



# SUPERVISOR'S EVALUATION OF DIPLOMA THESIS

## I. IDENTIFICATION DATA

<b>Title:</b>	<b>Bioethanol production technology from waste in Kazakhstan</b>
<b>Author:</b>	<b>Alikhan Uteyev</b>
<b>Type of thesis:</b>	Master
<b>Faculty/department:</b>	Faculty of Mechanical Engineering
<b>Department:</b>	Department of Process Engineering
<b>Supervisor:</b>	assoc. prof. Ing. Lukáš Krátký, Ph.D.
<b>Supervisor's place of employment:</b>	FME CTU in Prague, Department of Process Engineering

## II. EVALUATION CRITERIONS

<b>Diploma thesis assignment</b>	<b>Average</b>
<i>Difficulty evaluation of the diploma thesis assignment.</i>	
The main aim of the thesis was to prepare a techno-economic study of model waste to bioethanol technology, i.e. to design PFD chart, to perform an economic study of investment and productions costs, and payback. This topic was, therefore, a typical job for mechanical engineering, so its difficulty was average in my eyes.	

<b>Fulfilment of thesis's assignment</b>	<b>Fulfilled</b>
<i>Evaluate, whether the proposed final work fulfils the assignment. Comment where appropriate, points of reference that were not fully met, or if the work is extended compared to the assignment. If the assignment is also not completely fulfilled, try to assess the importance, impact and possibly cause various deficiencies.</i>	
The main tasks of this thesis were to discuss the potential of waste to bioethanol conversion technology in Kazakhstan's conditions, to summarize information about waste in Kazakhstan, to overview current knowledge about lignocellulosic bioethanol production technology (technical set up and scale, process parameters), to perform a techno-economic study of designed technology, and to evaluate its economic potential, i.e. design PFD scheme, do mass and energy balances and prepare an economic analysis of the technology. The thesis contains all the problematic, the tasks of the thesis were therefore fulfilled.	

<b>Activity and independence during thesis's processing</b>	<b>A – Excellent</b>
<i>Evaluate whether the student was active during thesis's processing, whether he respected specific deadlines, if his solution was continuously consulted and whether he was sufficiently prepared for consultations. Consider the student's ability to work independently and creatively.</i>	
The author's approach was enormously active. He was always ready for consultations and he successfully fulfils all tasks given by supervisor for next meetings.	

<b>Professional level</b>	<b>B – Very good</b>
<i>Assess the expertise level of the thesis, using knowledge gained from the study of scientific literature, documentation and utilization of data obtained from practice.</i>	
The professional level of the text itself and all the performed process calculations have standard level. Energy balance could be evaluated more in detail. He is able to transfer theory to practise. Practical part (PFD scheme, calculations) has excellent quality, but the text itself does not include locally detail/full information about process set-up and calculation.	

<b>Formal and language level</b>	<b>A – Excellent</b>
<i>Assess formal correctness in the bibliography, the typographical and linguistic aspects of the thesis.</i>	
The thesis contains all the necessary formal requirements.	

**Bibliography****A – Excellent**

*Comment the student's activity during the acquisition and use of learning materials to solve thesis. Characterize the selection of sources. Assess whether the student made use of all relevant sources. Verify that adopted information is properly distinguished from student's results and considerations, whether citation forms correspond with ethics, whether bibliographic citations are complete and finally whether all citation is in accordance with the practices and standards.*

The author used 26 references in the text, Wikipedia including. Citations in the manuscript and their format listed in the bibliography are not in accordance with the European Copyright Act No. 121/2000 and even with all the citation practices.

**Other comments**

*Comment the level achieved major results of the final work, e.g. the level of theoretical results, or the functional level of technical solutions, publication outlets, experimental skills, etc.*

No comments

**III. FINAL EVALUATION AND PROPOSAL OF CLASSIFICATION**

*Summarize aspects of the thesis that most influenced your final evaluation.*

Master thesis of Mr. Uteyev was scoped to perform a techno-economic study of bioethanol production from waste available in Kazakhstan. He firstly evaluated a potential of waste in Kazakhstan to produce bioethanol, overviewed current knowledge about lignocellulosic bioethanol production technology (technical set up and scale, process parameters), performed a techno-economic study of designed technology, evaluated its economic potential (i.e. design PFD scheme, do mass and energy balances and prepare an economic analysis of the technology), and compared CO<sub>2</sub> production by straw combustion to bioethanol production technology. He prepared software, excel file, with mass and energy balances, and economical analysis of such a technology with investment, operational costs and payback included.

Mr. Uteyev was proved by such a thesis that he has skills of a mechanical engineer. The results of master thesis are very interesting for future visions in lignocellulosic waste conversion technologies. Such a rough techno-economical analyse is missing.

Based on its quality and student's level during the preparation of the thesis, I undersigned Lukas Kratky, I evaluate it as the supervisor by the grade

**A – Excellent.**

Date: 6.8.2018

Signature: assoc. prof. Ing. Lukáš Krátký, Ph.D.