

I. IDENTIFICATION DATA

Thesis title:	A basic comparism of the hygroscopic cycle with the casical and organic Rankine cycle
Author's name:	Abduljalil Hashim A Mahrougi
Type of thesis :	bachelor
Faculty/Institute:	Faculty of Mechanical Engineering (FME)
Department:	Department Of Energy Engineering
Thesis reviewer:	Jan Opatřil, Ph.D.
Reviewer's department:	Department Of Energy Engineering

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment	challenging
<i>How demanding was the assigned project?</i>	
The assignment is very demanding due to the fact, that it is not a standard thermal cycle. The hygroscopic cycles using lithium bromide water solution are very little described in the literature.	

Fulfilment of assignment	fulfilled
<i>How well does the thesis fulfil the assigned task? Have the primary goals been achieved? Which assigned tasks have been incompletely covered, and which parts of the thesis are overextended? Justify your answer.</i>	
The work fulfills all the tasks of the assignment and all the goals.	

Methodology	correct
<i>Comment on the correctness of the approach and/or the solution methods.</i>	
The author has chosen the correct approach.	

Technical level	B - very good.
<i>Is the thesis technically sound? How well did the student employ expertise in the field of his/her field of study? Does the student explain clearly what he/she has done?</i>	
The work is at a good technical level, but in some parts the descriptions could be better, e.g., processing of substance properties.	

Formal and language level, scope of thesis	C - good.
<i>Are formalisms and notations used properly? Is the thesis organized in a logical way? Is the thesis sufficiently extensive? Is the thesis well-presented? Is the language clear and understandable? Is the English satisfactory?</i>	
From this point of view the thesis reaches good level. However, there were found some failings which should not be presented in the bachelor thesis, e.g.:	
<ul style="list-style-type: none"> - The page numbers should be included in the content for better orientation in the text - The title on last row of the page - The explanation of the variables in the equations should use the same notation - subscripts and superscripts - The table descriptions should be located above the tables 	

Selection of sources, citation correctness	A - excellent.
<i>Does the thesis make adequate reference to earlier work on the topic? Was the selection of sources adequate? Is the student's original work clearly distinguished from earlier work in the field? Do the bibliographic citations meet the standards?</i>	
The selection and scope of sources corresponds to their limited availability on the topic of hygroscopic cycles.	

Additional commentary and evaluation (optional)
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Comment on the overall quality of the thesis, its novelty and its impact on the field, its strengths and weaknesses, the utility of the solution that is presented, the theoretical/formal level, the student's skillfulness, etc.

Please insert your comments here.

III. OVERALL EVALUATION, QUESTIONS FOR THE PRESENTATION AND DEFENSE OF THE THESIS, SUGGESTED GRADE

The submitted thesis fulfil all the assigned tasks and meets the general requirements for the bachelor thesis. The assignment is very demanding due to the fact, that it is not a standard thermal cycle. The hygroscopic cycles using lithium bromide water solution are very little described in the literature.

The theoretical part describes the basic concepts and laws of thermodynamics. Especially in relation to thermal cycles, which are analyzed in the work.

Furthermore, the SRC, ORC and HCT cycles are compared with each other. The focus of the work is on the practical part, where the calculations, respectively the balances, of the individual components of the cycle were performed and the basic parameters of the circulation were evaluated.

On the other hand, there are some mistakes, which could be eliminated, especially in terms of style and form, see above.

Since the main advantage is zero cooling water consumption, I miss the comparison with the steam cycle equipped with dry cooling. However, this comparison would significantly exceed the scope of the bachelor's thesis. Therefore, for further work, I would recommend comparing the HCT against the steam cycle with the dry cooling system for the specific conditions of hot climate areas and HCT cycle optimization.

The presentation of results could be better and clearer. A lot of work had to be done, but it is not obvious from the text, e.g., processing of fluid properties in Matlab.

The student demonstrated understanding of the HCT cycles at a good level. The work has a very well processed extensive theoretical part. The calculation part is also beneficial. I recommend the thesis for defense.

The grade that I award for the thesis is **B - very good**.

Please explain following questions:

- 1) You state that the properties of lithium bromide water solution are available only up to 225 ° C. However, you are considering the temperature 238,5 ° C at the boiler outlet. How did you receive fluid properties for this temperature? Respectively, you state that you created the code in Matlab. Unfortunately, the approach is not entirely clear from the text. Please describe how did you obtained the substance properties outside the range of the tables.
- 2) What are the other advantages of this hygroscopic cycle, except zero cooling water consumption, and why should it be deployed against other cycles?

Date: **13.6.2022**

Signature:

