METHODOLOGY

for conducting preliminary and final stages
OF THE WORLD CONSTRUCTION CHAMPIONSHIP (WCC)
within the team nomination
Electrical Installation

2021

CONTENTS

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 team competence nomination:

The preliminary stage of the Championship is optional, i.e. Organizations-participants 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(see Annex Nr. 2 to the Methodology) 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 was developed to identify the level of competencies and a comprehensive assessment of the knowledge, skills and abilities of specialists and workers' organizations performing construction and installation work at industrial construction sites.

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
Organization-participant	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 of 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 representative of the Organization-developer 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

The tasks are formulated taking into consideration the following regulations:

1. IEC 60050-826-2004 Electrical Installations Terms and definitions;
2. IEC 60364-5-51:2005, Electrical installations of buildings - selection and installation of electrical equipment - general rules.
3. IEC 60364-5-52 Electrical installations of buildings - selection and installation of electrical equipment - joint systems (of electrical components)
4. IEC 60364-5-53:2002, Electrical installations of buildings - selection and installation of electrical equipment - insulation, commutation and operating
5. IEC 529-2013. Protection degrees provided by wrappers (IP code);
6. IEC 60364-5-54:2011. Electrical installations of buildings - selection and installation of electrical equipment - grounding schemes (Grounding devices, protective conductors and potential equalization protective conductors).
7. IES 60364-5-55 Electrical installations of buildings - selection and installation of electrical equipment - other equipment.
8. IEC 60364-6-2006 Electrical installations of buildings Part 6. Trials.
9. IES 60265-1 High voltage switches - high voltage switches to Nominal Voltage more than 1 kV and less than 52 kV.
10. IEC 60417 Graphic symbols, applied for equipment;
11. IEC 62271-100 High voltage complete switchgears - High voltage AC circuit breakers
12. IEC 62271-200 High-voltage complete switchgears - complete switchgears of alternating current in a metal shell with nominal voltages over 1 kV up to 52 kV;
13. IEC 61140 Electrical shock hazard protection - general aspects for installations and equipment.
14. GOST 21.210-2014 INTERSTATE STANDARD System of design documentation for construction. GRAPHIC IMAGES LEGEND OF ELECTRICAL EQUIPMENT AND WIRING
15. GOST 31565-2012. Interstate standard CABLE PRODUCTS Fire safety requirements
16. GOST 32397-2013. INTERSTATE STANDARD POWER SUPPLY BOARDS FOR INDUSTRIAL AND MUNICIPAL BUILDINGS. General specifications

4. REQUIREMENTS TO PARTICIPANTS

Participants who meet the requirements set out in Annex No. 1 to the Methodology are allowed to participate in the Championship, with 2 (two) people.

5. THE 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. Organizations-participants independently organize and hold the preliminary stage using the Tasks developed for the preliminary stage of the Championship (see Annex No. 2 to the Methodology) and the Methodology.
5.4 Mode of the preliminary stage of the Championship: full-time, on a day-release basis in the Organizations-participants.
5.5 The Task includes several practical modules. Description of the Task is presented in Annex No. 2 to the Methodology.
5.6 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.
5.7 The Organizer communicates on the issues of holding the preliminary stage of the Championship only with persons officially authorized and responsible in the Organizations-Participants for organizing and holding the Championship (hereinafter - Responsible person (s).
5.8 For additional information and clarifications on the preliminary stage of the Championship, the Participants may contact only the Responsible Persons in their organization.
5.9 The Responsible Person provides organizational and technical support to the Participants during the preliminary stage of the Championship.
5.10 The participating organizations, by their own decision, can make up to 30% amendments to the Task of the preliminary stage of the Championship. The Organizer must be officially notified of the introduction of such amendments, indicating detailed information, in which sections of the Task and to what extent the amendments were made. The Notice shall be sent by the Organization-Participant to the Organizer jointly with the final lists of the Finalists. The final lists of Finalists can be accepted for work by the Organizer only if there is a notice of amendments, if such amendments were made.
5.11 The Organizations-Participants independently choose the time and place for the preliminary stage, organize workplaces for the Participants, incl. independent provision with all tools and materials, personal protective equipment and work clothes (if required) to the Participants to complete the Task of the preliminary stage in accordance with Annex No. 2 to this Methodology. 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.

5.12 The sequence and procedure for completing the Task are defined in Annex No. 2 of this Methodology.

5.13 At the site of conducting the preliminary stage:

5.13.1 Workplace allocation

Jobs are allocated by drawing lots. The drawing lots is carried out by the Jury before the procedure for familiarizing the Participants with their workplaces.

The draw is made in the presence of all Participants in a manner that excludes the planned distribution of jobs or equipment.

In the course of preparing the site for the nomination, the numbers shall be assigned to workplaces by means of visual marking. Before the start of the competition, the Jury shall present for all the public anonymized envelopes with enclosed numbers of workplaces in accordance with the marking procedure. Team representatives take the envelopes and place themselves at their workplaces. Based on the drawing results, a protocol shall be prepared (Annex No. 4, Form 1).

5.13.2 Familiarizing with a workplace

Before the start of the competition, the Participants receive time to familiarize themselves with their workplaces (no more than 30 minutes). The Participants use this time to familiarize themselves with equipment, tools, rigging and materials. Measuring instruments of the Participants are compared with those of the Jury in order to avoid errors (if applicable). At the end of the familiarization period, the Participants shall confirm their familiarization with all equipment and materials by signing the Protocol of familiarization of the Participants with the equipment and workplaces (Annex No. 4, form 2).

5.13.3 Replacement of equipment and devices

The participant can ask for the opportunity to replace the equipment or device with the one brought with him. Permission for replacement is determined by a general vote of the Jury members with the registration of the protocol (Annex No 4, form 3). In this case, the responsibility for the serviceability of the device, the accuracy of its measurements and verification issues lies with the Participant.

5.13.4 Familiarization with the Task

Immediately before the start of the competition, the Jury must familiarize the Participants with the current Task, the assessment criteria for the Task, work regulations and rules of conduct at the site, hold a safety briefing in accordance with Annex No. 2 of the Methodology. Based on the results of familiarization, the corresponding protocols are drawn up (Annex No. 4, forms 4,5).

5.13.5 Abnormal situations

Any deviation from this Methodology shall be considered as an abnormal situation. The decision on an emergency situation is made by the chairman of the Jury and is confirmed by a simple vote of the members of the Jury with the preparation of the corresponding protocol (Annex No. 4, form 6).

5.13.6 Beginning and completion of work

Participants shall wait for the Chairman of the Jury to indicate the beginning and completion of the work. In case, for reasons beyond the control of the Participant, he/she had to interrupt the performance of the Task (hereinafter-Forced stop), the Participant shall immediately inform the Chairman of the Jury or the member of the Jury responsible for recording the time. In this case, the start and end time of the stop shall be recorded. After confirmation by the Jury Chairman, 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 by a panel decision of the Jury and shall be recorded in the Protocol of an emergency situation (Annex 4, form 6).

5.13.7 Communication and contacts of Participants

Participants shall not be allowed to communicate with third parties during the official time of the Championship, including areas outside their site, with the exception of lunch breaks and official communication times. During the competition, it is forbidden to contact other Participants

without the permission of the Chairman of the Jury. 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. Use of any information exchange equipment (mobile phones, electronic devices) shall be prohibited. Members of the Jury shall not be allowed to help Participants in any way in the interpretation of the Task, except with the permission of the Chairman of the Jury. Any questions that arise shall be referred to the Chairman of the Jury for decision.

5.13.8 Illness or accident

If any of the Participants gets sick or has become the victim of an accident, the Chairman of the Jury shall be immediately notified of this and shall decide to award points to the Participant for the amount of work performed.

5.13.9 Labour Protection

All Participants on the site shall comply with labour protection and safety requirements. Failure by Participants to comply with labour protection standards and regulations results in the loss of points in accordance with the assessment criteria, or the exclusion of Participants from performing Tasks if such a violation has led or could have led to a dangerous situation for people or damage to equipment. Each case shall be reviewed by the full Jury and a vote is taken for each case by the Jury members. The decision shall be made by a simple majority of votes and formalized by the Protocol of abnormal situations. When making a decision, the Jury members shall be guided by the requirements of labour protection for the nomination.

In order to ensure measures to prevent the spread of a new coronavirus infection on the territory of the Russian Federation, all persons present at the nomination site shall comply with a set of protective measures against COVID-19 infection.

6. PROCEDURE FOR 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 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 During the first day of the final stage, the Participants on the site where it is held receive registration badges, participate in the official opening ceremony for the Championship's final stage, and start to perform their Tasks.

6.6 At the site where the final stage is executed:

6.6.1 Workplace allocation

Before the start of the competitions, a drawing for jobs is conducted between the teams of Participants to exclude the possibility of gaining more favorable conditions for completing the task. The drawing is made by Technical experts in public.

6.6.1.1 Procedure for drawing jobs

In the course of preparing the site for the nomination, the numbers shall be assigned to workplaces by means of visual marking.

The drawing jobs can be made either in electronic format using the randomizer program (random number generator), or using impersonal envelopes with enclosed job numbers in accordance with the marking. In the latter case, before the start of the competition, the Technical expert shall present for all the public impersonal envelopes with enclosed numbers of workplaces in accordance with the marking procedure. Representatives from the teams of Participants shall

sort out the envelopes, show the contents to experts and other Participants and place at their workplaces.

When using the randomizer, the Technical expert shall enter the names of Participant Organizations into the program, and the system automatically assigns job numbers to the Teams of Participants.

The Organizer shall select the format for the job draw and the Technical experts shall communicate it to the Participants at the site of the final stage.

At the end of the procedure for drawing jobs by a Technical expert, a Protocol is drawn up (Annex 4, form 1).

6.6.2 Familiarizing with a workplace and the 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 conduct an introductory briefing of the Participants regarding the work regulations at workplaces, acquaint the Participants with the content of the Task and the evaluation criteria. Based on the results of familiarization, the corresponding protocols are drawn up (Annex No. 4, forms 4, 5).

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.

6.6.3 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 Chairman, 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 by a panel decision of the Jury and shall be recorded in the Protocol of an emergency situation (Annex 4, form 6).

6.6.4 Abnormal Situations

Any deviations from this Methodology and the provisions of the General Procedure for the Championship regarding the competitions of the final stage shall be considered as an abnormal situation. The decision on an abnormal situation is made by the experts of the Jury by a simple vote of experts with the preparation of the corresponding protocol. (Annex No.4, Form 6)

6.6.5 Communication and Contacts by Participants, Technical Experts, and the Jury Experts

Any communication during the performance of Tasks by Participants shall be regulated by the General Procedure for the Championship.

6.6.6 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.

6.6.7 Replacing Equipment and Devices

The participant can ask for the opportunity to replace the equipment or device with the one brought with him. Permission for the replacement is determined by a general vote of the Jury members with the registration of the protocol (Annex 4, form 3). In this case, the responsibility

for the serviceability of the device, the accuracy of its measurements and verification issues lies with the Participant.

7. TASK AND EVALUATION STRATEGY

7.1 Preliminary stage (if applicable)

7.1.1 The Task of the preliminary stage is presented in Annex No. 2 to the Methodology. Task completion time - no more than 8 hours with a break.
7.1.2 The results of the Task completed by the Participants shall be evaluated by the Jury in accordance with the assessment criteria provided for in Annex 2 to the Methodology.
7.1.3 The Jury's Decisions on the results of the Tasks completed by the Participants shall be drawn up in the final Protocol in accordance with Annex 5 to the Methodology.

7.2 Final Stage

7.2.1 The Task Content is electrical work on the installation of power cable systems and electrical equipment. The Task has several modules that are performed sequentially and includes the installation of the power panel, revision and adjustment of the high-voltage circuit breaker, installation of metal structures, cable laying with the installation of the end and adapter couplings, cable marking, insulation resistance measurement and cable pulling through the wall layout.
7.2.2 The time allowed to complete the Task – no more than 20 hours over two days, including the lunch break.
7.2.3 As part of the Task, a professional electrician must perform the installation of a safe and reliable power supply system, including the installation of external and internal cable lines and electrical equipment, in accordance with the applicable international electrical standards IEC.
7.2.4 The Task and assessment criteria is verified in accordance with the Verification Procedure.
7.2.5 The assessment is made upon completion of each module separately and is based on visual and measurement control, compliance with work technology (compliance with dimensions, installation of equipment and cable support systems, laying and connecting cables, mounting of end and adapter couplings) in accordance with the requirements of the IEC standards, compliance of safety measures, as well as in accordance with the prepared documents.
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 To assess the performance of the Tasks by the Participants, the Organizations-Participants shall independently create an Expert Jury within the team "Electrical Installation" competence nomination.
8.1.2 The jury within the team nomination "Electrical Installation" consists of a Chairman and 2 (two) members of the Jury.
8.1.3 The Jury Chairman shall be determined by a simple drawing method - a random selection of a conditional subject from a variety of similar subjects.

8.2 Final stage

8.2.1 To assess the performance of the Final Stage Tasks by the Participants, a Jury within the team “Electrical Installation” competence nomination shall be formed, consisting of experts from the Participant Organizations.
8.2.2 The requirements for the Jury Experts and the principle of forming the personal composition of the Jury 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 Procedure for 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 organizations independently on a basis of the maximum score received by the Participants within the team “Electrical Installation” competence nomination. The final scores of teams are compared, and the overall rating of teams for the nomination is generated.
9.1.2 Organizations-participants shall form and approve the final Protocol according to Annex 5 of the Methodology based on the results of the preliminary stage of the Championship.
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 Procedure for the Championship.
9.1.4 In case several teams of Participants scored the same number of points, the winners shall be determined by the time of completion of the Task, the teams of Participants who complete 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’s questionnaire.
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.
9.2.2 The team of Participants that 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 teams of Participants shall be named the winner in the nomination.
9.2.3 In case several teams of 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. Organizations-Participants 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's questionnaire.
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 Organization-Participant 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 Procedure for the Championship.

13. AWARDS

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

Annexes

Annex No.1

Qualification criteria for Participants

Team Nomination: "Electrical installation"

No.	Name	Content
1	General description of competence	A professional electrician must install a safe and reliable power supply system in accordance with applicable regulations, including installation of external and internal cable lines and electrical equipment.
2	Participants' Category	Minimum requirements for completing with a team of 2 people: - 2 (two) cable network electricians of the 4th and 5th levels; - 2 (two) cable network electricians of 5th level; - one cable network electrician and one electrician skilled in power mains and electrical equipment, both of 5th level
3	Required skills	Must know how to: - read working drawings, wiring diagrams, diagrams (tables) connections, operating instructions, process sheets, standard operating procedures; - use hand and electric hand tools when cutting cable; connecting, terminating and marking cable cores; installing cable couplings and installing power and control cables; installing metal structures; - use electrical measuring devices for measuring current, voltage, insulation resistance, identification of cable cores; - markup the installation location and install metal structures for cable laying and the installation of panels, cabinets; - lay cables indoor; - comply with labor protection, fire and environmental safety requirements when performing work
4	Knowledge requirements	Shall know - requirements of regulations, technical, technological documentation for the installation of cable and power networks; - basics of electrical engineering; - drawing and diagram legend - major cable brands and their construction; - types of materials used in the manufacture and installation of metal structures and cable and wire products; - rules for marking places where support structures, and routes for laying cables are installed; - rules and methods for laying cable trays, perforated mounting profiles, steel boxes;

		- rules and methods for installation of ground grids; - rules and methods of installation of end sealings and adapter couplings up to 35 kV; - rules and methods for cable core connections, terminations; - rules and methods of installation of power and control cables in trenches, channels and inside buildings, marking of cables and cable cores; - rules for using hand and power tools; - insulation resistance measurement methods - rules for checking installation and revision of cabinets with high-voltage equipment; - knowledge of the requirements of regulatory legal acts in the field of labor protection, fire safety, environmental protection, labor protection requirements at hazardous production facilities, rules of sanitary and personal hygiene
5	Requirements for the availability of special permits and documents set forth in official documents	Requirements for education and training: - availability of primary vocational education with the assignment of a qualifying category in accordance with the requirements for the category of participants; - professional training: professional training programs for the workers, retraining programs for workers, the presence of a document of education with the assignment of a qualifying category in accordance with the requirements for the category of participants; Have valid certificates - a document on education (qualifications) confirming the assignment of a qualifying category; - on testing knowledge of labor protection requirements; - on testing knowledge of fire safety in the scope of fire-technical minimum; - duly issued identity card of electrical safety access qualification level (not lower than 3).
6	Requirements for job functions	Demonstration of competence to apply in practice the instructions given in electrical drawings and diagrams, process maps, production and factory instructions. Demonstration of practical skills to apply in installation and revision of cabinets with high-voltage equipment. Demonstration of practical skills in the installation of grounding networks. Demonstration of practical skills when installing power and control cables in channels, tunnels and inside buildings. Demonstration of practical skills in stripping, terminating, connecting and attaching cables in various ways. Demonstration of practical skills in marking cables and cable cores. Demonstration of practical skills in the installation of end sealings and adapter couplings with a voltage up to 35 kV. Demonstration of practical skills in cable insulation resistance measurement, and the identification of cable

		cores. Demonstration of practical skills in laying cable trays, perforated mounting profiles and steel boxes on the floor, walls, trusses and columns.
7	Requirements for qualifications/profession	Installation of end sealings and adapter couplings of various types on cables up to 35 kV. Connecting, terminating, and attaching cables with a cross-section of more than 70 mm2. Installation of power and control cables. Marking of cable and cable cores. Markup of places where support structures are installed. Fastening of structures and cabinets with high-voltage equipment using a mechanized tool. Laying cable trays, perforated mounting profiles and steel boxes. Insulation resistance test. Completing units of materials and equipment for electrical installation works in industrial buildings and engineering structures

Annex No. 2

Tasks, evaluation criteria, timing, list of materials and equipment for the preliminary stage of the Championship

Section No.	Section Name
1.1	Task
1.2	Technological map of the Task
1.3	Evaluation Criteria of the Task

1.1. Tasks

Task Content

Cable routing mounting with power cable laying. Installation of power board, end coupling mounting and connection of power cable to power board.

Module 1: Power board mounting
Module 2: Cable routing mounting and power cable installation
Module 3: end coupling mounting and power board connecting

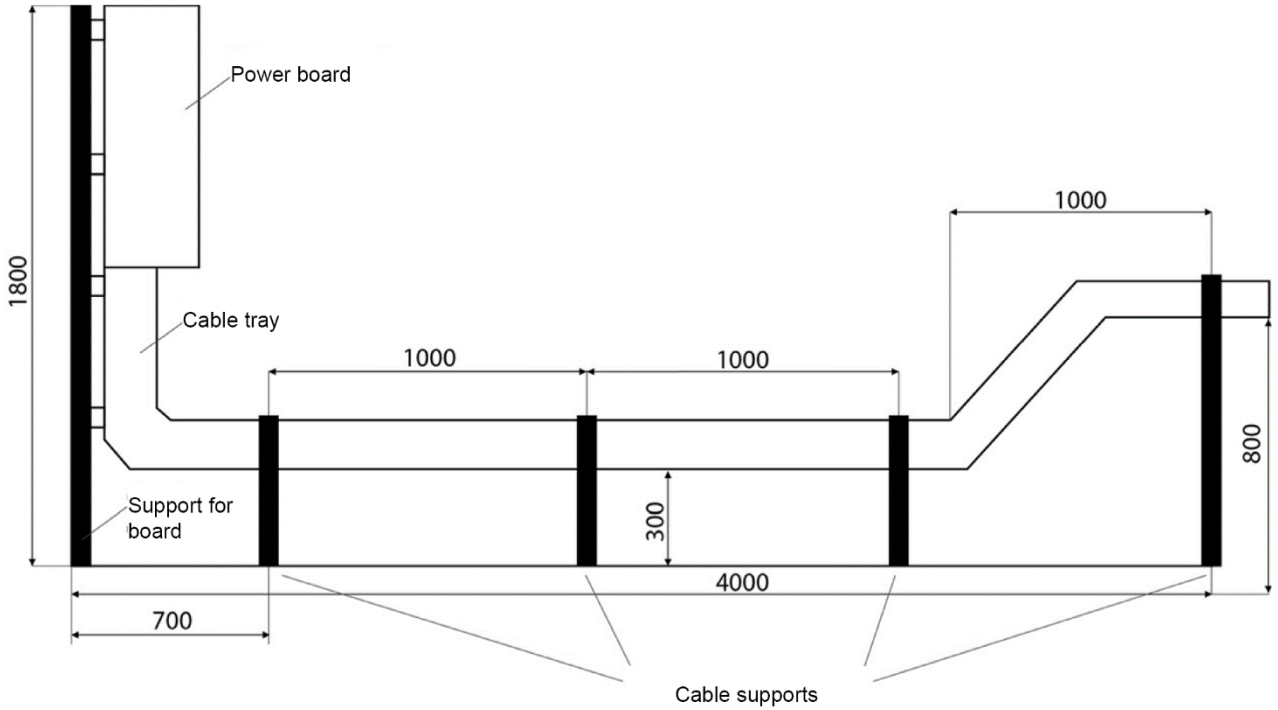
Documents attached:
Appendix No.1.1 Cable routing and electrical equipment location plan.
Appendix No.1.2. Cable log
Appendix No.1.3. Cable insulation resistance measurement table

Time limit for the task: 7 hours

Maximum number of points for the nomination is 100 points.

ANNEX 1.1

Cable routing and electrical equipment location layout.



ANNEX 1.2

Cable log

Cable line No	Routing		Cables (10 kV)		
	Start	End	Brand	Number of cores and cross section, mm	Effective length, m
1	Power board (marking)	Distribution Cabinet (conditionally) through the passes	Cable with cross-linked polyethylene-insulated conductors in flame-retarding PVC-compound	3x95/16	6

			sheathing 10mm2		

ANNEX 1.3

Cable Insulation Resistance Measurement Table

Workplace number/Full name	
Insulation resistance measurement data	1. Rmeas (L1:L2) =_____ 2. Rmeas(L1:L3)_____ 3. Rmeas(L2:L3)_____ 4. Rmeas(L1:RE) =_____ 5. Rmeas(L2:RE) =_____ 6. Rmeas(L3:RE) =_____ 7._____ 8._____

1.2 Technological Map of the Task

Module 1: Power Board Mounting

Module Composition

Instruction:

1. Perform the markup of the installation places and install the structure (frame) for mounting the power board according to the electrical equipment layout.
2. Perform power board mounting according to the electrical equipment layout.

The dimensions of installations are calculated from the reference point of power board frame marked on the working field before the start of the Championship.

Time limit for the task: 1 hour

No.	Operation	Content of operations	Equipment and tools
1	Markup of installation places for Metering & Distribution Board	Markup of installation places of a cable frame is to lead according to cable routing layout and location of electrical equipment (Annex 1.1) and in accordance with the mark on the floor at the venue of the Championship. The rack is attached to the floor (plywood) with screws.	cable frame, measuring tape, level, marker.
2	Installation and grounding of the power board	Install the board on the cable frame according to the plan of the cable routing and electrical equipment location (Annex 1.1). Ground the Cabinet to the common ground grid "conditionally", informing the Expert.	Set of wrenches and screwdrivers, power board

Module 2: Cable Routing Mounting and Power Cable Installation

Module Composition

Instruction:

1. Perform the markup of cable routing according to the cable routing layout.
2. Perform the installation of cable structures according to the cable routing layout.
3. Perform laying of power cable according to the cable routing layout and the cable log.

Time limit for the task: 3 hours

No.	Operation	Content of operations	Equipment and tools
1	Markup of Routing	Mark a place where the support structures are installed with a pencil (chalk) on the construction marks according to the cable routing layout (Annex 1.1)	Measuring tape, level, pencil (chalk).
2	Installation of floor-mounted cable frames and mounting of cable trays	Install floor-mounted cable frames on the floor (using self-tapping screws). Made the gradient of the routing to the power cabinet out of the tray on your own for subsequent cable laying with a permissible bending radius. Fasten trays to shelves with metalware according to the cable routing layout. (Annex No	Drill, polishing machine, side cutters, set of wrenches and screwdrivers, file, cable structures, wall layout

		1.1). Install the wall layout with a hole for cable pass according to the cable routing layout.	
3	Laying the cable in a tray. Marking	Lay the cable manually without fixing, taking into account future installation of the end coupling when entering the power board. Perform cable pulling through the wall layout when the end coupling is mounted. Secure the cable after mounting the coupling. Perform the markup of the cable according to the cable log (Annex 1.2).	Cable, tags, ties
4	Grounding of cable structures (conditionally)	Grounding of cable structures should be performed loosely (to the plywood of the working field) with a self-tapping screw, informing the Expert.	Screw driver with attachments; set of wrenches and screwdrivers

Module 3: End Coupling Mounting and Power Board Connection

Module Composition

Instruction:

1. Perform end coupling installation in accordance with the process map and the manufacturing plant's instructions.
2. Measuring insulation resistance of the cable
3. Perform cable connection to the power board.
4. Perform cable penetration sealing

Time limit for the task: 3 hours

No.	Operation	Content of operations	Equipment and tools
1	End coupling mounting	Perform end coupling installation in accordance with manufacturing plant's instructions.	Heat gun, drill, tool KSP-40, set for mounting NMB-4 tips, press pliers, straight insulation removal knife, toe end insulation removal knife, side cutters, coupling kit
2	Insulation resistance test of the finished coupling.	After mounting the coupling, perform the insulation resistance test of the finished coupling using a megohmmeter. Enter the result in the cable insulation resistance measurement table (Annex 1.3) Perform the resistance measurement in the presence of an Expert.	Megohmmeter
3	Cable cores attachment	Apply color markup on the cable cores by phases. Connect the cable cores to the input terminals of the power board. Cable cores are inserted into the power board from below.	Set of wrenches, duct tape.

		Ground the cable to the common ground grid (loosely) by notifying the Expert. Attach the cable to the cable structure.	
4	Cable penetration sealing	Perform sealing of the cable penetration with fire-resistant thermo-expanding pads.	Fire-resistant thermo-expanding pads

1.3. Evaluation Criteria of the Task

Module 1: Power Cabinet Mounting

Operation Name	Assessed professional competencies	The amount of points credited	Max value of the evaluation criterion	Actual amount of points
1. Workplace preparation	Organization of the workplace		**2**	
	- completeness of tools, materials and equipment corresponds to the technical production documentation;	1		
	- location of tools and equipment corresponds to HSE Policy (tools are in the belt, on the workbench, chair, table - not scattered on the floor)	1		
2. Personal and electric safety	HSE Compliance while performing installation works of the board including:		**2**	
	- availability of personal protective equipment when working with a power tool;	1		
	- tool performance check	1		
3. Power cabinet installation	Ability to perform the markup of the installation places of power cabinet in accordance with working documentation and execute installation work:		**7**	
	- installation height adjustment test (if the markup deviates by more than 5 mm, 0 points are credited)	1		
	- checking horizontal and vertical installation in mm; *(if travel angle of the power board is more than 3 degrees, 0 points are credited)*	1		
	- checking horizontal and vertical installation in mm; *(if the markup deviation is more than 5 mm vertically or horizontally, 0 points are credited)*	1		
	cabinet fastening security	2		
	- reliability of mounting devices inside the cabinet;	2		
4. Grounding of the power board (loosely)	Ability to perform grounding of the power board ("loosely"):		**1**	
	- availability of power supply cabinet grounding;	1		
	Total:		**12**	

Module 2: Cable Routing Mounting and Power Cable Laying

Operation number	Control parameters	The amount of points credited	Max value of the evaluation criterion	Actual amount of points
1. Workplace preparation	Organization of the workplace		**1**	
	- placement of materials, tools, equipment complies with health and safety (tools in a belt, on a workbench, chair, table - not scattered on the floor, etc.).	1		
2. Personal and electric safety	HSE Compliance while performing installation works of the cable line including:		**2**	
	- availability of personal protective equipment when working with a power tool;	1		
	- tool performance check	1		
3. Cable structures mounting	Ability to perform cable structures mounting:		**15**	
	Markup of installation places in accordance with the working documentation;	3		
	- vertical deviation of cable routing frames; *(if there is one violation, 1.5 points are credited; if there are two or more violations, 0 points are credited)*	3		
	- Perform the gradient to the power cabinet in accordance with permissible bending radius.	3		
	- there should be no excess materials on the edges of the tray, formed as a result of cutting the tray, no litter inside the tray; *(if there is one violation, 1.5 points are credited; if there are two or more violations, 0 points are credited)*	3		
	- secure connection of parts of boxes to each other and mounting on frames. *(if there are 2 violations, 1.5 points are credited; if there are 3 or more violations, 0 points are credited)*	3		
4. Cable routing grounding	Ability to perform grounding of the cable routing (loosely"):	2	**2**	
5. Cable laying	Ability to perform cable laying		**3**	
	- compliance with the bending radius on the side of the board.	3		
6. Marking of cable	Ability to perform marking of cable		**4**	
	- completeness of information on the tag;	2		
	- number of tags, according to the NTD.	2		
	Total:		**27**	

Module 3: End Coupling Mounting and Power Board Connection

Note Since the installation of the coupling is "hidden", it is required to evaluate each position according to the plant's instructions (specifically for the Championship), with the entry of comments and the signature of the Expert and participant for each position.

Operation number	Control parameters	The amount of points credited (withdrawn)	Max value of the evaluation criterion	Actual amount of points
1. Workplace preparation	Organization of the workplace		**1**	
	- placement of materials, tools, equipment complies with health and safety (tools in a belt, on a workbench, chair, table - not scattered on the floor, etc.).	1		
2. Personal and electric safety	HSE Compliance while performing installation works of the board including:		**3**	
	- availability of personal protective equipment when working with a power tool;	1		
	tool performance check	1		
	- at the end of the work, the following should be done: the workplace should be cleaned, the tools should be packed away, the floor should be swept, and the garbage should be removed).	1		
3. End coupling mounting	Ability to demonstrate the skills of performing high-quality cable preparation operations for end coupling mounting:		**41**	
	- Observation of the dimensions of the markup on the cable to remove the outer shell from the cable ends; *(if the markup is broken in any place for cutting the cable by more than 5 mm, 0 points are credited)*	3		
	- removing the outer shell from the cable ends; *(if the cutting depth of the shell is more than half the thickness, 0 points credited)*	3		
	- sealer tape winding, with the appropriate sealer number, according to the specification; (if there is a violation on at least one of the cores, 0 points are credited)	3		
	quality preparation of screen for subsequent installation: - removal of copper strips from the cable screen (accuracy of cutting along the cut line of the	3		

	cable sheath) fixing with bandage PVC tape in accordance with the factory instructions; (if there is a violation on at least one of the cores, 0 points are credited)			
	quality of removal of the semiconducting screen - the surface of the polyethylene insulation should be smooth, without bumps and burrs, there should be no sections of the screen not removed; *(if there is a violation on at least one of the cores, 0 points are credited)*	3		
	quality of removal of the semiconducting screen - mandatory cleaning of the core insulation surface with a solvent directed from the core end to the cut of the cable sheath; *(if there is a violation on at least one of the cores, 0 points are credited)*	3		
	stress-control tube shrinkage quality - compliance with the location and direction of (stress-control) tube shrinkage in accordance with the factory Instructions; *(if there is a violation on at least one of the cores, 0 points are credited)*	3		
	quality of insulation removal from cable cores: - compliance with the dimensions and lack of insulation at the ends of the cores in accordance with the Instructions; (if there is a violation on at least one of the cores, 0 points are credited)	3		
	joint compound installation - sealing cup number compliance for the transition (conductive screen-polyethylene insulation) according to the Instructions; *(if there is a violation on at least one of the cores, 0 points are credited)*	3		
	glove installation quality - compliance with the dimensions and direction of shrinkage performed by the hair dryer in accordance with the Instructions;	2		
	installation quality of the cups - mandatory file cleaning of the cutting edge, degreasing, correct sequence of tightening and breaking the heads in accordance with the Instructions; (if there is a violation on at least one of the cores, 0 points are credited)	3		

	joint compound installation between the cups and the cable insulation: joint compound number compliance according to the Instruction; *if there is a violation on at least one of the cores, 0 points are credited)*	3		
	installation quality and shrinkage quality of the insulating tube on the cup: tube number compliance and shrinkage direction performed by the hair dryer according to the Instructions; *(if there is a violation on at least one of the cores, 0 points are credited)*	3		
	heat pipes shrinkage quality: - dimensions and direction of shrinkage compliance in accordance with the factory Instructions; *(if there is a violation on at least one of the cores, 0 points are credited)*	3		
5. Resistance test.	Ability to demonstrate skills in checking insulation resistance after installing a coupling with a megohmmeter. Measurements shall be made in the presence of an Expert with the entry of the result in the Table of measurement of cable insulation resistance (Annex 1.3):		**6**	
	correct technological order of insulation resistance measurement	3		
	- measurement quantity	3		
6. Connecting the cable in the power board	Ability to demonstrate input and connection skills in the cable board:		**6**	
	- correspondence of letter and color marking by phases; (if there is a violation on at least one of the cores, 0 points are credited)	2		
	cable core connection security ((bolt tightening); (if there is a violation on at least one of the cores, 0 points are credited)	2		
	end coupling fastening security (rigidity).	2		
7. Cable fastening to cable structures	Cable fastening to cable structures - cable fastening security with nylon clamps. *(if there are 1,5 violations, 2 points are credited; if there are 0 or more violations, 0 points are credited)*	2	**2**	

8. General work planning	Task shall be executed in less than 7 hours, with high quality execution of the task.	2	**2**	
	Total:		**61**	

Annex No. 3

Safety requirements and technical requirements for the site of the preliminary stage of the Championship

1. General Requirements for Labor Protection

1.1. Persons who are at least 18 years of age, who have undergone training in labor protection, medical examination and have no contraindications for health reasons, are allowed to perform the Task for electrical work. A participant should have the electrical safety access qualification level not lower than 3 (certificate is required).

1.2. Participants must comply with the rules of conduct, the timetable and schedule of the Task, as well as the established work and rest regimes.

1.3. When performing electrical installation and commissioning of finished electrical equipment, the following dangerous and harmful factors may be affected:

- there is potential for electrocution (thermal burns, electric jolt) when accidentally touching uninsulated live parts of the electrical installation.
- the possibility of traumatic injury when using a faulty or careless use of a serviceable tool, as well as in case of accidental contact with moving or rotating parts of machinery and mechanisms;
- the possibility of fire as a result of heating live parts during overload, unsatisfactory electrical contact, as well as resulted from exposure to an electric arc during a short circuit.

1.4. When performing the Electrical Work Task, the following overalls and individual protective equipment should be used: suit, hair cover, disposable cotton protective gloves, a tool with insulated handles, as well as safety glasses in case of machining materials. It is forbidden to work in clothes with short or rolled-up sleeves.

1.5. In the process of work, the Participants must comply with the rules for wearing overalls, using individual and collective protective equipment, observe the rules of personal hygiene, wash their hands after using the toilets, keep the workplace clean, regularly remove waste material, shavings, garbage in the trash bin.

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

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

1.8. In the event of an accident, the injured person or other Participants must immediately inform the Jury about the incident. In case of equipment or tool failure, stop work and inform the Jury about it.

1.9. Responsibility for accidents that occurred in the premises for the Task 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;
- conducting training in safe working practices on electrical installations.

2. Requirements for labor protection before starting work

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

- carefully study the content and procedure for carrying out the practical task, as well as safe techniques for its implementation;
- put on overalls, carefully pull your hair under the hair cover;
- check the condition and serviceability of equipment and tools. Metal cases for all parts of electrical installations powered from the electric grid must be reliably grounded (neutralized);
- prepare the materials and devices necessary for work and put them in their places, remove all unnecessary things from the desktop;
- prepare personal protection equipment for work, make sure they are in good working order.

3. Requirements for labor protection in the course of work

3.1. It is allowed to include the assembled circuit on the desktop, stand, wall of the box allocated for the Task only after checking it by the Jury.

It is forbidden to serve meals without warning of all Participants.

3.2. When working with electrical circuits, the control of electrical equipment switchgear under voltage is carried out only in the presence of the Jury.

3.3. It is necessary to connect up wiring diagrams, switch them only if there is no voltage. Connect the power supply last.

3.4. Wiring diagrams must be assembled so that the wires, if possible, were not crossed, stretched or twisted in knots or loops.

3.5. When assembling the wiring diagram, it is forbidden to use connecting wires with damaged lugs or broken insulation.

3.6. When working with electrical appliances and machines, care must be taken to keep exposed parts of the body, clothing and hair away from rotating machine parts and exposed wires.

3.7. If there are moving or rotating mechanisms and machines in the wiring diagram that provide for both forward and reverse movements or direct and reverse rotations, it is prohibited to turn on the remote control buttons for reverse movement or reverse rotation until the movement of the mechanism in the forward direction has completely stopped.

3.8. To check the presence of voltage on the wiring diagram, you need to use a voltage indicator or a measuring device. It is necessary to locate measuring instruments and equipment taking into account the convenience of observation and control, excluding the possibility of contact of working with live parts.

3.9. It is forbidden to leave unattended switched-on wiring diagrams and devices.

4. Safety requirements in emergency situations

4.1. If a malfunction is detected in the operation of electrical installations 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. In the event of a fire or smoke, immediately switch-off the electrical equipment, 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 electrical equipment under voltage, only carbon dioxide and powder fire extinguishers, as well as dry sand or felt mat, should be used; in this case, foam fire extinguishers or water should not be used.

4.3. In case of an accident or sudden illness, it is necessary first of all to switch off the power of the electrical installation and report the incident to the Expert jury on the site, who shall take measures to provide first aid measures to the injured persons, call an ambulance, and, if necessary, send the injured person to the nearest medical facility.

5. Post-job requirements

After the completion of the work, each Participant shall:

- switch off electrical appliances and devices from the power source. Remove the residual charge on the capacitors (if any) by closing its contacts with an insulated conductor and disassemble the electrical wiring diagram;
- clean up the workplace, hand over the equipment, materials and tools to the Jury;
- take off your overalls and wash your hands thoroughly with soap and water.

6. Technical Requirements for the Site in Conducting the Preliminary Stage

6.1. The foundation of the platform floor must be a horizontally flat concrete surface, in which it is possible to drill for fastening anchors up to 15 cm long. The foundation of the platform floor is allowed to be made as a wooden podium.

6.2. The area of the working platform for completing the Task by one team must be at least 30 m^2. If necessary, sites for works can be marked with clear borders. The site must have a flat, hard surface.

6.3. Each team's site should have storage space for materials. Mechanized operations for the procurement and processing of reinforcement (cutting, bending, etc.) must be performed in a separate specially designated, equipped or fenced area.

6.4. Workplaces must be provided with tested inventory fences, protective and safety devices, devices (scaffolding, staging, step-ladders, access boards, etc.).

6.5. The site must be equipped with fire fighting equipment.

Annex No. 4

Recommended forms of protocols for the work of the Jury

Form 1

Drawing report sheet
for workplace allocation

Nomination_____

Chairman of the Jury_____

We, the undersigned, confirm that the drawing was carried out fairly and honestly. No complaints were raised.

No.	Full name of foreman	Workplace number	Signature

Date _____2021

Chairman of the Jury _____ /_____/

Form 2

Report Sheet on Familiarizing the Participants with the Equipment and 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 for the time necessary for familiarization, received and studied instructions for using the tool and consumable. We confirm the skill of using the equipment and consumables.

No.	Full name of foreman	Comments on information received	Signature

Date _____2021

Chairman of the Jury _____ /_____/

Form 3

Report sheet on replacing equipment and instruments

Nomination_____

Chairman of the Jury_____

We, the undersigned, take responsibility for the serviceability of the replaced equipment and devices, the accuracy of its measurements and verification issues

No.	Team Number	Protocol on replacing equipment and instruments	Signature

Date _____2021

Chairman of the Jury _____ /_____/

Form 4

Report Sheet on Familiarizing 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.	Full name of foreman	Comments and Misunderstanding on Information Received	Signature

Date _____2021

Chairman of the Jury _____ /_____/

Form 5

Report Sheet on Familiarization of the Participants with Safety and Labor protection Rules

Nomination _____

Safety and labor protection training session was conducted by _____

Chairman of the Jury _____

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

Date _____2021

The briefing was conducted by _____ /_____/

Form 6

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 _____ /_____/

Annex No.5

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

Form 1

LIST
of Championship Participants

Nomination «_____».

Period conducted: _____.

Place conducted: _____.

No.	Participant's Full Name	Position	Organization	Contacts
1.				
2.				
3.				
4.				
5.				
…				

Form 2

LIST
of Jury members

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

Form 3

Final Report sheet
The Jury

Date _____2021

Nomination «_____».

Period conducted: _____.

Place conducted: _____.

No.	Participant's Full Name	Position	Task Assessment			Final score (points awarded)	Place
			Module 1	Module 2	Module N		
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 (or authorized person)
_____ /_____/

Responsible employee:
_____ /_____/

Annex No.6

Form of providing the Organizer with a list of Finalists

Principal scope of Participants that will participate in the final stage of the Championship:

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							
…							

Scope of reserve Participants that will participate in the final stage of the Championship:

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 (or authorized person)
_____ /_____/

Responsible employee:
_____ /_____/