

I. IDENTIFICATION DATA

Title of thesis:	Power Characteristics of impellers
Author:	Amir Mohamed Amir Elhosiny Ibrahim
Thesis type:	bachelor
Faculty/department:	Faculty of Mechanical Engineering
Department:	Department of Process Engineering
Opponent:	Ing. Jan Skočilas, Ph.D.
Opponent affiliation:	Department of Process Engineering

II. EVALUATION OF THE PARTICULAR CRITERIA

Assignment	Easy
<p>Range of assignment can be classified as less demanding or easy. Basic literature devoted to thesis issue is extensive and accessible. Instrumentation was available at the workplace and did not require any additional over standard operations. Only the commercial software and simple calculation were possible and necessary to use for experimental post processing.</p>	

Fulfilling the assignment	Fulfilled with greater reservations
<p>The aims of the thesis are as follow: 1. Work out a literature search about mechanical mixing in non-baffled vessels, 2. describe the power characteristics of impellers with regards to the effect of various parameters of system vessel-impeller, 3. try to find information about concentration profiles for selected impellers, 4. determine experimentally a power characteristic of selected impellers, 5. try to compare the results with literature data, 6. describe effect of scale-up. I state that most of the objectives of the bachelor's thesis were only partially fulfilled or the student devoted them marginally effort, points 1, 3, 5 and 6. Objectives 2 and 4 were elaborated in more detail. The scope of the individual objectives doesn't fully match the assignment, however the certain effort was devoted to each point. The thesis fulfilled the assignment with greater reservations.</p>	

Selected solution procedure	Partly correct
<p>The thesis has two part – theoretical and experimental. In the theoretical part of the thesis, the student used the older but fundamental literature. I miss primarily the description of actual results in the given issue, with an emphasis on the scale-up methodology. In the practical part, the correct measurement procedure were selected correctly. The question is whether the appropriate device for experimentation was selected. The description of the experimental evaluation methodology and the statistical analysis of the results are completely missing.</p>	

Professional level	E - sufficient
<p>The fundamental literature was used to prepare the final thesis. The student had to study and acquire terminology and basic principles of the process, device design and experiment. The professional level is significantly reduced by a formal adjustment and insufficient presentation of the achieved results, with minimal discussion of these results.</p>	

Formal and language level, scope of work	E - sufficient
<p>The formal level of the thesis does not correspond to the standards of the final work of the university. In terms of presenting results in graphs, there is no description of axes. The units of numbers are missing in tables and charts. The obtained results are related to the parameter setting of the measuring system not to the physical quantity (for example, the existence of a vortex in the vessel). The calculated values in used equations are missing. It is hard to evaluate the correctness of the results.</p>	

The work contains a lot of typographical errors and typing errors. The text from the point of view of the English grammar contains a lot of mistakes, wrong word-order in the sentence, incomprehensible sentences, and incorrect technical terminology.

Source Selection, Correct Quotation

E - sufficient

The student used 6 literature sources in the thesis, which is low. The citations found in the text is inconsistent and have wrong format. The student has taken a lot of graphic outputs from the literature, but without any reference. It is not clear, which figures have been created and which have been taken over.

More comments and ratings

Within the theoretical part of the thesis, actual or new knowledge in the given issue was not presented, only basic literature was used. In the practical part, the student made extensive measurements for various combinations of vessels, liquids and mixers. Unfortunately, the results are presented unclearly without detailed discussion, therefore it eliminates their further use, for example, for practice.

III. TOTAL EVALUATION AND PROPOSAL FOR CLASSIFICATION

The objectives of the thesis were clear and achievable within range of the time given to the student for thesis processing. The post processing and presentation of the achieved results and also simple replication of the basic information about issue from the literature without any effort to extend them with actual state of art, have the major impact on the overall evaluation of the thesis. Despite the significant deficiencies, I recommend the thesis to defend procedure.

I evaluate the submitted final thesis with the grade **E - sufficient**

I have several questions that should be answered during the defense:

- 1) Page 11, figure (4) description. The stirring shaft shown in the figure (1) doesn't pass through a motor that is placed on the top of the vessel. Can you correct this statement?
- 2) Describe the main advantages and disadvantages of the mechanical mixing in non-baffled vessels.
- 3) Which value of viscosity has been used for calculation of Reynolds number with respect to the mentioned its dependency on the temperature, see tables 2, 3, 4, 5? Was the temperature dependency of the liquid density also considered in calculations?
- 4) Please, specify the ranges of Reynolds number of your experiments.
- 5) How the vortex length was measured, figure 25?
- 6) Please, explain the discrepancy between your experimental results and data from literature for measurement with water.
- 7) Create and present graph representing the dependence of Power number to Reynolds number for scale-up geometrical combination of the selected type of impeller. In the graph will be results of measurement ($P = f(Re)$) of the 4RT impeller type, for all combination of the impeller-vessel diameter ratio, e.g. 35.3/70, 49.1/100 and 69.75/140 and only for one distance of impeller from vessel bottom ($C = Dimp$) and only for water measurement.

Date: 18th of June, 2018

Signature:

Ing. Jan Skočilas, Ph.D.

