Appendix 12d

REPORT

to occupy the academic position:

''Professor''	X
''Associate Professor''	
	one of the academic positions indicated shall be marked with the sign "X"

Candidates to occupy the position:

1	Assoc. Prof.	PhD	Nina	Yankova	Penkova	UCTM
№	academic position	scientific degree	name	middle name	last name	workplace

Scientific area:

5	Technical sciences
code	name

Professional area:

5.4	Energetics
code	name

Scientific specialty:

Industrial Thermal Engineering

The competition has been announced:

37	**21.04.2020**	Silicate Technology	Metallurgy and Materials Science
in SG issue	date	for the needs of the Department	Faculty

The report was written by:

Prof.	PhD	Kosta	Petrov	Boshnakov	UCTM
academic position	scientific degree	name	middle name	last name	workplace

1. Report for the candidate:

Assoc. Prof.	PhD	Nina	Yankova	Penkova
academic position	scientific degree	name	middle name	last name

1.1. Meeting the minimum requirements under the Regulations:

A) The candidate meets the minimum requirements	20 points	X
B) The candidate doesn't meet the minimum requirements	0 points	
		one of the answers given is marked with the sign "X"

It must be filled in if answer B is marked. The publication activity of the candidate is analyzed. The response of the results achieved (quoted) is analyzed.
The candidate, Assoc. Prof. Dr. Nina Yankova Penkova for participation in the competition for professor has presented a total of 53 scientific publications, of which 24 are in scientific journals, referenced and indexed in world-famous databases and 29 are in publications with scientific review or edited collective volumes (including the monography). **On indicator A,** 50 points were achieved as a result of a dissertation defense on the topic "Method for calculation of a regenerative heat exchanger with ceramic filling". As proof is presented the Diploma for educational and scientific degree "Doctor" from the High Attestation Commission № 29833 from 25.07.2005. **On indicator B3,** 100 points have been achieved. Assoc. Prof. N. Penkova presented a monograph on "Heat transfer in transparent structures in passive solar systems", published by Academic Publications, ISBN: 978-954-2940-25-8 Sofia, 2020. The volume of the monograph is 122 pages. The monograph is based on 9 publications in scientific journals, referred and indexed in world-famous databases, in 7 of which Assoc. Prof. N. Penkova is the first author and on 4 publications in scientific peer-reviewed editions or in edited collective volumes. The monograph fully satisfies the requirements of the Regulations for acquiring scientific degrees and holding academic positions at UCTM in part B3 habilitation thesis-monograph. **On indicator D,** 523 points have been achieved, with minimum requirements for a

professor of 200 points. The points are formed by 24 scientific publications in publications that are referenced and indexed in world-famous databases of scientific information (339 points) and by 28 publications in in unreferred journals with scientific review or in edited collective volumes (184).

On indicator D have been achieved 284 points with a minimum requirements for a professor of 100 points. 240 points are from citations and/or reviews in scientific journals, refered and indexed in world-famous databases with scientific information, 24 points are from citations in monographs and collective volumes with scientific review and 20 points from citations and / or reviews in non-refereed journals with scientific review.

According to indicator E, 278 points have been achieved with minimum requirements for a professor of 150 points. The achieved points are formed as follows: 40 points from one defended doctoral student, 10 points from participation in a national educational project, 20 points from participation in 1 international educational project, 40 points from the management of 1 national scientific and 1 educational project, 151 points from attracted funds for projects managed by the applicant and 17 points from published 1 university textbook and from 1 methodical instructions, which can be used as a textbook.

1.2. Relevance of scientific and / or applied research:

A) The research is relevant. Part of the research is pioneering (no results are known on the topic by other authors)	8 points	X
B) Research is relevant. Results from other authors are known for each of the topics and / or applications studied.	6 points	
C) Most of the research is relevant, but also some results are presented that have no scientific and / or applied value	4 points	
D) The smaller part of the research is relevant	2 points	
E) Research is not relevant	0 points	
		one of the answers given is marked with the sign "X"

The evaluation of the relevance of the research must be substantiated.

The scientific activity of Assoc. Prof. Dr. Eng. Nina Penkova is dedicated to research in two main areas: energy and technological efficiency of thermal units and facilities and efficiency and reliability of passive solar systems.

Mathematical models have been developed and simulation studies have been conducted for analysis of the thermal and mechanical condition of insulating glass structures (double-glazed windows) and the influence of coatings on them, study of heat transfer in high

temperature chamber furnaces for firing ceramics, analysis and optimization of temperature stratification of heat accumulators, analysis of mass transfer and the ongoing mechanical processes in ceramic products during convective drying, analysis of combustion efficiency in boilers, heat transfer and natural ventilation in warehouses and others. The method of finite volumes and elements is mainly used for discretization of the mathematical models and for their computer simulation - the software product ANSYS.

1.3. Objectives of the research:

A) Realistic and of scientific and / or applied interest	8 points	X
B) Realistic, but not of scientific and / or applied interest	4 points	
C) Unattainable (unrealistic)	0 points	
		one of the answers given is marked with the sign "X"

Objectives must be specified. The type of the set objectives must be justified
The goals of the research are realistic and are of scientific and applied science interest. They are aimed at specific industrial sites. The performed analyzes are based on computer simulations of the developed mathematical descriptions of the ongoing processes in insulating glass structures, high-temperature chamber furnaces for firing ceramics, convective dryers for ceramic products, heat accumulators, boilers and others.

1.4. Candidate research contributions:

A) With lasting scientific and / or applied response, they form the basis for new research and applications	20 points	X
B) They are of significant scientific and / or applied interest, complete and / or summarize previous research	16 points	
C) They are of scientific and / or applied interest	12 points	
D) Lack of significant contributions	8 points	
E) Lack of contributions	0 points	
		one of the answers given is marked with the sign "X"

Contributions must be specified. The type of results achieved must be justified.
The most important scientific, scientific-applied and applied contributions are: 1.For high-temperature chamber furnaces for firing ceramics, an algorithm for modeling and numerical study of the non-stationary conjugated heat exchange and a mathematical model of the related heat exchange and mechanical processes have been developed and validated. 2.An algorithm for modeling and numerical simulation of the interconnected heat exchange, mass transfer and mechanical processes in capillary-porous colloidal bodies during convective drying in industrial dryers has been compiled and validated. 3.A model of non-stationary heat transfer and hydrodynamic processes in a two-phase, two-component environment of industrial water heat accumulators has been created and validated. 4.As a result of the model studies of the heat exchange and the thermo-mechanical processes in bent glazing, an assessment of the temperature non-uniformity and the strained state of the glasses was performed. 5.The hypothesis that non-stationary heat transfer in flat building glazing can be considered as a sequence of steady states has been proved. 6.Through model studies of the moisture-mechanical processes in the material and balance dependences, the potential for reducing the drying time of ceramic products in an industrial dryer has been established. 7.Based on model research, a draft solution for improving the combined heat transfer in a high-temperature chamber furnace for firing technical ceramics has been proposed. 8.Guidelines for precise selection of double glazing based on model studies of heat transfer are formulated. 9.A methodology for determining the energy effect of glazing of terraces has been developed.

1.5. Participation of the candidate in the achievement of the presented results:

A) The candidate has at least an equal participation in the submitted papers	8 points	X
B) The candidate has at least an equal participation in most of the submitted papers	7 points	
C) The candidate has a secondary participation in most of the submitted papers	4 points	
D) The candidate participation is unnoticeable	0 points	
		one of the answers given is marked with the sign "X"

Critical notes must be provided if one of the items C or D is marked.

1.6 Pedagogical activity:

A) The candidate has effective and sufficient pedagogical activity at the university. The textbooks issued are modern and useful (they meet the requirements of the Regulations). The work with undergraduate and doctoral students is at a high professional level.	8 points	X
B) The candidate has sufficient pedagogical activity at the university. The textbooks issued satisfy the requirements of the Regulations.	6 points	
C) The pedagogical activity and / or textbooks issued are insufficient (do not meet the requirements of the Regulations)	0 points	
		one of the answers given is marked with the sign "X"

Critical notes must be provided if one of the items B or C is marked.

1.7. Critical notes:

A) Lack of critical notes	8 points	
B) Critical notes of a technical nature	7 points	X
C) Critical notes that would partially improve the results achieved in a small part of the research	5 points	
D) Critical notes that would partially improve the results achieved in most of the research	3 points	
E) Significant critical notes	0 points	
		one of the answers given is marked with the sign "X"

Critical notes must be provided if one of the answers C, D or E is marked.

1.8. Conclusion

A) The evaluation of the candidate's activity is **POSITIVE**	This evaluation is assigned to a total number of at least 50 points	X
B) The evaluation of the candidate's activity is **NEGATIVE**	This evaluation is assigned to a total number below 50 points	
		one of the answers given is marked with the sign "X"

To be filled in if requested by the member of the scientific jury
The documents and materials presented by Assoc. Prof. PhD Eng. Nina Penkova meet the requirements of the Law for development of the academic staff in the Republic of Bulgaria (ZRASRB), the Regulations for application of ZRASRB, and the Regulations for development of the academic staff of UCTM-Sofia. She has a sufficient number of scientific papers published in well-known international specialized journals. The works have original scientific, scientific-applied and applied contributions. The scientific and pedagogical qualification of Assoc. Prof. Dr. Eng. Nina Penkova is at the required level. The total number of points from the evaluation of the candidate's activity according to this form is 79, with a minimum value for a positive evaluation of 50 points. Based on the analysis of the significance of the scientific papers and materials presented in the competition, I find it reasonable to give my positive assessment and recommend to the Scientific Jury to vote for the academic position of "Professor" to Assoc. Prof. Dr. Eng. Nina Yankova Penkova in professional field 5.4 "Energetics", scientific specialty "Industrial Thermal Engineering" at UCTM-Sofia.

14.09.2020	The report was written by:	
date	**Prof. PhD Eng. Kosta Boshnakov**	signature