

2020-02-01 07-25-18 Z-engine with Extra Exhaust valve
 Mode: #10 : ; ; : Optimiz.: SFC = F(CR, m_f.B, SOC_C, EVO, EPC, IVO, Int_Dur,
 EEVO, e.Exh_dur, PR_C.hp, PR_C.lp, PR_T.lp, EGR_LP)
 Title:
 www.diesel-rk.com
 Fuel: Diesel No. 2

----- PARAMETERS OF ENGINE WITH TURBOCOMPAUNDING OR SUPERCHARGING -----
 126.42 - P_ovrl - Overall Power with account of geared units, kW
 -17.306 - dP_add - Power added by geared Turb/Comp/TC/EGR compressor, kW
 464.36 - Torq_ovrl- Overall Torque in view of geared T/C/TC/EGR_comp., N m
 36.275 - BMEP_ovrl- Overall BMEP, bar
 0.18016 - SFC_ovrl - Overall Specific Fuel Consumption, kg/kWh
 0.17447 - SFC_o.ISO- Same Specific Fuel Consumption but in ISO, kg/kWh
 0.45414 - Eta_ovrl - Overall Engine Efficiency
 10.0000 - R_gear - Gear ratio of TK speed reducer
 1.00000 - Eta_mC.hp- Mechanical Efficiency of HPC
 -17.304 - dPdrv_hp - Power added by geared Unit of HP stage, kW
 10.0000 - R_gear.lp- Gear Ratio of LP Units and drive shaft coupling
 1.00000 - Eta_mC.lp- Mechanical Efficiency of LP Compressor
 -0.00211 - dPdrv_lp - Power added by geared Unit of LP stage, kW

----- PARAMETERS OF EFFICIENCY AND POWER -----
 2600.0 - RPM - Engine Speed, rev/min
 143.73 - P_eng - Piston Engine Power, kW
 41.241 - BMEP - Brake Mean Effective Pressure, bar
 527.92 - Torque - Brake Torque, N m
 22.776 - MFR - Mass Flow Rate of the (Fuel) System, kg/h
 0.07300 - m_f - Mass of Fuel Supplied per cycle, g
 0.07522 - m_f_42.7 - Cycle Fuel Mass of all fuels given to diesel (42.7 MJ/kg)
 0.15847 - SFC - Specific Fuel Consumption, kg/kWh
 0.15347 - SFC_ISO - Specific Fuel Consumption in ISO, kg/kWh
 0.51631 - Eta_f - Efficiency of piston engine
 42.746 - IMEP - Indicated Mean Effective Pressure, bar
 0.53515 - Eta_i - Indicated Efficiency
 6.9333 - Sp - Mean Piston Speed, m/s
 1.5047 - FMEP - Friction Mean Effective Pressure, bar (MAHLE data)
 0.96480 - Eta_m - Mechanical Efficiency of Piston Engine

----- ENVIRONMENTAL PARAMETERS -----
 1.00000 - po_amb - Total Ambient Pressure, bar
 293.00 - To_amb - (20 C) Total Ambient Temperature, K
 1.0200 - p_Te - Exhaust Back Pressure, bar (after turbine)
 0.99000 - po_afltr - Total Pressure after Induction Air Filter, bar
 30.000 - Psi_H2O% - Relative Air Humidity, %
 0.00434 - H2O_vap.o- H2O Mass Fraction in the ambient Air

----- EXHAUST GAS RECIRCULATION SYSTEM (LP) -----
 0.06459 - EGR_lp - Exhaust Gas Recirculation Ratio in LP system
 1.0200 - p_egr.o - Pressure in the Line Supplying EGR, bar
 921.61 - T_egr.o - (648 C) Temperature in the Line Supplying EGR, K
 EGR Cooler #1 : dT= 593.3 K dp= 0.020 bar t_coolant= 36 C Ef=0.97
 0.09524 - H2O_vAfC - H2O Steam Fraction in EGR after EGR cooler
 0.0000 - H2O_wAfC - H2O Liquid Fraction in EGR after EGR cooler
 0.01021 - H2O_vCo - H2O Steam Fract. in EGR+Air mixture before Compressor
 0.0000 - H2O_wCo - H2O Liquid Frac. in EGR+Air mixture before Compressor
 0.01000 - dp_egr.lp- D.P. btw cooled EGR and intake air pipe, bar
 328.35 - T_egr.lp - (55 C) EGR Temperature before mixing, K
 0.00712 - m_egr - Exhaust Gas Recirculation Flow Rate, kg/s
 0.05127 - C_s.egr - Stoichiom. Burned Gas Fraction after mixing
 297.59 - T_mix - (24 C) Temperature of Air and EGR mixture, K
 0.99000 - p_mix - Pressure of Air and EGR mixture, bar
 0.11017 - m_air+egr- Mass Airflow + EGR through Engine Cylinders, kg/s
 0.11649 - m_gas+egr- Mass Exhaust Gasflow from Engine Cylinders, kg/s

----- TURBOCHARGING AND GAS EXCHANGE -----
 14.496 - p_C - Pressure before Inlet Manifold, bar
 314.77 - T_C - (42 C) Temperature before Inlet Manifold, K
 0.10305 - m_air - Total Mass Intake Airflow of the Engine, kg/s
 0.79728 - Eta_TC - Turbocharger Efficiency
 2.6060 - po_T - Average Total Turbine Inlet Pressure, bar

1099.5	- To_T	- (826 C) Average Total Turbine Inlet Temperature, K
0.10938	- m_gas	- Total Mass Exhaust Gasflow of the Engine, kg/s
1.2015	- A/F_eq.t	- Total Air Fuel Equivalence Ratio (Lambda)
0.83231	- F/A_eq.t	- Total Fuel Air Equivalence Ratio
0.20705	- Eta_v	- Volumetric Efficiency
0.11015	- x_r	- Residual Gas Mass Fraction
0.93020	- Phi	- Coeff. of Scavenging (Delivery Ratio / Eta_v)
0.0000	- BF_int	- Burnt Gas Fraction Backflowed into the Intake, %
0.0000	- %Blow-by	- % of Blow-by through piston rings
0.01961	- H2O_vap	- H2O Vapor Fract. in Cyl. Air after Gasexchange
0.01723	- H2O_liq	- H2O Liquid Fract. in Cyl. Air after Gasexchange
----- INTAKE SYSTEM -----		
0.99990	- Sig_pint	- Pressure Ratio in a Unit before Intake Manifold
14.471	- p_int	- Average Intake Manifold Pressure, bar
316.71	- T_int	- (44 C) Average Intake Manifold Temperature, K
0.88136	- v_int	- Average Gas Velocity in intake manifold, m/s
300.00	- Tw_int	- (27 C) Average Intake Manifold Wall Temperature, K
166.31	- hc_int	- Heat Transfer Coeff. in Intake Manifold, W/(m2*K)
280.00	- Tw_int.p	- (7 C) Average Intake Port Wall Temperature, K
297.04	- hc_int.p	- Heat Transfer Coeff. in Intake Port, W/(m2*K)
0.00393	- H2O_vap	- H2O Vapor Fract. in Air of Intake Manifold (average)
0.00633	- H2O_liq	- H2O Liquid Fract. in Air of Intake Manif. (average)
12.979	- A_v.thrt	- Total Effective Valve Port Throat Area, cm2
Valve Dim. Estim.: Num=2 Dv= 35.0 Dt= 30.0 Ds= 5.5 Lv= 7.1 Lv_desig= 8.8 mm		
----- EXHAUST SYSTEM -----		
1.9913	- p_exh	- Average Exhaust Manifold Gas Pressure, bar
987.87	- T_exh	- (715 C) Average Exhaust Manifold Gas Temperature, K
52.419	- v_exh	- Average Gas Velocity in exhaust manifold, m/s
56.749	- Sh	- Strouhal number: Sh=a*Tau/L (has to be: Sh > 8)
910.67	- Tw_exh	- (638 C) Average Exhaust Manifold Wall Temperature, K
281.42	- hc_exh	- Heat Transfer Coeff. in Exhaust Manifold, W/(m2*K)
452.85	- hc_exh.p	- Heat Transfer Coeff. in Exhaust Port, W/(m2*K)
0.0000	- H2O_vap	- H2O Vapor Fract. in Gas of Exhaust Manif. (average)
0.0000	- H2O_liq	- H2O Liquid Fract. in Gas of Exh. Manif. (average)
4.7360	- A_v.thrt	- Total Effective Valve Port Throat Area, cm2
Valve Dim. Estim.: Num=1 Dv= 32.0 Dt= 28.0 Ds= 5.5 Lv= 12.8 Lv_desig= 8.0 mm		
----- SYSTEM OF EXTRA EXHAUST -----		
16.000	- EEVO	- Extra Exhaust Valve Opening, CA deg. ABDC
97.000	- EEVC	- Extra Exhaust Valve Closing, CA deg. ABDC
40.000	- d_e.ex.0	- Extra Exh. Manifold Exit Orifice Diameter, mm
1.1068	- p_e.exh	- Average Pressure in Extra Exh. Manifold, bar
712.91	- T_e.exh	- (440 C) Aver. Temper. in EE Manif., K
29.951	- m_e.exh%	- Fraction [%] of gas exhausted via Extra system.
0.03489	- m_e.exh	- Mass flow rate trough Extra Exhaust system, kg/s
603.02	- Tw_ee	- (330 C) Aver. Wall Temperat. of EE Manifold, K
Valve parameters: Num=1 Dv= 29.0 Dt= 25.0 Ds= 5.0 Lv= 10.0 Lv_desig= 10.0 mm		
----- INJECTION OF MAIN FUEL SYSTEM "A" -----		
Fuel:	Diesel No. 2	C:0.870 H:0.126 O:0.004
System:	Pintle type injector	1 inj: 44 x 0.085 x 76.0
21.840	- MFR	- Mass Flow Rate of the (Fuel) System, kg/h
0.07000	- m_f	- Cycle mass delivered by the system , g
0.95890	- E_f_frac	- Fraction of Energy Supplied by this Fuel System
1076.2	- p_inj.max	- Max. Sac Injection Pres. (before nozzles), bar
384.82	- p_inj.avr	- Mean Sac Press. for Total Fuel Portion, bar
5.0000	- N_pilots	- Number of injected portions
9.7626	- d_32	- Sauter Mean Diameter of Drops, microns
24.544	- d_32.LD	- Diam. of Large Drops formed at inject. end, micron
80.000	- SOI	- Start of Injection or Ignition Timing, deg. B.TDC
31.500	- Dur_inj	- Duration of Injection, CA deg.
1.00000	- Phi_d1	- Durat. of First Phase of Fuel Flow Rise, deg.
1.00000	- Phi_d2	- Durat. of Secnd Phase of Fuel Flow Rise, deg.
0.50000	- C_inflex	- Rated Highness of F.Flow Rise Curve Inflexion
98.953	- Delay_ig	- Selfi-Ignition Delay Period (theoretic), deg. integral calculation by CHEMKIN for Diesel Oil
98.953	- Delay_ig	- Selfi-Ignition Delay Period (real), deg.
-18.953	- SOC	- Start of Combust. if no external ign., deg.B.TDC
-19.867	- SOC_Ex.Ig	- Start of Combust. with external ign., deg. B.TDC
0.99881	- x_Ev.Ig.D	- Fuel Mass Fraction Evaporated during Ignit. Delay

14.033 - Phi_z - Combustion Duration for this fuel system, deg.

----- INJECTION OF FUEL: SYSTEM "B" -----

Matter: H2O Inj. into Intake Port
System: Custom Fuel System
12.480 - MFR - Mass Flow Rate of the (Fuel) System, kg/h
0.03569 - m_f - Cycle mass delivered by the system , g
0.47446 - H2O/fuel - H2O mass rated to equiv. mass of diesel oil (42.7 MJ/kg)
51.000 - SOI - Start of Injection or Ignition Timing, deg. B.TDC
1.00000 - Dur_inj - Duration of Injection, CA deg.

----- INJECTION OF FUEL: SYSTEM "C" -----

Fuel: Diesel No. 2 C:0.870 H:0.126 O:0.004
System: Hole type injector 1 inj: 1 x 0.200 x 84.0
0.93600 - MFR - Mass Flow Rate of the (Fuel) System, kg/h
0.00300 - m_f - Cycle mass delivered by the system , g
0.04110 - E_f_frac - Fraction of Energy Supplied by this Fuel System
1498.5 - p_inj.max - Max. Sac Injection Pres. (before nozzles), bar
692.62 - p_inj.avr - Mean Sac Press. for Total Fuel Portion, bar
1.00000 - N_pilots - Number of injected portions
12.006 - d_32 - Sauter Mean Diameter of Drops, microns
30.995 - d_32.LD - Diam. of Large Drops formed at inject. end, micron
20.000 - SOI - Start of Injection or Ignition Timing, deg. B.TDC
7.2000 - Dur_inj - Duration of Injection, CA deg.
1.00000 - Phi_d1 - Durat. of First Phase of Fuel Flow Rise, deg.
1.00000 - Phi_d2 - Durat. of Secnd Phase of Fuel Flow Rise, deg.
0.50000 - C_inflex - Rated Highness of F.Flow Rise Curve Inflexion
40.117 - Delay_ig - Selfi-Ignition Delay Period (theoretic), deg.
integral calculation byCHEMKIN for Diesel Oil
39.487 - Delay_ig - Selfi-Ignition Delay Period (real), deg.
-19.487 - SOC - Start of Combust. if no external ign., deg.B.TDC
-19.865 - SOC_Ex.Ig - Start of Combust. with external ign., deg. B.TDC
0.99982 - x_Ev.Ig.D - Fuel Mass Fraction Evaporated during Ignit. Delay
49.935 - Phi_z - Combustion Duration for this fuel system, deg.

----- COMBUSTION -----

1.2123 - A/F_eq - Air Fuel Equival. Ratio (Lambda) in the Cylinder
0.82485 - F/A_eq - Fuel Air Equivalence Ratio in the Cylinder
242.17 - p_max - Maximum Cylinder Pressure, bar
2327.2 - T_max - (2054 C) Maximum Cylinder Temperature, K
26.000 - CA_p.max - Angle of Max. Cylinder Pressure, deg. A.TDC
28.000 - CA_t.max - Angle of Max. Cylinder Temperature, deg. A.TDC
3.8739 - dp/dTheta - Max. Rate of Pressure Rise, bar/deg.
1.3161 - Ring_Intn - Ringing / Knock Intensity, MW/m2
12331. - F_max - Max. Gas Force acting on the piston, kg
-19.865 - SOC - Start of Combustion (total), deg. B.TDC
13.682 - Phi_z - Combustion Duration (for 99% of fuel), deg.
Phi_z 5%= 3.3; Phi_z 50%= 6.0; Phi_z 95%= 10.4
1.8824 - Rs_tdc - Swirl Ratio in the Combustion Chamber at TDC
1.5787 - Rs_ivc - Swirl Ratio in the Cylinder at IVC
16.224 - W_swirl - Max. Air Swirl Velocity, m/s at cylinder R= 32
0.03619 - H2O_vap - H2O Vapor Fract. in Cyl. Air before Combustion
0.0000 - H2O_liq - H2O Liquid Fract. in Cyl. Air before Combust.
0.09524 - H2O_tot - H2O Vapor Fract. in Cyl. Gas after Combustion
0.07396 - H2O_stoi - H2O Vapor Fraction in Stoichiometric Burnt Gas

----- ECOLOGICAL PARAMETERS -----

4.3396 - Hartridge - Hartridge Smoke Level
0.47535 - Bosch - Bosch Smoke Number
0.10349 - K,m-1 - Factor of Absolute Light Absorption, 1/m
0.04510 - PM - Specific Particulate Matter emission, g/kWh
580.51 - CO2 - Specific Carbon dioxide emission, g/kWh
0.00117 - NO - Specif. NOx emiss. reduc. to NO, g/kWh (Zeldovich)
* Zeldovich's mechanism usage causes improbable decrease of NOx emission
at large recidual gas fraction and/or at multiple injection. Use DKM !
Contribution of each injected fuel portion in total emission of NOx
p01= 0.215 p02= 0.235 p03= 0.098 p04= 0.215 p05= 0.234 p06= 0.002
0.07525 - SE - Summary emission of PM and NOx (Complex #1)
0.0000 - SO2 - Specific SO2 emission, g/kWh

----- CYLINDER PARAMETERS -----

24.116 - p_ivc - Pressure at Compression Start (at IVC), bar

363.55	- T_ivc	- Temperature at Compression Start (at IVC), K
0.00146	- m_ivc	- Mass of Gas (incl. Resid.) in Cyl. at IVC, kg
0.08688	- C_ivc	- Stoich. Burnt Gas Fract. in Cyl. at IVC
0.00134	- m_a_ivc	- Mass of Air in Cylinder at IVC, kg
57.842	- p_340	- Pressure in Cylinder at 20 CA deg. BTDC, bar
162.57	- p_tdc	- Compression Pressure at TDC, bar
527.29	- T_tdc	- Compression Temperature at TDC, K
16.857	- p_evo	- Pressure in Cylinder at EVO, bar
1317.3	- T_evo	- Temperature in Cylinder at EVO, K

----- HEAT EXCHANGE IN THE CYLINDER -----

1050.0	- T_eq	- Average Equivalent Temperature of Cycle, K
858.80	- hc_c	- Aver. Factor of Heat Transfer in Cyl., W/m ² /K
700.00	- Tw_pist	- (427 C) Average Piston Crown Temperature, K
490.00	- Tw_lin.up	- (217 C) Upper Part Temp. of Cylind. Liner (near TDC), K
415.40	- Tw_lin.av	- (142 C) Average Cylinder Liner Temperature, K
400.00	- Tw_lin.dn	- (127 C) Lower End Temp. of Cylinder Liner (near BDC), K
470.00	- Tw_head	- (197 C) Average Head Wall Temperature, K
428.19	- Tw_cool	- (155 C) Average Temperature of Cooled Surface of Cylinder Head, K
398.16	- Tboil	- (125 C) Boiling Temp. in Liquid Cooling System, K
13191.	- hc_cool	- Average Factor of Heat Transfer, W/(m ² *K) from head cooled surface to coolant
2503.7	- q_head	- Heat Flow in a Cylinder Head, J/s
1510.8	- q_pist	- Heat Flow in a Piston Crown, J/s
182.54	- q_liner	- Heat Flow in a Cylinder Liner, J/s

----- MAIN ENGINE CONSTRUCTION PARAMETERS -----

29.984	- CR	- Compression Ratio
4.5689	- CR_opn.h	- CR in view of losses due to open height of porting
	 Inj. System A	
44	- n_noz.A	- Number of Injector Nozzles
0.85000E-01	- d_noz.A	- Injector Nozzles Bore, mm
0.0000	- Phi_in.A	- Injection Duration for specif. Inj. Profile, deg.
0.0000	- m_f_ip.A	- Fuel Mass for Specif. Injection Profile of Sys.A, g
	 Inj. System C	
1	- n_noz.C	- Number of Nozzles of Injection System C
0.20000	- d_noz.C	- Bore of all Nozzles of Injection Syst.C, mm
0.0000	- Phi_in.C	- Injection Duration for Sys.C specif. by Profile, deg.
0.0000	- m_f_ip.C	- Fuel Mass for Specif. Injection Profile of Sys.C, g
	 Ports timing	
-126.00	- IVO	- Intake Valve Opening, deg. before DC
144.00	- IVC	- Intake Valve Closing, deg. after BDC
61.000	- EVO	- Exhaust Valve Opening, deg. before BDC
112.00	- EVC	- Exhaust Valve Closing, deg. after DC

----- COMPRESSOR PARAMETERS LP stage -----

26000.	- RPM_C.lp	- Rotor Speed of LPC, rev/min
20.509	- P_C.lp	- Power of LP Compressor, kW
0.76000	- Eta_C.lp	- Adiabatic Efficiency of LP Compressor
0.11017	- m_C.lp	- Mass Airflow of LP Compressor, kg/sec
1.9196	- m*_C.lp	- Mass Airflow Parameter, kg SQRT(K)/(s bar)
0.11120	- m.cor_Clp	- Corrected Mass Airflow of LPC, kg/s
1507.2	- RPM*_C.lp	- Rotor Speed Parameter, rev/min SQRT(K)
26018.	- RPMcor_lp	- Corrected Rotor Speed, rev/min
3.8798	- PR_C.lp	- Pressure Ratio of LP Compressor
0.0000	- Kpi_C.lp	- Factor Kpi of LP Compressor
0.99000	- po_iC.lp	- Inlet Total Pressure of LPC, bar
297.59	- To_iC.lp	- (24 C) Inlet Total Temperature of LPC, K
3.8410	- po_"C.lp	- Total Discharge Press.(before LP cooler), bar
482.83	- To_"C.lp	- (210 C) Total Discharge Temp. (before LP cooler), K
0.96000	- Ecool.lp	- Thermal Efficiency of LP Air Inter-cooler
306.00	- Tcool.lp	- (33 C) LP Inter-cooler Refrigerant Temperature, K
7.0031	- A_cool	- Factor of pressure losses in the Inter-cooler
3.8210	- po_C.lp	- Total Pressure after LP Inter-cooler, bar
313.07	- To_C.lp	- (40 C) Total Temperature after LP Inter-cooler, K
0.00434	- H2O_vap	- H2O Vapor Mass Fraction in Air after Intercooler
0.0000	- H2O_liq	- H2O Liquid Mass Fraction in Air after Intercooler

----- COMPRESSOR PARAMETERS HP stage -----

26000.	- RPM_C.hp	- Rotor Speed of HPC, rev/min
17.304	- P_C.hp	- Power of HPC, kW

0.93000 - Eta_C.hp - Adiabatic Efficiency of HPC
0.11017 - m_C.hp - Mass Airflow of HP Compressor, kg/s
0.51015 - m*_C.hp - Mass Airflow Parameter, kg SQRT(K)/(s bar)
0.02955 - m_cor_Chp- Corrected Mass Airflow of HPC, kg/s
1469.4 - RPM*_C.hp- Rotor Speed Parameter, rev/min SQRT(K)
25366. - RPMcor_hp- Corrected Rotor Speed, rev/min
3.7991 - PR_C.hp - Pressure Ratio of HP Compressor
0.0000 - Kpi_C.hp - Factor Kpi of HP Compressor
3.8210 - po_iC.hp - Inlet Total Pressure of HPC, bar
313.07 - To_iC.hp - (40 C) Inlet Total Temperature of HPC, K
14.516 - po_"C.hp - Total Discharge Press. (before HP cooler), bar
469.36 - To_"C.hp - (196 C) Total Discharge Temp. (before HP cooler), K
0.97000 - Ecool.hp - Thermal Efficiency of HP Air Inter-cooler
310.00 - Tcool.hp - (37 C) HP Inter-cooler Refrigerant Temperature, K
26.425 - A_cool - Factor of pressure losses in the Inter-cooler
14.496 - po_C.hp - Total Pressure after Inter-cooler, bar
314.78 - To_C.hp - (42 C) Total Temperature after Inter-cooler, K
0.00362 - H2O_vap - H2O Vapor Mass Fraction in Air after Intercooler
0.72503E-03 - H2O_liq - H2O Liquid Mass Fraction in Air after Intercooler

----- TURBINE PARAMETERS HP stage -----
26000. - RPM_T.hp - HP Turbine Rotor Speed, rev/min
0.0000 - P_T.hp - Effective Power of HPT, kW
1.00000 - Eta_T.hp - Internal turbine Efficiency of HPT
0.97000 - Eta_mT.hp- Mechanical Efficiency of HPT
0.11649 - m_T.hp - Mass Gasflow of HPT, kg/s
0.01482 - m*_T.hp - Mass Gasflow Parameter, (kg SQRT(K))/(s kPa)
784.10 - RPM*_T.hp- Rotor Speed Parameter, rev/min SQRT(K)
1.00000 - PR_T.hp - Expansion Pressure Ratio of HPT
0.0000 - B_T.hp - Relative Work B=118.34 {1-PR**[(1-k)/k]} Eta_T
2.6060 - po_T.hp - Inlet Total Pressure of HPT, bar
1099.5 - To_T.hp - (826 C) Inlet Total Temperature of HPT, K
2.6060 - po_eT.hp - HP Turbine Exhaust Back Pressure, bar
1099.5 - To_eT.hp - (826 C) HP Turbine Exhaust Back Temperature, K

----- TURBINE PARAMETERS LP stage -----
26000. - RPM_T.lp - LP Turbine Rotor Speed, rev/min
20.507 - P_T.lp - Effective Power of LPT, kW
0.70537 - Eta_T.lp - Adiabatic Efficiency of LPT
0.97000 - Eta_mT.lp- Mechanical Efficiency of LPT
0.11649 - m_T.lp - Mass Gasflow of LPT, kg/s
0.01482 - m*_T.lp - Mass Gasflow Parameter, (kg SQRT(K))/(s kPa)
784.10 - RPM*_T.lp- Rotor Speed Parameter, rev/min SQRT(K)
2.5507 - PR_T.lp - Expansion Pressure Ratio of LPT
17.305 - B_T.lp - Relative Work B=118.34 {1-PR**[(1-k)/k]} Eta_T
2.6060 - po_T.lp - Inlet Total Pressure of LPT, bar
1099.5 - To_T.lp - (826 C) Inlet Total Temperature of LPT, K
1.0217 - po_eT.lp - LP Turbine Exhaust Back Pressure, bar
933.33 - To_eT.lp - (660 C) LP Turbine Exhaust Back Temperature, K

----- MULTIPLE INJECTION PARAMETERS -----

	Injection						Ignition		Large Drops	
	SOI	Fract.	Mass	Separ.	Durat.	d32	Delay	Burst	d32	Evapor
	[CA BTDC]		[g]	[CA]	[CA]	[micr]	[CA]	[CA]	[micr]	[CA]
Pilot 1	80.0	.200	.0140	--	5.2	10.5	100.	379.9	28	4
Pilot 2	73.4	.200	.0140	1.4	5.2	10.3	92.4	379.0	26	8
Pilot 3	66.8	.200	.0140	1.4	5.2	10.0	89.3	381.3	26	55
Pilot 4	60.2	.200	.0140	1.4	5.3	9.9	80.1	379.7	27	60
Pilot 5	53.5	.200	.0140	1.4	5.0	8.5	72.5	379.0	17	44
Main **	20.0	1.00	.0030	28.5	7.2	12.0	40.1	379.9	30	48

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THE ALLOCATION OF FUEL IN THE ZONES AT THE END OF INJECTION

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N	In plan	Spray	Impingment	Fractions of fuel in the zones %					
s	Angle	Angle	Surface	Dilut.	S.Core	Piston	Inters.	Head	Liner
1	0.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00
2	8.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00
3	16.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00
4	24.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00

5	32.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00
6	40.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00
7	48.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00
8	56.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00
9	64.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00
10	72.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00
11	80.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00
12	88.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00
13	96.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00
14	104.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00
15	112.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00
16	120.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00
17	128.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00
18	136.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00
19	144.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00
20	152.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00
21	160.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00
22	168.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00
23	176.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00
24	-176.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00
25	-168.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00
26	-160.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00
27	-152.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00
28	-144.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00
29	-136.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00
30	-128.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00
31	-120.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00
32	-112.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00
33	-104.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00
34	-96.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00
35	-88.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00
36	-80.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00
37	-72.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00
38	-64.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00
39	-56.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00
40	-48.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00
41	-40.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00
42	-32.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00
43	-24.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00
44	-16.0	38.0	not imping	1.77	0.38	0.00	0.00	0.00	0.00

Sum for system : "A" % 95. | 78.04 16.56 0.00 0.00 0.00 0.00

45 | 129.0 | 84.0 | pist. bowl | 85.51 3.43 9.09 0.00 0.00 1.98

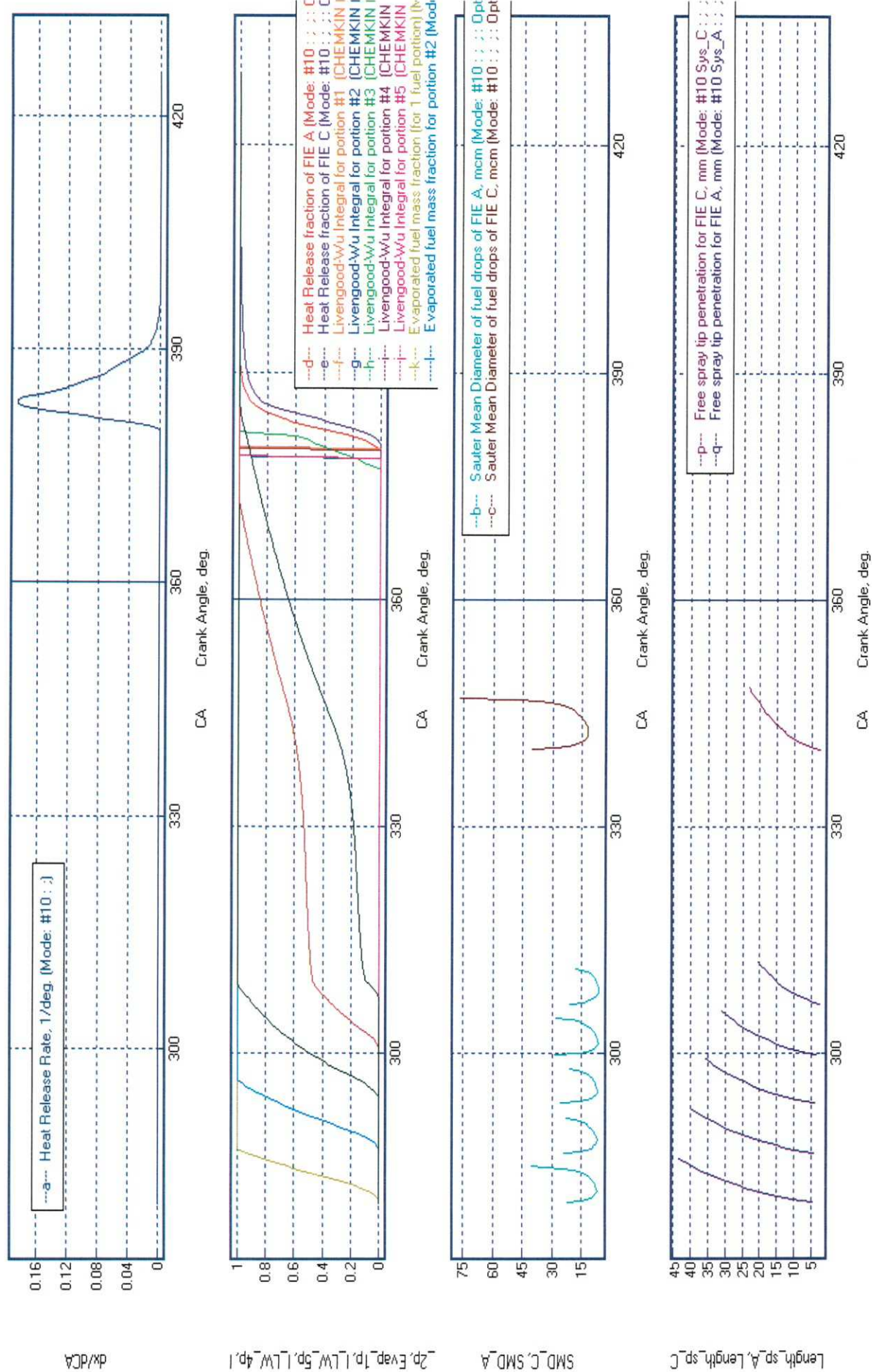
Sum for system : "C" % 100. | 85.51 3.43 9.09 0.00 0.00 1.98

Evaporation constants bi 753 3080 452 382 76 18

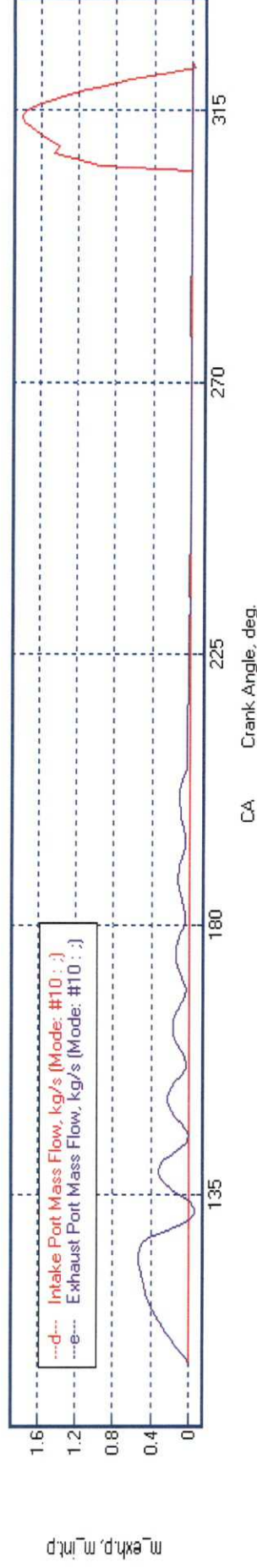
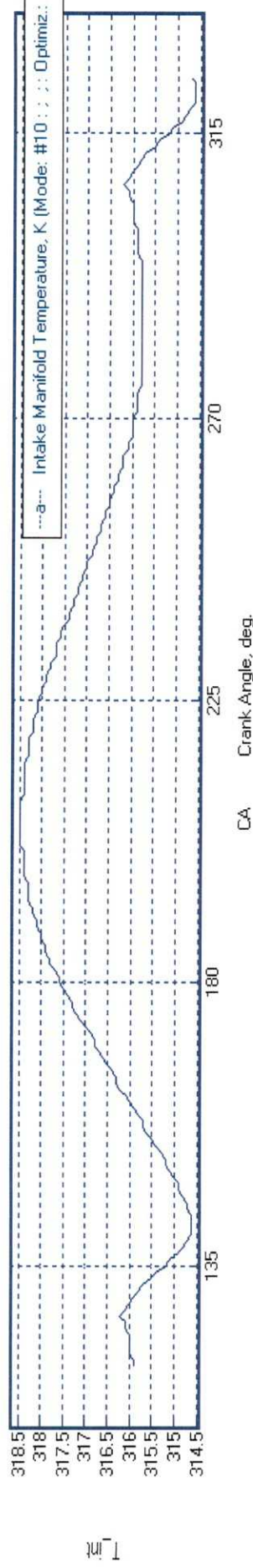
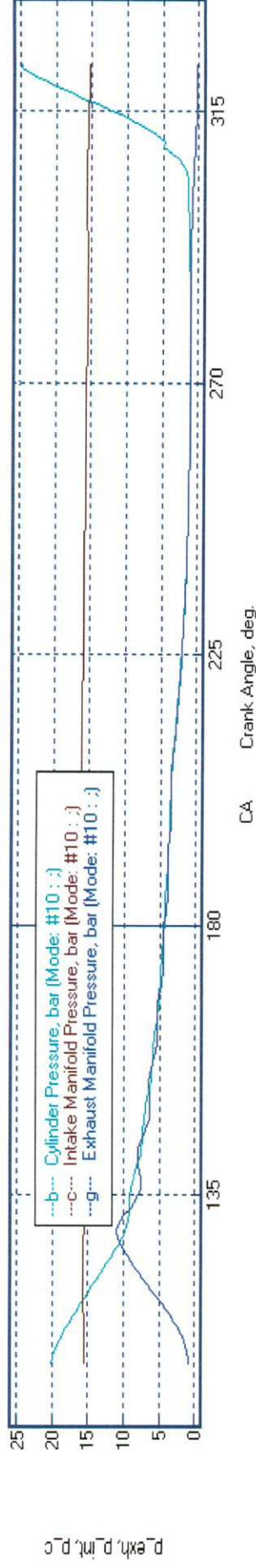
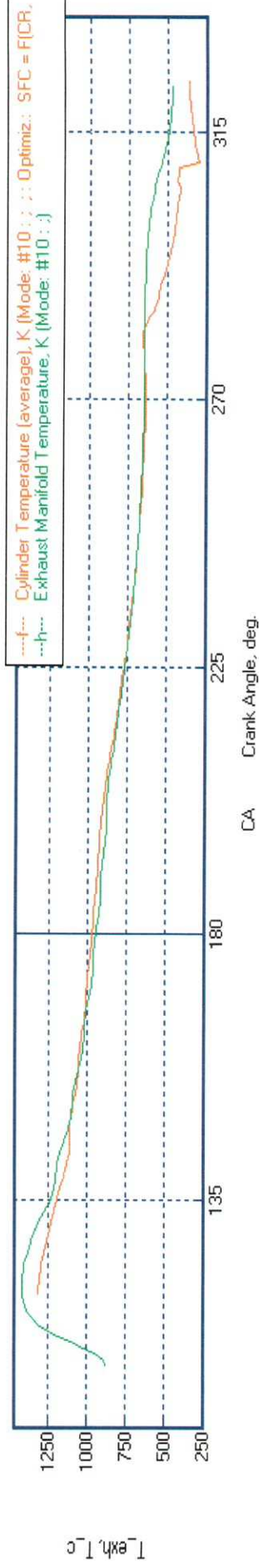
The note: "Inters." is column with fraction of fuel in a zone of
intersection of Near-Wall Flows formed by adjacents sprays.
Rs:Swirl | (Piston clearance,mm 1.00) |Optimal|-Geometric formula: 0.26
Ratio | Rs of piston bowl 1.88 | Rs |-by Razleytsev : 0.26

Vers: 5.2.0.33 (Kernel 17.12.19; RK-model 21.12.19; NOx-model 06.12.19)

Diesel - RK: &Fuel Injection and Heat Release



Diesel - RK: & Gas Exchange



Diesel - RK: &In-cylinder Parameters

