

## I. IDENTIFICATION DATA

<b>Thesis name:</b>	<b>Comparison of instrumentation for online measurement of particle emissions from direct injection spark ignition engines</b>
<b>Author's name:</b>	<b>Sairam Polasa</b>
<b>Type of thesis :</b>	Masters
<b>Faculty/Institute:</b>	Faculty of Mechanical Engineering
<b>Department:</b>	Department of Automotive, Combustion Engine and Railway Engineering
<b>Thesis supervisor:</b>	Prof. Michal Vojtíšek
<b>Supervisor's department:</b>	Department of Automotive, Combustion Engine and Railway Engineering

## II. EVALUATION OF INDIVIDUAL CRITERIA

<b>Assignment</b> <i>Evaluation of thesis difficulty of assignment.</i>	<b>Challenging</b>
The goal of the thesis was to evaluate the concentrations of particulate matter in the exhaust of a direct injection gasoline engine subjected to transient tests on gasoline and its blends with n-butanol and isobutanol. Online readings from several instruments typically used for diesel particulate matter measurement were compared, with the goal to assess their suitability for positive ignition engines.	
<b>Satisfaction of assignment</b> <i>Assess that handed thesis meets assignment. Present points of assignment that fell short or were extended. Try to assess importance, impact or cause of each shortcoming.</i>	<b>Fulfilled (without objections)</b>
Mr. Polasa has fulfilled the assignment to its entirety. He has started the work early, leaving sufficient time to resolve technical issues and to address shortcomings.	
<b>Activity and independence when creating final thesis</b> <i>Assess that student had positive approach, time limits were met, conception was regularly consulted and was well prepared for consultations. Assess student's ability to work independently.</i>	<b>B – Very good</b>
Mr. Polasa has shown an active interest in the topic. He has reported progress and consulted on a regular basis. Some shortcomings in statistics and technical writing required additional guidance, which was also given on advanced topics such as aerosol science.	
<b>Technical level</b> <i>Assess level of thesis specialty, use of knowledge gained by study and by expert literature, use of sources and data gained by experience.</i>	<b>B – Very good</b>
The thesis addresses non-regulated properties of particulate matter and its measurement, generally a specialized and a rather difficult topic. Mr. Polasa has gained a considerable degree of knowledge during the process. The presented results are remarkably detailed and extensive and are generally of high quality, somewhat diminished by limited initial experience with data processing, statistics, technical writing, and writing in general. The work brings a good amount of information and insights useful for future work.	
<b>Formal and language level, scope of thesis</b> <i>Assess correctness of usage of formal notation. Assess typographical and language arrangement of thesis.</i>	<b>D – Satisfactory</b>
The scope of the thesis is appropriate. The writing is well structured, but in many places somewhat difficult to follow and to comprehend, most likely due to language limitations. Figures are relevant and generally of very high quality, with only minor shortcomings (axis ranges on some figures, some figures extending beyond page margins). Some figures are not introduced in the text.	

## Selection of sources, citation correctness

**C – Good**

*Present your opinion to student's activity when obtaining and using study materials for thesis creation. Characterize selection of sources. Assess that student used all relevant sources. Verify that all used elements are correctly distinguished from own results and thoughts. Assess that citation ethics has not been breached and that all bibliographic citations are complete and in accordance with citation convention and standards.*

A total of 45 sources are listed and cited. The selection of sources is appropriate and reasonably balanced, the works cited are relevant and mostly from reputable sources. The attribution of information to the sources is appropriate. The format of the citations slightly differs from the common formats, in multiple cases, some details (journal name, characterization of the source as M.S. thesis, ...) are missing; otherwise, correct information is given and the sources can be readily identified.

## Additional commentary and evaluation

*Present your opinion to achieved primary goals of thesis, e.g. level of theoretical results, level and functionality of technical or software conception, publication performance, experimental dexterity etc.*

Mr. Polasa has worked very diligently and has shown considerable professional growth during the course of working on the thesis. His situation was made more difficult by exclusion of physical presence of students at the university during the spring of 2020 and by additional experiments being postponed due to coronavirus related restrictions.

In lieu of multiple engines, multiple fuels were run one engine to offer some variety of particulate matter properties.

The topic addressed here is of current interest to the research community. The results are of good quality and will be useful in ongoing exhaust toxicity studies and in ongoing gasoline direct injection engine particle emissions research.

### III. OVERALL EVALUATION, QUESTIONS FOR DEFENSE, CLASSIFICATION SUGGESTION

*Summarize thesis aspects that swayed your final evaluation.*

*The thesis presents data from online measurement of concentrations and size distributions of particulate matter, with the goal to assess the suitability of various instruments, originally designated for diesel particulate matter measurement, to gasoline direct injection engines. Data from repeated measurements on multiple fuels are presented and evaluated for repeatability, overall ratio of measured values to the detection limits of individual instruments, and consistency among the instruments. The scope and arrangement of the thesis are excellent. A wealth of useful information is presented and reasonably well analyzed. Technical writing and some formal aspects do not meet the same level of excellence. Mr. Polasa has shown personal interest and responsibility, has learned considerably, and overall, did good work. I believe that with additional experience, his engineering judgment, technical writing and analytical skills will further improve.*

I evaluate handed thesis with classification grade **C - Good**

#### Questions:

While the primary goal of the thesis was to assess the performance of the instruments, additional observations can be inferred from the results. Please comment on the differences among the tested fuels – both the differences between each alternative fuel and gasoline, and between the two butanol isomers.

Date: **August 26, 2020**

Signature: