O P I N I O N
of the materials submitted for participation in the competition for occupying the academic position "Associate Professor" in field of higher education – 5. Technical Sciences, professional direction - 5.6. Materials and Materials Science, specialty - "Materials Science and Materials Technology"

Member of the Scientific Jury: Assoc. Prof. Ivan Nenov Mitev, PhD

In the competition for occupying the academic position Associate Professor, announced in the State Gazette, no. 53/09.06.2026 and on the Technical University of Gabrovo website for the needs of the Department of "Material science and Mechanics of materials" at the Faculty of "Mechanical and Precision Engineering", as the only candidate participated Ch. Assistant Milka Grigorova Atanasova, PhD – Technical University of Gabrovo.

1. **Overview of the content and results in the presented scientific works**

The candidate is a “Doctor” in the scientific specialty “Manufacturing Technology”. Outside of the scientific publications related to the dissertation for awarding the educational and scientific degree of “Doctor”, Chief Assistant Professor Milka Atanasova, PhD, participates in the competition with a total of 37 scientific works. They are presented in the list for participation in the competition and fall entirely within the scope of the competition (Materials Science and Technology of Engineering Materials), distributed in groups of criteria according to the LDASRB/ 2019, as follows:

- *Group A, Indicator 1*: Abstract of a dissertation for the award of the educational and scientific degree 'Doctor' (PhD) on the topic 'Technology for finishing processing of holes, implementing the "Spherical mandreling" method' (2016) (A.1);
- *Group B, Indicator 4*: The candidate participates with a total of 10 scientific publications on the topic: “Applications of concentrated energy fluxes with a continuous electron beam for surface hardening and welding of dissimilar materials”. All of them have been published in journals/editions referenced and indexed in world-renowned databases of scientific information, being the sole author of 2 of them.
- *Group G*

Indicator 7: A total of 2 articles published in indexed journals in WoS and Scopus with SJR Q3.

Indicator 8: A total of 25 publications, including 7 articles and 18 conference papers, distributed as follows:

- 4 scientific articles in the Journal of the Technical University of Gabrovo: 2016 (8.13 and 8.14); 2023 (8.19); 2024 (8.20);
- 1 article in the Trakya University Journal of Natural Sciences, 2007 (8.10);
- 1 article in Innovation in Woodworking Industry and Engineering Design, 2023 (8.18);
- 1 article in the International Journal of Innovative Research and Scientific Studies, 2025 (8.21);
- 1 paper at the International Conference “Research and Development in Mechanical Industry” RaDMI, 2005 (8.6);
- 1 paper at the International Scientific Conference AMTECH, 2005 (8.7);
- 10 papers at the International Scientific Conference UNITECH, Gabrovo: 2002 (8.1); 2004 (8.4, 8.5); 2005 (8.8); 2006 (8.9); 2008 (8.11); 2009 (8.12); 2018 (8.15); 2021 (8.16); 2022 (8.17);

- 2 papers at the Jubilee Scientific Session '90 Years of Aviation Education in Bulgaria', 2004 (8.2; 8.3);
- 4 papers at the International Scientific Conference 'Mechatronics, Eco- and Energy-Saving Systems and Technologies': 2025 (8.22; 8.23; 8.24); 2026 (8.25);
- 2 textbooks, one co-authored and titled „Facilities Layout Planning“(2019), and for the other – „Blank Manufacturing Technologies. Part I: Casting Production“(2026), she is the sole author."
- *Group D*: The presented list of scientific works includes a total of 25 citations in indexed journals in WoS and Scopus. Out of them, the ones with the highest number of citations are: 8 - of scientific work 4.3, 9 - of scientific work 4.4, and 5 - of scientific work 7.1.

The candidate's score in Group D is equivalent to 250 points, which exceeds the minimum requirements. The above-presented evidence proves that the candidate's scientific asset in quantitative terms satisfies the minimum national requirements according to the LDASRB / 2019 and those of the Technical University of Gabrovo for occupying the academic position of „Associate Professor“ in the field of the competition.

2. General characteristics of the candidate's activity

2.1. Educational and pedagogical activity

According to the attached reference, Chief Assistant Professor Milka Atanasova, PhD, has given lectures in 8 courses and conducted laboratory classes in 12 courses in both the “Bachelor” and “Master” educational and qualification degrees in the professional fields 5.6 Materials and Materials Science and 5.1 Mechanical Engineering.

She has served as a student group supervisor for the „Bachelor“educational and qualification degree, specialty „Technology of Materials and Materials Science“, full-time and part-time forms of study, from the 1st to the 4th year inclusive. Since 2019, she has been the coordinator for Master's degree programs in the specialty „Technology of Materials and Materials Science“, full-time and part-time forms of study, and since 2023, also the coordinator for Master's degree programs in the specialty „Surface Engineering of Engineering Materials (Surface Engineering) “, full-time form of study, in the professional field 5.6 Materials and Materials Science.

Chief Assistant Professor Milka Atanasova, PhD, participates in the maintenance and modernization of the material and technical facilities related to the educational process in the field of the competition.

The above facts confirm that the candidate has the necessary pedagogical training and qualifications to occupy the academic position of “Associate Professor” in the field of the competition.

2.2. Scientific and scientific-applied activity

The research activity of Chief Assistant Professor Milka Atanasova, PhD, is entirely in the field of the competition, demonstrating continuous growth over the years. A gradual development and expansion of the scope of her scientific interests is observed – from research in the field of hydrostatic plastic deformation (in the period 2002–2009), through modeling and investigation of carbido-bainitic cast irons (2016–2018) and sonochemical synthesis of bioplasticizers (2021–2023), to her modern and most significant research related to electron beam welding of dissimilar materials and Surface Engineering (2022–2026).

Chief Assistant Professor Milka Atanasova, PhD, is a participant in 5 national research projects with European funding, as well as in 17 projects funded by the national budget through the Technical University of Gabrovo.

3. Contributions and their significance for science and practice

After analyzing the presented scientific works, I fully accept the candidate's claims for scientific-applied and applied contributions. They are in full compliance with the subject matter of the announced competition and can be categorized into two main areas:

Scientific-applied contributions:

- A new process for electron beam surface treatment of cylindrical parts by linear scanning in the axial direction has been developed, enabling effective transformation hardening of the surface layer.
- Regularities have been established in the formation of joints between various combinations of dissimilar materials, including copper and stainless steel, titanium and aluminum alloys, as well as carbido-bainitic ductile iron and stainless steel.
- The mechanisms of structure formation, phase transformations, and intermetallic interaction during electron-beam welding have been clarified depending on the energy parameters of the process, the position, and the oscillation of the electron beam.
- Dependencies have been established between the technological modes of electron beam processing, the formed microstructure, phase composition, and performance characteristics of the processed materials.
- Existing knowledge has been expanded regarding the influence of structure and heat treatment on the wear resistance of carbido-bainitic cast irons, as well as regarding the possibilities of using bio-based plasticizers in modifying the properties of polymer materials.

Applied contributions:

- Specific technological regimes have been proposed for obtaining high-quality and defect-free welded joints between various pairs of dissimilar materials.
- Optimal parameters have been determined for electron beam surface hardening of C45 steel, ensuring high hardness, a favorable stress state, and enhanced performance characteristics.
- The necessity of preheating and appropriate selection of process parameters when joining difficult-to-weld materials has been proven.
- Original experimental setups, test benches, and specialized tooling equipment have been developed and constructed for the needs of scientific research and the educational process.
- Two university textbooks have been published, one of which is a sole-authored edition, intended for the training of students in the professional field 5.6 Materials and Materials Science."

I consider the established contributions to have both scientific and practical significance. They expand knowledge in the field of materials science, welding technologies, and Surface Engineering, while simultaneously offering practical solutions for optimizing technological processes and enhancing the operational reliability of engineering products.

4. Evaluation of the candidate's personal contribution

The personal contribution of Chief Assistant Professor Milka Atanasova, PhD, to the achieved scientific and scientific-applied results is beyond doubt. She has actively participated in all stages of planning, conducting experiments, and analyzing the obtained experimental data. Categorical proof of her research independence is the presence of 5 sole-authored scientific works in her overall list (including publications B.4.6 and B.4.7 from the habilitation thesis), as well as the sole-authored textbook published in 2026.

5. Notes and recommendations

I have no significant remarks regarding the scientific works, publications, and textbooks presented for the competition.

I recommend that Chief Assistant Professor Eng. Milka Atanasova, PhD, continue her research and teaching activities in the department with the same high level of activity.

6. Personal impressions

I have known Chief Assistant Professor Milka Atanasova, PhD, since her time as a student, as she was a student of mine. Subsequently, she joined the Department of Materials Science and Technology of Materials before its merger with the Department of Mechanical Engineering and Technologies, which allows me to have direct and long-standing observations of her professional development.

My impressions of our joint work are exceptionally positive. She possesses the necessary theoretical knowledge and practical skills for her teaching and research activities. In our professional relations, she stands out with excellent communication skills and a high sense of responsibility in performing departmental tasks.

7. Conclusion

Bearing in mind the above, I propose Ch. Assistant Milka Grigorova Atanasova, PhD, to be elected as an "Associate Professor" at the Technical University of Gabrovo in field of higher education - 5. Technical sciences, professional direction – 5.6. Materials and Materials Science, specialty – Materials Science and Materials Technology.

23.10.2026 Member of the Scientific Jury:

/Assoc. Prof. I. Mitev, PhD/