

The First World Vocational College Skills Competition

Competition Rules

I. Name of the Skill

No.: W16

Chinese name: 碳中和可再生能源工程技术

English name: Carbon Neutral Renewable Energy Engineering Technology

Industry: Energy power & materials industry

II. Competition Purpose

The World Vocational College Skills Competition aims to bring together standards, technologies, equipment, teachers and students in the field of vocational and technical education at home and abroad, promote China's vocational education to go global and serve international cooperation in production capacity, build an important platform for teachers and students of international vocational schools to deepen friendship, exchange skills and show expertise, and promote the development of a world community of skills. Through skills competitions, displays and experience exchanges, the best practices of international vocational and technical education are shared, the influence of Chinese vocational and technical education in the world in this field is enhanced, and China's vocational and technical education is aligned with global vocational and technical education.

Many countries and regions in the world have put forward the climate target of "carbon neutrality", and countries are increasingly pressing to seek for renewable energy to replace non-renewable energy. The Carbon Neutral Renewable Energy Engineering Competition Skill Competition (the "Competition") is based on the era of "carbon neutrality", extensive industrial demand for renewable energy and trends of innovative development, and different features of forms of renewable energy. In combination with the latest technologies and standards in the industry, the Competition tests competitors' mastery of industry standards and specifications for renewable energy, and their comprehensive professional abilities such as installation and deployment of systems, programming and debugging, maintenance testing and electrical design through practical operations such as installation, operation and debugging, maintenance and troubleshooting of renewable energy systems.

III. Competition Content

The Competition is divided into three modules including "Engineering Practices and Operations", "Innovation in Engineering Projects" and "Presentation of Engineering Projects", with multiple tasks in each module.

Due to the COVID-19 pandemic and considering that foreign competitors cannot participate in the Competition on site, they are allowed to submit their works in the form of recorded videos by closely centering on such elements as low-carbon energy conservation, integrated energy applications and efficient use of energy and combining basic requirements of the three modules.

For domestic competitors, specific content of on-site competition modules is as follows (foreign competitors can use the content for reference, with concrete requirements specified in the fourth point of the next part of “Competition Method”):

i. Competition content of the “Engineering Practices and Operations” module

Competition teams shall conduct their practices and operations on site in accordance with the operation procedures and specific requirements specified in the test project (“TP”) of the module provided by the venue, with the results evaluated by on-site judges in line with practical operations. Specific tasks are as follows:

Task 1: Design of electrical diagrams -- systemic design of electrical diagrams of the renewable energy engineering project.

Task 2: Equipment installation and connection -- teams shall complete the installation and connection of their equipment, operate successively in line with the power-on order, and examine the working status of equipment.

Task 3: Hardware and software settings of unit modules -- working parameters of modules shall be set in a correct manner according to the Parameters Configuration of systems’ unit modules.

Task 4: Functional debugging and troubleshooting of systems -- possible unit module faults shall be excluded and functional debugging of systems completed.

ii. Competition content of the “Innovation in Engineering Projects” module

Competition teams shall carry out application and innovation and settle problems in the light of targets specified in the TP of “Innovation in Engineering Projects”, with the results evaluated by on-site judges in line with practical operations. Specific tasks are as follows:

Task 1: Construction of the photovoltaic power station and wind power station -- in accordance with project requirements and offered components, system components of energy controlling systems, light source tracking equipment and wind energy equipment shall be installed and wired, with the output of photovoltaic/wind power generation debugged. Complete the program design and debugging of manual and automatic analog light source tracking system.

Task 2: Design and debugging of the energy conversion and storage control system -- complete the design and debugging of wind-solar hybrid power generation system and energy conversion and storage system, and accomplish that of programs which can stably work at the maximum power point.

Task 3: Debugging and operation of the grid-connected inverter control system -- complete the debugging of grid-connected output system of inverters, record relevant data of electricity meters, and adjust system parameters to improve the quality of system output electricity in accordance with project requirements and provided components.

Task 4: Operation optimization of energy monitoring and management system -- According to the TP requirements, complete the construction of such interfaces as wind-solar hybrid power generation system, light source control system, energy conversion and storage control system and grid-connected inverter control system so that operation data, status and information related to the systems can be displayed in

real time,.

iii. Competition content of the “Presentation of Engineering Projects” module

Teams shall deliver summary reports on the Competition, expound their understanding of “carbon neutrality” and applications of renewable energy, and prospect for future Competitions. To be specific, the summaries shall take approximately five to ten minutes, and the materials shall be submitted in the form of recorded videos.

iv. Professional quality

The development of teams’ professional quality will be assessed, which is mainly demonstrated in the following aspects during the Competition:

- (1) Standard use of tools;
- (2) Standardization of equipment operation;
- (3) Safe and courteous production;
- (4) Capabilities of communication and cooperation between teams; and
- (5) Planning and logic of tasks and capabilities of problem settlement.

IV. Competition Method

1. The Competition adopts a "1+1" Chinese and foreign joint teams, that is, a team consists of one group of Chinese competitors and one group of foreign competitors; each group includes two students. Chinese competitors are not allowed to form a multi-school group. Competitors should sign up, compete and win prizes by teams.
2. Domestic competitors must be registered full-time students in higher vocational colleges, as well as registered undergraduate students in vocational colleges.
3. Foreign competitors must be foreign full-time students in related majors of vocational schools or colleges and universities providing vocational education, and international students of undergraduate schools in China are also encouraged to participate.
4. Competitor replacement: If a competitor is unable to participate for any reason during the preparation, the relevant department must issue a written explanation ten working days before the start of the corresponding Competition. The competitor will be replaced after verification by the office of the Executive Committee of the Competition (“Executive Committee”). After the Competition starts, the team is not allowed to replace any competitor.

V. Competition Process

The specific Competition date will be confirmed by the Executive Committee in a unified manner. The Competition duration is one day, with the timeline as shown in Table 1.

Table 1 Competition Milestones and Timeline

Date	Time	Work content
Day 1	Before 12:00	Registration

	13:00-14:30	Opening ceremony (specific time is subject to the official publication of the World Vocational College Skills Competition)
	14:30-15:00	Team leader meeting (the draw in groups and pre-competition briefing)
	15:00-15:30	Competitors get familiar with the workshops and equipment, receive pre-competition safety training, and sign the Safety Responsibility Agreement.
	12:00-16:00	Training for judges and competition affairs staff
Day 2	07:00-07:30	Competitors arrive in the workshops
	07:30-08:00	Check-in and the draw for workstation No. of competitors in the first module
	08:00-09:30	Competitors compete in the first module (they can apply for the entry of teachers once for joint competition according to their needs, with the time length of no longer than 15 minutes)
	09:30-10:10	Result evaluation of competitors in the first module
	10:10-10:40	Check-in of competitors in the second module
	10:40-12:40	Competitors compete in the second module (they can apply for the entry of teachers twice for joint competition according to their needs, each with the time length of no longer than 20 minutes)
	12:40-13:40	Result evaluation and lunch process for competitors in the second module
	13:40-15:40	Competitors prepare the recorded videos and reported materials in the third module and then submit them Judges evaluate the results of materials submitted by foreign competitors
	15:40-17:10	Result evaluation of competitors in the third module
	17:10-18:10	Result evaluation, reviews and entry
Day 3	09:00-11:00	Closing ceremony (specific time is subject to the official publication of the World Vocational College Skills Competition)
Notes	Foreign competitors shall submit their Competition materials two to five days before the start of the Competition (specific time is subject to the official notification of the host of World Vocational College Skills Competition)	

Note: The Competition venue is arranged by the Executive Committee in a uniform manner, and the jury president can adjust the arrangements according to specific situation.

VI. Competition Task Paper

Competition Task Paper is made public one month before the start of the Competition through the online information release platform designated by the Competition.

VII. Competition Rules

i. Familiarization with the venue

1. The Executive Committee will arrange for teams to get familiar with the workshop in a unified and orderly manner after the completion of check-in.
2. It is strictly forbidden to communicate with on-site staff. Please refrain from making unfounded remarks that can cause damage to the overall image of the World Vocational College Skills Competition.
3. Teams should strictly observe all rules for the Competition when familiarizing themselves with the workshop. In order to avoid accidents, crowding and talking loudly are strictly forbidden.

ii. Entry into the workshop

Competitors should arrive at the workshop 30 minutes in advance and have their identities, qualifications, and relevant documents verified by staff. Workstations should be decided by drawing lots and should not be changed or adjusted without permission. During the Competition, competitors are not allowed to leave the workshop without permission. In case of special circumstances, the approval of judges must be obtained. Competitors shall not bring articles not related to the Competition to the workshop.

iii. Formal Competition

1. When competing, all the hands-on operations and presentations should be conducted independently by students.
2. All competitors in the workshop shall not intervene in the tasks of other competitors. They shall not take the position of another team member or perform the duties of other team members. Additionally, verbal and personal attacks against judges and staff shall be prohibited.
3. Competitors must strictly follow the safety operating procedures and receive the supervision and warnings of judges so as to ensure their personal and equipment safety. In case of a personal safety accident and an equipment fault due to the personal mis-operation of competitors, the jury president has the right to stop the team from continuing the Competition. In the event of failure to continue the Competition due to an equipment fault arising from non-personal factors of competitors, the jury president shall make a decision based on the specific situation (shifting the team to a standby workstation or rearranging it to the last Competition session). If the jury president confirms that the equipment fault can be removed by technical support staff and that the team can continue the Competition, the competitor shall be given additional Competition time to make up for the delay.
4. Competitors are not allowed to leave the workshop without permission after entering it. If it is necessary to leave the workshop or stop Competition, because of an illness or other causes, competitors shall give a sign to judges. Only after obtaining the consent of the jury president of the workshop and signing the relevant record form can competitors leave the workshop and go to the designated place as ushered by staff.
5. Competitors must submit their Competition results (TP) in conformity with procedures, store Competition documents in the designated folders of computers at the workstation, support judges to record information about the workshop, and sign such records for confirmation. When a judge asks a competitor to sign, the competitor

shall not reject the request without a reason.

6. When the jury president gives the instruction of ending the Competition, all teams shall immediately stop their operations and clean up their workstations rather than delay the Competition for any reason.

iv. Competition method

The Competition will be conducted in the forms of on-site Competition and recorded broadcast. Domestic competitors will engage in the on-site competition; if foreign competitors are unable to attend the on-site Competition, the Competition should be recorded and broadcast. Foreign competitors must send the competition videos that meet the requirements to the mailbox designated by the Executive Committee seven days before the official competition day, and the Executive Committee should uniformly check it, conduct the pilot broadcast and seal it for filing. On the official competition day, the videos should be unsealed by the jury, and those from the foreign competitors should be broadcast on the large screen on site.

v. On-site Competition method

On-site Competition is divided into three modules such as "Engineering Practices and Operations", "Innovation in Engineering Projects" and "Presentation of Engineering Projects". The time limit for the "Engineering Practices and Operations" module is 90 minutes, and "Innovation in Engineering Projects" and "Presentation of Engineering Projects" 120 minutes respectively. Domestic competitors should submit the recorded videos of five to ten minutes before the "Presentation of Engineering Projects" module is concluded. The Competition duration is no more than 330 minutes in total.

1. "Engineering Practices and Operations" module: In line with the TP of "Engineering Practices and Operations", two competitors should complete all operation procedures and concrete requirements specified in the TP on the Competition platforms, with the time limit being 90 minutes. From the perspective of requirements for engineering abilities, on-site judges should assess competitors' operation results with regard to processes, criteria, specifications and safety. The results will be marked in a percentile system, with the weight standing at 0.4.

2. "Innovation in Engineering Projects" module: Competitors should study and discuss the content of TP of "Innovation in Engineering Projects", and confirm their implementing schemes. Competitors should complete targeted tasks and follow technical requirements specified in the TP on the Competition platforms, with the time limit being 120 minutes. From the perspective of application abilities of engineering technologies and skills of students, on-site judges will assess their results concerning scheme implementation and implementing effects. The results will be marked in a percentile system, with the weight being 0.5.

3. "Presentation of Engineering Projects" module: Teams should deliver summary reports on the Competition, expound their understandings of "carbon neutrality" and applications of renewable energy, and prospect for future Competitions. To be specific, the summaries should take approximately five to ten minutes, and materials be submitted in the form of recorded videos. After competitors submit their recorded videos (in MP4 format, with the resolution no less than 720×576), on-site judges will mark their results in a percentile system, with the weight being 0.1 and without defense.

vi. Requirements for submitted Competition works in the form of recorded videos

1. Content of videos: The content should be closely focused on low-carbon energy conservation, integrated energy applications and efficient use of energy, and combined with requirements of the three modules by fully utilizing labs, equipment, systems and virtual simulation experiments;
2. There is zero restriction on recording software which means that competitors can select software on their own;
3. The MP4 format should be adopted for videos;
4. The resolution should be no less than 720×576. For the same work, videos should be presented in a uniform manner;
5. Videos of each module should be produced separately: File size should not exceed 500M without video lags in terms of "Engineering Practices and Operations" (suggested time length is 20 to 40 minutes), "Innovation in Engineering Projects" (suggested time length is 20 to 40 minutes) and "Presentation of Engineering Projects" (suggested time length is five to ten minutes);
6. In addition to the above videos of three modules, competitors can also provide relevant documents including the TP of project design, engineering designs and project summaries named "Other documents" and then upload them in the form of zip packages;
7. Competitors of each module must appear on camera. It is recommended to add dubbing and subtitles in order to enhance the demonstration effects; and
8. When submitting materials, competitors should offer the contact information of project leader and online contact information, and ensure smooth communication on the Competition day.

VIII. Competition Environment

1. The workshop shall be no smaller than 500 square meters with a clear height of no less than four meters. Each workstation shall not be smaller than 20 square meters, and shall be labeled with a workstation number and equipped with a Competition platform, a preparation workbench and a chair. Additionally, each workstation should come with a workbench for competitors to write and place tools and the corresponding number of cleaning supplies.
2. Each workstation in the workshop shall offer three-phase 380 V power with circuit 1, with the power no less than 4 kW. Moreover, two single-phase 220 V AC electrical sockets shall be provided with a power supply load of no less than 1 kW, power protection devices be equipped, and safety measures be conducted. Electric wires in the workshop shall be arranged with wire covers.
3. Workstations shall be separated with separation labels or fences to ensure that competitors are free from external influences. Meanwhile, stable lighting and the supplies of water, power, and emergency power supply equipment should be available in the workshop.
4. The workshop is expected to be spacious and bright with a flat and dry floor and good ventilation.

5. Staff for security protection, firefighting, equipment maintenance and power lines repair shall be on standby at the workshop to prevent and respond to emergencies. In the meantime, public service facilities, such as maintenance services, medical services, and supply depots should be available for competitors and staff in the workshop.

6. There shall be network cameras at the workshop to shoot the whole process of the Competition.

7. Specific areas of the workshop shall be open to the public so that they can observe the Competition within the prescribed time.

IX. Technical Specifications

The Competition conforms to relevant international standards:

IEC 61215: Crystalline silicon terrestrial photovoltaic modules - design qualification and type approval

IEC 61730: Photovoltaic (PV) module safety qualification - part 1: Structure requirements

IEC 61173: Overvoltage protection for photovoltaic electricity generation systems

IEC 61194: Characteristic parameters of stand-alone photovoltaic systems

IEC 61400-13: Measurement of mechanical loads

IEC 61400-12: Power performance measurements of electricity producing wind turbines

IEC 61400-2: Safety standard for small wind turbine design

X. Technology Platform

1. Configuration of software platforms

No.	Type	Functions
1	PLC programming	Programming of PLC ladder diagrams can be completed
2	Configuration software	Configuration of upper computers can be completed
3	Drawing software	Electrical principle diagrams can be drawn

2. Configuration of hardware platforms

The equipment for the Competition shall include training platforms of wind power generation, photovoltaic power generation and energy data collection and management modules, with the configuration of parameters for reference as follows:

Competition equipment module	Detailed description
Analog light source tracking device	The device consists of at least four solar panels, analog light sources (including lights), solar tracking sensors, 2D solar tracking systems, analog light source operation systems, turbine gearboxes, turbine screw lifts and stands. Analog light sources are driven by stepper motors, which can operate around the arc orbits and simulate the running tracks of the sun, with the inclination of orbits adjustable to simulate that of solar

	radiation. Solar panels are installed on the stands of 2D running platforms in a fixed manner, with solar tracking sensors installed in the middle and turbine screw lifts adopted at the bottom for which competitors can manually adjust the distance between solar panels and analog light sources.
Analog wind power device	The device consists of wind turbines, three-phase variable-frequency motors, encoders, transmission devices, safety covers of wind turbines and towers. Three-phase variable-frequency motors (with encoders) and wind turbines are installed on the towers, which are driven by belts. Also, there is a safety cover, made of transparent half-arc polymethyl methacrylate, on the rotating side of blades.
Analog energy control system	The system consists of control panels (consisting of power, mesh panels and tool drawers), programmable logic controllers (PLC), programming lines, analog modules, frequency converters, touchscreens, AC contactors, relays, buttons and switches.
Energy conversion and storage control system	The system consists of control panels (consisting of power, mesh panels and tool drawers), photovoltaic array convergence modules, DC power lightning protectors, DC voltage and DC current intelligent digital display meters, disk resistors, circuit breakers, switching power supplies, DC voltage and current collecting modules, CPU core modules, man-machine interaction modules, PWM drive modules, communication modules, temperature alarm modules, DC/DC Boost main circuit modules, storage battery systems, charging and discharging controllers and downloaders.
Grid-connected inverter control system	The system consists of DSP core modules, interface modules, LCD modules, keyboard interface modules, drive circuit modules, Boost circuit modules, busbar voltage, power grid voltage and current sampling modules, temperature alarm modules, communication modules, switching power supplies, DC loads, AC loads, DC voltage and DC current intelligent digital display meters, inverter output electricity meters, isolation transformers and off-grid inverters.
Energy monitoring and management system	The system consists of the core modules of system controllers, relay modules, communication modules, industrial tablets, keyboards, mice and configuration software.

XI. Result Evaluation

i. Requirements for judges (taking the 12 teams for instance)

No.	Professional and technical directions	Requirements for knowledge and competence	Judging, teaching and work experience	Professional and technical titles (professional qualification level)	Headcount
1	Electrical engineering	Drawing of electrical diagrams and installation and debugging of electrical systems	Served as a judge at a national, industrial and provincial Competition	Associate senior title or above, or technician professional qualification or above	6
2	Auto	PLC programming	Served as a judge at a national, industrial and provincial Competition	Associate senior title or above, or technician professional qualification or above	6

Total number of judges	12
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ii. Result evaluation

1. The final total mark should be 100.
2. In accordance with the operation procedures and specific requirements specified in the TP of “Engineering Practices and Operations”, on-site judges will give the results (in a percentile system) of competitors in the module by examining their operations, with the weight being 0.4.
3. In accordance with the tasks and specific requirements specified in the TP of “Innovation in Engineering Projects”, on-site judges will give the results (in a percentile system) of competitors in the module by observing their presentations of implementation results, with the weight being 0.5.
4. In accordance with the teams’ summary reports and presentations, on-site judges will give the results (in a percentile system) of competitors in the third module, with the weight being 0.1.
5. The weighted sum of the three modules will be the final result of a competitor.

iii. On-site marking rules (applicable to domestic competitors)

1. Marking rules for the “Engineering Practices and Operations” module

Tier-1 indicators	Proportion	Tier-2 indicators	Score
Design of electrical diagrams	25%	Completing the drawing of connection diagrams/schematic diagrams correctly	15
		Correct labels of drawing	10
Equipment installation and connection	30%	Able to select and install mechanic and electrical modules correctly	10
		Able to accomplish electrical connection correctly	15
		Able to power on equipment in an orderly and correct manner with the system normally activated	5
Software-hardware configuration	10%	Able to set equipment parameters of unit modules correctly	5
		Normal communication for unit modules and monitoring software	5
System debugging and troubleshooting	35%	Able to debug the photovoltaic power generation system and master the test methods of photovoltaic output characteristics with the testing data being correct	10
		Able to debug the wind power generation system with the fans normally running and testing data being correct	8
		Able to debug parameter settings and functions of the energy conversion and storage control system	9

		Able to debug the grid-connected inverter control system with the testing data being correct	8
Professional quality	Examining during the Competition	Operation specifications of vocational skills	
		Dressing, safety and professional quality	

Note: There will be no specific point allocation for professional quality. However, where a competitor violates relevant rules during the operations, one to five points will be deducted from his/her total scores for practical operations. For a competitor who severely violates the rules, he/she will be stopped from competing with the scores in the module canceled. There may be micro-adjustments in the percentages of indicators during the practical Competition.

2. Marking rules for the “Innovation in Engineering Projects” module

Tier-1 indicators	Proportion	Tier-2 indicators	Score
Establishment of photovoltaic power stations and wind power stations	35%	Installation and wiring of components	12
		Programming and debugging of the automatic photovoltaic tracking system	16
		Innovative design for the automatic tracking system	7
Design and debugging of the energy conversion and storage control system	25%	Design and debugging of the tracking program for maximum photovoltaic power	17
		Innovative design for the maximum power	8
Debugging and operation of the grid-connected inverter control system	15%	Debugging of the grid-connected output system	7
		Parameter adjustments for refining electricity quality	8
Operating optimization of the energy monitoring and management system	25%	Design for system interface configuration	8
		Functional realization of system configuration	12
		Creative design for system configuration	5
Professional quality	Examining during the Competition	Operation specifications of vocational skills	
		Dressing, safety and professional quality	
Total score	100 points		

Note: There will be specific point allocation for professional quality. However, where a competitor violates relevant rules during the operations, one to five points will be deducted from his/her total scores for practical operations. For a competitor who severely violates the rules, the scores in the module will be canceled. Specifically, serious rule-violations include (but are not limited to) violating safety rules for electricity (for relevant criteria, please refer to national and industrial criteria of low- and high-voltage electricity safety). There may be micro-adjustments in the

percentages of indicators during the practical Competition.

3. Marking rules for the “Presentation of Engineering Projects” module

Tier-1 indicators	Proportion	Tier-2 indicators	Score
Ideology	25%	The viewpoints are correct, and the theme is prominent	21-25 points
		The viewpoints are correct, and the theme is clear	16-20 points
		The viewpoints are vague, and the theme is unknown	1-15 points
Content	25%	The key points are complete combining the reality, with problems solved	21-25 points
		There are deficiencies in the key points though the competitor has combined the reality, with an ordinary level of skills	16-20 points
		The key points are poor and unrealistic, with a poor level of skills	0-15 points
Logic	20%	The logic is rigorous, logical and coherent	16-20 points
		The logic is less rigorous, logical and coherent	11-15 points
		The logic is disorderly, illogical and incoherent	1-10 points
Expressions	20%	With process-oriented language, the expressions are appealing and clear	16-20 points
		With fluent language, the expressions are articulate and ordinary	11-15 points
		The language lacks of fluency, and the expressions are inarticulate and poor	1-10 points
Technologies and specifications	10%	In terms of videos, the length is rational, and the pictures are clear and synchronous with sounds.	7-10 points
		In terms of videos, the length is rational, and the pictures are clear but not synchronous with sounds.	4-6 points
		In terms of videos, the length is unqualified, and the pictures are unclear and not synchronous with sounds.	1-3 points
Total score	100 points		

iv. Off-site marking rules (applicable to foreign competitors)

1. Marking rules for the “Engineering Practices and Operations” module

Marking indicators	Proportion	Key points of marking for reference
Content effects	40%	The engineering philosophy is closely focused on the theme and modules; the content is abundant and specific; the pictures are clear and smooth when videos are played; and the overall effect of presentations is good

Practices and operations	40%	Skills can be represented during practices and operations, which are not limited to design, installation, connection, activation, operation and debugging
Professional quality	20%	Judges will inspect professional operation specifications, dressing, safety, professional quality and teamwork

2. Marking rules for the “Innovation in Engineering Projects” module

Marking indicators	Proportion	Key points of marking for reference
Content effects	40%	The engineering philosophy is closely focused on the theme and modules; the content is abundant and specific; the pictures are clear and smooth when videos are played; and the overall effect of presentations is good
Project innovativeness	40%	The project is innovative
Professional quality	20%	Judges will inspect professional operation specifications, dressing, safety, professional quality and teamwork

3. Marking rules for the “Presentation of Engineering Projects” module

Tier-1 indicators	Proportion	Tier-2 indicators	Score
Engineering philosophy	20%	The viewpoints are correct, and the theme is prominent	16-20 points
		The viewpoints are correct, and the theme is clear	11-15 points
		The viewpoints are vague, and the theme is unknown	1-10 points
Content	25%	The key points are complete combining the reality, with problems solved	21-25 points
		There are deficiencies in the key points though the competitor has combined the reality, with an ordinary level of skills	16-20 points
		The key points are poor and unrealistic, with a poor level of skills	0-15 points
Logic	20%	The logic is rigorous, logical and coherent	16-20 points
		The logic is less rigorous, logical and coherent	11-15 points
		The logic is disorderly, illogical and incoherent	1-10 points
Expressions	20%	The language is process-oriented, the expressions are appealing, and the reactions are strong	16-20 points
		The language is fluent, the expressions are articulate, and the reactions are available	11-15 points
		The language lacks of fluency, the expressions are inarticulate, and the reactions are poor	1-10 points
Instrumentation	15%	With a good appearance, the competitor behaves appropriately	11-15 points
		With a good appearance, the competitor behaves well	6-10 points

		With an ordinary appearance, the competitor behaves normally	1-5 points
Total score	100 points		

v. Marking by judges

1. The jury should consist of a jury president and several judges. The competition is subject to the jury president responsibility system. The jury president is responsible for the overall judgment and management of the Competition.

2. Judges shall be classified into check-in, on-site and marking judges, according to competition requirements. To be specific, check-in and on-site judges shall not participate in marking.

The specific division of responsibilities is as follows:

(1) The check-in judges are responsible for the registration and identity verification of competitors, and for organizing them to draw their workstation numbers;

(2) On-site judges shall record information about the workshop and maintain the order of the workshop, as stipulated.

(3) Marking judges shall evaluate the skills, data recorded on site and operation specifications of competitors in accordance with the Competition's marking criteria, and make a statistical summary of their results.

3. The juries shall assume the responsibility for result evaluation of the Competition; for each jury, there will be two to three on-site judges at every four to six workstations, each with a leader; on-site judges shall record detection data and operations instead of judging; for marking judges, there will be one jury (in pairs) at every 10-15 workstations to conduct routine judgment on the recording, designed parameters, programs and product quality of on-site judges; before the Competition, judges will be trained and judging criteria will be unified.

4. Competitors shall operate in line with the requirements of Competition TP and record the content that shall be recorded in the TP according to operational requirements. The content that must be confirmed by judges must be signed by judges for confirmation, otherwise, points will not be awarded.

5. Courteous production assessment is a deduction, including work attitudes, awareness of safety, professional norms and environmental protection.

6. The jury shall mark based on on-site records by judges, the TP, and marking criteria, in line with the principle of being "just, fair, open, reasonable, standardized, and transparent without objection", and lastly determine winners according to marking and points.

7. Marking shall be in teams, and judges shall supervise each other in order to inspect, approve and review the detection and marking results. By doing so, the marking can be accurate and fair.

8. Result review. To safeguard the accuracy of result judgment, the arbitration team will review the results of all competitors of the overall results of the Competition; the arbitration team shall promptly notify the jury president of any marking errors

identified in the review in writing, who will correct the results and sign for confirmation. If the error rate of review and sampling exceeds 5%, the jury will review all results.

vi. Result ranking

The result of each group should be the sum of the results of two modules, and the final result of each team should be the average sum of its results of Chinese-foreign groups. If the total scores of two teams are the same, the team that has higher results in the second module shall be ranked higher; if the total scores and results of two teams in the second module are both the same, the teams shall be ranked by the total completing time in the first and second modules; the team spending less time completing all tasks shall be ranked higher.

vii. Result announcement

1. Prior to the closing ceremony, Competition results, upon statistics, summaries, and sorting by staff, should be submitted to the Executive Committee and jury for joint review. After judges' tasks are confirmed to have zero mistake, teams and their corresponding workstation numbers should be recorded for verification by the jury.
2. After the end of all Competitions, the mark keeper will summarize the declassified results of teams as the final results, and announce the latter after the signature of jury president and leader of supervision and arbitration team. The final results will be submitted to the competition administration system simultaneously.
3. Competition results will be announced by the designated staff by the Executive Committee at the closing ceremony.
4. The information officer of the Competition should submit the printed paper report card that has been signed to the Executive Committee and office of the Executive Committee of World Vocational College Skills Competition.
5. After the Competition, results will be published on a designated online information release platform by the Executive Committee of World Vocational College Skills Competition.

XII. Awards and Prizes

A gold medal, A silver medal and A bronze medal will be awarded by the Competition to each different team, and the teams in the top 50% of the overall results (other than the top three) will be awarded the winning prize.

XIII. Preliminary Plans for the Competition Venue

i. Contingency plan for firefighting

1. The division shall establish coordination mechanisms with public security and fire departments to ensure Competition safety. It shall also formulate contingency plans to respond to emergencies in a timely manner.
2. Safety exits, firefighting access, alert areas and evacuation lanes for emergencies shall be marked on the floor plan of the venue.
3. The venue shall provide emergency measures for medical care and firefighting.
4. Fire extinguishers shall be equipped in accordance with the safety requirements for

firefighting, and persons in charge shall be designated for leveraging amid emergencies.

5. Special contact lines between firefighters and security personnel shall be set, with the contact persons of both sides determined. Persons in charge of safety shall take charge of the special communication.

ii. Contingency plan for power supply

1. A team for ensuring the safe use of electricity shall be established to bear the responsibility for communication matters with power departments, safeguard the normal supply of electricity during the Competition, and address issues swiftly when abnormal events occur.

2. Protection measures for conducting dual power

iii. Contingency plan for medical care

1. A medical secure service station shall be set within the scope of the alert line at the workshop so as to offer emergency services such as first aid and wound treatment for potential emergencies.

2. The workshop shall introduce medical and firefighting measures, and set the special contact lines for medical workers, with the contact persons determined. Persons in charge of safety shall take charge of the special communication.

iv. Contingency plan for equipment

1. The workshop shall be equipped with at least one set of backup equipment, preventing the technical faults that may take place during the Competition.

2. A certain number of technical engineering personnel of equipment maintenance shall be allocated to the workshop with the aim to handle issues that may occur. Moreover, assistant judges shall confirm the status of Competition equipment and computer software so that the root cause can be rapidly identified and effective measures be taken in a timely manner, securing a successful Competition.

3. The computer configuration of workstations shall be unified and relevant software installed, and adequate backup computers shall be supplied at the workshop.

XIV. Safety

Event safety is a prerequisite for the smooth running of all work of the Competition and a core issue that must be considered in the preparation and operation of the Competition. The Executive Committee of the Competition shall take practical and effective measures to ensure the personal safety of competitors, judges, staff, and audience during the Competition.

1. Competition environment

(1) The Executive Committee shall organize a special inspection of the workshop, accommodation places and transport before the Competition, and make explicit safety requirements. The arrangement of the workshop, the equipment and facilities within the workshop, should comply with the relevant national safety regulations. If necessary, workshop simulation tests can also be conducted to identify possible problems. The organizer must exclude hazards in accordance with the requirements of the Executive Committee before the Competition.

(2) A cordon should be set up around the workshop to prevent the entry of unauthorized persons in case of accidents. The necessary labor protection should be provided for the competitors with reference to the requirements of the relevant occupational positions within the competition site. In the section with dangerous operation, the judges should take strict precautions against the wrong operation of the competitors.

(3) The organizer should provide conditions to ensure the implementation of the contingency plan. For competitions involving work at height, possible falling objects, large electricity consumption, fire prone and other circumstances, policies and plans must be specified, and first aid personnel and facilities must be equipped.

(4) The Executive Committee shall formulate the staff evacuation plan for the open workshop and experience area in conjunction with the organizer. In addition to complete indication signs, additional guidance personnel shall be assigned and alternate lanes shall be opened in areas where there are crowded and intersecting traffic and pedestrian flow in the workshop environment.

(5) During the Competition, the organizer shall take key positions in the management of the workshop, increase efforts and establish a security management log.

2. Living conditions

(1) During the Competition, in principle, the Executive Committee will arrange the food and accommodation for the competitors uniformly. The organizer shall respect the culture and beliefs of international teams and ethnic minorities and arrange the food and accommodation for the international competitors and coaches, competitors and coaches of ethnic minorities in accordance with relevant policies.

(2) The place of accommodation arranged during the Competition should have the business permit for hotel/accommodation. If the school dormitory is used for accommodation, the Executive Committee and the school providing the dormitory will be jointly responsible for the accommodation, health, and food safety during the Competition.

(3) Transport safety of organized visits and observation activities during the Competition is under the responsibility of the Executive Committee. The Executive Committee and the organizer shall ensure the transport safety for competitors, judges, and staff during the Competition.

(4) The security management of each Competition, in addition to the necessary security quarantine measures that can be taken, shall strictly comply with the relevant national laws and regulations to protect personal privacy.

3. Team responsibility

(1) Each school shall purchase personal accident insurance for the competitors during the Competition when organizing the teams.

(2) After the teams are formed, the relevant management policy shall be formulated and safety education shall be provided to all competitors.

(3) The teams shall strengthen the safety management of the competitors and achieve the alignment with the safety management of the workshop.

4. Emergency response

If an accident occurs during the Competition, whoever finds it should report to the Executive Committee immediately, and also take measures to avoid further deterioration. The Executive Committee should immediately activate the emergency plan to address the problem. A Competition may be suspended if there is a major safety problem, and whether to suspend it should be determined by the Executive Committee of division.

5. Penalties

(1) Where a major safety event is caused by a team, the team will be disqualified from prizes.

(2) Teams involved in a major safety risk may be disqualified from continuing the competition, if they are alerted and warned by the staff of the workshop but of no avail.

(3) Staff who violate rules will be held accountable according to the corresponding policies. Where the circumstances are serious and cause major security incidents, the relevant parties will be held legally accountable by the judicial authorities.

6. Pandemic control

(1) Organizing colleges

Organizing colleges of Competitions are the main institutions in charge of the pandemic control. To be specific, they should properly fulfill the local anti-pandemic requirements, establish relevant organizations, and unify and assume responsibilities for the organization of pandemic control. During the Competition organization, organizing colleges should strengthen the communication and contact with local guiding institutions for pandemic control, develop implementing plans for all Competitions, fulfill the requirements throughout the Competition, and define the requirements in the guidelines for the World Vocational College Skills Competition. The colleges should arrange for dedicated personnel to coordinate with participating colleges, and inform them of specific requirements in a proactive manner regarding Competition arrangements and personnel registration. The colleges should ensure the temperature detection for competitors, examine their health codes, offer essential prevention supplies, and conduct relevant tasks for pandemic control, so as to secure a successful Competition.

(2) Participating colleges

Participating colleges should reinforce the unified management of competitors, and reduce accompanying team members. The colleges should designate personnel for the preparation of pandemic control for competitors, and prepare materials related to the prevention for them. Competitors should complete their registration with the temperature detected as normal, and then check in the hotels designated by organizing colleges. During the Competition, competitors should take personal protective measures, prepare sufficient disposable surgical face masks, and avoid staying at crowded sites and areas with poor ventilation. Competitors should be subject to the inspections of pandemic control launched by organizing colleges. In case of fever, fatigue, dry cough and breathing difficulties, please immediately contact the colleges' pandemic control teams, and visit the hospital in time depending on the disease condition to ensure that the Competition is held in a secure manner.

(3) Anti-pandemic measures

1) All relevant departments are expected to attach great importance to requirements for pandemic control. In conformity with local requirements, relevant preparations should be made to ensure that the Competition would be held in a safe and smooth manner.

2) All teams and relevant organizations should check the body temperature and monitor the health status of all participants from the 14th day before the Competition. Participants who have physical abnormalities and who are identified to have physical abnormalities should receive the nucleic acid test, in line with the principle that “participants with physical abnormalities should be tested, and other participants would be tested if they are willing to do so”.

3) All participants can enter the workshop only when their body temperature is below 37.3°C. For those with physical abnormalities, organizers of the Competition would support health authorities to organize experts from disease control and medical institutions to give the nucleic acid test to them and propose professional suggestions.

4) Other anti-pandemic matters not covered herein should be subject to local anti-pandemic policies.

XV. Competition Notice

i. Notice for teams

1. Team competitors should not be replaced, in principle, after their registration is confirmed; after the Competition begins, teams should not replace their competitors. If a competitor is absent, it would be considered that the competitor forfeits the Competition.

2. Teams shall carefully read all documents released after by the Executive Committee and learn exactly the timeline and judgment details to join the Competition smoothly.

3. Teams shall hold their entry cards issued by the Executive Committee and valid IDs to participate in Competitions and relevant activities, in accordance with the Competition process.

4. Teams will have the Competition workshops and sequence decided by drawing lots.

5. The jury shall have the right to make a decision on behavior not covered herein. In the event of a dispute, the decision by the supervision and arbitration team would be considered as the final decision, and no media information would be referred to.

ii. Notice for instructors

1. Instructors shall ensure the pre-competition draw lots, confirm the entry sequence, and assist the organizer of the Competition in organizing relevant matters of all Competitions for competitors of the institution.

2. Instructors shall seek to ensure the professional and ideological guidance and psychological counseling for competitors of the institution, and be calm and inclusive facing competitors and during the Competition; furthermore, they shall jointly maintain the order.

3. Instructors shall abide by the Competition rules, and respect and cooperate with

judges for ensuring a fair, just, smooth and efficient Competition.

4. Teams shall unswervingly implement all regulations of the Competition. For instructors, they shall strengthen the management of competitors, make the pre-competition efforts, and prompt competitors to take their IDs.

5. When there are abnormalities or questions raised by competitors of the institution during the Competition, instructors shall learn the circumstances in a timely manner, make objective judgment, and pacify the competitors. After the internal negotiation, instructors can report the specific situation or submit a written application to the Competition's supervision and arbitration team within the specified time limit if it is considered necessary.

6. The competitor who stops the Competition due to the appeal or objections to the arbitration opinion will be treated as forfeited.




7. Instructors shall conscientiously study and grasp the technical rules and requirements for the workshop of the Competition in order to prepare technically and prepare for the Competition.

8. Instructors should make technical and working summaries after the Competition.

iii. Notice for competitors

1. When completing the registration, competitors should receive the entry cards with their IDs, with their qualifications confirmed. An entry card is the certificate of a competitor participating in the Competition. Upon confirmation, a competitor should not be casually replaced during the Competition, otherwise, he/she should be punished as cheating and cannot be involved in the ranking.

2. Competitors must wear protective equipment correctly according to relevant requirements, as shown in the following figures.

Protective items	Diagram	Notes
Head protection		The helmet can guard against injuries caused by touch and smash to the head
Body protection		1. Trousers are mandatory 2. The protective suit must be close-fitting and not loose, meeting the three tight-fitting requirements
Foot protection		The shoes are anti-slip, anti-smash and insulation-resistant

3. With valid IDs, a competitor shall arrive at the designated site of all inspection

projects 30 minutes ahead of the Competition for check-in and draw lots to decide the workstation number, in accordance with the sequence, project session and the time.

4. After the check-in, a competitor shall arrive at the workshop 15 minutes ahead of the Competition ushered by the staff. The project qualification for competitors, who do not arrive after the Competition timer starts, will be canceled.

5. When entering the workshop, competitors shall wear their entry cards, wear uniforms according to the Competition project, and ensure neat dressing subject to the requirements of safety production and the Competition.

6. Competitors shall earnestly read the guidelines for all Competition operations, consciously abide by the workshop discipline, and compete in accordance with Competition rules and project and workshop requirements. In addition, competitors shall not bring any items to the workshop without permission, and cheating is prohibited.

7. During the Competition, competitors shall be subject to the judgment made by judges. In case of objection to the marking of judges, competitors shall not argue or talk back to judges, but they can file a written supervisory arbitration application to the Competition's supervisory arbitration team represented by the team leader within the specified time limit. The application will be investigated, examined and handled by the Supervisory Arbitration Committee of the Competition ("Supervisory Arbitration Committee").

8. The jury shall give a warning to competitors who disobey the instructions of judges and staff, disrupt the workshop or interfere with other competitors. Where a competitor is given two warnings accumulatively or seriously violates relevant rules resulting in the termination of the Competition, the qualifications and results will be canceled upon the judging by jury president.

9. During the Competition, where there is a major safety accident or problem, judges can stop the Competition and cancel the qualifications and results of competitors if they are warned by judges but of no avail.

10. During the Competition, where there is a violation that leads to the cancellation of qualification specified in the Skill-Specific Competition Rules, judges can stop the Competition and cancel the qualifications and results of competitors.

11. If a competitor participating in the skill Competition completes the operations in advance, he/she shall wait in the designated area and ask the judge for permission before leaving the workshop.

12. During the Competition, if the Competition equipment or a detection device goes wrong, the competitor shall promptly report the fault to the judge. The competitor shall not solve the problem on his/her own, otherwise, the Competition qualification will be canceled.

iv. Notice for staff

1. Staff should obey the leadership of the Executive Committee, abide by professional ethics, adhere to principles, and act according to rules. Besides, judges should perform their duties in a strict, conscientious, just, accurate, and courteous manner.

2. Staff must attend the pre-competition training organized by the Executive

Committee. Also, they must wear their badges and uniforms, have a tidy and clean appearance and good manners, and talk politely.

3. Staff shall keep Competition secrets during the Competition rather than disclose or imply such secrets to team leaders, coaches and competitors of divisions.

4. The Competition time shall be strictly observed and shall not be shortened or extended without permission.

5. Staff shall strictly conform to Competition discipline. Except for the Competition Notice for competitors, staff shall not give a hint to or answer competitors' questions related to the Competition.

6. Staff shall remain at their posts rather than take others' posts without permission, and shall not be late or leave early.

7. Staff shall supervise competitors to observe Competition rules and safe operating procedures, and shall not intervene with competitors. Problems that occur during the Competition shall be solved in a proper manner.

8. Staff shall follow the principles of justice and equity, maintain discipline at the workshop, perform judging duties properly, and record information about the workshop truthfully.

9. Staff shall swiftly check and repair equipment faults occurring at each round of Competition, and promptly report those that cannot be fixed.

XVI. Appeal and Arbitration

During the Competition, in case of injustice or rule violations by relevant personnel, a written appeal can be submitted to the arbitration team within two hours after the Competition on that day. The content, time, people involved, and basis of the appeal shall be adequately and truthfully described in the appeal that shall be signed in person. Non-written appeals will not be accepted.

The supervision and arbitration team should organize a review within two hours after receiving the appeal report and timely inform the appealing party in writing of the review result. If the appealing party still has objection to the reviewed result, it can submit an appeal to the Supervisory Arbitration Committee of division. The arbitration award of the Supervisory Arbitration Committee should be the final.

Arbitration award will be signed for by the complainant and cannot be received on his/her behalf. If the complainant leaves at the agreed time and place, he/she is considered to have waived the appeal. The appealing party should not reject the arbitration award for any reason and can waive the appeal at any time. The complaining party shall not disrupt the venue for any reason through drastic actions.

XVII. Competition Observation

The Competition workshops are open to visitors with visiting lanes set, which means that visitors can observe and experience the on-site Competition, on the premise of not intervening with competitors and in line with the specified time and routes.

i. Observers

Experts, technicians, teachers from enterprises, institutions, colleges and industrial associations, and students in universities and high, secondary and primary schools.

ii. Observation method

Observers can enter the workshops for observation in an orderly manner within specified time.

iii. Observation discipline

1. Observers must wear the observation cards;
2. When observing, observers shall not discuss or communicate with each other concerning the Competition, and communication with competitors is strictly prohibited;
3. When observing, observers shall not stay in front of a workstation for fear of influencing competitors;
4. During the observation, observers shall not raise a question to the workshop judges and staff; and
5. No photo during the observation.

For those who violate the above rules, their observation qualifications will be canceled immediately.

XVIII. Live Competition

By the unified arrangements of the Executive Committee, live broadcasts and reports on the Competition will be rolled out.

- i. Live broadcast method: Video recording equipment shall be deployed at the workshop to record and display the Competition.
- ii. Live broadcast arrangements: Dedicated personnel shall be arranged for the interviews and shooting at the opening and closing ceremonies, and for ensuring the normal running of live broadcasts during the Competition.
- iii. Live broadcast content: The opening and closing ceremonies shall be shot by multiple cameras. In addition, videos on interviews with outstanding competitors, teachers, comments by experts and judges, and interviews with businessmen shall be produced to highlight the skills and characteristics of the Competition. Comprehensive information and materials shall be provided for publicity, arbitration, and resource conversion.

XIX. Resource Conversion

Targets of the Competition are to give further play to the crucial roles of the World Vocational College Skills Competition in refining talent training quality, testing teaching achievements and leading educational and teaching reforms, and pool and integrate such resources as educational and industrial talent, intelligence and technologies based on the Competition. Moreover, it is to support the establishment of a high-quality vocational and education system, and provide a stage for more teenagers to realize their life values relying on a particular skill. The Competition also aims at building a skill-oriented society where all people can grow into talent and present their skills as many as possible, and instructing the whole society on learning, shoring up and engaging in vocational education. To achieve the above goals, the Competition will carry out resource conversion in the following aspects. Converted

resources should be uploaded to an online information release platform designated by the Competition.

i. Establish a resource library for professional teaching: The Competition will transform practical training tutorials, TPs and engineering cases into the basic materials of a resource library leveraged for practical teaching. In addition, it will develop an information-based teaching platform to expand the scope of sharing quality resources, explore diversified cultivating modes such as the “Online-offline” mixed cultivation mode, and nurture innovative and practical talent by adapting to the requirements of strategic emerging industries and the development of new infrastructure.

ii. Facilitate the “reforms in textbooks, teachers and teaching methods”: The Competition has collaboratively built a brand involving multiple professional fields based on market requirements. Through resource development and conversion of the Competition, the orderly combinations of teaching content will be mobilized to bring effective use of resources into full play. By adopting methods of training for teachers, professional research and discussions and resource conversion meetings, Competition results will be promoted, and high-level and structural teacher teams be created, taking the effective transformations in teaching philosophy of new majors and innovations in talent training modes as the starting point. Also, transformation paths of professional courses on targeted measures will be jointly explored.

iii. Deepen the industry-education integration: The Competition will strengthen the match between intelligent photovoltaic industrial demand and talent supply. Furthermore, it will give full play to the predictive ability of industrial enterprises for talent requirements, perceptual ability of employment institutions for the changes in talent and skills and refining ability of training and assessment organizations for criteria of professional skill levels. On the basis of the Competition, a cooperative university-enterprise platform will be established to help colleges conduct the professional layout and development of emerging industries and enhance the capabilities of developing the vocational and educational service sectors.

XX. Miscellaneous