

2021-02-19 13-31-57-165 Z-engine with Extra Exhaust valve 15D Optimiz.

Mode: #10 : aaaa;

Title: 10 mm Monte-Carlo metod against PSO

www.diesel-rk.com

Fuel: Diesel No. 2

----- PARAMETERS OF ENGINE WITH TURBOCOMPAUNDING OR SUPERCHARGING -----

40.428	- P_ovrl	- Overall Power with account of geared units, kW
-3.4036	- dP_add	- Power added by geared Turb/Comp/TC/EGR compressor, kW
244.36	- Torq_ovrl	- Overall Torque in view of geared T/C/TC/EGR_comp., N m
19.089	- BMEP_ovrl	- Overall BMEP, bar
0.14547	- SFC_ovrl	- Overall Specific Fuel Consumption, kg/kWh
0.13850	- SFC_o.ISO	- Same Specific Fuel Consumption but in ISO, kg/kWh
0.54995	- Eta_ovrl	- Overall Engine Efficiency
10.0000	- R_gear	- Gear ratio of TK speed reducer
1.00000	- Eta_mC.hp	- Mechanical Efficiency of HPC
-3.4055	- 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
0.00186	- dPdrv_lp	- Power added by geared Unit of LP stage, kW

----- PARAMETERS OF EFFICIENCY AND POWER -----

1580.0	- RPM	- Engine Speed, rev/min
43.832	- P_eng	- Piston Engine Power, kW
20.696	- BMEP	- Brake Mean Effective Pressure, bar
264.93	- Torque	- Brake Torque, N m
5.8810	- MFR	- Mass Flow Rate of the (Fuel) System, kg/h
0.03102	- m_f	- Mass of Fuel Supplied per cycle, g
0.03269	- m_f 42.7	- Cycle Fuel Mass of all fuels given to diesel (42.7 MJ/kg)
0.13417	- SFC	- Specific Fuel Consumption, kg/kWh
0.12775	- SFC_ISO	- Specific Fuel Consumption in ISO, kg/kWh
0.59625	- Eta_f	- Efficiency of piston engine
21.524	- IMEP	- Indicated Mean Effective Pressure, bar
0.62009	- Eta_i	- Indicated Efficiency
4.2133	- Sp	- Mean Piston Speed, m/s
0.82735	- FMEP	- Friction Mean Effective Pressure, bar (MAHLE data)
0.96156	- 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) -----

0.0000	- EGR_lp	- Exhaust Gas Recirculation Ratio in LP system
1.0200	- p_egr.o	- Pressure in the Line Supplying EGR, bar
722.57	- T_egr.o	- (449 C) Temperature in the Line Supplying EGR, K
EGR Cooler #1 : dT= 400.2 K dp= 0.020 bar t_coolant= 36 C Ef=0.97		
0.0000	- H2O_v.AC	- H2O Steam Fraction in EGR after EGR cooler
0.0000	- H2O_w.AC	- H2O Liquid Fraction in EGR after EGR cooler
0.00434	- H2O_v.Com	- H2O Steam Fract. in EGR+Air mixture before Compressor
0.0000	- H2O_w.Com	- H2O Liquid Frac. in EGR+Air mixture before Compressor
0.01000	- dp_egr.lp	- D.P. btw cooled EGR and intake air pipe, bar
322.38	- T_egr.lp	- (49 C) EGR Temperature before mixing, K
0.0000	- m_egr	- Exhaust Gas Recirculation Flow Rate, kg/s
0.0000	- C_s.egr	- Stoichiom. Burned Gas Fraction after mixing
293.00	- T_mix	- (20 C) Temperature of Air and EGR mixture, K
0.99000	- p_mix	- Pressure of Air and EGR mixture, bar

----- TURBOCHARGING AND GAS EXCHANGE -----

6.0728	- p_C	- Pressure before Inlet Manifold, bar
318.71	- T_C	- (46 C) Temperature before Inlet Manifold, K
0.02724	- m_air	- Total Mass Intake Airflow of the Engine, kg/s
0.80729	- Eta_TC	- Turbocharger Efficiency
1.8576	- po_T	- Average Total Turbine Inlet Pressure, bar
801.34	- To_T	- (528 C) Average Total Turbine Inlet Temperature, K
0.02771	- m_gas	- Total Mass Exhaust Gasflow of the Engine, kg/s

1.1370	- A/F_eq.t	- Total Air Fuel Equivalence Ratio (Lambda)
0.87950	- F/A_eq.t	- Total Fuel Air Equivalence Ratio
0.21896	- Eta_v	- Volumetric Efficiency
0.24850	- x_r	- Residual Gas Mass Fraction
0.88395	- 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
0.02447	- H2O_vap	- H2O Vapor Fract. in Cyl. Air after Gasexchange
0.0000	- H2O_liq	- H2O Liquid Fract. in Cyl. Air after Gasexchange

----- INTAKE SYSTEM -----

0.99992	- Sig_pint	- Pressure Ratio in a Unit before Intake Manifold
6.0675	- p_int	- Average Intake Manifold Pressure, bar
311.60	- T_int	- (38 C) Average Intake Manifold Temperature, K
0.02724	- m_int	- Intake Manifold Mass Air (+ EGR) Flow, kg/s
0.51169	- v_int	- Average Gas Velocity in intake manifold, m/s
300.00	- Tw_int	- (27 C) Average Intake Manifold Wall Temperature, K
94.513	- hc_int	- Heat Transfer Coeff. in Intake Manifold, W/(m2*K)
280.00	- Tw_int.p	- (7 C) Average Intake Port Wall Temperature, K
212.77	- hc_int.p	- Heat Transfer Coeff. in Intake Port, W/(m2*K)
0.00434	- H2O_vap	- H2O Vapor Fract. in Air of Intake Manifold (average)
0.0000	- 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= 6.6 Lv_desig= 8.8 mm

----- EXHAUST SYSTEM -----

1.8461	- p_exh	- Average Exhaust Manifold Gas Pressure, bar
762.90	- T_exh	- (490 C) Average Exhaust Manifold Gas Temperature, K
0.02772	- m_exh	- Exhaust Manifold Mass Gas Flow, kg/s
14.540	- v_exh	- Average Gas Velocity in exhaust manifold, m/s
29.600	- Sh	- Strouhal number: Sh=a*Tau/L (has to be: Sh > 8)
690.30	- Tw_exh	- (417 C) Average Exhaust Manifold Wall Temperature, K
106.30	- hc_exh	- Heat Transfer Coeff. in Exhaust Manifold, W/(m2*K)
185.35	- 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)
9.4719	- A_v.thrt	- Total Effective Valve Port Throat Area, cm2

Valve Dim. Estim.: Num=2 Dv= 32.0 Dt= 28.0 Ds= 5.5 Lv= 7.6 Lv_desig= 8.0 mm

----- SYSTEM OF EXTRA EXHAUST -----

90.000	- EEVO	- Extra Exhaust Valve Opening, CA deg. ABDC
100.000	- EEVC	- Extra Exhaust Valve Closing, CA deg. ABDC
20.000	- d_e.ex.0	- Extra Exh. Manifold Exit Orifice Diameter, mm
1.0269	- p_e.exh	- Average Pressure in Extra Exh. Manifold, bar
567.29	- T_e.exh	- (294 C) Aver. Temper. in EE Manif., K
5.0324	- m_e.exh%	- Fraction [%] of gas exhausted via Extra system.
0.00147	- m_e.exh	- Mass flow rate through Extra Exhaust system, kg/s
491.65	- Tw_ee	- (218 C) Aver. Wall Temperat. of EE Manifold, K

Valve parameters: Num=1 Dv= 25.0 Dt= 20.0 Ds= 5.0 Lv= 5.0 Lv_desig= 6.0 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 0.109 x 76.0
1.00000	- Protr.A	- Protrusion of the nozzles below cylind. head plane, mm
38.000	- Alf_noz.A	- Spray inclination angle to vertical axis, deg.
5.6880	- MFR	- Mass Flow Rate of the (Fuel) System, kg/h
0.03000	- m_f.A	- Cycle mass delivered by the system A, g
0.96719	- E_f_frac	- Fraction of Energy Supplied by this Fuel System
321.62	- p_inj.m.A	- Max. Sac Injection Pres. (before nozzles), bar
108.21	- p_inj.avr	- Mean Sac Press. for Total Fuel Portion, bar
4.0000	- N_pilots	- Number of injected portions
16.947	- d_32.A	- Sauter Mean Diameter of Drops, microns
46.629	- d_32.LD	- Diam. of Large Drops formed at inject. end, micron
84.000	- SOI	- Start of Injection of system, CA deg. B.TDC
84.000	- SOI_main	- SOI of Main portion of Sys. , CA deg. BTDC
12.700	- 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
91.053	- Delay_ig	- Selfi-Ignition Delay Period (theoretic), deg.
		integral calculation by CHEMKIN for Diesel Oil
88.000	- Delay_ig	- Selfi-Ignition Delay Period (real), deg.

-4.0000 - SOC - Start of Combust. if no external ign., deg.B.TDC
 -4.0000 - SOC_Ex.Ig- Start of Combust. with external ign., deg. B.TDC
 0.99794 - x_Ev.Ig.D- Fuel Mass Fraction Evaporated during Ignit. Delay
 0.0000 - S_liner.A- Fuel fraction of system A allocated on liner, %
 15.201 - Phi_z - Combustion Duration for this fuel system, deg.

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

Matter: H2O Inj. into Intake Port
 System: Custom Fuel System
 1.1376 - MFR - Mass Flow Rate of the (Fuel) System, kg/h
 0.00600 - m_f.B - Cycle mass delivered by the system B, g
 0.18347 - H2O/fuel - H2O mass rated to equiv. mass of diesel oil (42.7 MJ/kg)
 55.000 - SOI - Start of Injection of system, CA deg. B.TDC
 3.0000 - 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
 1.00000 - Protr.C - Protrusion of the nozzles below cylind. head plane, mm
 84.000 - Alf_noz.C- Spray inclination angle to vertical axis, deg.
 0.19297 - MFR - Mass Flow Rate of the (Fuel) System, kg/h
 0.00102 - m_f.C - Cycle mass delivered by the system C, g
 0.03281 - E_f_frac - Fraction of Energy Supplied by this Fuel System
 678.57 - p_inj.m.A- Max. Sac Injection Pres. (before nozzles), bar
 265.61 - p_inj.avr- Mean Sac Press. for Total Fuel Portion, bar
 1.00000 - N_pilots - Number of injected portions
 15.969 - d_32.A - Sauter Mean Diameter of Drops, microns
 41.416 - d_32.LD - Diam. of Large Drops formed at inject. end, micron
 3.5661 - SOI - Start of Injection of system, CA deg. B.TDC
 3.5661 - SOI_main - SOI of Main portion of Sys. , CA deg. BTDC
 2.5000 - 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
 7.5661 - Delay_ig - Selfi-Ignition Delay Period (theoretic), deg.
 integral calculation by CHEMKIN for Diesel Oil
 7.5661 - Delay_ig - Selfi-Ignition Delay Period (real), deg.
 -4.0000 - SOC - Start of Combust. if no external ign., deg.B.TDC
 -4.0000 - SOC_Ex.Ig- Start of Combust. with external ign., deg. B.TDC
 0.99605 - x_Ev.Ig.D- Fuel Mass Fraction Evaporated during Ignit. Delay
 0.0000 - S_liner.C- Fuel fraction of system C allocated on liner, %
 68.600 - Phi_z - Combustion Duration for this fuel system, deg.

----- COMBUSTION -----

1.3004 - A/F_eq - Air Fuel Equival. Ratio (Lambda) in the Cylinder
 0.76897 - F/A_eq - Fuel Air Equivalence Ratio in the Cylinder
 257.41 - p_max - Maximum Cylinder Pressure, bar
 2291.5 - T_max - (2018 C) Maximum Cylinder Temperature, K
 11.000 - CA_p.max - Angle of Max. Cylinder Pressure, deg. A.TDC
 14.000 - CA_T.max - Angle of Max. Cylinder Temperature, deg. A.TDC
 8.5567 - dp/dTheta- Max. Rate of Pressure Rise, bar/deg.
 2.2136 - Ring_Intn- Ringing / Knock Intensity, MW/m2
 13107. - F_max - Max. Gas Force acting on the piston, kg
 -4.0000 - SOC - Start of Combustion (total), deg. B.TDC
 14.598 - Phi_z - Combustion Duration (for 99% of fuel), deg.
 Phi_z 5%= 3.6; Phi_z 50%= 6.9; Phi_z 95%= 11.8
 2.1014 - Rs_tdc - Swirl Ratio in the Combustion Chamber at TDC
 1.9558 - Rs_ivc - Swirl Ratio in the Cylinder at IVC
 12.519 - W_swirl - Max. Air Swirl Velocity, m/s at cylinder R= 33
 0.0000 - H2O_vap - H2O Vapor Fract. in Cyl. Air before Combustion
 0.0000 - H2O_liq - H2O Liquid Fract. in Cyl. Air before Combust.
 0.06025 - H2O_tot - H2O Vapor Fract. in Cyl. Gas after Combustion
 0.07396 - H2O_stoi - H2O Vapor Fraction in Stoichiometric Burnt Gas

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

3.9883 - Hartridge- Hartridge Smoke Level
 0.43682 - Bosch - Bosch Smoke Number
 0.09496 - K,m-1 - Factor of Absolute Light Absorption, 1/m
 0.02862 - PM - Specific Particulate Matter emission, g/kWh
 468.73 - CO2 - Specific Carbon dioxide emission, g/kWh
 0.58158E-04 - NO - Specif. NOx emiss. reduc. to NO, g/kWh (Zeldovich)

* Zeldovich's mechanism usage causes improbable decrease of NOx emission

at large residual gas fraction and/or at multiple injection. Use DKM !
 Contribution of each injected fuel portion in total emission of NOx
 p01= 0.201 p02= 0.248 p03= 0.248 p04= 0.295 p05= 0.008
 0.04770 - SE - Summary emission of PM and NOx (Complex #1)
 0.0000 - SO2 - Specific SO2 emission, g/kWh

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

7.1795 - p_ivc - Pressure at Compression Start (at IVC), bar
 341.73 - T_ivc - (69 C) Temperature at Compression Start (at IVC), K
 0.73281E-03 - m_ivc - Mass of Gas (incl. Resid.) in Cyl. at IVC, kg
 0.20224 - C_ivc - Stoich. Burnt Gas Fract. in Cyl. at IVC
 0.58460E-03 - m_air.ivc - Mass of Air in Cylinder at IVC, kg
 40.806 - p_340 - Pressure in Cylinder at 20 CA deg. BTDC, bar
 120.77 - p_tdc - Compression Pressure at TDC, bar
 742.34 - T_tdc - (469 C) Compression Temperature at TDC, K
 5.0364 - p_evo - Pressure in Cylinder at EVO, bar
 941.24 - T_evo - (668 C) Temperature in Cylinder at EVO, K

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

1278.3 - T_eq - (1005 C) Average Equivalent Temperature of Cycle, K
 434.20 - hc_c - Aver. Factor of Heat Transfer in Cyl., W/m²/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
 415.55 - 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
 418.71 - Tw_cool - (146 C) Average Temperature of Cooled Surface
 head of Cylinder Head, K
 398.16 - Tboil - (125 C) Boiling Temp. in Liquid Cooling System, K
 12575. - hc_cool - Average Factor of Heat Transfer, W/(m²*K)
 from head cooled surface to coolant
 1764.2 - q_head - Heat Flow in a Cylinder Head, J/s
 1262.1 - q_pist - Heat Flow in a Piston Crown, J/s
 56.417 - q_liner - Heat Flow in a Cylinder Liner, J/s

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

32.000 - CR - Compress. Ratio (if OP then both pistons are at TDC)
 7.7437 - 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
 0.10884 - d_noz.A - Injector Nozzles Bore, mm
 0.0000 - Dur_inj.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 - Dur_injC - 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
 -121.00 - IVO - Intake Valve Opening, deg. before DC
 131.00 - IVC - Intake Valve Closing, deg. after BDC
 28.000 - EVO - Exhaust Valve Opening, deg. before BDC
 102.00 - EVC - Exhaust Valve Closing, deg. after DC

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

15800. - RPM_C.lp - Rotor Speed of LPC, rev/min
 2.3243 - P_C.lp - Power of LP Compressor, kW
 0.76000 - Eta_C.lp - Adiabatic Efficiency of LP Compressor
 0.02692 - m_C.lp - Mass Airflow of LP Compressor, kg/sec
 0.46544 - m*_C.lp - Mass Airflow Parameter, kg SQRT(K)/(s bar)
 0.02696 - m_cor_Clp - Corrected Mass Airflow of LPC, kg/s
 923.05 - RPM*_C.lp - Rotor Speed Parameter, rev/min SQRT(K)
 15934. - RPMcor_lp - Corrected Rotor Speed, rev/min
 2.0221 - 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
 293.00 - To_iC.lp - (20 C) Inlet Total Temperature of LPC, K
 2.0019 - po_C.lp - Total Discharge Press. (before LP cooler), bar
 378.91 - To_C.lp - (106 C) Total Discharge Temp. (before LP cooler), K
 0.96000 - Ecool.lp - Thermal Efficiency of LP Air Inter-cooler
 310.00 - Tcool.lp - (37 C) LP Inter-cooler Refrigerant Temperature, K
 60.896 - A_cool - Factor of pressure losses in the Inter-cooler

1.9819 - po_C.lp - Total Pressure after LP Inter-cooler, bar
312.76 - 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 -----

15800. - RPM_C.hp - Rotor Speed of HPC, rev/min
3.4055 - P_C.hp - Power of HPC, kW
0.94000 - Eta_C.hp - Adiabatic Efficiency of HPC
0.02692 - m_C.hp - Mass Airflow of HP Compressor, kg/s
0.24021 - m*_C.hp - Mass Airflow Parameter, kg SQRT(K)/(s bar)
0.01392 - m.cor_Chp - Corrected Mass Airflow of HPC, kg/s
893.42 - RPM*_C.hp - Rotor Speed Parameter, rev/min SQRT(K)
15423. - RPMcor_hp - Corrected Rotor Speed, rev/min
3.0743 - PR_C.hp - Pressure Ratio of HP Compressor
0.0000 - Kpi_C.hp - Factor Kpi of HP Compressor
1.9819 - po_iC.hp - Inlet Total Pressure of HPC, bar
312.76 - To_iC.hp - (40 C) Inlet Total Temperature of HPC, K
6.0928 - po_"C.hp - Total Discharge Press. (before HP cooler), bar
438.63 - To_"C.hp - (165 C) Total Discharge Temp. (before HP cooler), K
0.97000 - Ecool.hp - Thermal Efficiency of HP Air Inter-cooler
315.00 - Tcool.hp - (42 C) HP Inter-cooler Refrigerant Temperature, K
183.11 - A_cool - Factor of pressure losses in the Inter-cooler
6.0728 - po_C.hp - Total Pressure after Inter-cooler, bar
318.71 - To_C.hp - (46 C) Total Temperature after 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

----- TURBINE PARAMETERS HP stage -----

15800. - 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
0.02624 - m_T.hp - Mass Gasflow of HPT, kg/s
0.00400 - m*_T.hp - Mass Gasflow Parameter, (kg SQRT(K))/(s kPa)
558.15 - 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
1.8576 - po_T.hp - Inlet Total Pressure of HPT, bar
801.34 - To_T.hp - (528 C) Inlet Total Temperature of HPT, K
1.8576 - po_eT.hp - HP Turbine Exhaust Back Pressure, bar
801.34 - To_eT.hp - (528 C) HP Turbine Exhaust Back Temperature, K

----- TURBINE PARAMETERS LP stage -----

15800. - RPM_T.lp - LP Turbine Rotor Speed, rev/min
2.3261 - 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
0.02624 - m_T.lp - Mass Gasflow of LPT, kg/s
0.00400 - m*_T.lp - Mass Gasflow Parameter, (kg SQRT(K))/(s kPa)
558.15 - RPM*_T.lp - Rotor Speed Parameter, rev/min SQRT(K)
1.8238 - PR_T.lp - Expansion Pressure Ratio of LPT
11.562 - B_T.lp - Relative Work $B=118.34 \{1-PR^{**}[(1-k)/k]\}$ Eta_T
1.8576 - po_T.lp - Inlet Total Pressure of LPT, bar
801.34 - To_T.lp - (528 C) Inlet Total Temperature of LPT, K
1.0186 - po_eT.lp - LP Turbine Exhaust Back Pressure, bar
720.98 - To_eT.lp - (448 C) LP Turbine Exhaust Back Temperature, K

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

Portion	Injection						Ignition		Large Drops	
in	SOI	Fract.	Mass	Separ.	Durat.	d32	Delay	SOC	d32	Evapor
System	[CA BTDC]		[g]	[CA]	[CA]	[micr]	[CA]	[CA]	[micr]	[CA]
Main A	84.0	.200	.0060	1.4	1.9	18.3	91.1	364.0	44	50
Post 1A	80.7	.250	.0075	1.4	2.2	17.5	87.9	364.0	48	63
Post 2A	77.1	.250	.0075	1.4	2.1	16.8	84.7	364.0	48	64
Post 3A	73.6	.300	.0090	67.7	2.3	15.9	80.7	364.0	44	59
Main C	3.6	1.00	.0010	*****	2.6	16.0	11.7	364.0	41	15

"Delay" here is estimated in theory (if no ignition from other source)

"Large Droplets" are forming at the end of injection of every portion

"Evapor" means a duration of complete evaporation of Large Droplets

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

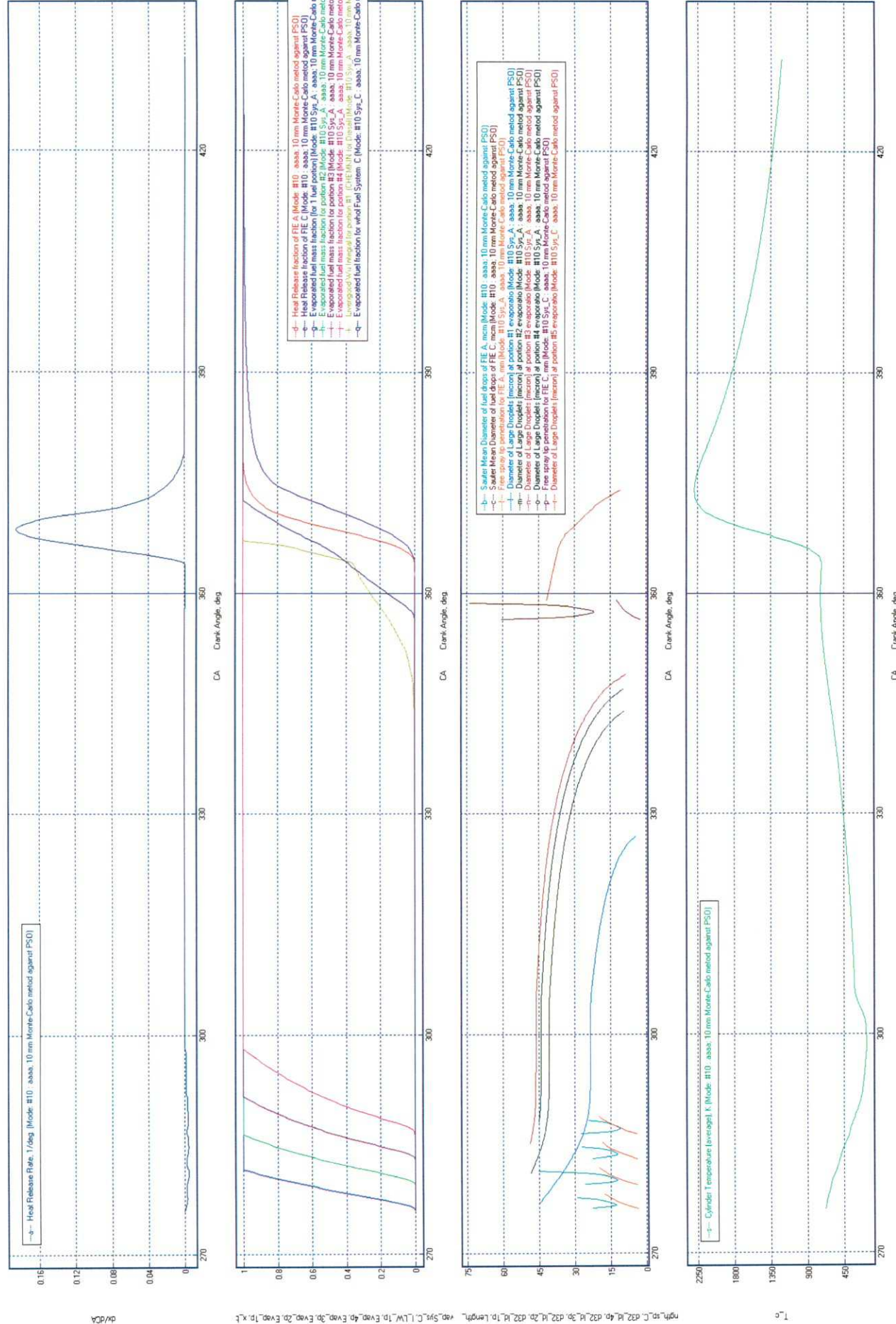
N	In plan s Angle	Spray Angle	Impingement Surface	Fractions of fuel in the zones %					
				Dilut.	S.Core	Piston	Inters.	Head	Liner
1	0.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
2	8.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
3	16.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
4	24.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
5	32.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
6	40.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
7	48.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
8	56.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
9	64.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
10	72.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
11	80.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
12	88.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
13	96.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
14	104.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
15	112.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
16	120.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
17	128.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
18	136.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
19	144.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
20	152.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
21	160.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
22	168.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
23	176.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
24	-176.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
25	-168.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
26	-160.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
27	-152.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
28	-144.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
29	-136.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
30	-128.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
31	-120.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
32	-112.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
33	-104.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
34	-96.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
35	-88.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
36	-80.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
37	-72.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
38	-64.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
39	-56.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
40	-48.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
41	-40.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
42	-32.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
43	-24.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
44	-16.0	38.0	not imping	0.90	1.05	0.00	0.00	0.00	0.00
Sum for system : "A" %				86.	39.52	46.32	0.00	0.00	0.00
45	129.0	84.0	not imping	85.36	7.44	0.00	0.00	0.00	0.00
Sum for system : "C" %				93.	85.36	7.44	0.00	0.00	0.00
Evaporation constants bi				1203	1852	296	250	125	67

The note: "Inters." is column with fraction of fuel in a zone of intersection of Near-Wall Flows formed by adjacents sprays.

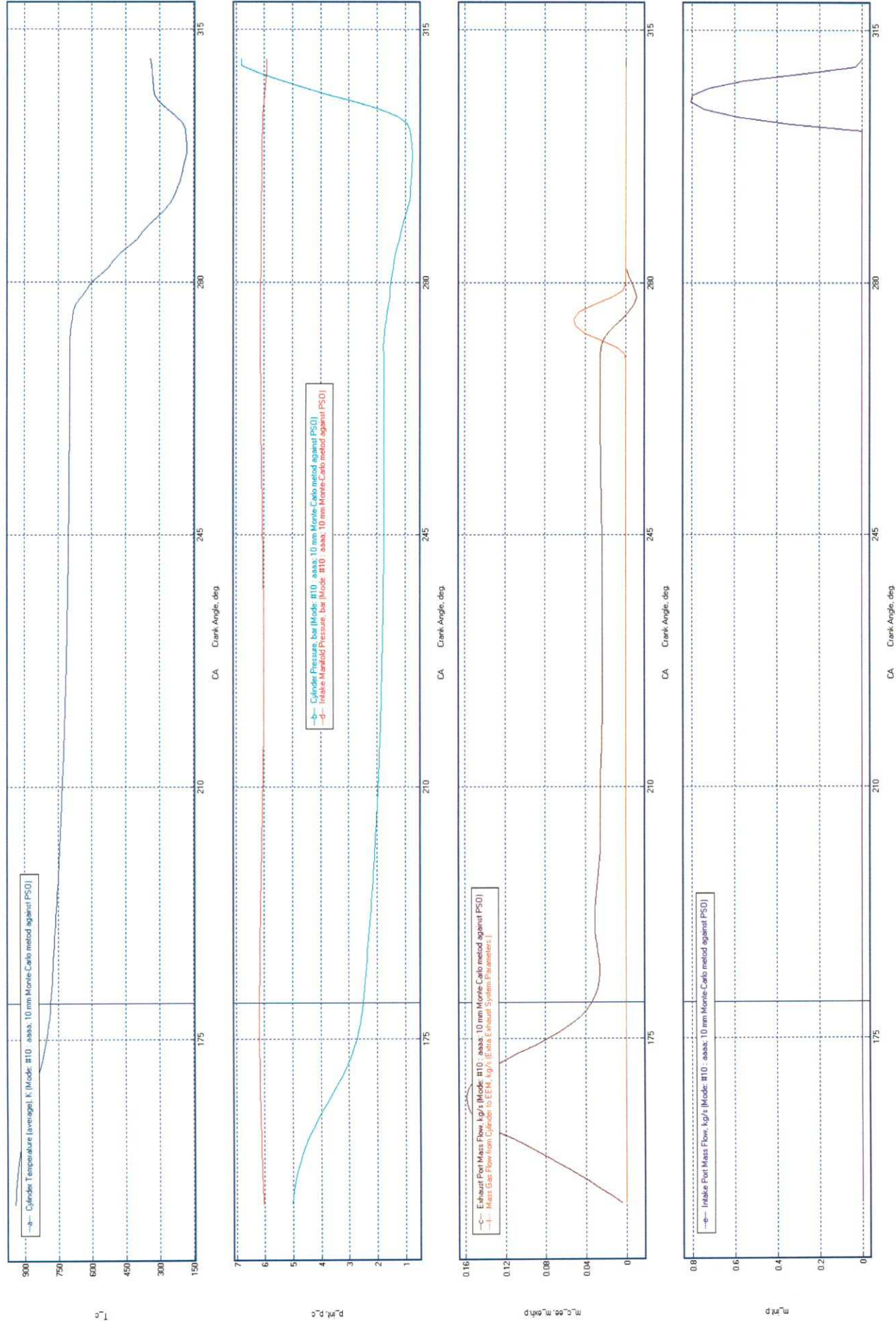
Rs:Swirl (Piston clearance,mm 0.00) |Optimal|-Geometric formula: 0.64
Ratio | Rs of piston bowl 2.10 | Rs |-by Razleytsev : 0.64

Vers: 5.2.0.33 (Kernel 19.04.20; RK-model 19.04.20; NOx-model 26.05.20)

Diesel - RK: &Fuel Injection and Heat Release



Diesel - RK: &Gas Exchange



Diesel - RK: &In-cylinder Parameters

