

I. IDENTIFICATION DATA

Thesis name:	Detection of high particulate matter emitters
Author's name:	Yuvanesh Suresh
Type of thesis :	Master's thesis
Faculty/Institute:	Faculty of Mechanical Engineering
Department:	Department of Automotive, Combustion Engine and Railway Engineering
Thesis reviewer:	Ing. Martin Pechout, Ph.D.
Reviewer's department:	Czech University of Life Sciences, Department of Vehicles and Ground Transport

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment	A
<i>Evaluation of thesis difficulty of assignment.</i>	
The thesis assignment requests non-standardized data processing, its evaluation using literature based metrics and its comparison. These factors were contributing to high demands placed on the student.	

Satisfaction of assignment	A
<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>	
The assignment is fully satisfied. What is more, an overview statistics summarizing contribution by vehicle emission standard is prepared.	

Method of conception	A
<i>Assess that student has chosen correct approach or solution methods.</i>	
The approach is correct and is carefully taking into account instruments noise and possible ambient effects. The instruments-reported concentrations are thoroughly judged in order to prevent false detection. In order to make the data comparable to relevant emission standards limit the obtained concentration has to be recalculated. The author has chosen fuel based emission factor which allows further recalculation to brake specific particles production thus direct comparison is allowed. This method is correct, only the difference in conditions during prescribed homologation test cycle and buses passing event could be more widely addressed.	

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>	
Student developed evaluation methods with careful assessment of ambient air variable background effect and possible particulate matter nucleation. This lead to utilization of metrics based on available expert literature (Count Mean Diameter a Mass Mean Diameter). All vehicles are evaluated and transparently displayed and some examples are reported in detail with discussion. Unfortunately, the statistics of buses sorted according emission standard stage in the chapter 6 (figures 6.2 and 6.3) contains only mass based data. Overall number of buses in each stage class is not taken into consideration in total particulate mass distribution - figure 6.3.	

Formal and language level, scope of thesis	A
<i>Assess correctness of usage of formal notation. Assess typographical and language arrangement of thesis.</i>	
The thesis is well organized; the description is clear and graphical expressions are easy to understand.	

Selection of sources, citation correctness

A

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.

Student had to find number of information in available literature in order to describe particulate matter properties, health and environmental effects, instrument operational principles and size spectra evaluation methods. The cited sources are relevant to the topic.

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.

Please insert your commentary (voluntary evaluation).

III. OVERALL EVALUATION, QUESTIONS FOR DEFENSE, CLASSIFICATION SUGGESTION

Summarize thesis aspects that swayed your final evaluation. Please present apt questions which student should answer during defense.

Master's candidate proved his ability to find and process topic relevant information, assess instruments data quality, suggest, perform and evaluate multiple ways of quantification of emitted particulate matter. What is more, the student was able to take into account possible particle nucleation and made countermeasures to prevent false positive detection.

Obtained findings are mostly clearly presented. In some cases the presentation can be slightly improved to prevent misunderstanding (mainly figure 6.3).

Questions for defense:

Sulphates are mentioned as a possible source of volatile particulate fraction on page 45. What is the current sulfur content in EN590 diesel allowed by the standard?

When considering low fuel sulphur level (10 mg/kg), may it affect of particulate matter formation?

What are the typical conditions for particle nucleation? Were prerequisites fulfilled in case of the vehicle EURO VI - 4AR 7512 bus (Shown in fig. 5.5 and 5.6)?

I evaluate the thesis with classification grade **A- (excellent with very minor shortcomings)**.

Date: **31. 8. 2018**

Signature:

