000Btu/lb considering efficiency	11.26	22.52	39.40
1 cylinder needs this lb/hr	2.25	4.50	7.88
in kg/hr	1.02	2.05	3.58
in g/min	17.06	34.11	59.70
need this g/rev 2000 rpm motor	0.009	0.017	0.030
in g/explosion 2rev= 1explosion	0.017	0.034	0.060
Designed Cylinder internal volume in Liters	1	1.5	2
Designed Cylinder explosion volume in Liters	0.1	0.15	0.2
internal pressure inside combustion chamber P=nRT/V n= number of moles in one explosion R=.082 liter-atm/mole-K T= 2273K (combustion temp.) V is explosion volume	15.90	21.19	27.82

Fuel and compression needed for a 300 mile voyage

No. of hours	4	4	4

Total energy consumed (kWh)	596	1192	2086
Total Btu needed	2026400	4052800	7092400
Total Btu needed considering motor efficiency	2701867	5403733	9456533
No. of ft^3 H2 needed H2 has 320 Btu/ft^3 1atm	8443	16887	29552
No. of liters H2 needed 1ft^3=28.3 liters	239115	478230	836903
tank diameter	9	9	9
tank height	51	51	51
tank volume in liters	53	53	53
no. of tanks to be used	4	8	16
total available volume	213	425	850
compression needed in atm	1125	1125	984
compression needed in psi	15974	15974	13977
Expected H2 Recovery Rate in %	33%	33%	33%
compression needed given estimated recovery	10702	10702	9365
Quantum Technologies compression tanks	10000	10000	10000
Current Requirements			
H2 requirements g/min from line 21	17.1	34.1	59.7
H2O production g/min	154	307	537
Energy rate (J/min) needed to break this much water using 1g needs 10.5 J	1612	3224	5642
Energy rate in Watts (J/sec)	27	54	94

Voltage to operate electrolysis (V)	4	4	4
Current needed to operate electrolysis (amps)	6.7	13.4	23.5
Number of electrolysis units	4	6	8
current needed by each electrolysis unit	1.7	2.2	2.9
Expected battery needs (Wh) 10% of total energy	59600	119200	208600
Weight in kg at 100Wh/kg	596	1192	2086