FileEditor:junk.out

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        NASA-GLENN CHEMICAL EQUILIBRIUM PROGRAM CEA2, MAY 21, 2004
                  BY  BONNIE MCBRIDE AND SANFORD GORDON
     REFS: NASA RP-1311, PART I, 1994 AND NASA RP-1311, PART II, 1996

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 problem
     rocket  fac   ac/at=3.0  tcest,k=3800
   p,bar=100,
   sup,ae/at=10000,
 react
   name=H2 moles=1.0  t,k=298.15
   name=O2 moles=0.5  t,k=298.15
  end

 OPTIONS: TP=F  HP=F  SP=F  TV=F  UV=F  SV=F  DETN=F  SHOCK=F  REFL=F  INCD=F
 RKT=T  FROZ=F  EQL=T  IONS=F  SIUNIT=T  DEBUGF=F  SHKDBG=F  DETDBG=F  TRNSPT=F

 TRACE= 0.00E+00  S/R= 0.000000E+00  H/R= 0.000000E+00  U/R= 0.000000E+00

 Pc,BAR =   100.000000

 Pc/P =

 SUBSONIC AREA RATIOS =

 SUPERSONIC AREA RATIOS = 10000.0000

 NFZ=  1  Mdot/Ac= 0.000000E+00  Ac/At= 3.000000E+00

    REACTANT           MOLES    (ENERGY/R),K   TEMP,K  DENSITY
        EXPLODED FORMULA
 N: H2               1.000000  -0.326752E-06   298.15  0.0000
          H  2.00000
 N: O2               0.500000  -0.154035E-05   298.15  0.0000
          O  2.00000

  SPECIES BEING CONSIDERED IN THIS SYSTEM
 (CONDENSED PHASE MAY HAVE NAME LISTED SEVERAL TIMES)
  LAST thermo.inp UPDATE:    9/09/04

  g 6/97  *H              g 4/02  HO2             tpis78  *H2
  g 8/89  H2O             g 6/99  H2O2            g 5/97  *O
  g 4/02  *OH             tpis89  *O2             g 8/01  O3
  g11/99  H2O(cr)         g 8/01  H2O(L)          g 8/01  H2O(L)

 O/F =   0.000000

                       EFFECTIVE FUEL     EFFECTIVE OXIDANT        MIXTURE
 ENTHALPY                   h(2)/R             h(1)/R               h0/R
 (KG-MOL)(K)/KG       -0.60888815E-07     0.00000000E+00     -0.60888815E-07
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KG-FORM.WT./KG	bi(2)	bi(1)	b0i
*H	0.11101687E+00	0.00000000E+00	0.11101687E+00
*O	0.55508435E-01	0.00000000E+00	0.55508435E-01

POINT	ITN	T	H	O
1	8	3730.278	-9.575	-14.967
2	2	3723.353	-9.593	-14.984

Pinf/Pt = 1.730122

3	3	3542.876	-9.813	-15.178

Pinf/Pt = 1.727754

3	2	3543.310	-9.812	-15.178
4	2	3716.555	-9.601	-14.991
4	2	3715.486	-9.602	-14.992
4	2	3715.394	-9.602	-14.992
2	2	3726.907	-9.584	-14.976

Pinf/Pt = 1.730186

3	3	3546.007	-9.804	-15.170

Pinf/Pt = 1.727819

3	2	3546.443	-9.803	-15.169
4	2	3720.093	-9.592	-14.983
4	2	3719.022	-9.593	-14.984
4	2	3718.930	-9.593	-14.984

END OF CHAMBER ITERATIONS

4	8	484.022	-33.409	-25.834

SINGULAR MATRIX, ITERATION 3 VARIABLE 2(EQLBRM)

4	12	636.889	-26.867	-23.839
4	2	636.039	-26.398	-24.841

THEORETICAL ROCKET PERFORMANCE ASSUMING EQUILIBRIUM

COMPOSITION DURING EXPANSION FROM FINITE AREA COMBUSTOR

Pin = 1450.4 PSIA
Ac/At = 3.0000 Pinj/Pinf = 1.022603
CASE =

	REACTANT	MOLES	ENERGY KJ/KG-MOL	TEMP K
NAME	H2	1.0000000	0.000	298.150
NAME	O2	0.5000000	0.000	298.150

O/F= 0.00000 %FUEL= 0.000000 R,EQ.RATIO= 1.000000 PHI,EQ.RATIO= 0.000000

	INJECTOR	COMB END	THROAT	EXIT
Pinj/P	1.0000	1.0468	1.7669	387793.1
P, BAR	100.00	95.533	56.597	0.00026
T, K	3730.28	3718.93	3546.44	636.04
RHO, KG/CU M	5.1130 0	4.9007 0	3.0842 0	8.7846-5
H, KJ/KG	0.00000	-45.579	-1035.77	-12767.4
U, KJ/KG	-1955.80	-1994.96	-2870.84	-13060.9
G, KJ/KG	-58737.3	-58647.8	-56920.0	-22790.0
S, KJ/(KG)(K)	15.7461	15.7578	15.7578	15.7578

M, (1/n)	15.858	15.862	16.069	18.015
(dLV/dLP)t	-1.04715	-1.04708	-1.04248	-1.00000
(dLV/dLT)p	1.7849	1.7862	1.7446	1.0000
Cp, KJ/(KG)(K)	10.1792	10.2076	10.0551	2.0394
GAMMAs	1.1324	1.1322	1.1289	1.2925
SON VEL,M/SEC	1488.2	1485.6	1439.3	616.0
MACH NUMBER	0.000	0.203	1.000	8.204

PERFORMANCE PARAMETERS

Ae/At	3.0001	1.0000	10000.0
CSTAR, M/SEC	2203.0	2203.0	2203.0
CF	0.1371	0.6533	2.2938
Ivac, M/SEC	6758.5	2714.3	5111.3
Isp, M/SEC	301.9	1439.3	5053.2

MOLE FRACTIONS

*H	0.03354	0.03351	0.02917	0.00000
HO2	0.00027	0.00026	0.00018	0.00000
*H2	0.12070	0.12052	0.11189	0.00000
H2O	0.68966	0.69025	0.71805	1.00000
H2O2	0.00005	0.00005	0.00003	0.00000
*O	0.01572	0.01568	0.01331	0.00000
*OH	0.10590	0.10552	0.09457	0.00000
*O2	0.03417	0.03419	0.03278	0.00000

 * THERMODYNAMIC PROPERTIES FITTED TO 20000.K

   PRODUCTS WHICH WERE CONSIDERED BUT WHOSE MOLE FRACTIONS
   WERE LESS THAN 5.000000E-06 FOR ALL ASSIGNED CONDITIONS

O3 H2O(cr) H2O(L)