

REVIEW

by assoc. prof. dr. eng. Simeon Penchev Iliev,
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of a dissertation on the topic "Research into the working process of a diesel engine operating with the addition of alcohol" for the award of the educational and scientific degree "doctor", with a doctoral candidate, eng. Daniel Krasimirov Kostadinov, Department of "Transport Equipment and Technologies" at TU-Varna, scientific supervisors assoc. prof. dr. eng. Krasimir Bogdanov and assoc. prof. dr. eng. Radostin Dimitrov.

1. Brief biographical information about the doctoral student

The doctoral student Eng. Daniel Krasimirov Kostadinov completed his higher education at the Technical University of Varna in 2015. He was enrolled in full-time doctoral studies by order of the Rector No. 249/ 20.04.2016 in the doctoral program "Internal Combustion Engines". He was enrolled with the right to defend by order of the Rector No. 337/ 14.07.2020. I have good personal impressions of the doctoral student, from his studies as a bachelor and master in the department.

2. General presentation of the dissertation work

The dissertation contains 171 pages, including 69 figures, 10 tables, 116 formulas, organized into 4 chapters, general conclusions and a list of references of 78 titles, of which 22 are in Cyrillic and 56 in Latin.

The first chapter is devoted to the possibilities of diesel engines operating with different alcohols. Types of alcohol fuels and their application in diesel engines are considered.

Based on the review of different fuels, the main goal and objectives of the dissertation are formed.

In the second chapter, theoretical calculations were made using a specialized software product AVL BOOST. The calculations are carried out in the properties of the fuel used set in the product. The model is calibrated with comparative data provided by the engine manufacturer, which resulted in relatively small differences between experimental and theoretical results. The resulting error is below 2%. This confirms that the engine simulation provides sufficiently reliable data compared to real measurements.

The third chapter is devoted to a description of the experimental setup and methodology of conducting the study.

The fourth chapter analyzes the results of the experimental studies.

The dissertation ends with general conclusions and inferences. The material from the theoretical and experimental studies presented and structured in this way is the result of the doctoral student's in-depth knowledge of the problem. It shows possibilities for formulating the research tasks and proposing successful approaches for their solution.

3. Relevance of the problem

With the decline in oil reserves and the introduction of increasingly strict regulations on the composition of exhaust gases, the search for alternative fuels and additives is becoming increasingly relevant. The use of alternative fuels and the study of the possibilities for their use in existing engines is definitely of particular relevance.

4. Research methodology

The research was conducted using two main approaches: Theoretical and experimental. The chosen research methodology can provide an answer to the set goal and objectives of the dissertation work.

5. Competence of the doctoral student

The theoretical and experimental studies conducted demonstrate a thorough understanding of the problem. The results obtained have been presented at scientific forums and published in journals and scientific papers. The author has proven his ability to work in a team with other scientists. The doctoral student has participated in 5 scientific papers, one of which is an independent work.

6. Contributions to the dissertation

In general, I accept the conclusions and contributions made.

6 scientific and applied contributions and 3 applied contributions are presented.

7. Publications on the dissertation

The list of publications related to the topic of the dissertation includes a total of 4 titles: 1 solo and 3 with two authors. The publications are written in Bulgarian.

8. To what extent is the dissertation the personal work of the doctoral student.

I believe that the doctoral dissertation and the contributions are largely the personal work of the doctoral student Eng. Daniel Krasimirov Kostadinov, which is confirmed by the publications listed in the dissertation. Knowledge of the subject matter and the participation of the dissertation student in conducting the experimental research is evident from the topics of the presented scientific works and the presented figures and graphs in the dissertation work. From the information provided regarding the detection of plagiarism in the dissertation, as well as the checks carried out in this area, it is clear that the scientific work is authentic.

I definitely believe that the doctoral student independently, with the help of his scientific supervisors, developed his dissertation work and the contributions listed in the dissertation are the personal work of Eng. Daniel Kostadinov and his supervisors.

9. Possibility of using the results of the dissertation work

The results of the dissertation work have great scientific and applied potential. There are no documents attached to the dissertation work for implementation in practice or for high scientific achievements. However, the results obtained have the

capacity to achieve great socio-economic benefits from the use of fuels with alcohol additives.

10. Abstract

The draft abstract submitted with the dissertation meets the requirements for the formation of an abstract and the ZRASRB, reflecting the main points of the dissertation work. The draft abstract is 41 pages long, presenting everything necessary for assessing the content and essence of the dissertation work.

11. Notes and recommendations

I have the following recommendation for the dissertation thus examined:

1. Some of the terms used, such as "sprayers" and "atomization", are not typical for the field in which the dissertation was developed.

12. Conclusion:

Based on the materials of the dissertation work of the doctoral student Daniel Krasimirov Kostadinov and the results obtained, I believe that all the requirements for the award of the scientific and educational degree "Doctor" have been met. I propose that the esteemed scientific jury award eng. Daniel Krasimirov Kostadinov the educational and scientific degree "Doctor" in the professional field: 5.1 Mechanical Engineering, the scientific specialty "Internal Combustion Engines".

07.06.2025 г.

Reviewer:

/assoc. prof. Simeon Iliev/