

Overall Information

Table1- Overall Information

Vehicle plate number	78524
CPK data logger number	LN: 001443, DN: 1930, Sim +989218786219
Bus line	Number 4 (south to north Bus line)
Bus Terminals	Tehran South Bus Terminal - Park Way Bus Terminal
Total path distance	22.8 km
DPF producer company	PURIttech (Passive system with FBC)
Installation date	28/Jan/2015
Report period	16/Aug/2015 – 31/Aug/2015 (sixteen days)
K value – DPF upstream	1.80 [1/m]
K value – DPF downstream	0.02 [1/m]

Table 2- DPF Maintenance History

Filter maintenance date	DPF core was removed on Jul 22 nd and was cleaned on Aug 12 th .*
Dosing status	Dosing value has been kept constant from installation date until now.

Table 3- Fuel and Additive Consumption Information

Bus mileage (from DPF installation date)	31427 km
Bus mileage over the period	2674 km
Working days over the period	14 days
Stop days	2 days
Data logger working days	14 days
Working hours over the period	185 hours 49 minutes
Average working hours per day (including stop days)	11 hours 36 minutes
Bus average speed	14.39 km/hr
Idle speed time to all working time ration	-
Total Bus fuel consumption over the period	1742 lit
Fuel consumption per hour	9.37 lit/hr
Average fuel consumption	0.65 lit/km
Total Bus additive consumption over the period	-
Average additive consumption	-
Additive consumption to fuel ration	-

Notice: Due to some technical problem related to data logger, rpm data missed. So parameters like idling speed was left blank.

Notice: Because of additive hose problem, system didn't get enough additive during this period. Also additive consumption value in DPF during this period is unavailable.

Temperature, Pressure and Engine Speed Overview

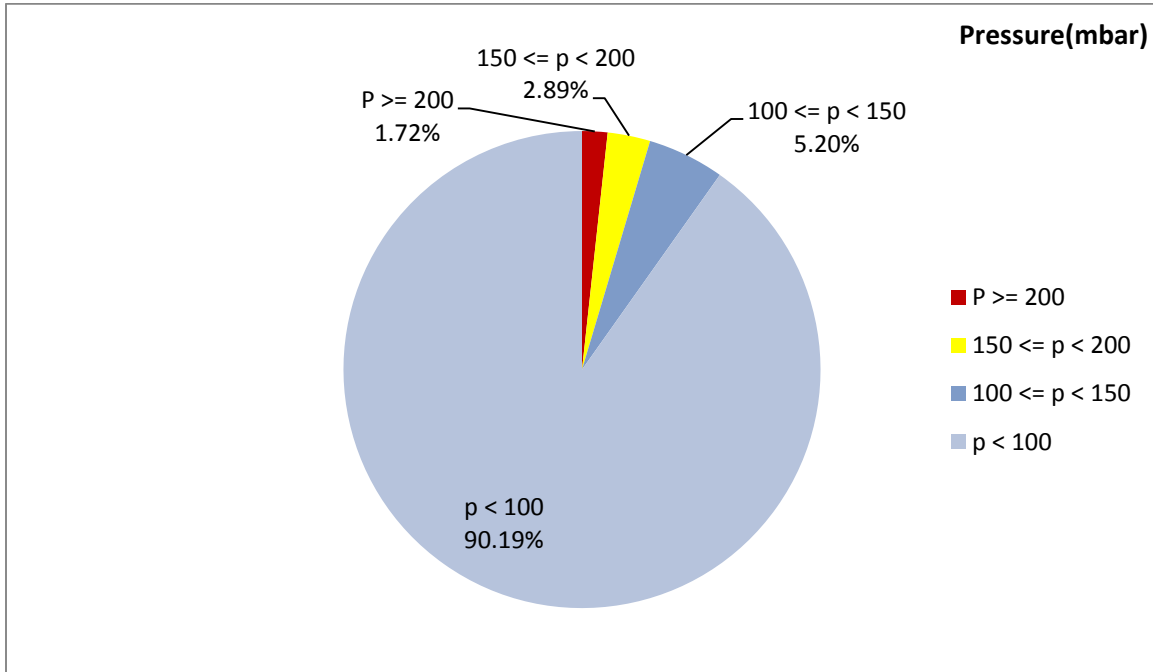


Figure 1- Pressure distribution over the working hours

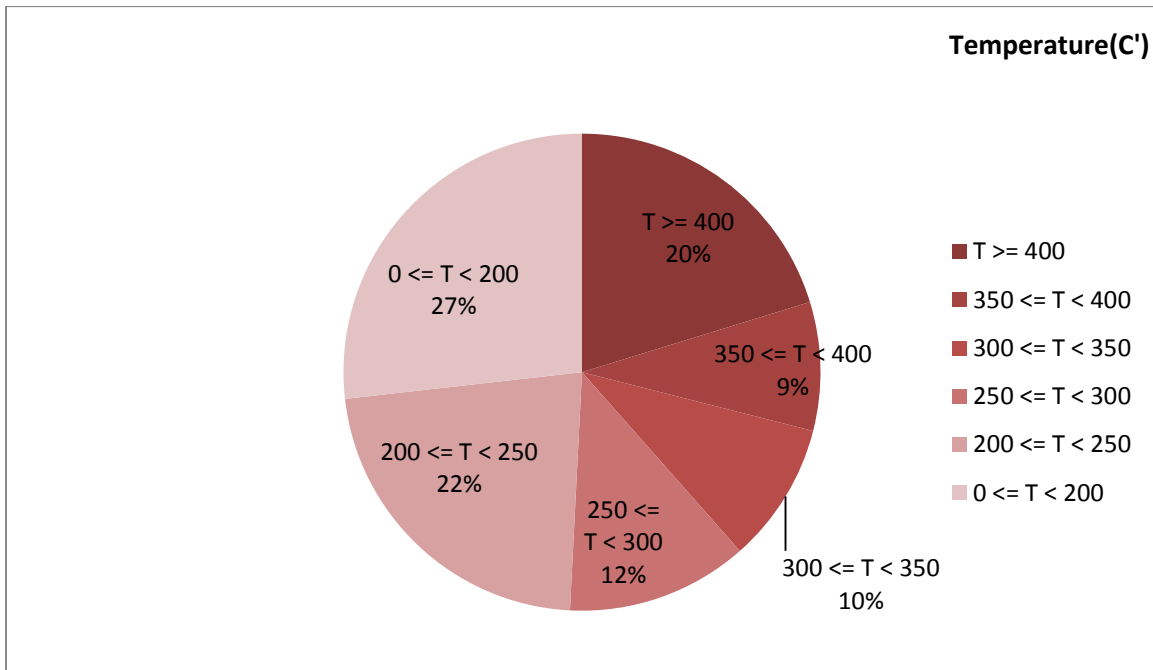


Figure 2-Temperature distribution over the working hours

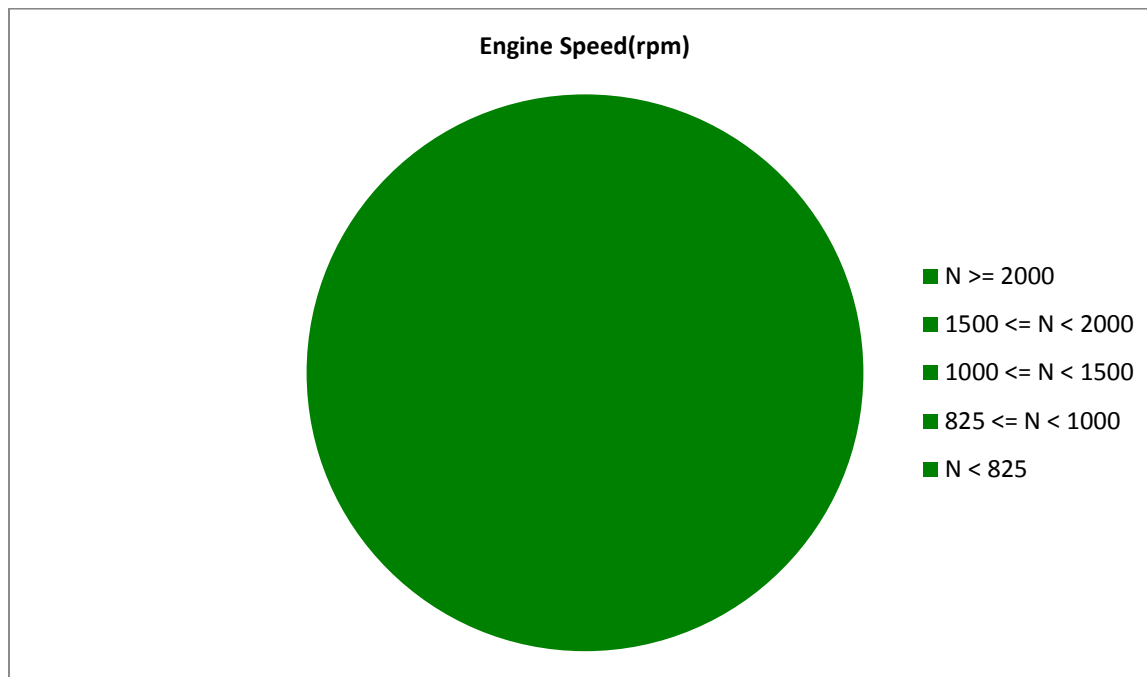


Figure 3- Engine speed distribution over the working hours

Table 4- Mean values

Mean temperature (C)	Mean pressure(mbar)	Mean engine speed(rpm)
288.78	38.23	-

Table 5- Mean values without idling

Mean temperature (C)	Mean pressure(mbar)	Mean engine speed(rpm)
288.78	38.23	-

Table 6- Max-min values

Max-min temperature(C)	Max-min pressure(mbar)	Max-min engine speed(rpm)
726-50	354-0	-

Notice: Due to technical problem, rpm sensor data missed. So parameters like idling speed was left blank.

Detailed Pressure Analysis

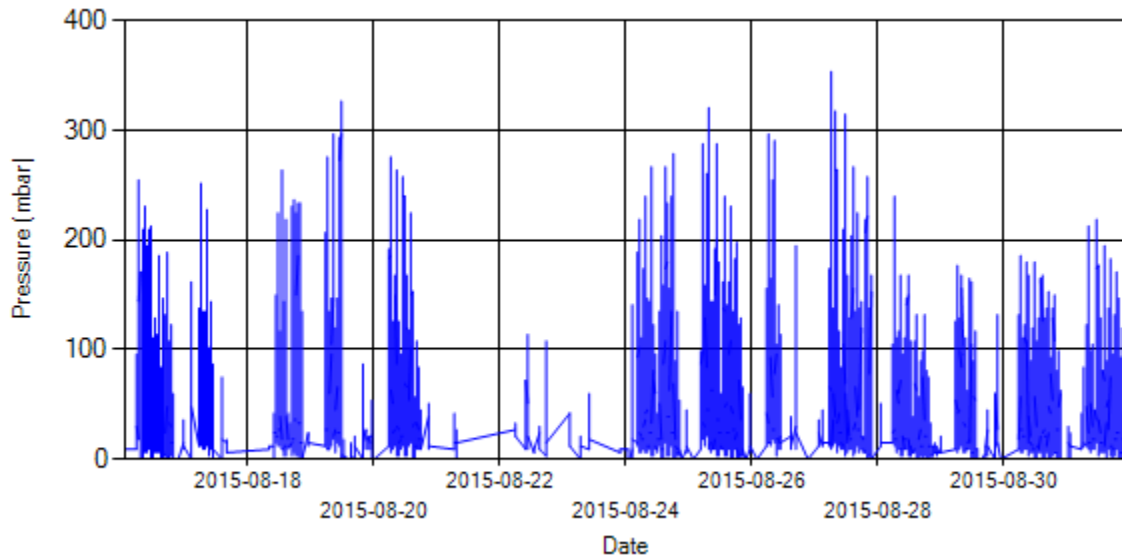


Figure 4- Pressure distribution over the period

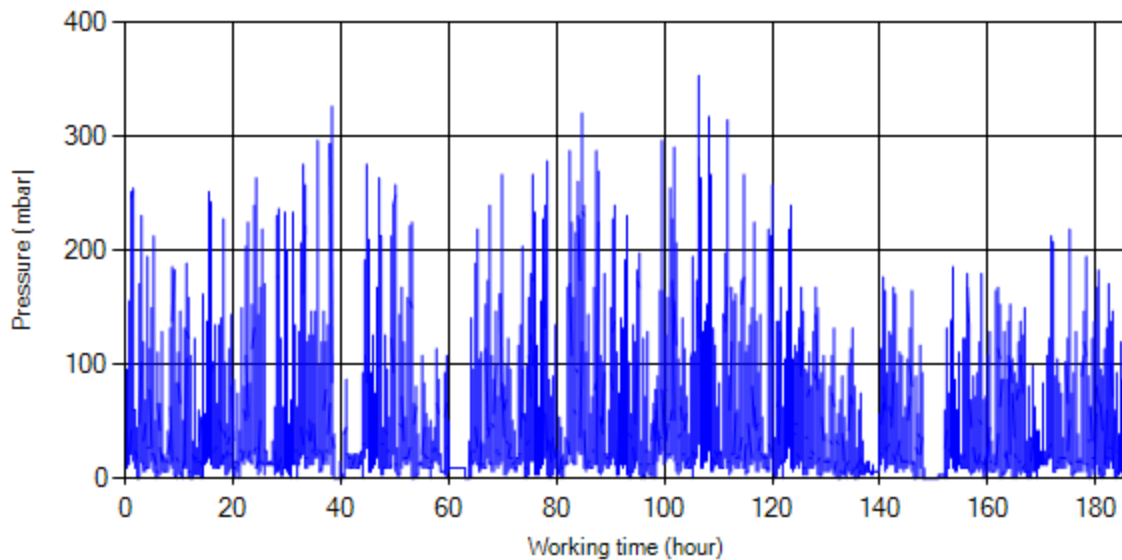


Figure 5- Pressure vs. working hours

Notice: backpressure distribution was shown into two diagrams. As obvious in figure 5, stop-working periods were eliminated and pressure was displayed along working hours.

Detailed Temperature Analysis

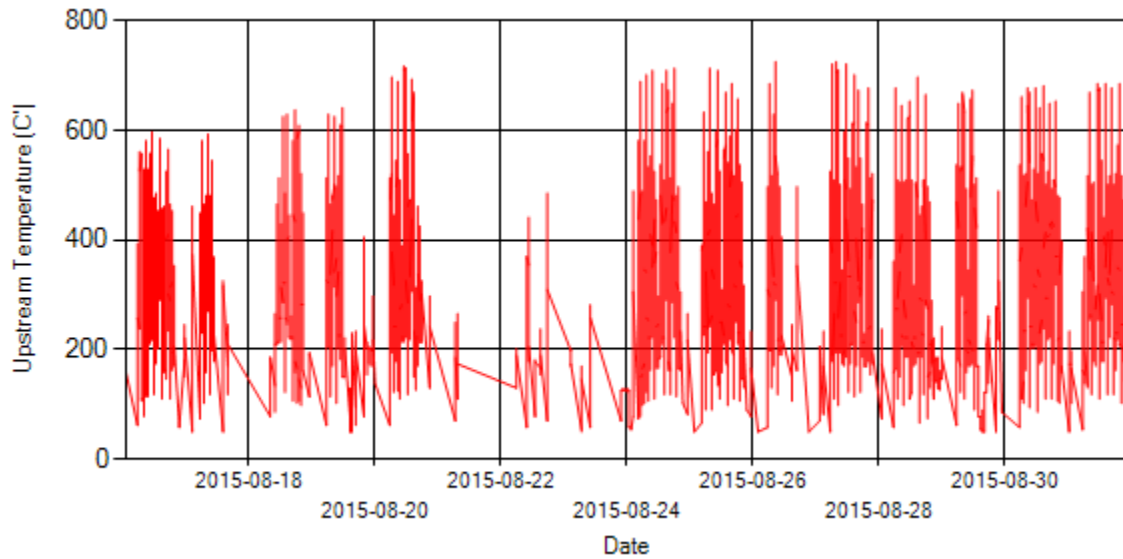


Figure 6- Temperature distribution over the period

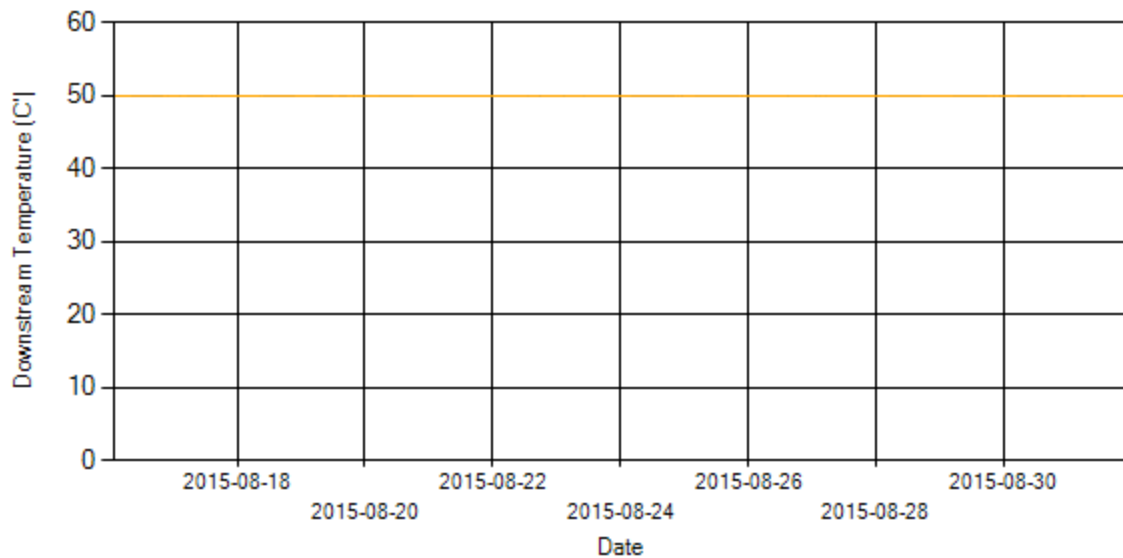


Figure 7- Temperature distribution over the period

Notice: Temperature 2 sensor had problem during this period and showed constant 50 values.

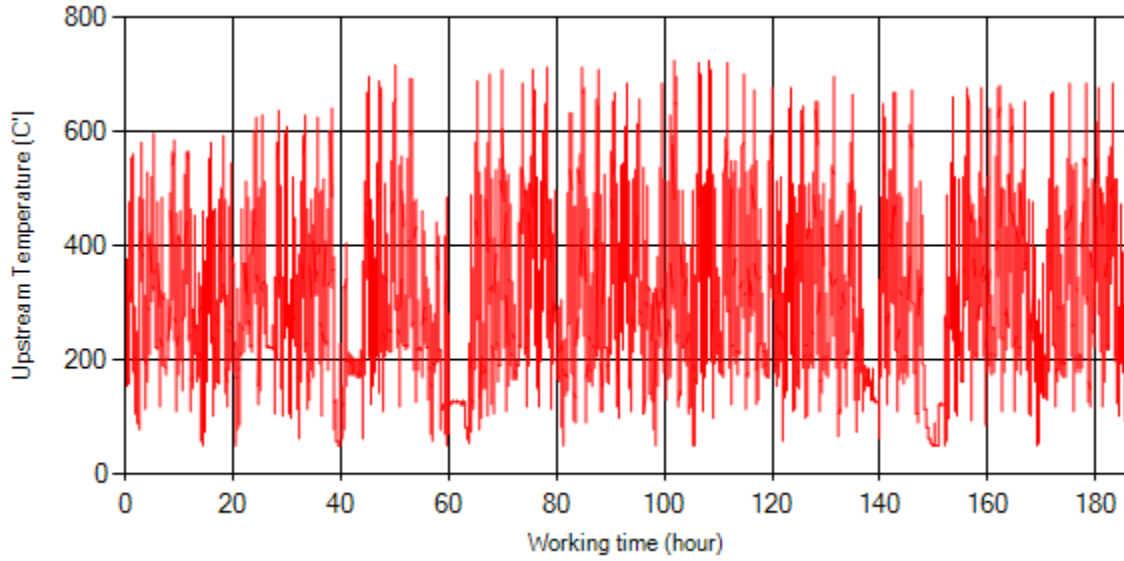


Figure 8- Temperature vs. working hours

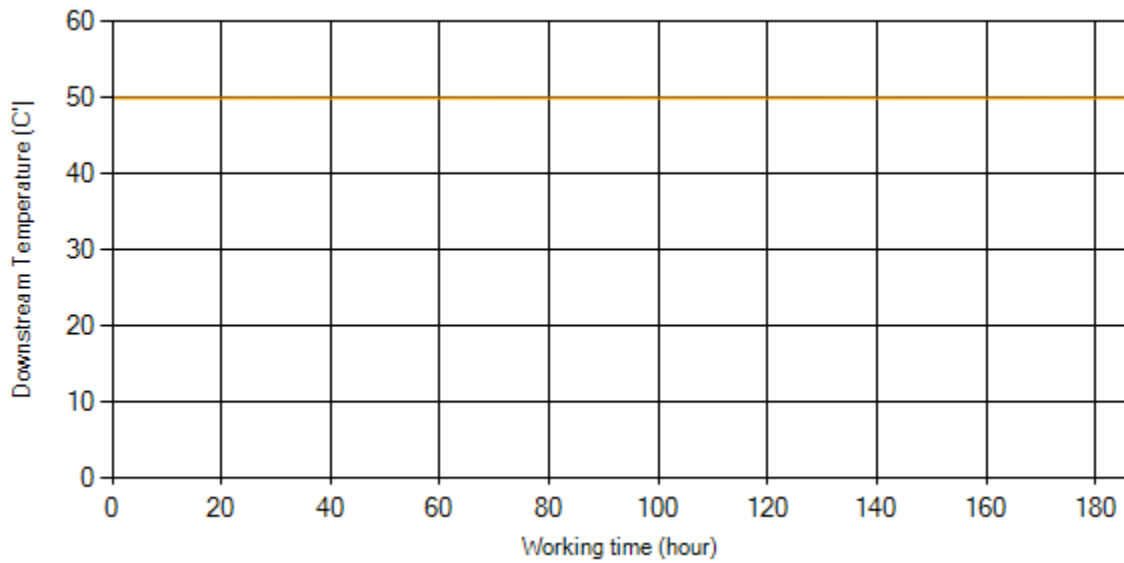


Figure 9- Temperature vs. working hours

Engine Speed Diagrams

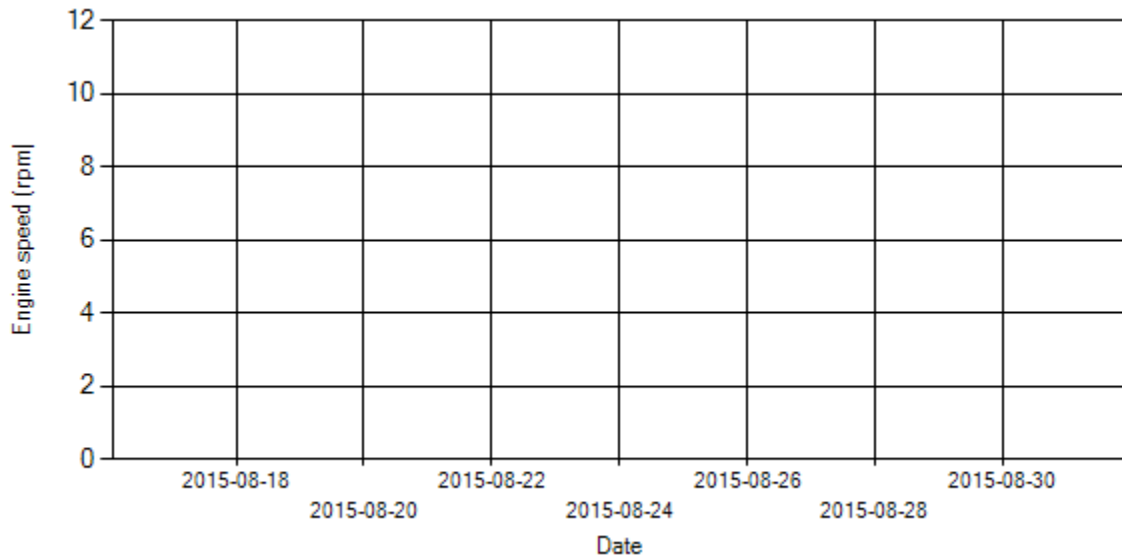


Figure 10- Engine speed distribution over the period

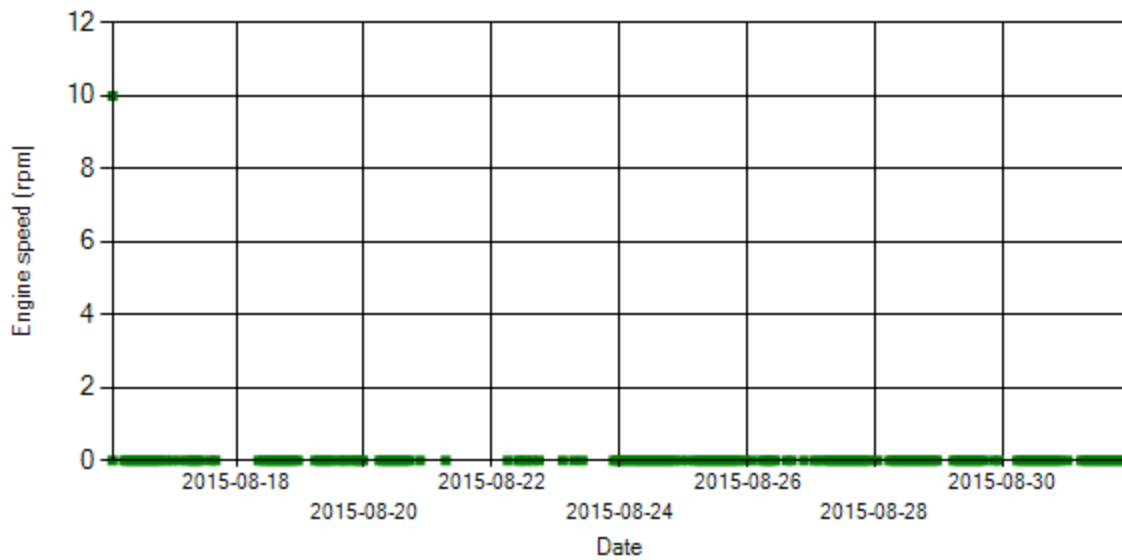


Figure 11- Engine speed diagram for calculating CPK's working days

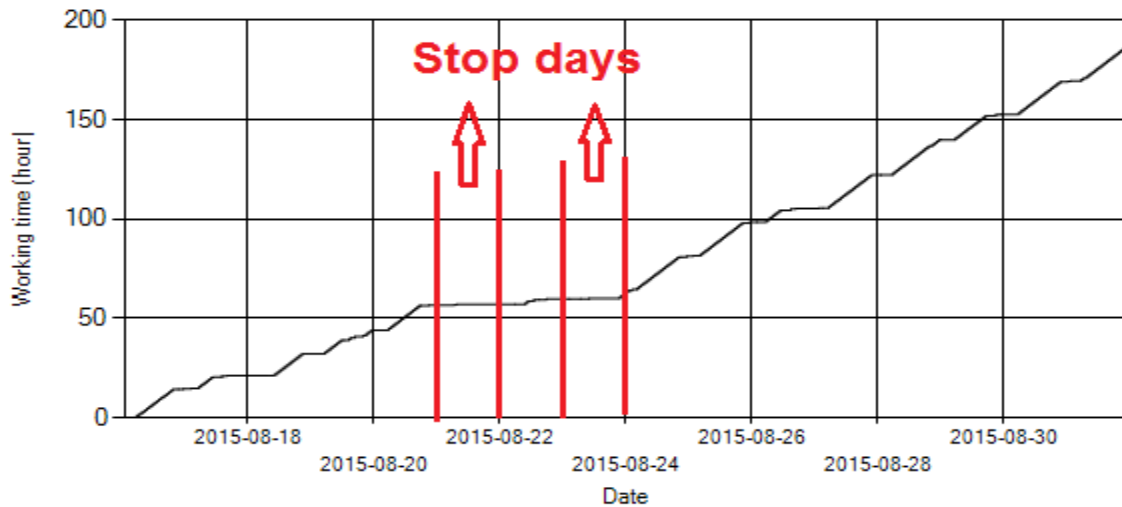


Figure 12- Time diagram for calculating CPK's working days

Notice: Data logger sampling time can be calculated from Figure 12. The lines parallel with Date axis show days without data logger data. As depicted in Figure 12, Aug 21st and 23rd were stop days.

Pressure-Engine Speed diagrams

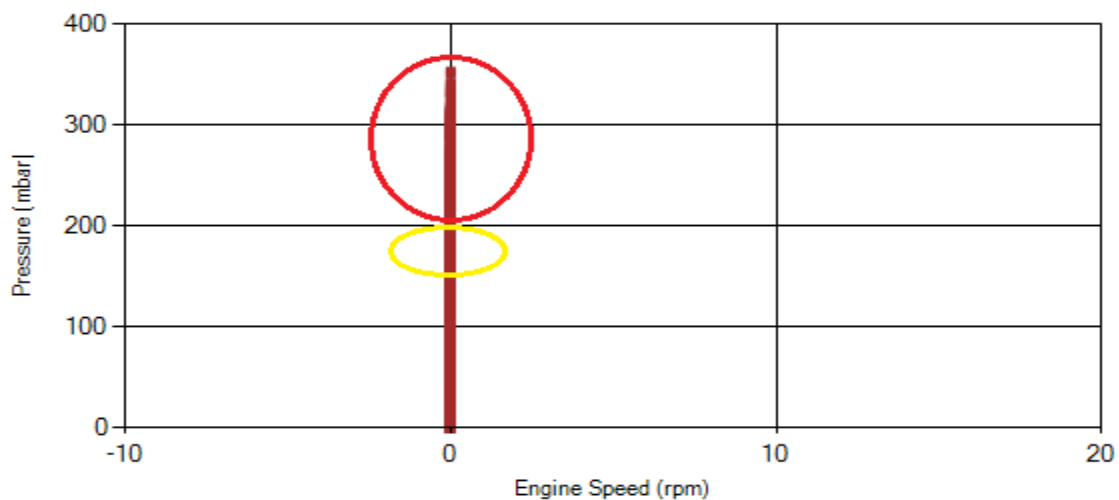


Figure 13- Pressure against engine speed

Notice: Red alarm (pressure>200 mbar) and yellow alarm (200>pressure>150) ranges were indicated in figure 13.

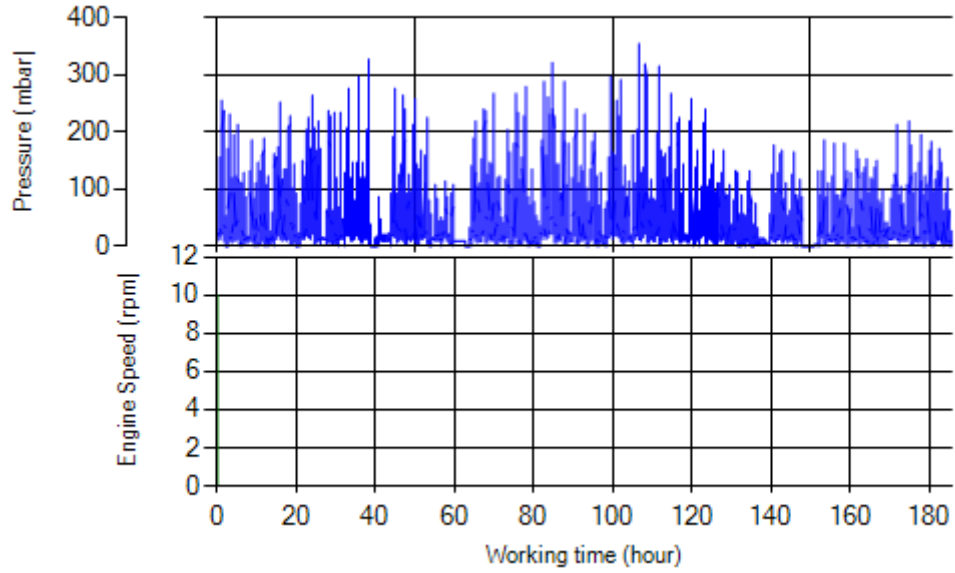


Figure 14- P, N distribution vs. working hours

Temperature-Engine Speed diagrams

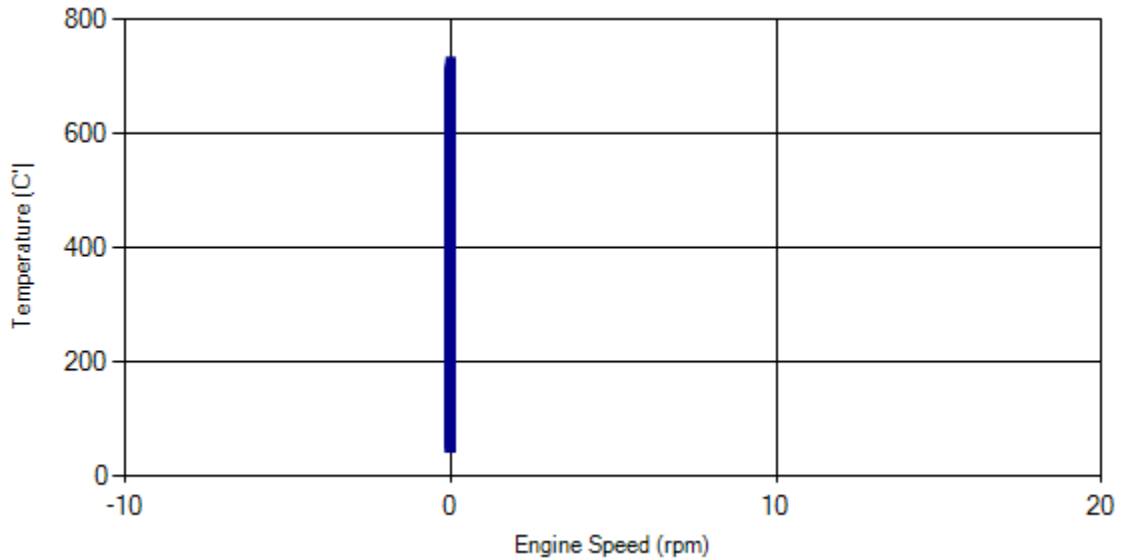


Figure 15- Temperature against engine speed

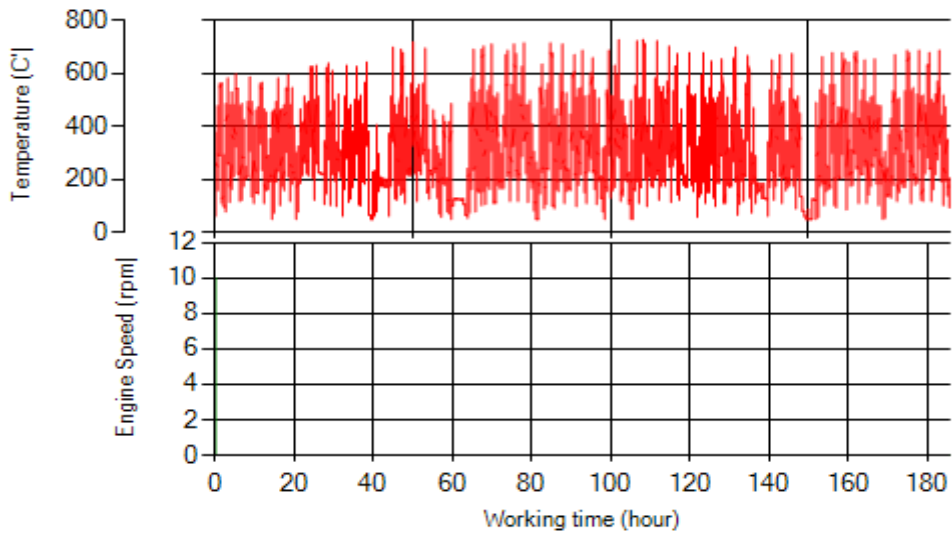
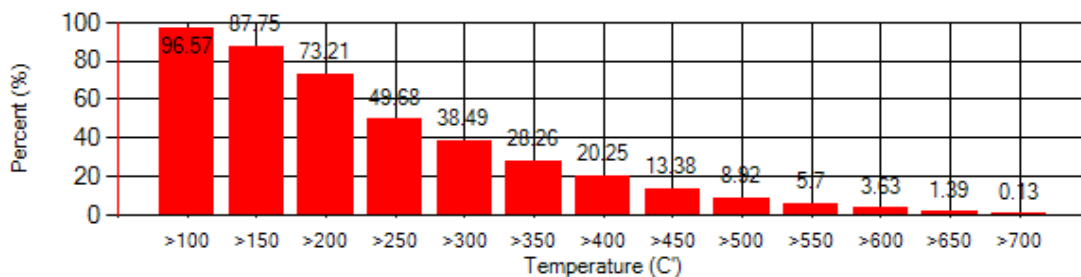


Figure 16- T, N distribution vs. working hours

Filter Operation Analysis

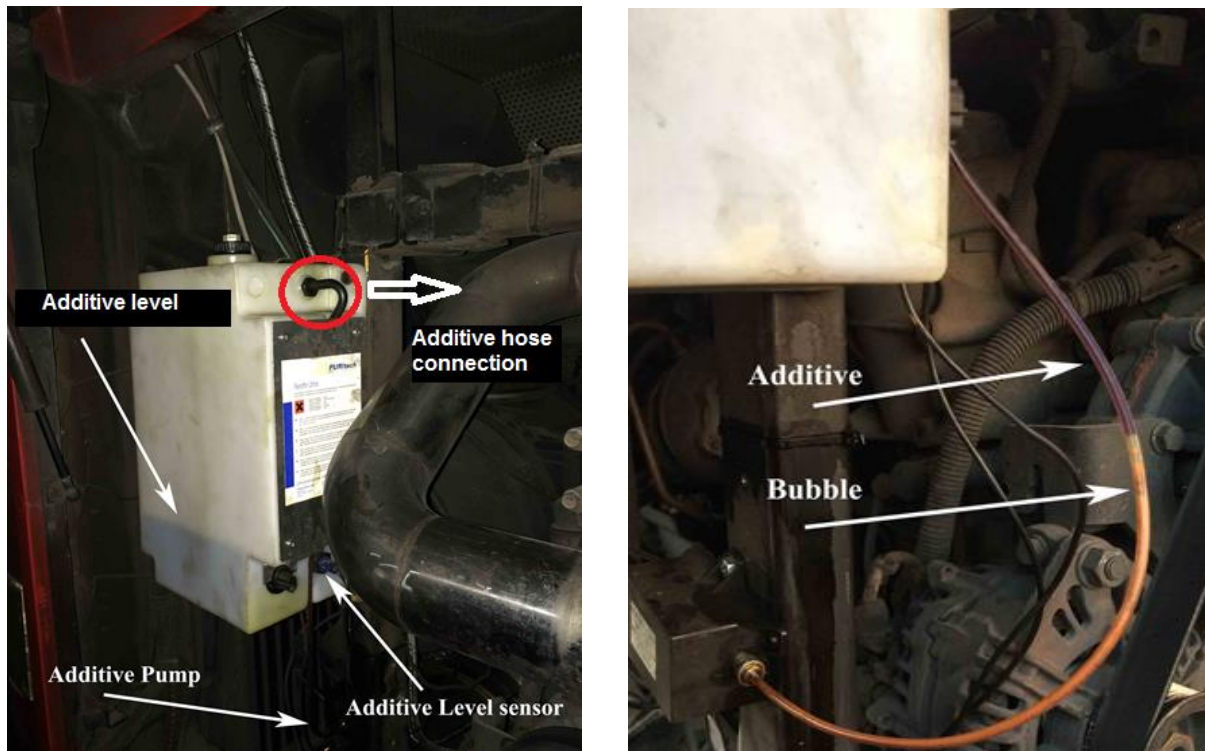
- As depicted in figure 1, 1.72% of total working time pressure is above 200 mbar and 4.61% above 150mbar. Additive system defect was the reason of back pressure rise.
- Figure 2 displays flow temperature before the DPF. It can be obviously observed that 20% of total working time temperature is above 400 °C and 29% above 350°C. Back pressure rise played important role at increasing flow’s temperature.
- Despite of additive lack, filter operating was acceptable because of high temperature distribution. It is worth-mentioning, 5.7% of total working time temperature is above 550 °C which can guarantee passive system working for a while without additive.



Filter operation status	Excellent <input type="checkbox"/>	Good <input checked="" type="checkbox"/>
	Maintenance required <input type="checkbox"/>	Failed <input type="checkbox"/>

Appendix

As mentioned in the report, because of additive hose problem, system didn't get enough additive during this period. Additive hose are not integrated and was connected to the top of the tank. So bubble formation inside the hose is probable happening.



Additive system bubble problem

We suggest these items for improving additive system operation.

- 1- Making hosing system integrated (including inside and outside of additive tank) and connecting the hose to the tank from the bottom, reduce bubble problem possibility.
- 2- Considering lack of room, downsizing the tank make its installation easier. (5 liter can be appropriate size for Tehran's Bus).
- 3- For improving tank safety it could be replaced by iron tank.