

METHODOLOGY

for conducting preliminary and final stages
OF THE WORLD CONSTRUCTION CHAMPIONSHIP (WCC)
within the individual nomination:
Design of electrical part and automation systems

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1. PURPOSE AND SCOPE

These methodological recommendations (hereinafter referred to as the Methodology) determine the procedure and conditions for holding the preliminary and final stages of the World Construction Championship (WCC) (hereinafter referred to as the Championship) within the individual nomination “Design of electrical part and automation systems.”

The preliminary stage of the Championship is optional, i.e. Participant Organizations shall make their own decisions and determine the option of selecting specialists to participate in the final stage of the Championship:

- or independently organize and hold the preliminary stage in the organization using the Tasks developed for the preliminary stage of the Championship according to the Methodology,
- or conduct the selection of Participants according to the qualification criteria in accordance with Appendix No. 1 to the Methodology.

The lists of Finalists shall be sent within the terms established by Section 9 of the Methodology, in accordance with the Quotas presented in Appendix No. 3 to the General Procedure for the Championship.

The participating organization shall provide the Organizer with information about the finalists in the format in accordance with Appendix No. 6 to the Methodology and ensure their registration on the Official website of the Championship <https://pro-wcc.ru> (hereinafter - the Official website) in the section “Participants”.

The Methodology of individual nomination "Design of electrical part and automation systems" is developed for revealing the level of competence and complex evaluation of knowledge, skills and abilities of specialists, carrying out activities in the field of designing of architectural and the construction part of industrial construction facilities.

Individual nomination: “Design of electrical part and automation systems” is held by specialization:

- design of electrical lighting
- design of power supply systems up to 1000 V,
- design of low-current systems (fire-fighting automation, alarms and warnings),
- design of power supply systems above 1000 V (primary switching, relay protection and automation),
- design of automation of building engineering systems of capital construction objects.

2. TERMS AND DEFINITIONS

Abbreviation	Decryption
Jury/Expert jury	A group of experts evaluating the results of tasks performed by Participants on nominations
Task/Task of the Championship	Task, during performance and according to the results of which the Participants demonstrate the level of knowledge, abilities and skills on the nomination
Quotas	Number of places for specialists of Organizations-participants established by the Organizing Committee for each nomination in the

	final stage of the Championship
Nomination	Name of the activity (profession) on which the Championship competitions are held
Organizer	A team of diverse specialists under the direction of the Ministry of Construction of Russia and Rosatom State Corporation, responsible for organizing and holding of the Championship
Participant Organization	An Organization whose specialists take part in Championship competitions/General partner-Participant
Organizing committee	Federal Organizing Committee of the Championship
Official site	Website of the Championship containing complete, reliable, updated information about the Championship
Site	The site of the nomination, the place where the Participant /team of Participants complete the Tasks for the final stage of the Championship
Participant / Team of Participants	Specialist / Team of specialists taking part in the Championship competitions
Organization-developer	An Organization not participating in the competitions but providing methodological support for nominations
Technical expert	A Developer Organization representative who works on the site of the final stage of the Championship and ensures holding of the nomination competitions and the work of Expert Jury
Finalist	Specialist participating in the final competitions of the Championship
Championship	World Construction Championship (WCC) shall mean the international championship in industrial construction

3. REGULATIONS

Tasks are developed on the basis of international standards, interstate standards, IEC standards, national set of rules, national standards, public manuals and recommendations for the design, installation and operation of equipment manufacturers by specialization of Participants.

The list of regulatory and technical documentation used during the development of the Tasks:

Specialization “Design of Electrical Lighting”

- GOST 21.608-2014. Rules of working documentation execution of power electrical equipment;
- GOST 32144-2013. Electric energy Electromagnetic compatibility of technical equipment. Standards of quality of electric energy in common-use power supply systems;
- GOST 29322-2014. Standard voltages;
- GOST 28249-93. Short circuits in electrical installations. Methods of calculation in AC electrical installations with a voltage up to 1 kV;
- GOST IEC 61140-2012. Electric shock hazard protection General safety provisions for installations and equipment;
- GOST 14254-2015. Protection degrees provided by wrappers (IP code);

GOST IEC 60050-151-2014. International electrotechnical dictionary. Part 151. Electrical and magnetic devices;

- GOST 21.114-2013. Rules for performing general sketch drawings of non-standard products;

- SP 52.13330.2016. Natural and artificial lighting;

SNRA II-8.03-96. Artificial and natural lighting;

BR KR (Building regulation of the Kyrgyz Republic) 23-05:2019 Natural and artificial lighting;

- TKP 45-2.04-153-2009 (02250). Natural and artificial lighting;

CP RK (Code of practice of the Republic of Kazakhstan) 2.04-104-2012. Natural and artificial lighting.

Specialization “Design of power supply systems below 1000 V”

- GOST 21.613-2014. Rules of working documentation execution of power electrical equipment;

- GOST 30331. Low voltage electric installations

GOST IEC 60050-151-2014. Electrical and magnetic devices;

- GOST 28249-93. Short circuits in electrical installations. Methods of calculation in AC electrical installations with a voltage up to 1 kV;

- SP 76.13330.2016. Electrical devices:

- SNiP 3.05.06-85. Electrical devices:

BR RK (Building regulation of the Republic of Kazakhstan) 4.04-07-2013. Electrical devices:

- TKP 339-2011. Electrical installations up to 750 kV;

- EIR 6, 7th Edition. Electrical installation rules

- EIR RK Electrical installation rules

- EIR RA. Electrical installation rules

Specialization "Design of power supply systems above 1000 V (primary switching, relay protection and automation)"

- GOST R IEC 60050-826-2009. Electrical Installations Terms and definitions;

GOST IEC 60027-7-2016. Letter designations used in electrical engineering. Part 7. Generation, transmission and distribution of power

GOST 29322-2014/ (IEC60038:2009). Standard voltages;

- GOST 26522-85. Short circuits in electrical installations. Terms and definitions;

- GOST R 52735-2007. Short circuits in electrical installations. Calculation methods in AC electrical installations with a voltage exceeding 1 kV;

-CD 153-34.0-20.527-98. Guidelines for the calculation of short circuit currents and selection of electrical equipment;

- GOST R IEC 60949-2009. Calculation of thermally permissible short-circuit currents considering non-adiabatic heating;

- IEC 61000. Electromagnetic compatibility (EMC);

- GOST 32144-2013. Electric energy Electromagnetic compatibility of technical equipment. Standards of quality of electric energy in common-use power supply systems;

- GOST30804.4.30-13 (IEC61000-4-30:2008). Electric energy Electromagnetic compatibility of technical equipment. Methods for measuring electricity quality indicators;

IEC 62271-1. General technical requirements for high-voltage complete switchgear standards;

IEC 62271-100. High voltage complete switchgears - High voltage AC circuit breakers - High voltage complete switchgears;

IEC 62271-102. High voltage complete switchgears - disconnectors and earthing switches alternating current;

IEC 62271-200. High voltage complete switchgears - complete AC switchgears in a metal shell with rated voltages above 1 kV up to 52 kV;

IEC 62271-202. High/low voltage unit substations;

IEC 60076-2. Power transformers - temperature rise;

IEC 60076-5. Power transformers - short-circuit resistance;

IEC 60265-1. High voltage switches - high voltage switches to Nominal Voltage more than 1 kV and less than 52 kV.

IEC 60282-1. High voltage fuses – current limiting fuses;

IEC 60287-1-1. Electrical cables - rated current calculation - rated current calculation formulas (load factor 100%) and loss calculation - General provisions;

IEC 60427. High voltage AC circuit breakers.

Specialization “Design of Automation of Building Engineering Systems”

- GOST 21.208-2013. Technological process automation
- GOST 21.408-2013. Rules of working documentation execution for the automation of technological processes
- GOST 16037-80. Welded joints of steel pipelines
- GOST 25164-96. Connections of devices with external hydraulic and gas lines. Types and basic parameters. Technical Requirements

Specialization «Design of low-current systems (fire-fighting automation, alarms and warnings)»

- GOST R 53325-2012 Fire techniques. Means of fire automatics. General technical requirements and test methods;
- Electrical installation rules. Edition 7;
- BR RK (Building regulation of the Republic of Kazakhstan) 2.02-02-2019 “Fire automation of buildings and structures”;
- BR RK (Building regulation of the Republic of Kazakhstan) CH PK 2.02-11-2002. The norms of the buildings, accommodations and structures equipped with automatic fire alarm systems, automatic fire fighting installations and awaring people of fire;
- TR EAEU 043/2017 Technical regulations of the Eurasian Economic Union "On requirements for fire safety and fire extinguishing means";
- GOST 31565-2012 Cable products. Requirements of fire safety;
- TKP 45-2.02-317-2018 Fire automation of buildings and structures;
- TKP 45-4.02-273-2012 Smoke protection of buildings and structures in case of fire. Systems of ventilation. Construction standards and rules for design;
- TKP 45-2.02-315-2018 Fire safety of buildings and structures Construction design code

Information Modeling Regulations (common for all specializations)

- GOST R 57311-2016 "Information Modeling in the Construction Industry. Requirements for operating instructions of completed construction projects (Russia);
- PAS 1192-2: 2013 Specification for information management for the capital/delivery phase of construction projects using building information modeling (UK);
- SP 331.1325800.2017 Information modeling in construction. Rules governing the exchange between information models for facilities and models used in software packages (Russia);

- <https://www.buildingsmart.org> "GOST R 10.0.02-2019/ISO 16739-1: 2018 System of standards for information modeling of buildings and structures. Industry Foundation Classes (IFC) for exchanging and managing data about construction projects. Part 1. Data diagram (Russia)";
- ISO 16739-1:2018 Industry Foundation Classes (IFC) for data sharing in the construction and facility management industries — Part 1: Data schema;
- <https://www.buildingsmart.org> National BIM Standard — United States™ V3(USA);
- BSI BS 1192-4-2014 Collaborative production of information Part 4: Fulfilling employer's information exchange requirements using COBie-Code of practice (UK);
- GOST R 57295-2016 Design Management System. Guidance on design management in the construction industry (Russia);
- Consolidated Rules 404.1325800.2018 Information Modeling in the Construction Industry. Rules for developing project plans implemented with the use of information modeling technology (Russia);
- ISO 19650-1:2018 Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM) - Information management using building information modelling - Part 1: Concepts and principles;
- LEVEL OF DEVELOPMENT (LOD) SPECIFICATION PART I & COMMENTARY For Building Information Models and Data (<https://bimforum.org>).
- AIA G202™–2013, Project Building Information Modeling Protocol Form (USA);
- BIM Project Execution Planning Guide (USA Computer Integration Construction Research Program);
- <https://www.egfntd.kz> CP RK (Code of practice of the Republic of Kazakhstan) 1.02-112-2018 "Life cycle of construction objects. Part 1. General concept";
- <https://www.egfntd.kz> CP RK (Code of practice of the Republic of Kazakhstan) 1.02-113-2018 "Life cycle of construction objects. Part 2. Requirements for information models at the stage of pre-design preparation of construction";
- <https://www.egfntd.kz> CP RK (Code of practice of the Republic of Kazakhstan) 1.02-114-2018 "Life cycle of construction objects. Part 3. Requirements for information models at the stage of design preparation of construction";
- <https://www.egfntd.kz> CP RK (Code of practice of the Republic of Kazakhstan) 1.02-118-2019 "Life cycle of construction objects. Part 4. Requirements for information models at the stage of pre-design preparation of construction";
- <https://www.egfntd.kz> CP RK (Code of practice of the Republic of Kazakhstan) 1.02-115-2018 "Regulations for joint generation management of construction data. Shared data environment";
- <https://www.egfntd.kz> CP RK (Code of practice of the Republic of Kazakhstan) 1.02-116-2018 "Requirements for presentation of project documentation obtained using information modeling";
- <https://www.egfntd.kz> CP RK (Code of practice of the Republic of Kazakhstan) 1.02-117-2018 "Procedure for the examination of information models";
- <https://www.egfntd.kz> CP RK (Code of practice of the Republic of Kazakhstan) 1.02-111-2017 "Application of information modeling in a project organization".

4. REQUIREMENTS TO PARTICIPANTS

Participants who meet the following requirements are allowed to participate in the Championship:

Requirements for	– Higher education
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<p>qualifications/profession</p>	<ul style="list-style-type: none"> - Position - an employee of a design organization or design department (division): project engineer (of all categories). - Total period of employment - not less than 3 years - Time period working in specialty - not less than 2 years - Knowledge of specialized software in the direction of the nomination is not lower than at the level of an experienced user; - User-level knowledge of Windows, MS Office, and the Internet.
<p>Knowledge Requirements</p>	<p><i>Participant must know how to:</i></p> <p>Common to all specializations:</p> <ul style="list-style-type: none"> - methods of collecting and processing of directory and abstract information for comparative analysis and approved selection of equipment for power supply systems, electrical lighting systems, fire protection systems and automation systems; - programs for writing and modifying documents, performing calculations; - basic principles of data transfer using open formats; - methods of performing calculations by specialization; - conditions for checking the equipment of the power supply system, electrical lighting system, fire protection systems and automation systems; - requirements for equipment depending on the placement conditions; - CAD systems; - principles of ethical conduct; - algorithm for developing a project in the context of a capital construction project; - terminology for related sections in the project, the letter codes used for components in the plans and process flowcharts, and the rules for displaying items (products, infrastructure, and their constituent components); - possible ways of information transfer with the use of the software; - general information of the systems of related sections of the project; - general information about building structures of CBD (Capital Building Department); - the procedure for transmitting and receiving baseline data - initial data volume is sufficient to perform the project section in the specialty; - initial data volume required to execute next section; - basic laws of physics (especially in the section "Electricity"), the basics of electrical engineering and the theory of automated control, necessary for conducting electrical calculations, developing electrical circuits and selecting electrical equipment. <p>On Specialization "Design of electrical lighting" in addition</p>

to the General:

- methods of lighting calculation;
- types and systems of artificial lighting; normalized lighting indicators;
- requirements for categories of reliability of power supply of electric receivers;
- requirements for placement of panel equipment;
- requirements for placement of control devices;
- environmental requirements for the placement of equipment, materials and products;
- conditions for the selection of switching equipment;
- diagramming rules
- requirements for selecting switching equipment;
- conditions for the selection of cable and wire products
- conditions for the selection of cable-bearing structures
- methods for calculating electrical loads
- method of calculating short-circuit currents
- method for calculating the voltage deviation (drop) ;
- method of determining the center of electric loads

On Specialization "Design of power supply systems" in addition to the General:

- requirements for placement of switchgear (points), panel equipment;
- requirements for placement of control devices;
- environmental requirements for the placement of equipment, materials and products;
- conditions for the selection of switching equipment;
- diagramming rules
- requirements for placement of cable sewers and busbars;
- conditions for the selection of cable and wire products
- conditions for the selection of cable-bearing structures
- methods for calculating electrical loads
- method of calculating short-circuit currents
- method for calculating the voltage deviation (drop) ;
- method of determining the center of electric loads

Specialization "Design of low-current systems (fire-fighting automation, alarms and warnings)" in addition to the General:

- methods for calculating sound pressure in premises;
- methods for determining address line congestion;
- methods for calculating the reserve capacity of batteries;
- conditions for the selection of cable and wire products
- conditions for the selection of cable-bearing structures
- principles of detector selection depending on the type of detected impact;

	<ul style="list-style-type: none"> - principles of detector selection depending on the detection method. <p>Specialization "Design of automation of building engineering systems" in addition to the General:</p> <ul style="list-style-type: none"> - methods of analysis, calculation and modeling of systems; - fundamentals of electric drive and industrial automation, electric machines; - basics of using analog and digital devices; - rules for applying Boolean algebra; - devices and principles of interaction of components and elements of equipment and devices; - basic principles of operation of control and measuring devices; - fundamentals of metrological support of processes in systems; - basic principles for collecting and transmitting system parameters; - principles of operation of the primary measurement tools.
Skill Requirements	<p><i>Participant must know how to:</i></p> <ul style="list-style-type: none"> - perform calculations based on his specialization; - perform the selection of equipment from the conditions that affect the design; - carry out equipment layout and laying of networks; - identify and analyze the advantages and disadvantages of design options, and assess the risks linked to actualizing the project - use regulatory technical documents and legislative regulatory acts in the development of project solutions; - prepare reporting documentation on project solutions; - define technical requirements for related sections of the project; - use professional computer software for system designing - make electrical, functional, structural and automation diagrams; - create a task for developers of related sections of the project.
Job Functions Requirements	<p>A Participant must possess the necessary qualifications to perform the following functions:</p> <p>to perform project solutions for the electric lighting systems or power supply systems up to 1000 V, or low-current systems (fire suppression automated controls, alarm and warning systems) or power supply systems up to 1000 V (primary switching, relay protection and automation) or automating a building's utility system on capital construction projects.</p>

5. ORDER OF THE PRELIMINARY STAGE OF THE CHAMPIONSHIP (if applicable)

- 5.1 The purpose of the preliminary stage of the Championship is to identify and select the Finalists who are able to demonstrate a high level of knowledge and skills that meet international requirements.
- 5.2. The preliminary stage of the Championship is held within the terms established by the Organizing Committee: from 03 August to 11 December 2020.
- 5.3. Participant Organizations shall independently organize and hold the preliminary stage using the Tasks developed for the preliminary stage of the Championship and the Methodology.
- 5.4 Operating mode for the preliminary stage of the Championship: full-time, on an on-the-job basis in the Participant Organizations.
- 5.5 The Organizer does not provide any clarifications about the Task for the Participants during the organization and conduct of the preliminary stage of the Championship.
- 5.6 The Organizer communicates on the issues of holding the preliminary stage of the Championship only with persons officially authorized and responsible in the Participant Organizations for organizing and holding the Championship (hereinafter - Responsible person (people)).
- 5.7 For additional information and clarifications on the preliminary stage of the Championship, the Participants may contact only the Responsible Persons in their organization.
- 5.8 The Responsible Person provides organizational and technical support to the Participants during the preliminary stage of the Championship.
- 5.9 The Participant Organizations shall choose the time and place for the preliminary stage, and organize workplaces for the Participants. The organizer shall neither go to the site for the execution of the Task nor participate in the organization and conduct of the preliminary stage. Participants are allowed to go through the preliminary stage using personal electronic devices.
- 5.10 Holding the theoretical and practical part of the preliminary stage of the Championship:
- 5.10.1 The tasks of the theoretical and practical part of the preliminary stage of the Championship is either posted on the information and educational resource of the private institution run by the State Atomic Energy Corporation “ROSATOM” called “The Branch center of the capital construction” (hereinafter referred to as the Resource), or provided by the Organizer in electronic form at the official request of the Participant Organizations (indicating the contact details of the Responsible person (people)).
- 5.10.2 Participant Organizations can independently choose a tool for testing Participants: either a Resource, or the organization’s own electronic resource, or another tool. Information about selecting a tool to test the Participants shall be sent to the Organizer.
- 5.10.3 If a Resource is selected as the tool to conduct the testing part of the Task, the Organizer shall only perform the following works for Participant Organizations:
- confirm the registration for Participants, and provide Participants with access to the Resource from a personal computer, as well as to the Task, from a mobile device
 - shall publish Tasks involved in the preliminary stage,
 - shall generate uploads with the results of the Participants completing the tasks for those responsible in Participant Organizations, but no more frequently than 1 (one) time in 3 (three) work days
 - in case errors occur in how the Resource functions, the Organizer shall correct them no later than 2 (two) working days.

5.10.4 The Organizer does not provide Participants with an Internet connection (hereinafter referred to as the Internet) and if an Internet failure occurs then the Organizer shall not be responsible for the result of the Participants performing their theoretical tasks.

5.11 At the Site where the Preliminary stage is Executed (if applicable):

5.11.1 Workplace and Task Familiarization

Participants are allowed to perform the Task only after passing the briefing on labor protection and safety at the workplace.

Immediately before the beginning of the Task, the Jury Experts (if applicable) or the Responsible Person shall conduct an induction briefing for Participants regarding work regulations at workplaces, and acquaint the Participants with the content of the Task and the evaluation criteria.

No more than 30 minutes are allotted to conduct an introductory briefing and provide explanations on the work regulations, which are not included in the total time for completing the Task.

No more than 30 minutes are allotted for familiarization with a workplace and study of the Task, which are not included in the total time for completing the Task. Based on the results, a protocol shall be prepared (Annex No. 2, Form 1, 2, 3).

5.11.2 Beginning and completion of work

The Participant shall wait for the instructions of the Responsible Person or the Jury Expert (if applicable) to start and finish the work. If, for reasons beyond the control of the Participant, he/she had to interrupt the Task, then he/she shall immediately report the forced stop to the Jury Expert (if applicable), or to the Responsible Person. In this case, the start and end time of the stop shall be recorded.

After confirmation by the Jury Expert (if applicable), or by the Responsible Person, the Participant shall have the right to receive additional time equal to the time of the forced stop. The amount of extra time shall be determined individually, and shall be recorded in the Protocol for an abnormal situation (Annex No. 2, form 4).

5.11.3 Abnormal Situations

Any deviations from this Methodology and the provisions of The General Order of the Championship shall be considered as an abnormal situation. The decision on an abnormal situation shall be made by the Jury Experts (if applicable) by voting or by the Responsible person with the execution of the corresponding protocol (Annex No. 2, form 4).

5.11.4 Communication and Contacts by Participants

The Participants may not legally communicate with unauthorized persons during the official time of the preliminary stage of the Championship, including contacts of Participants with each other are prohibited. Periods of time (15-30 minutes) allocated for official communication of Participants can be held before the start of the Task and after the end of work on the site. Using any equipment for personal communications (mobile phones, electronic devices) is prohibited.

5.13.8 Illness or Accident

If any of the Participants gets sick, or falls victim to an accident, the Responsible Person or the Jury Chair (if applicable) shall be immediately notified of this, and shall decide whether to award points to the Participant for the amount of work performed.

5.13.9 Industrial Safety

All Participants on the site shall comply with labor protection and safety requirements.

In order to support the measures to prevent the spread of the novel coronavirus infection inside the Russian Federation, all people that are present at the Championship site shall comply with a set of protective measures to help combat the COVID-19 infection.

6. ORDER OF THE FINAL STAGE OF THE CHAMPIONSHIP

6.1 The Organizing Committee shall establish the dates and venue of the final stage of the Championship annually and publish them on the official website of the Championship.

6.2 The form of participation in the Championship is full-time, with a day release.

6.3 The Participants shall arrive at the venue of the final stage of the Championship no later than 1 (one) day before the start of the competition.

6.4 Prior to the start of the Championship competitions, the Participants shall receive registration badges, undergo a General labor protection and safety briefing, and participate in a General organizational meeting in the Championship region. The time and place shall be determined by the Organizer and notified additionally no later than 5 (five) days before the start of the Championship competitions.

6.5 At the Site of Conducting the Final Stage:

6.5.1 Becoming Familiar with the Workplace and Task

Participants are allowed to perform the Task only after passing the briefing on labor protection and safety at the workplace.

Immediately before the beginning of the Task, the Technical Experts will conduct an induction briefing for Participants regarding the work regulations at workplaces, and acquaint the Participants with the content of the Task and the evaluation criteria.

No more than 30 minutes are allotted to conduct an introductory briefing and provide explanations on the work regulations, which are not included in the total time for completing the Task.

No more than 30 minutes are allotted for familiarization with a workplace and study of the Task, which are not included in the total time for completing the Task. Based on the results, the Technical Expert shall execute a protocol (Annex No. 2, Form 1, 2, 3).

6.5.2 Beginning and Completion of Work

The participant must wait for the instructions of the Technical Expert to begin and complete the work. In case for reasons beyond the control of the Participant, he/she had to interrupt the Task, he/she shall immediately report the forced stop to the expert of the Jury. In this case, the start and end time of the stop shall be recorded.

After confirmation by the Jury Expert, the Participant shall have the right to receive additional time equal to the time of forced stop. The amount of extra time shall be determined individually and shall be recorded in the Protocol of an emergency situation (Annex No. 2, form 4).

6.5.3 Abnormal Situations

Any deviations from this Methodology and the provisions of The General Order of the Championship shall be considered as an abnormal situation. The decision on an abnormal situation shall be made by the Jury experts (if applicable) by voting or by the Responsible person with the execution of the corresponding protocol (Annex No. 2, form 4).

6.5.4 Communication and Contacts by Participants, Technical experts, and the Expert Jury

Any communication during the performance of Tasks by Participants shall be regulated by The General Order of the Championship.

6.5.5 Illness or Accidents

In case of an accident or sudden illness, the Participant shall first report the incident to the Expert jury on the site, who shall take measures to provide first aid to the victims, call an ambulance, and, if necessary, send the victim to the nearest medical facility.

The Expert jury shall make a collective decision on whether it is possible to compensate for the lost time. If a Participant has to withdraw from further participation in the Championship, he/she receives points for the amount of work performed.

6.5.6 Industrial Safety

All Participants on the site shall comply with labor protection and safety requirements.

In order to support the measures to prevent the spread of the novel coronavirus infection inside the Russian Federation, all people that are present at the Championship site shall comply with a set of protective measures to help combat the COVID-19 infection.

7. TASK AND EVALUATION STRATEGY

7.1 Preliminary stage (if applicable)

7.1.1 The task of the preliminary stage contains a theoretical and practical part and shall be conducted in the testing format. The test contains a total of sixty (60) questions. Time to complete is 60 minutes

7.1.2 The tasks of the theoretical part are 50 (fifty) test questions with multiple choice answers, of which 1 (one) will be correct. Time to complete is 40 minutes

7.1.3 The section with practical tasks (cases) includes ten (10) calculation case studies for each of the sections in the nomination in the form of text and (or) graphic tasks, which allows determining the level of proficiency in engineering calculations. Time to complete is 20 minutes

7.1.4 The Tests are performed individually by each Participant.

7.1.5 Tests may contain both text and graphical questions.

7.1.6 Participants perform tasks in the chosen specialization (design of electric lighting systems, design of power supply systems up to 1000 V, design of low-current systems (fire-fighting automation, alarms and warnings), design of power supply systems above 1000 V (primary switching, relay protection and automation), design of automation of building engineering systems of capital construction projects) and information modeling.

7.1.7 During the preliminary stage for Task execution, each Participant shall answer all theoretical questions, and solve the practical tasks (case studies).

7.1.8 The Task is assessed on a 70-point scale.

7.1.9 Each correct answer in the theoretical part of the Task earns 1 (one) point.

7.1.10 The maximum number of points for the theoretical part of the Task is 50 (fifty) points.

7.1.11 Each correct answer in the theoretical part of the Task earns 2 (two) points.

7.1.12 The maximum number of points for the theoretical part of the Task is 20 (twenty) points.

7.1.13 Calculating the total number of correct answers for the Task shall be performed either automatically (if the Resource or the Participant Organization's own electronic resources are used as a testing tool), or manually by the Responsible Person, or by the Jury.

7.1.14 The results of the Tasks completed by the Participants shall be drawn up in the final report in accordance with Annex 4 (form 3) to the Methodology.

7.2 Final stage

7.2.1 in the final stage, Participants perform a practical Task in the chosen field of activity (design electric lighting systems, design of power supply systems up to 1000 V, or design of low-current systems (fire suppression automated controls, alarm and warning systems), or design of power supply systems above 1000 V (primary switching, relay protection and automation), or design of automation of building's utility systems), which consists of initial data and instructions.

Along with the Task, Participants are given a list of documents, methodologies and recommendations of manufacturers required for completing the Task, a list of output documents provided by Participants for verification by the Jury, a list of websites with reference databases and methodological instructions of manufacturers that Participants will have access to during the final stage.

The Task includes::

- drawing up electrical, functional, structural and automation diagrams;
- selection of catalogues equipment for the implementation of a given process;
- performing electrical and lighting calculations;
- calculation and selection of cable-carrying systems;
- calculations of sound pressure in rooms, congestion of address communication lines;
- selection of primary measuring instruments, control devices, switching devices, lighting equipment, cable and wire products;
- design of plans for equipment placement and installation of electrical networks;
- processing equipment and materials specifications.

7.2.2 The time allowed to complete the Task is no more than 20 hours within two days, including a lunch break.

7.2.3 The Task and assessment criteria for the final stage of the Championship are verified in accordance with the Verification Procedure.

7.2.4 Criteria consist of quantitative and qualitative indicators. Quantitative indicators allow you to determine how much a Participant has done during the competition, and qualitative indicators is the level instrument to access Task completion. Together, this criteria shows a level of professionalism by the Participant in this field of engineering.

7.2.5 Tasks contain groups for testing: theoretical knowledge of general physical principles, standard technical documents and rules, and the level of awareness of participants in the field of information modeling.

7.2.6 The results of the Task completed by the Participants shall be evaluated by the Jury in accordance with the assessment criteria within 2 (two) days of the final competition. The Jury shall provide the participants with final results and valuation sheets for review. Participants confirm that they have familiarized themselves with the results by signing the valuation sheets.

7.2.7 The Jury's Decisions on the results of the Tasks completed by the Participants shall be drawn up in the final report sheet in accordance with Annex 4 to the Methodology. The report form sheet can be supplemented by a decision made by the Organizer.

8. EXPERT JURY

8.1 Preliminary stage (if applicable)

8.1.1 In order to assess the performance of the Tasks of the preliminary stage, the Participant Organizations can independently create an Expert Jury on individual nomination "Design of Electrical Part and Automation Systems". Assessment of the Tasks performed by the Participants may be done either automatically (if the Resource or the Participant Organization's own electronic resources are used as a testing tool), or manually by the Responsible Person.

8.1.2 The Jury for individual nomination "Design of electrical part and automation systems" consists of the Chairman and 2 (two) Jury members.

8.1.3 The Chairman of the Jury is determined by a simple drawing of lots.

8.2 Final stage

8.2.1 In order to assess how the Tasks were executed by the Participants in the Final Stage, a Jury for the individual nomination "Design of electrical part and automation systems", consisting of experts from the Participant Organizations, is formed.

8.2.2 The requirements for the Expert jury and the principle of forming the personal composition of the Jury in the final stage of the Championship are established by The Regulations on the Work of the Expert Jury.

8.2.3 The activity of the Expert Jury is regulated by official documents: The General Order of the Championship, the Regulations on the Work of the Expert Jury, and The Methodology.

9. PROCEDURE FOR DETERMINING THE FINALISTS AND WINNERS OF THE CHAMPIONSHIP

9.1 Procedure for determining the Finalists (if applicable)

9.1.1 The Winners of the preliminary stage of the Championship are determined by the Jury based on the maximum score gained by the Participants. The final scores of the Participants are compared, and an overall rating of Participants by nomination is generated.

9.1.2 Participant Organizations, based on the results of the preliminary stage of the Championship, shall form and approve the final Protocol as per Annex 4 to the Methodology.

9.1.3 The Organizations-Participants shall determine the Finalists independently on the basis of the overall rating of the winners of the preliminary stage in accordance with Quotas according to The General Order of the Championship.

9.1.4 In case several Participants scored the same number of points, the winners shall be determined by the time of completion of the Task, the Participants who completed the Tasks faster go to the final stage of the Championship.

9.1.5 All finalists shall register on the official website of the Championship, and fill out a Participant questionnaire in the "For Participants" section.

9.1.6 The Participant Organizations shall send an official email to the Organizer's email address with the list of Finalists approved by the organization's director, or an authorized representative (main and reserve members), for the nominations in the form prescribed as per Appendix No. 6 to the Methodology, in both PDF and Excel format, within the period established by the Organizer and published on the Official website of the Championship.

9.2 Procedure for determining the winners of the Championship

9.2.1 The Jury shall sum up the results of the Championship in the nomination and determine the winners in the final stage of the Championship.

9.2.2 The Participant who has received the highest number of points based on the results of Tasks and has taken the 1 (first) place in the overall rating of the Participants shall be named the winner in the nomination.

9.2.3 In case several Participants have scored the same number of points, the winners shall be determined by the introduction of an additional assessment criterion, which the Technical expert and the Jury shall announce to the Participants before the start of the competition.

9.2.4 The Jury shall create a list of winners of the final stage of the Championship and draw up the final Protocol, which shall be submitted to the Organizer along with the Protocols and rating sheets with the results of Tasks.

10. REPLACEMENTS

10.1. Participant Organizations shall ensure a reserve team of Participants for the nomination to replace Finalists in the event of unforeseen circumstances and forced cancellation of participation of Participants from the first team in the final stage of the Championship.

10.2. The number of reserve Participants shall be equal to the number of the main Participants.

10.3. Participants of the reserve team shall meet the qualification criteria specified in the Methodology.

10.4. Reserve team participants shall register on the official website of the Championship, and fill out a Participant questionnaire in the “For Participants” section.

10.5. Participants can be replaced no later than 2 (two) weeks before the start of the final stage of the Championship. The date of replacement shall be the date when the Organizer sends a response to the Participant Organization with confirmation of the replacement.

10.6. The Organization participating in the Championship shall replace the Participant from the reserve team of Participants by sending an official notification to the Organizer indicating the reason for the replacement, indicating data about the Participants of the main and reserve teams and receiving a response from the Organizer confirming the replacement.

11. APPEALS

11.1 Within the framework of the final stage of the Championship, the Participants may appeal against the quality of the evaluation of the results and the work of the Jury on the evaluation and summing up procedure.

11.2 The appeal is filed on the terms and conditions established by the Regulation on the Appeal Commissions for Nominations.

11.3 Appeals are reviewed by the Appeals Commission.

12. RIGHTS, POWERS AND OBLIGATIONS

The rights, powers and obligations of the Participants, Expert Juries, Technical Experts, the Organizer are established in The General Order of the Championship.

13. AWARDS

The winners and laureates of the Championship are provided with monetary awards in accordance with The General Order of the Championship.

Example of the theoretical and practical part of the Tasks for the preliminary stage of the Championship

1. Example of the theoretical part (depends on the specialization):

1. Name Detail Levels of Information Model Elements Offered by PAS 1192-2:2013 Specification (UK)

- a) ...
- b) ...
- c) ...
- d) ...

2. What is the aim of reactive power compensation in distribution networks?

- a) ...
- b) ...
- c) ...
- d) ...

3. Indicated in the Automation Diagram:

- a) ...
- b) ...
- c) ...
- d) ...

2. Example of the practical part (depends on the specialization):

Based on source data:

1. Calculate the maximum current of the 3-phase short circuit, A;
2. Calculate the calculated value of the Joule integral, ka^2*s ;
3. Calculate the shock current, A;
4. Calculate the current sensitivity coefficient of MTZ with combined voltage start-up;
5. ...

Recommended forms of protocols for the work of the Jury

Form 1

**Report Sheet on Familiarizing the Participants with
Workplaces**

Nomination _____

Chairman of the
Jury _____

We, the undersigned, confirm that we were given the opportunity to fully familiarize ourselves with the equipment and workplaces on the site, test the equipment during the time necessary for familiarization. We confirm the skill of using the equipment.

No.	Participant's Full Name	Comments on information received	Signature

Date _____ 2021

Chairman of the Jury _____

Form 2

Report Sheet on Familiarizing the Participants with the Task and Assessment Criteria

Nomination _____

Chairman of the
Jury _____

We, the undersigned, confirm that we have been given the opportunity to fully familiarize ourselves with the Task and the assessment criteria.

No.	Participant's Full Name	Comments and Misunderstandings on Information Received	Signature

Date _____ 2021

Chairman of the Jury _____

**Jury Decision Record Sheet
on an abnormal situation**

Nomination _____

Chairman of the Jury

The Jury decided on _____

We confirm our agreement with this decision.

Jury member Full name	Signature

Date _____ 2021

Chairman _____ of _____ the
Jury _____

Form of providing the Organizer with a list of Finalists

First team of Finalists:

No.	Full Name	Position	Organization	E-mail	Contact phone	Specialty within the nomination (if applicable)	Registration mark on the Official website (yes / no)
Nomination							
Nomination							
...							

Reserve team of Finalists:

No.	Full Name	Position	Organization	E-mail	Contact phone	Specialty within the nomination (if applicable)	Registration mark on the Official website (yes / no)
Nomination							
...							

Head of organization (authorized person)

_____ / _____ /

Responsible employee:

_____ / _____ /

Recommended forms of final reporting documents for the work of the Jury

Form 1

LIST

of Championship Participants

Nomination « _____ ».

Period of conducting: _____.

Place of conducting: _____.

No.	Participant's Full Name	Position	Organization	Contacts
1.				
2.				
3.				
4.				
...				

Form 2
LIST
of Jury members

No.	Full name	Position	Organization	Contact details/e-mail	Nomination
1.					
2.					
3.					
4.					
5.					
6.					
...					

Form 3

Final Report sheet
The Jury

Date _____2021

Nomination «_____».

Period of conducting: _____.

Place of conducting: _____.

No.	Participant's Full Name	Position	Point count for completing the Task	Final score (points awarded)	Place
1.					
2.					
3.					
4.					
5.					
6.					

...					
Jury members					
1.	Full name	Position	Organization	Signature	Date
2.	Full name	Position	Organization	Signature	Date
...					
Chairman of the Jury:					
1.	Full name	Position	Organization	Signature	Date

Head of organization (authorized person)

_____ / _____ /

Responsible employee:

_____ / _____ /

Labor Protection Requirements and Safety Requirements for the Site of the Preliminary Stage of the Championship

(if applicable)

1. General Requirements for Industrial Safety

It is forbidden to work in computer classes:

- to work at the computer and touch the monitor screen with dirty or damp hands;
- to move the monitor and system unit without the permission of the Jury;
- to touch wires, sockets, and connecting devices;
- to use personal data carriers and mobile phones;
- to have meals and drinks in the computer class;
- to perform work that is not specified in the Task;
- to place foreign objects on the computer table.
- to fix any computer problems on your own;
- to put foreign objects on the main and peripheral equipment;
- to connect cables, connectors, and other facilities to an on-line computer;
- to use excessive effort when installing external media;
- to turn off the computer when external media is installed.

2. Requirements for Industrial Safety before Starting Work

2.1. Before starting work, Participants must do the following:

- check the condition and serviceability of computer equipment elements that are powered from the power grid;
- - prepare the materials and devices necessary for work and put them on workplace, remove all unnecessary items from the desktop;
- prepare personal protective equipment against COVID-19 infection.

3. Requirements for Industrial Safety During the Course of Work

3.1 When performing the Task, individual protective equipment (mask, gloves) must be used when necessary.

3.2 Participants shall comply with the rules for the use of individual and collective protective equipment, observe the rules of personal hygiene, and keep the workplace clean.

In the room for performing electrical work, there must be a first-aid kit with the necessary medicines and dressings. The first aid kit must contain an inventory of medicines and instructions for providing first aid to injured persons.

Participants shall comply with fire safety rules, know locations of primary fire extinguishing equipment and evacuation exits. The room for the Tasks is supplied with powder or carbon dioxide fire extinguishers.

In the event of an accident, the injured person or other Participants shall immediately inform the Jury about the incident. If the equipment fails, stop working and report it to the Jury Experts.

3.6 Responsibility for accidents that occurred in the nominated premise is borne by the Participants, both directly violating the rules of safe work on electrical installations, and persons of the administrative and technical personnel who did not provide:

- execution of organizational and technical measures to prevent the possibility of accidents;

- compliance of the workplace with labor protection requirements;

4. Safety Requirements in Emergency Situations

4.1. If a malfunction is detected in the operation of computer devices under voltage (increased heating, sparking, burning smell, smoke, etc.), the Participant should immediately switch-off the power supply and report the incident to the Jury.

4.2 if there is a power outage in the premises, stop panicking and do not leave your seat until you hear the Technical expert's command;

4.3 In the event of a fire or smoke, immediately switch-off the computer hardware, take measures to evacuate people, inform the Jury and the nearest fire department about this accident. Start extinguishing the fire with the available fire fighting equipment.

To extinguish equipment under voltage, use only carbon dioxide and powder fire extinguishers, as well as dry sand or felt mats. In this situation, foam fire or water extinguishers must not be used.

In case of an accident or sudden illness, it is essential to report the incident to the Jury Experts, who will take measures to provide first aid to the injured persons, calling an ambulance, and, if necessary, send the injured person to the nearest medical facility.