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: Prof. Galya Velikova Duncheva, DSc, 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 holds a PhD degree in the scientific specialty "Mechanical Engineering Technology." In addition to the scientific publications derived from her dissertation, Ch. Assistant Dr. Milka Atanasova participates in the competition with a total of 40 scientific works. The scientific works presented in the list for participation in the competition are categorized according to the indicator groups set out in the Law on the Development of the Academic Staff in the Republic of Bulgaria (2019), as follows:

► *Group A, indicator 1:* Dissertation abstract for the award of PhD educational and scientific degree on the topic "Technology for Finishing Holes Implementing the Spherical Burnishing Method" (2016) (A.1);

► *Group B, Indicator 4*: Habilitation thesis comprising 10 thematically related scientific publications in journals refereed and indexed in WoS and Scopus, on the topic "Applications of concentrated energy flows using a continuous electron beam for surface hardening and the welding of dissimilar materials" (B.4); Based on the level of publication, these scientific publications are distributed as follows:

● 4 articles in international scientific journals with Impact Factor (WoS, Scopus), including 2 articles in Metals (MDPI, Q2: IF 2022: 2.9) (4.3) and (IF 2023: 2.6) (4.4); 1 article in Crystals (MDPI, Q2: IF 2025: 2.9) (4.8); and 1 article in Journal of Manufacturing and Materials Processing (MDPI, Q1: IF 2025: 4.0) (4.9);

● 4 articles in international scientific journals with SJR (Scopus): 1 article in Bulgarian Chemical Communications, Scopus, Q4, (SJR 2022: 0.169) (4.1); 2 articles in Journal of Physics: Conference Series, Scopus, Q3, (SJR 2022: 0.183) (4.2) and (SJR 2024: 0.187) (4.5); 1 article in Archives of Materials Science and Engineering, Scopus, Q3, (SJR 2025: 0.280) (4.10);

● 2 scientific articles in Environment Technology Resources - Proceedings of the 16th International Scientific and Practical Conference, Scopus (4. 6 and 4.7).

► *Group G*

■ *Indicator 7:* 2 scientific articles published in Biointerface Research in Applied Chemistry, Scopus Q3, (SJR 2022: 0.336) (7.1) and Engineering Proceedings, Scopus Q3, (SJR 2025: 0.254) (7.2).

■ *Indicator 8:* A total of 25 scientific publications, comprising 6 articles and 19 papers, distributed according to the place of publication as follows:

● 1 article in the International Journal of Innovative Research and Scientific Studies (8.21);

● 5 articles in national scientific journals, of which 4 in the Journal of the Technical University of

Gabrovo (8.13; 8.14; 8.19; 8.20) and 1 article in Innovation in Woodworking Industry and Engineering Design, published by the University of Forestry, Sofia (8.18);
● 2 scientific reports at international conferences abroad (8.6 and 8.10);
● 17 scientific reports at international and national conferences within the country (8.1 – 8.5; 8.7 – 8.9; 8.11; 8.12; 8.15 – 8.17; 8.22; 8.23 – 8.25).
► 2 textbooks—one co-authored with Assoc. Prof. Dr. Ivan Amudzhev, and the other authored independently—namely: „Planning the Layout of Production“, 2019, ISBN 978-954-490-646-7 (U.1), and „Technologies for Manufacturing Workpieces. Part I: Production of Castings“, 2026, ISBN 978-954-683-745-5 (U.2).

Excluding the abstract of the PhD dissertation, 21 out of a total of 37 scientific articles and reports are published in English. The candidate is the sole author of 6 scientific works, comprising 1 textbook and 5 scientific articles and reports (4.46; 4.7; 8.9; 8.20; 8.25). Ch. Assistant Dr. Milka Atanasova is the first author of 2 scientific works and the second author of 4 works co-authored by two individuals, including 1 textbook.

The review of the candidate's scientific works shows the following: 1) All publications are in the field of materials science and technology of engineering materials; 2) Outside of textbooks, all scientific publications are research with the exception of a scientific paper (8.18), presenting an overview of modern "green technologies" for the synthesis of esters as biobased additives in polyvinyl chloride; 3) The scientific papers for participation in the competition were published in the period 2002 - 2026 with an interruption in the period 2010 - 2015, during which the candidate worked on the PhD dissertation; 4) During the period 2022 - 2026, a trend of increasing both the intensity and the scientific level of publication was observed. During the last period, Ch. Assistant Dr. Milka Atanasova significantly improved her qualifications, working actively in the Laboratory "Development and Research of Intelligent Systems for Research of Structure and Properties of Materials" within the Center of Competence "Intelligent, Mechatronic, Eco- and Energy-Saving Systems and Technologies" at Technical University of Gabrovo. *In numerical terms, the candidate's asset for indicators group B is 183.76 points, and for indicators group G is a total of 211.5 points.*

► *Group D*

The list of citations includes 25 references to co-authored scientific articles published in journals indexed and abstracted by WoS and Scopus. The majority of these citations appear in high-ranking, indexed journals—classified in the Q1 quartile—from publishers such as Elsevier, MDPI, and Springer. Examples include Journal of Materials Science and Technology, Journal of Materials Research and Technology, Journal of Advanced Joining Processes, Surface and Coatings Technology, Metals, Crystals, Sensors, and the International Journal of Advanced Manufacturing Technology, among others. These facts confirm that the candidate’s scientific publications are accessible to the global research community in the fields of materials science and the technology of engineering materials. *The candidate’s score under Group D amounts to 250 points, which is five times the minimum requirement.*

The above confirms that the candidate’s record, in quantitative terms, exceeds the minimum national requirements as well as those of Technical University of Gabrovo for holding 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

Ch. Assistant Dr. Milka Grigorova Atanasova has delivered lectures, conducted laboratory exercises, and supervised course projects in the following subjects, for both full-time and part-time modes of study:

● In professional field 5.6. Materials and Materials Science, Bachelor’s degree level: “Manufacturing Technologies for Workpieces,” “Metal Forming,” “Stamping Technology and

Tools," "Welding of Materials," "Technical Safety," "Casting of Materials – Project," and "Metal Forming – Project";

● In professional field 5.1. Mechanical Engineering and professional field 5.13. General Engineering, for the educational and qualification degree of "Bachelor": "Materials Science and Technology of Engineering Materials", "Materials Science and Technology of Materials", and "Technical Safety";

● In professional field 5.6. Materials and Materials Science, Master's degree level: "Composite Materials," "Welding," and "Processing of Materials by Plastic Deformation";

● In professional field 5.1. Mechanical Engineering and professional field 5.13. General Engineering, at the Master's educational and qualification degree level: "Materials Science and Technology of Engineering Materials," "Resource-Saving Technologies," and "Technological Processes and Apparatuses."

The candidate is a co-author of one textbook and has independently developed a textbook titled "Technologies for Manufacturing Workpieces. Part I: Production of Castings."

Ch. Assistant Dr. Milka Atanasova is actively involved in maintaining and modernizing the technical infrastructure supporting the educational process and research activities. Her contributions include: the design and development of a test rig for the hydrostatic plastic forming of open-ended parts; the design and development of dies for height-reduction (upsetting) operations; the design and development of dies for shearing/cutting operations; the design and development of pattern and molding equipment for the production of complex castings; and the maintenance of hydraulic and eccentric presses in the laboratories dedicated to "Metal Forming via Plastic Deformation." Ch. Assistant Dr. Milka Atanasova has supervised 21 doctoral candidates who have successfully defended their dissertations. Furthermore, she has made a significant contribution to the preparation of academic documentation within the department, as well as to the documentation required for accreditation processes.

The above facts confirm that the candidate possesses the necessary pedagogical training and qualifications for the academic position of "Associate Professor" in the field of the competition.

2.2. Scientific and scientific-applied activity

Within the framework of the competition, the habilitation thesis—comprising 10 thematically related scientific publications (B.4)—is of decisive importance for the level of the candidate's scientific output. It focuses on the application of concentrated energy flows via a continuous electron beam in two areas: 1) welding of dissimilar materials (4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8) and 2) surface hardening of metal components (4.9, 4.10). The work is underpinned by a unified concept aimed at establishing correlations between "technological parameters for continuous electron-beam processing" – "microstructure, phase composition, and the evolution of chemical interactions between materials"– "mechanical properties and surface integrity characteristics." The relevance of the topic, the research methodology, and the scientific contributions are clearly substantiated in the attached "Extended Habilitation Report." In addition to the habilitation thesis, further scientific publications in these two areas include items (8.19, 8.24, 8.25) and (8.21), respectively.

In addition to the two aforementioned areas, the scientific publications of Ch. Assistant Milka Atanasova focus on the investigation of: the structure, mechanical properties, and service performance of carbide-bainitic cast irons (8.13, 8.14, 8.15); the hydrostatic and hydromechanical plastic forming of parts open on one or both sides (8.1, 8.2, 8.3, 8.4, 8.5, 8.6, 8.7, 8.8, 8.9, 8.10, 8.11, and 8.12); bio-based additives and plasticizers for polymeric materials (7.1, 8.16, 8.17, 8.19); and the physical metallurgy of metals and alloys (publications 8.22 and 8.23).

Ch. Assistant Dr. Milka Atanasova has participated as a researcher in five national research projects and 17 university research projects. In terms of their subject matter, all the projects fall within the scope of the competition.

3. Contributions and their significance for science and practice

I accept the classification and formulation of the scientific-applied and applied contributions presented in the author's summary. These contributions are significant and useful for both science and practice. I will highlight the key scientific-applied contributions:

● *A new process for electron-beam surface treatment of cylindrical components, involving proven transformation surface hardening of medium-carbon structural steel, characterized by linear scanning in the axial direction, which eliminates the effect of thermal overlap in the axial direction (B.4.9, B.4.10, G.8.21);*

● *Electron-beam welding processes have been developed that ensure the creation of monolithic joints—free from cracks and defects—between the following pairs of dissimilar materials: copper and AISI 304L stainless steel (B.4.1–B.4.3); carbide-bainitic spheroidal graphite cast iron (CADI) and AISI 316L stainless steel (B.4.6); AISI 316L stainless steel and additively manufactured Maraging 300 steel (B.4.7); titanium alloy Ti-6Al-4V and aluminum alloy Al6082-T6 (B.4.4, B.4.5, B.4.8); and copper and aluminum alloy Al6082-T6 (G.8.19).*

4. Evaluation of the candidate's personal contribution

I consider that Ch. Assistant Dr. Milka Atanasova has made a significant personal contribution to the conduct of applied scientific research, as well as to the maintenance and modernization of the department's material and technical infrastructure.

5. Notes and recommendations

I have no objections of a fundamental nature. I offer the following recommendations to Ch. Assistant Dr. Milka Atanasova: 1) To continue her research work at the same pace she has maintained in recent years, while taking a leading role in the organization and conduct of scientific research; 2) To take on the supervision of doctoral students. Implementing these recommendations would require a significant reduction in her departmental duties related to the preparation of various types of documentation—a development I sincerely wish for her.

6. Personal impressions

I have direct experience with Milka Atanasova, having served as her PhD thesis supervisor. She is hardworking, demonstrates personal commitment to the execution of every task, and maintains a collegial attitude. Through her work as a researcher in the Laboratory for the Development and Investigation of Intelligent Systems for Analyzing Material Structure and Properties—and in collaboration with other research laboratories within the Competence Center for Intelligent, Mechatronic, Eco-friendly, and Energy-saving Systems and Technologies at the Technical University of Gabrovo—she has significantly enhanced her qualifications in the field relevant to this competition.

7. Conclusion

In view of the above, I propose that Ch. Assistant Dr. Milka Grigorova Atanasova be appointed as an Associate Professor at the Technical University of Gabrovo in the field of higher education – 5. Technical Sciences, professional field – 5.6 Materials and Materials Science, specialty – Materials Science and Technology of Engineering Materials.

16.10.2026 **Member of the Scientific Jury::**

/ Prof. Galya V. Duncheva, DSc, PhD /