University of Zagreb, Faculty of Agriculture,
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TRACTOR DI DIESEL ENGINE PERFORMANCES USING DIFFERENT TYPES OF DIESEL FUEL

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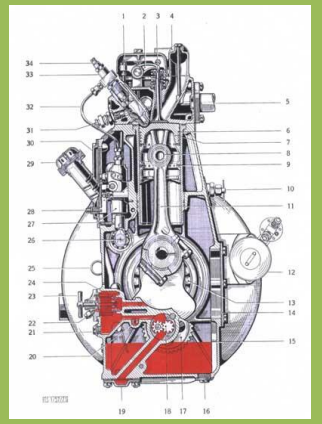
INTRODUCTION

- Fuel quality is important condition for a good function of diesel engine.
- Fuel quality has also a direct influence on engine performances (power, torque, fuel consumption).
- Croatia market offers, among other types of diesel fuel, special type of diesel fuel that can only be used in agricultural machinery.



- Diesel fuels available for use in tractors and other farm machinery in Croatia are:

- Premium quality Euro diesel (EDP)
- Standard quality Euro diesel (ED)
- Euro diesel for agriculture colored with blue paint (EDB)

- The government has lowered the price of EDB by not charging the rates of excise duties on standard quality ED
- To avoid the use of EDB in nonagricultural vehicles the blue color is added to detect frauds.

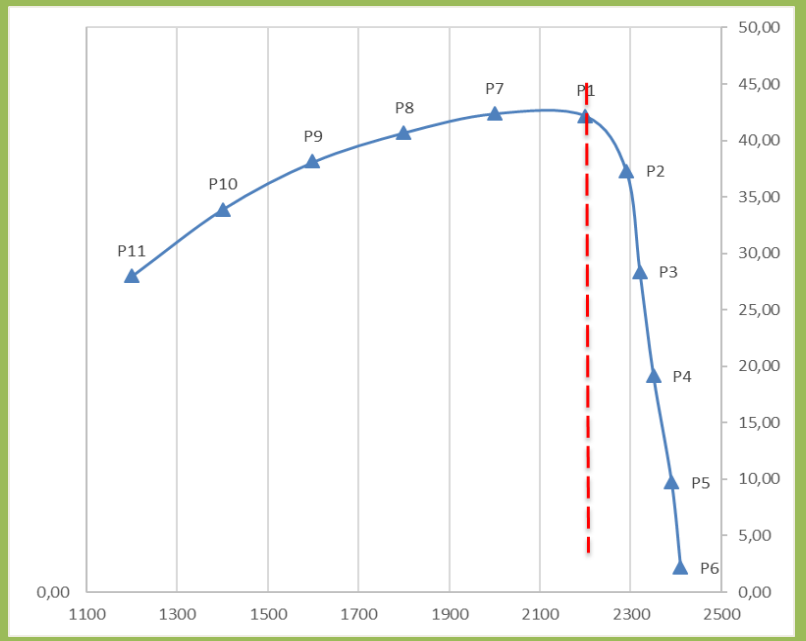
OBJECTIVES

- Determination of fuel quality based on engine performances.

MATERIALS AND METHODS

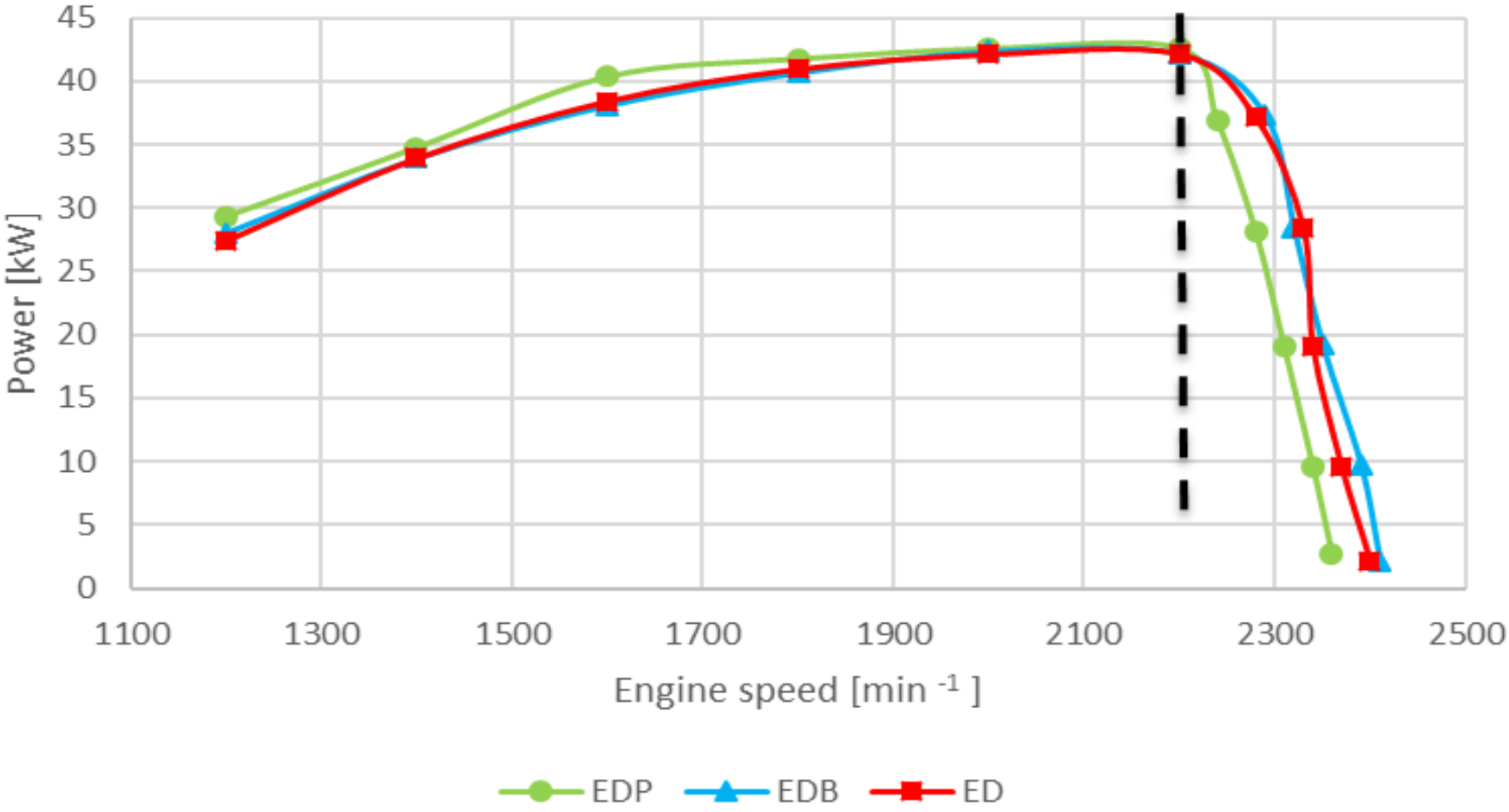
- The study was performed at Faculty of Agriculture, in laboratory for engine testing of Department of Agriculture Engineering.
- Tested engine used for analysis is produced in Same Deutz-Fahr Company, installed in tractor Deutz-Fahr Ecoline 310.
- Declared nominal engine power is 46 kW and maximal engine torque is 244 Nm.

- The engine was connected through power take off shaft with hydraulic brake Schenk type U1-40.
- Testing included brake force, engine speed measurements and fuel consumption.
- From given result have been calculated engine power, torque, hourly fuel consumption and specific fuel consumption.

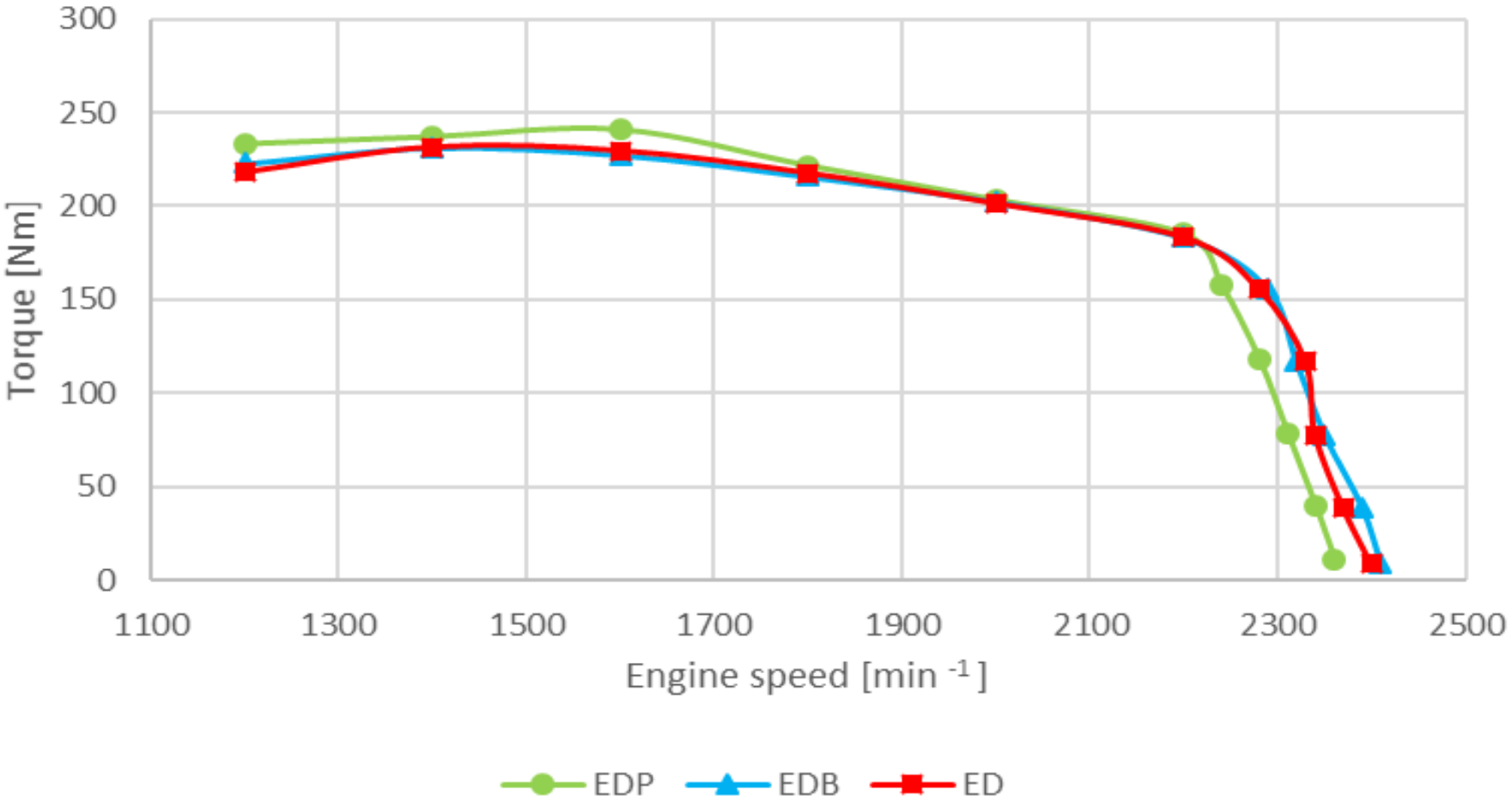


- All fuel types were produced from the same producer
- Samples were taken from 3 diferent gas stations from same company
- The engine performances using different types of fuel were evaluated in compliance with the OECD standard (CODE 2) for the purpose of the official testing of agricultural tractors

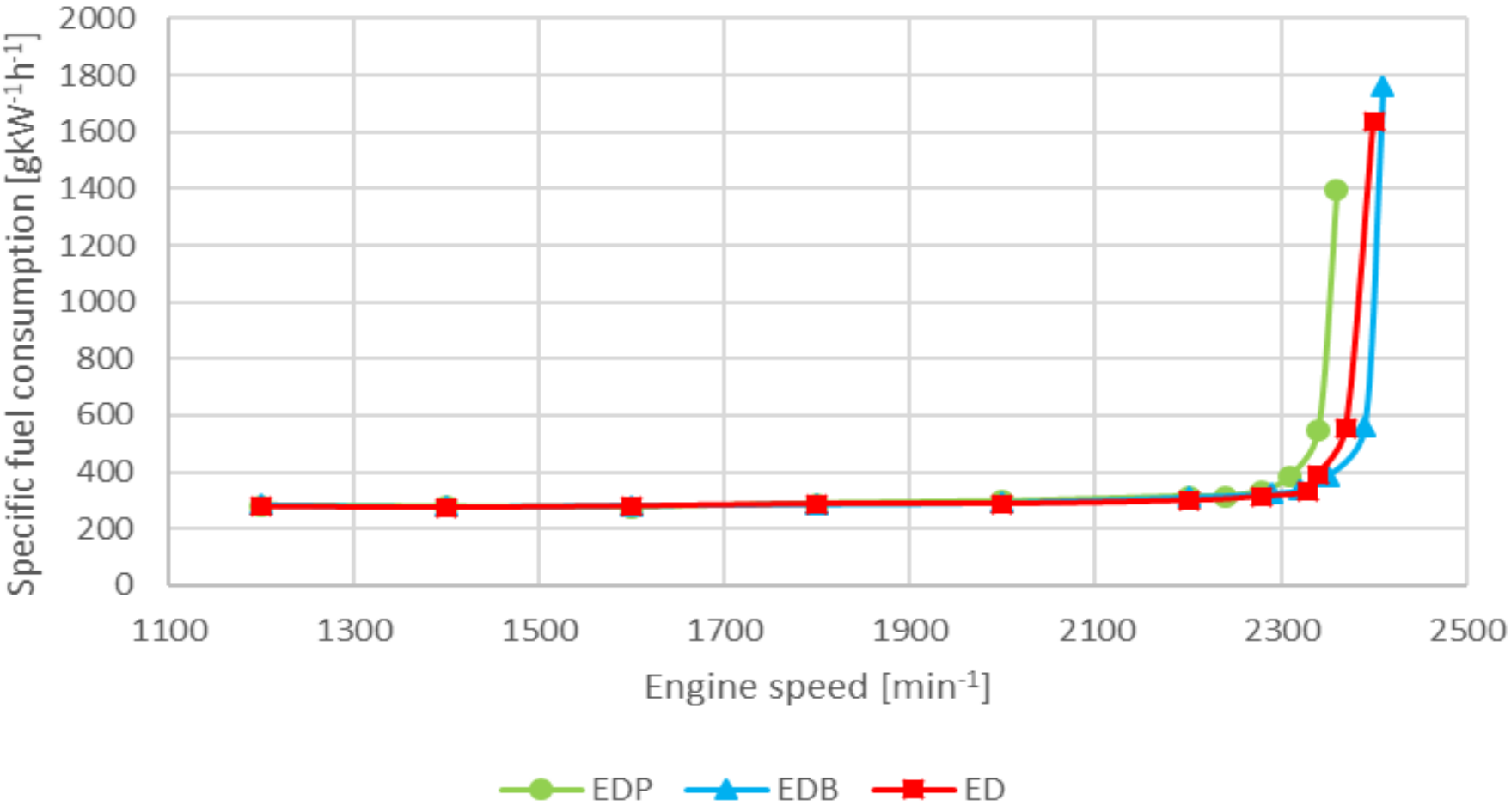
Power


45
40
35
30
25
20
15
10
5
0
Power [kW]
1100
1300
1500
1700
1900
2100
2300
2500
Engine speed [min -1]
EDP
EDB
ED

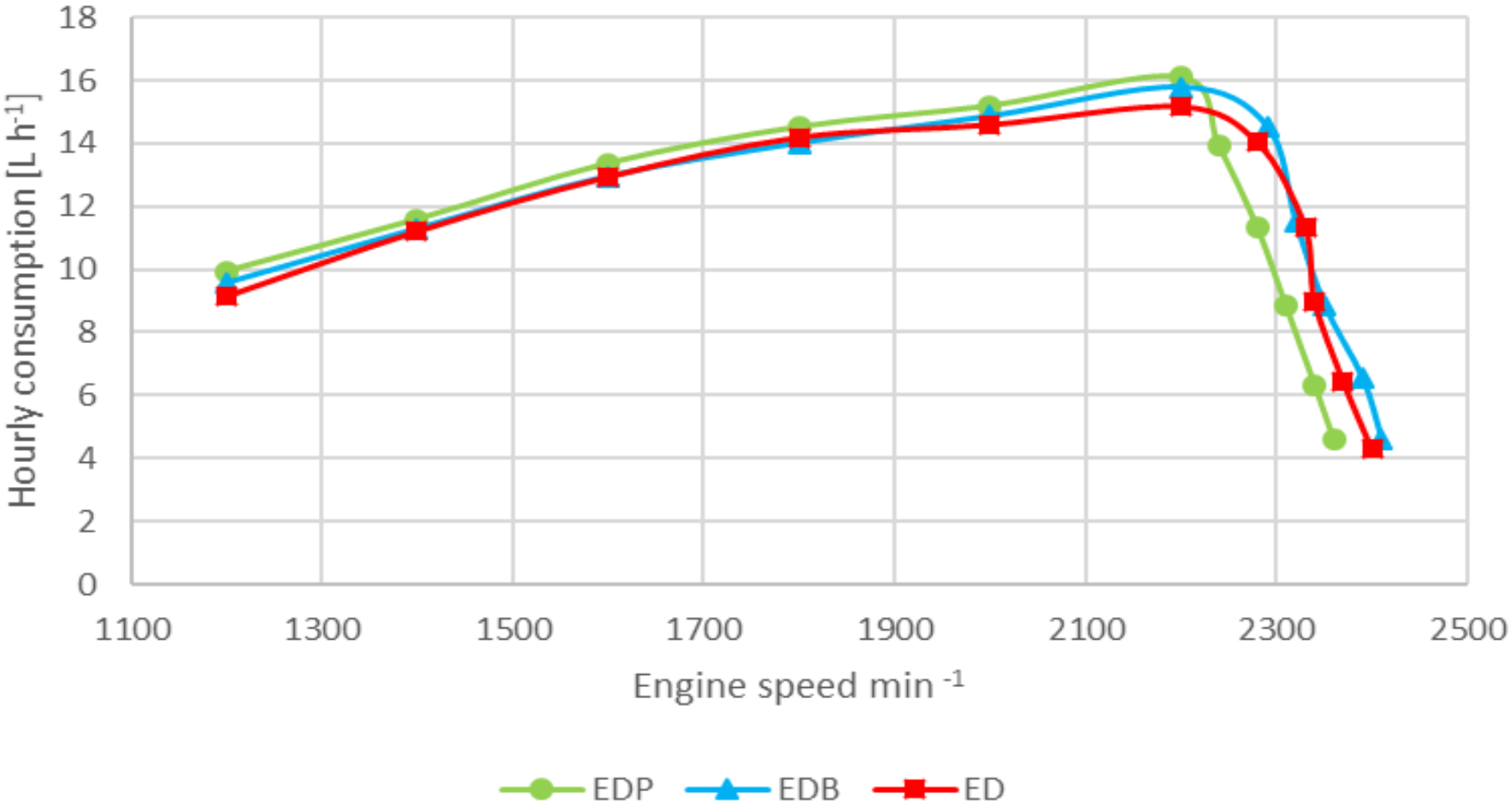
Torque


300
250
200
150
100
50
0
Torque [Nm]
1100
1300
1500
1700
1900
2100
2300
2500
Engine speed [min -1]
EDP
EDB
ED

Specific fuel consumption



Hourly fuel consumption



CONCLUSIONS

- Based on the obtained results, it can be concluded that there were no differences in the investigated diesel engine performances using standard Eurodiesel and Eurodiesel Blue.
- Using premium Eurodiesel (Class) fuel the average engine power was increased by about 2% and the torque by about 3% in relation to the power and torque achieved using standard Eurodiesel and Eurodiesel Blue.
- The average specific fuel consumption by using premium Eurodiesel (Class) was 7.5% lower than the Eurodiesel Blue and 4.6% lower than standard Eurodiesel.