

REVIEW

By:

Prof. Eng. Ivaylo Georgiev Koprev, PhD,

University of Mining and Geology “St. Ivan Rilski”

for the competition for occupying the academic position “Associate Professor” in the field of higher education 5. Technical Sciences, professional field 5.8 “Prospecting, Extraction and Processing of Mineral Resources”, scientific specialty “Open-pit and Underwater Mining of Mineral Resources”, announced by the University of Mining and Geology “St. Ivan Rilski” in the State Gazette, issue 36 of 17.04.2026, with candidate Chief Assistant Dr. Eng. Martin Ivanov Pushkarov.

Grounds for submitting the review:

Participation in the Scientific Jury, approved according to Order No. RD13-22/18.05.2026 of the Rector of the University of Mining and Geology “St. Ivan Rilski”.

1. Creative Biography

Between 2011 and 2017, the candidate obtained a Bachelor’s and Master’s degree in “Hydraulic and Pneumatic Engineering” at the Technical University of Sofia. Between 2017 and 2020, he completed a Master’s degree at the University of Mining and Geology “St. Ivan Rilski” in the specialty “Open-pit Mining”. He earned a PhD in “Fluid Mechanics” in 2020.

Since June 2025, he has held the position of Chief Assistant at the University of Mining and Geology “St. Ivan Rilski”, where he develops active teaching and research activities. Prior to that, between November 2024 and June 2025, he was an Assistant at the same university.

Between 2021 and 2024, he worked as a Chief Assistant at the Technical College – Sofia, part of the Technical University – Sofia. Parallel to his academic work, he has accumulated significant practical experience in industry. Between 2020 and 2022, he was an investment project manager at “Minproekt” EAD, and

before that he consecutively held positions as mechanical engineer, design engineer, and head of the “Mechanical–Technological and Design” department.

His professional experience includes designing mechanical and technological systems, developing equipment for the mining and food industries, as well as managing engineering and investment projects.

2. General Description of the Submitted Materials

The following materials were provided:

Announcement in State Gazette issue 36 / 17.04.2026

Copies of diplomas for completed higher education (Bachelor, Master) and diploma for acquired PhD degree

Creative autobiography

Documents from UMG “St. Ivan Rilski” certifying work experience and teaching workload

Set of scientific articles and a monograph

List of scientific publications submitted for obtaining the PhD degree

Full set of scientific publications submitted for participation in the competition for “Associate Professor”

List of conference papers

Reports from NACID and citation reports from Scopus, Web of Science, Google Scholar, etc.

3. General Characteristics of the Research and Applied Scientific Work

The research and applied scientific work of Chief Assistant Dr. Eng. Martin Pushkarov is oriented toward the following areas:

Hydraulic and pneumatic components and their testing

Modelling of turbomachinery and hydrodynamic processes

Analysis of mine waters and methods for their treatment

Experimental studies of air and water flows

Energy technologies for sustainable production

Developments in the field of bioenergy and biochar

Most closely related to the competition profile is the research work on mine waters. In the monograph “Numerical Modelling and Experimental Analysis of Pollution in Mine Waters in Mining Operations” (2026), the topic is examined in a broad engineering-applied context, including mine safety, slope and underground workings stability, drainage processes, and long-term stability of disturbed terrains.

His scientific output demonstrates consistency, thematic development, and contribution to engineering sciences.

4. Publication Activity

The candidate participates with 27 scientific publications, including:

Monograph:

Pushkarov, M. – Numerical Modelling and Experimental Analysis of Pollution in Mine Waters in Mining Operations.

Refereed journals: 21 articles

Non-refereed journals: 6 articles

Under indicator B (habilitation work): the monograph listed above.

Under indicator G (publications in refereed and indexed journals): 21 publications.

Total points: 228.38, meeting the minimum requirements.

With a required minimum of 400 points, the candidate presents 463.68 points.

5. Teaching Activity

According to the report from the Mining–Technological Faculty of UMG “St. Ivan Rilski”, the candidate has an average teaching load of about 400 hours, formed by teaching the following courses:

Good Mining Practices – Bachelor

Mining Software – Master

Mining Technologies – Bachelor

Open-pit Mining – Bachelor

Surface Mine Complex – Bachelor

Design of Technical Reclamation in Open-pit Mines – Master

The candidate has substantial thematic workload in the field of mineral extraction and meets the long-term teaching requirements of UMG.

6. Main Scientific and Applied Contributions

The contributions can be grouped into the following areas:

I. Hydrokinetic Turbines and Energy Utilization of Water Currents

Research includes development, mathematical modelling, numerical simulations, experimental studies, and optimization of hydrokinetic turbines.

II. Hydraulic Systems, Measurement and Diagnostics

Includes engineering solutions for testing, diagnostics, and optimization of hydraulic systems used in mobile machinery and mining equipment.

III. Environmental Technologies and Sustainable Resource Use

Focus on biochar and hydrochar applications, air quality analysis, emissions from construction materials, and sustainable engineering practices.

IV. Engineering Design, Laboratory Systems, and Digital Technologies

Development of laboratory stands, measurement systems, specialized equipment, and use of CAD/CAE technologies and 3D modelling.

V. Mining Engineering, Mathematical Modelling, and Intelligent Technologies

Methods for optimizing open-pit mining processes, modelling of crushing–screening complexes, diagnostics of mobile machines, and digital technologies for efficiency and safety.

The reviewer accepts and positively evaluates the contributions.

7. Citations

For the competition, the candidate submitted 8 citations from publications indexed in Scopus and Web of Science. Scopus shows 25 independent citations and h-index = 3. Five of the eight submitted citing publications are in Q1 or Q2 journals with impact factor between 2.6 and 3.5.

These results demonstrate not only compliance with minimum requirements but also the significance of the research.

8. Critical Notes and Recommendations

The overall evaluation is positive. However, several directions for improvement are noted:

The wide thematic scope is an advantage but risks fragmentation. Consolidation around key areas such as open-pit mining, mine waters, and digital technologies is recommended.

Practical experience should be more actively integrated into student and doctoral training through experimental and project-based activities.

9. Conclusion

The reviewer considers not only the minimum indicators but also the overall connection between education, engineering experience, scientific work, and teaching activity.

The presented results meet the requirements of the Law on the Development of Academic Staff in the Republic of Bulgaria, its regulations, and the internal rules of UMG “St. Ivan Rilski”.

On this basis, the reviewer **gives a positive opinion and recommends** that Chief Assistant Dr. Eng. Martin Ivanov Pushkarov be appointed to the academic position Associate Professor in field 5. Technical Sciences, professional field 5.8 “Prospecting, Extraction and Processing of Mineral Resources”, specialty “Open-pit and Underwater Mining of Mineral Resources”.

13.08.2026, Sofia

Reviewer:

Prof. Eng. Ivaylo Koprev, PhD