

Technical Description

Electrical Installations

Skill 18



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1 Introduction

1.1 Name and description of the skill competition

1.1.1 The name of the skill competition is

Electrical Installations

1.1.2 Description of the associated work role(s) or occupation(s)

An electrician works on commercial, residential, agricultural and industrial projects. There is a direct relationship between the nature and quality of the product required and the payment made by the customer. Therefore the electrician has a continuing responsibility to work professionally in order to meet the requirements of the customer and thus maintain and grow the business.

Electrical installation is closely associated with other parts of the construction industry, and with the many products that support it, normally for commercial purposes.

The electrician works internally, including the homes of customers and on small and major projects. He or she will plan and design, select and install, commission, test, report, maintain, fault find and repair systems to a high standard. Work organisation and self-management, communication and interpersonal skills, problem solving, flexibility and a deep body of knowledge are the universal attributes of the outstanding electrician.

Whether the electrician is working alone or in a team the individual takes on a high level of personal responsibility and autonomy. From working to provide a safe and reliable electrical installation and maintenance service, in accordance with relevant standards, through to diagnosing malfunctions, programming and commissioning home and building automation systems, concentration, precision, accuracy and attention to detail every step in the process matters and mistakes are largely irreversible, costly and potentially life threatening.

With the international mobility of people the electrician faces rapidly expanding opportunities and challenges. For the talented electrician there are many commercial and international opportunities; however these carry with them the need to understand and work with diverse cultures and trends. The diversity of skills associated with electrical installations is therefore likely to expand.

1.2 The content, relevance and significance of this document

This document incorporates a Role Description and Occupational Standards which follow the principles and some or all of the content of the WorldSkills Occupational Standards. In doing so WSE acknowledges WorldSkills International's (WSI's) copyright. WSE also acknowledges WSI's intellectual property rights regarding the assessment principles, methods and procedures that govern the competition.

Every Expert and Competitor must know and understand this Technical Description.

In the event of any conflict within the different languages of the Technical Descriptions, the English version takes precedence.

1.3 Associated documents

Since this Technical Description contains only skill-specific information it must be used in association with the following:

- WSE – Competition Rules
- WSI – WorldSkills Occupational Standard framework

- WSE – WorldSkills Europe Assessment Strategy
- WSE – Online resources as referenced in this document
- WSE – Code of Ethics and Conduct
- Host Country – Health and Safety regulations

2 The Occupational Standards

2.1 General notes regarding WSOS / WSEOS

Where appropriate WSE has utilised some, or all, of the WorldSkills International Occupational Standards (WSOS) for those Skills Competitions that naturally align between the two international competitions. Where the Skill is exclusive to the EuroSkills Competition, WorldSkills Europe has developed its own Occupational Standards (WSEOS) using the same principles and framework to that used for the development of the WSOS. For the purposes of this document the use of the words “Occupational Standards” will refer to both WSOS and WSEOS.

The Occupational Standards specifies the knowledge, understanding and specific skills that underpin international best practice in technical and vocational performance. It should reflect a shared global understanding of what the associated work role(s) or occupation(s) represent for industry and business. Helpfully, for the global consultation on the WSOS in 2014-2021, around 50 percent of responses came from European industry and business.

Each Skill Competition is intended to reflect international best practice as described by the Occupational Standards, and to the extent that it is able to. The Occupational Standards is therefore a guide to the required training and preparation for the Skill Competition.

In the Skill Competition the assessment of knowledge and understanding will take place through the assessment of performance. There will not be separate tests of knowledge and understanding.

The Occupational Standards are divided into distinct sections with headings and reference numbers added.

Each section is assigned a percentage of the total marks to indicate its relative importance within the Occupational Standards. The sum of all the percentage marks is 100.

The Marking Scheme and Test Project will assess only those Skills that are set out in the Occupational Standards. They will reflect the Occupational Standards as comprehensively as possible within the constraints of the Skill Competition.

The Marking Scheme and Test Project will follow the allocation of marks within the Occupational Standards to the extent practically possible. A variation of five percent is allowed, provided that this does not distort the weightings assigned by the Occupational Standards.

2.2 Occupational Standards

Section		Relative importance (%)
1	Communication and interpersonal skills	10
	<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> • the significance of establishing and maintaining customer confidence and trust • the importance of maintaining and keeping knowledge base up-to-date • the roles and requirements of related trades 	

Section		Relative importance (%)
	<ul style="list-style-type: none"> • the value of building and maintaining productive working relationships • techniques of effective teamwork • the importance of swiftly resolving miss-understandings and conflicting demands 	
	<p>The individual shall be able to:</p> <ul style="list-style-type: none"> • interpret customer requirements and manage customer expectations positively • provide advice and guidance on products/ solutions e.g. technological advancements • visualise and translate customer wishes making recommendations which meet/improve their design and budgetary requirements • question customers closely/deeply to fully understand requirements • provide clear instructions • introduce related trades to support customer requirements • produce written reports for customers and the organisation • produce a cost and time estimate for customers • recognise and adapt to the changing needs of related trades • work effectively as a member of a team 	
2	Problem solving, innovation and creativity	10
	<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> • the common types of problem which can occur within the work process • diagnostic approaches to problem solving • trends and developments in the industry including new technology, standards and working methods e.g. 'smart house' and energy saving measures 	
	<p>The individual shall be able to:</p> <ul style="list-style-type: none"> • check work regularly to minimise problems at a later stage • identify problems originating from the work of a related trade e.g. heating pump, ventilation system etc. • challenge incorrect information to prevent problems • recognise and understand problems swiftly and follow a self-managed process for resolving • recognise opportunities to contribute ideas to improve the solution and overall level of customer satisfaction • demonstrate a willingness to try new methods and embrace change e.g. ready-made components 	
3	Planning and design	10

Section		Relative importance (%)
	<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> • different types of standards, drawings, installation descriptions and manuals • range of materials and installation techniques to be used in different environments 	
	<p>The individual shall be able to:</p> <ul style="list-style-type: none"> • read, interpret and revise drawings and documentation including: <ul style="list-style-type: none"> ◦ layout and circuit drawings ◦ follow written instructions ◦ plan installation work using drawings and documentation provided • to answer some questions about Theoretical knowledge <ul style="list-style-type: none"> ◦ Technology ◦ Circuit technology ◦ Operational analysis • Technical calculation 	
4	Installation	40
	<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> • ducting and wiring systems for commercial, domestic, residential agricultural and industrial use and when and where to use a specific ducting and/or wiring system • the range of electrical switchboards used for commercial, domestic, residential, agricultural and industrial uses and when and where to use a specific switchboard system • types of electric lighting and heating systems for commercial, domestic residential and industrial use • control devices and socket outlets used for commercial, domestic, residential, agricultural and industrial uses • structured cabling systems including: computer network cabling, fire/ burglar alarm (conventional and addressable), evacuation control (audio and optical), control and monitoring, access control ('stand-alone' and 'network supervised'), closed circuit television (cameras, lenses and attachment component, recorders and monitors • Building Automation Systems such as KNX • Car charging station • PV 	
	<p>The individual shall be able to:</p> <ul style="list-style-type: none"> • select and install equipment and wire ways as per drawings and documentation provided • install ducting and cabling systems on different surfaces as per manufacturer's instructions and current industrial standards • select and install single and double insulated cables inside ducts, conduits and flexible conduits 	

Section		Relative importance (%)
	<ul style="list-style-type: none"> • install and securely fix double insulated cables onto cable ladder, cable tray and different surfaces as per manufacturer's instructions and current industrial standards • install metal and plastic ducting (trunking): accurately measure and cut duct at specified lengths/ angles; assemble without distortion to joints and to specified tolerances • assemble different termination adaptors, including glands onto duct and attach ducts, of different types, securely onto a surface • install metal and plastic conduits/ flexible conduits and attach securely onto surface, maintaining even radius bends, without distortion to conduit • correct termination adaptors used for entry of conduits into boxes, boards and ducts • install and securely attach different types of cable ladder and cable tray to a surface • install electrical switchboards onto a surface in a secure way and assemble switchboard apparatus in a switchboard as per layout drawings/instructions to include: main switches, RCDs, MCBs, fuses, controlling equipment such as relays and timers and home and building automation devices • terminate and install wiring inside a switchboard according to circuit drawings • connect equipment as per instructions provided to include: structured cabling systems as per manufacturer's instructions and current industrial standards and regulations • programming KNX Systems with devices like dimmactuator, blindactuator, roomcontrolling, movedetector.display, on/off actuator, different type of sensor. 	
5	Testing, reporting and commissioning	20
	<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> • industrial regulations and standards applicable to different types of installations • verification standards, methods and reports to be used to record verification results • types of measuring instruments • tools and software used for parameterization, programming and commissioning • the correct operation of the electrical installation in accordance with the planned specification and customer requirements 	
	<p>The individual shall be able to:</p> <ul style="list-style-type: none"> • select and install equipment and wire ways as per drawings and documentation provided • install ducting and cabling systems on different surfaces as per manufacturer's instructions and current industrial standards 	

Section		Relative importance (%)
	<ul style="list-style-type: none"> • select and install single and double insulated cables inside ducts, conduits and flexible conduits • install and securely fix double insulated cables onto cable ladder, cable tray and different surfaces as per manufacturer's instructions and current industrial standards • install metal and plastic ducting (trunking): accurately measure and cut duct at specified lengths/ angles; assemble without distortion to joints and to specified tolerances • assemble different termination adaptors, including glands onto duct and attach ducts, of different types, securely onto a surface • install metal and plastic conduits/ flexible conduits and attach securely onto surface, maintaining even radius bends, without distortion to conduit • correct termination adaptors used for entry of conduits into boxes, boards and ducts • install and securely attach different types of cable ladder and cable tray to a surface • install electrical switchboards onto a surface in a secure way and assemble switchboard apparatus in a switchboard as per layout drawings/instructions to include: main switches, RCDs, MCBs, fuses, controlling equipment such as relays and timers and home and building automation devices • terminate and install wiring inside a switchboard according to circuit drawings • connect equipment as per instructions provided to include: structured cabling systems as per manufacturer's instructions and current industrial standards and regulations • programming KNX Systems with devices like dimmactuator, blindactuator, roomcontrolling, movedetector.display, on/off actuator, different type of sensor. 	
6	Work organization and self-management	10
	<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> • health and safety legislation, obligations and documentation • the principles of working safely with electricity • the situations when personal protective equipment must be used • the purposes, uses, care, maintenance and storage of all tools and equipment together with their safety implications • the purposes, uses, care and storage of materials • the importance of keeping a tidy work area • sustainability measures applying to the use of 'green' materials and recycling • the ways in which working practices can minimise wastage and help to manage costs whilst maintaining quality • the principles of work flow and measurement • the significance of planning, accuracy, checking and attention to detail in all working practices 	

Section		Relative importance (%)
	<ul style="list-style-type: none"> • impact of new technology 	
	<p>The individual shall be able to:</p> <ul style="list-style-type: none"> • follow health and safety standards, rules and regulations • diligently follow electrical safety procedures • identify and use the appropriate personal protective equipment including safety footwear, ear and eye protection • select, use, clean, maintain and store all tools and equipment safely • select, use and store all materials safely • identify and take care of expensive fixtures/fittings • plan the work area to maximise efficiency and maintain the discipline of regular tidying • measure accurately • manage time effectively • work efficiently and check progress and outcomes regularly • establish and consistently maintain high quality standards and working processes 	
	Total	100

3 The assessment approach & principles

3.1 General guidance

Note: this Section and Section 4 summarize a great deal of new information and guidance regarding assessment. Please refer to the Competition Rules for greater detail.

The Competition Committee (CC) establishes the principles and techniques to which assessment at the EuroSkills Competition must conform.

Expert assessment practice lies at the heart of the EuroSkills Competition. For this reason it is the subject of continuing professional development and scrutiny. The growth of expertise in assessment will inform the future use and direction of the main assessment instruments used by the EuroSkills Competition: the Marking Scheme, Test Project, and Competition Information System (CIS).

Assessment at the EuroSkills Competition falls into two broad types: measurement and judgement. All assessments will be governed by explicit benchmarks, referenced to best practice in industry and business.

The Marking Scheme must include these benchmarks and follow the weightings within the Occupational Standards. The Test Project is the assessment vehicle for the Skill Competition, and also follows the Occupational Standards. The CIS enables the timely and accurate recording of marks, and has expanding supportive capacity.

The Marking Scheme, in outline, will lead the process of Test Project design. After this, the Marking Scheme and Test Project will be designed and developed through an iterative process, to ensure that both together optimize their relationship with the Technical Description and the principles for assessment as set out in the WSE Assessment Strategy. They will be agreed by the Experts and submitted to WSE for approval together, in order to demonstrate their quality and conformity with the Occupational Standards.

Prior to submission for approval to WSE, the Marking Scheme and Test Project will be reviewed by the WSE Skill Advisors in order to benefit from the capabilities of the CIS.

4 The Marking Scheme

4.1 General guidance

This section describes the role and place of the Marking Scheme, how the Experts will assess Competitors' work as demonstrated through the Test Project, and the procedures and requirements for marking.

The Marking Scheme is the pivotal instrument of the WorldSkills Competition, in that it ties assessment to the standard that represents each skill competition, which itself represents a global occupation. It is designed to allocate marks for each assessed aspect of performance in accordance with the weightings in the Standards.

By reflecting the weightings in the Standards, the Marking Scheme establishes the parameters for the design of the Test Project. Depending on the nature of the skill competition and its assessment needs, it may initially be appropriate to develop the Marking Scheme in more detail as a guide for Test Project design. Alternatively, initial Test Project design can be based on the outline Marking Scheme. From this point onwards the Marking Scheme and Test Project should be developed together.

Section 2.1 above indicates the extent to which the Marking Scheme and Test Project may diverge from the weightings given in the Standards, if there is no practicable alternative.

For integrity and fairness, the Marking Scheme and Test Project are increasingly designed and developed by one or more Independent Test Project Designer(s) with relevant expertise. In these instances, the Marking Scheme and Test Project are unseen by Experts until immediately before the start of the skill competition, or competition module. Where the detailed and final Marking Scheme and Test Project are designed by Experts, they must be approved by the whole Expert group prior to submission for independent validation and quality assurance. Please see the Competition Rules for further details.

Experts and Independent Test Project Designers are required to submit their Marking Schemes and Test Projects for review, verification, and validation well in advance of completion. They are also expected to work with their Skill Advisor, reviewers, and verifiers, throughout the design and development process, for quality assurance and in order to take full advantage of the CIS's features.

In all cases a draft Marking Scheme must be entered into the CIS at least eight weeks prior to the Competition. Skill Advisors actively facilitate this process.

4.2 Assessment criteria

The main headings of the Marking Scheme are the Assessment Criteria. These headings are derived before, or in conjunction with, the Test Project. In some skill competitions the Assessment Criteria may be similar to the section headings in the Standards; in others they may be different. There will normally be between five and nine Assessment Criteria. Whether or not the headings match, the Marking Scheme as a whole must reflect the weightings in the Standards.

Assessment Criteria are created by the person or people developing the Marking Scheme, who are free to define the Criteria that they consider most suited to the assessment and marking of the Test Project. Each Assessment Criterion is defined by a letter (A-I). **The Assessment Criteria, the allocation of marks, and the assessment methods, should not be set out within this Technical Description. This is because the Criteria, allocation of marks, and assessment**

methods all depend on the nature of the Marking Scheme and Test Project, which is decided after this Technical Description is published.

The Mark Summary Form generated by the CIS will comprise a list of the Assessment Criteria and Sub Criteria.

The marks allocated to each Criterion will be calculated by the CIS. These will be the cumulative sum of marks given to each Aspect within that Assessment Criterion.

4.3 Sub criteria

Each Assessment Criterion is divided into one or more Sub Criteria. Each Sub Criterion becomes the heading for a WorldSkills marking form. Each marking form (Sub Criterion) contains Aspects to be assessed and marked by Measurement or Judgement, or both Measurement and Judgement.

Each marking form (Sub Criterion) specifies both the day on which it will be marked, and the identity of the marking team.

4.4 Aspects

Each Aspect defines, in detail, a single item to be assessed and marked, together with the marks, and detailed descriptors or instructions as a guide to marking. Each Aspect is assessed either by Measurement or by Judgement.

The marking form lists, in detail, every Aspect to be marked together with the mark allocated to it. The sum of the marks allocated to each Aspect must fall within the range of marks specified for that section of the Standards. This will be displayed in the Mark Allocation Table of the CIS, in the following format, when the Marking Scheme is reviewed from C-8 weeks. (Section 4.1 refers.)

	CRITERIA								TOTAL MARKS PER SECTION	WSSS MARKS PER SECTION	VARIANCE	
	A	B	C	D	E	F	G	H				
STANDARDS SPECIFICATION SECTION	1	5.00								5.00	5.00	0.00
	2		2.00					7.50		9.50	10.00	0.50
	3								11.00	11.00	10.00	1.00
	4			5.00						5.00	5.00	0.00
	5				10.00	10.00	10.00			30.00	30.00	0.00
	6		8.00	5.00				2.50	9.00	24.50	25.00	0.50
	7			10.00				5.00		15.00	15.00	0.00
TOTAL MARKS	5.00	10.00	20.00	10.00	10.00	10.00	15.00	20.00	100.00	100.00	2.00	

4.5 Assessment and marking

There is to be one marking team for each Sub Criterion, whether it is assessed and marked by Judgement, Measurement, or both. The same marking team must assess and mark all Competitors. Where this is impracticable (for example where an action must be done by every Competitor simultaneously, and must be observed doing so), a second tier of assessment and marking will be put in place, with the approval of the Competitions Committee Management Team. The marking teams must be organized to ensure that there is no compatriot marking in any circumstances. (Section 4.6 refers.)

4.6 Assessment and marking using judgement

Judgement uses a scale of 0-3. To apply the scale with rigour and consistency, Judgement must be conducted using:

- benchmarks (criteria) for detailed guidance for each Aspect (in words, images, artefacts, or separate guidance notes). This is documented in the Standards and Assessment Guide.
- the 0-3 scale to indicate:
 - 0: performance below industry standard
 - 1: performance meets industry standard
 - 2: performance meets and, in specific respects, exceeds industry standard
 - 3: performance wholly exceeds industry standard and is judged as excellent

Three Experts will judge each Aspect, normally simultaneously, and record their scores. A fourth Expert coordinates and supervises the scoring, and checks their validity. They also act as a judge when required to prevent compatriot marking.

4.7 Assessment and marking using measurement

Normally three Experts will be used to assess each Aspect, with a fourth Expert supervising. In some circumstances the team may organize itself as two pairs, for dual marking. Unless otherwise stated, only the maximum mark or zero will be awarded. Where they are used, the benchmarks for awarding partial marks will be clearly defined within the Aspect. To avoid errors in calculation or transmission, the CIS provides a large number of automated calculation options, the use of which is mandated.

4.8 Assessment overview

Decisions regarding the choice of criteria and assessment methods will be made during the design of the competition through the Marking Scheme and Test Project.

4.9 Skill Assessment Strategy

The Chief Expert divides the Experts of the Jury in such way that 3 Experts must be assigned to assess each Aspect of a Sub Criterion. Each marking group must mark the same Aspects of a Sub Criterion for every Competitor to ensure standardisation of marking. Each marking group should, where possible, mark a similar number of Aspects of a Sub Criterion.

The marking groups will be organised so that Experts do not mark their compatriot Competitors.

Exception:

Compatriot marking will only be allowed with the approval of the Chair of the Competition Development Committee. Approval will only be given in extreme circumstances.

Measurement / Objective criteria testing	Info example
Tolerances: Measurements: <math> < 500\text{mm} \pm 2 / \geq 500\text{mm} \pm 4\text{mm}</math> Level / plumbing: bubble into the lines (touch allowed)	Take 2 (sort) measures by the examples in wall (correct =1 /no correct =0)

Measurement / Objective criteria testing	Info example
Judgement criteria testing (To do with the flash cards, at the same time, and the difference between the highest and lower can't be more than 1 point. If difference >1, have to do new judgement)	INFO / EXAMPLE: Take 2 cut's / angle directions of duct in examples in the wall, to judge (ex. below:) 0 point: The opening between cut's is >4 mm 1 point: The opening between cut's is >2 mm <4 mm 2 point: The opening between cut's is >1 mm <2 mm 3 point: The opening between cut's is <1 mm

4.10 Skill Assessment Procedures - Mark distribution

This section defines the assessment criteria and the number of marks (judgement and measurement) awarded. The total number of marks for all assessment criteria must be 100. The table below is advisory only for the development of the Test Project and Marking Scheme.

Section	Criterion	Marks		
		Judgement (if applicable)	Measurement	Total
A	Installing & Connecting	20	20	40
B	Commissioning & Testing	4	10	14
C	Programming & Commissioning Automation (Functions)	0	30	30
D	Fault Finding (8 Faults)	0	8	8
E	Health & Safety	0	8	8
Total =		24	76	100

5 The Test Project

5.1 General notes

Sections 3 and 4 govern the development of the Test Project. These notes are supplementary.

Whether it is a single entity, or a series of stand-alone or connected modules, the Test Project will enable the assessment of the skills in each section of the Occupational Standards.

The purpose of the Test Project is to provide full and balanced opportunities for assessment and marking across the Occupational Standards, in conjunction with the Marking Scheme. The relationship between the Test Project, Marking Scheme and Occupational Standards will be a key indicator of quality.

The Test Project will not cover areas outside the Occupational Standards, or affect the balance of marks within the Occupational Standards other than in the circumstances indicated by Section 2.1.

The Test Project will enable knowledge and understanding to be assessed solely through their applications within practical work.

The Test Project will not assess knowledge of the EuroSkills Competition's rules and regulations.

This Technical Description will note any issues that affect the Test Project's capacity to support the full range of assessment relative to the Standard Specification. Section 2.1 refers.

5.2 Format/ structure of the Test Project

- Test Project with separately assessed modules

5.3 Test Project design requirements

The application selected for the competition concerns for example the installation of a certain building.


Tasks to be carried out by the Electrician:

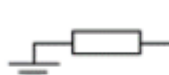
- Task 1: Installation and connecting of Distribution box, cables and wire ways, cabling and wiring, mounting and connecting electrical equipment; Commissioning and testing of the installation; Programming and commissioning Automation/Bus System KNX – 17 hours (full functionality provided prior to the last 3 hours)

- Task 2: Fault Finding – 30 Minutes (with 8 Faults)

Symbols for the faults:

 short circuit

 Open Circuit

 Low Insulation Resistance

S Incorrect setting (timer/overload)

V Value (incorrect component)

✗ Polarity / Phase Sequence

 High Resistance

5.4 Test Project development

The Test Project **MUST** be submitted using the templates provided by WSE. Use the Word template for text documents and DWG template for drawings. Please contact jordy.degroot@worldskillseurope.org for guidance.

If the Test Project is designed by an Independent Test Project designer, then the Test Project must be designed in accordance with the WSE Independent Test Project Guide v1.1.

If your Skill wishes to have an Independent Test Project designer, you must ensure that WorldSkills Europe is made aware of this, so that it can be assured that there is proper funding in place, or that the Independent Test Project designer is aware that he/she will do this task free of charge.

5.4.1 Who develops the Test Projects or modules

The Test Project / modules are developed under the supervision of:

- Some Experts (if necessary)
- Chief Expert, Deputy Chief Expert

- The functionality of the automation task will be developed by an external designer and presented by C3 in the morning

5.4.2 How and where is the Test Projects or modules developed

The Test Project or modules are developed in the following manner:

- Other:
 - CE and DCE for drawings
 - Functionality by an external designer
 - Fault Finding board by CE and DCE. Faults by Group of experts

5.4.3 When is the Test Project developed

The Test Project is developed according to the following timeline:

As long the Sponsors are known:

TIME	ACTIVITY
9 months prior to the Competition	Start to develop the task
6 months prior to the Competition	The first version of the task is ready for the IL
Functionality presenting from the external Designers on	C3 in the morning

5.5 Test Project validation

The test project will be validated by CE and DCE

CE and DCE: just the drawings

5.6 Test Project selection

- Other:
 - CE and DCE for drawings
 - Functionality by an external designer
 - Fault Finding board by CE and DCE. Faults by Group of experts
 - The automation task will be undertaken by an external party.

5.7 Test Project circulation

Please note that if a Test Project is known by the Chief- and/or Deputy Chief Experts, and/or any of the other Experts, it must be shared via the forums before the start of the Competition. This also means that this Test Project is subject to a 30% change before the start of the Competition.

The Test Project is circulated via the website as follows:

- Submitted to the Secretariat for circulation 2 months before the current Competition

5.8 Test Project coordination (preparation for competition)

Coordination of the Test Project will be undertaken by:

- Chief Expert and Deputy Chief Expert
- Chief Expert and Workshop Manager

5.9 Test Project change at the competition

According to general rules (30% change)

For example:

- Fault Finding (Scheme not published)
- Automation Functions (external development) 30 %
- Scheme not published (From the Fuseboards)

5.10 Material or manufacturer specifications

Specific material and/or manufacturer specifications required to allow the Competitors to complete the Test Project will be supplied by the Host Organization and are available via the forums. However, note that in some cases details of specific materials and/or manufacturer specifications may remain secret and will not be released prior to the Competition. These items may include those for fault finding modules or modules not circulated.

Important instructions for IL products are provided in the forum.

5.11 Software specifications

KNX ETS Software actual version

Siemens LOGO Soft Comfort actual version

6 Skill management and communication

6.1 Discussion forum

Prior to the EuroSkills Competition, all discussion, communication, collaboration, and decision making regarding the Skill Competition must take place on the skill specific Discussion Forum, which can be reached via www.worldskillseurope.org. Skill related decisions and communication are only valid if they take place on the forum. The Chief Expert (or an Expert nominated by the Chief Expert) will be the moderator for this Forum. Refer to Competition Rules for the timeline of communication and competition development requirements.

6.2 Competitor information

All information for registered Competitors is available from the WorldSkills Europe website www.worldskillseurope.org. Please contact jordy.degroot@worldskillseurope.org for guidance.

The information includes:

- Competition Rules
- Technical Descriptions
- Test Projects
- Infrastructure List
- EuroSkills Health, Safety, and Environment Policy and Regulations
- Other Competition-related information

6.3 Test Projects and Marking Schemes

Circulated Test Projects will be available at the WorldSkills Europe website from www.worldskillseurope.org. Please contact jordy.degroot@worldskillseurope.org for guidance.

6.4 Day-To-Day management

The day-to-day management of the Skill Competition during the EuroSkills Competition is defined in the Skill Management Plan that is created by the Skill Management Team led by the Chief Expert. The Skill Management Team comprises the Jury President, Chief Expert and Deputy Chief Expert. The Skill Management Plan is progressively developed in the six months prior to the Competition and finalized at the Competition by agreement of the Experts. The Skill Management Plan can be viewed at www.worldskillseurope.org. Please contact jordy.degroot@worldskillseurope.org for guidance.

7 Skill specific safety requirements

7.1 Requirements

Refer to Host Country/Region Health and Safety documentation for Host Country/Region regulations. This document will be shared via the forums. One overall Health and Safety document will be published, as well as Skill specific safety requirements.

8 Materials and equipment

8.1 Infrastructure List

The Infrastructure List details all equipment, materials and facilities provided by the Competition Organizer.

The Infrastructure Lists will be available at the WorldSkills Europe website from www.worldskillseurope.org. Please contact jordy.degroot@worldskillseurope.org for guidance.

The Infrastructure List specifies the items and quantities requested by the Experts for the next Competition. The Host Organization will progressively update the Infrastructure List specifying the actual quantity, type, brand, and model of the items.

At each Competition, the Experts must advise the Competition Manager of any increases in space and/or equipment.

At each Competition, the Technical Observer must audit the Infrastructure List that was used at that Competition.

The Infrastructure List does not include items that Competitors and/or Experts are required to bring and items that Competitors are not allowed to bring – they are specified below.

8.2 Competitor tools

WorldSkills Europe aims to minimize the sending of toolboxes as much as possible. We therefore ask you to keep this in mind when writing the section below. Please be advised that competitors should bring as little as possible and what they do bring **MUST** be true hand tools. Only items are allowed that would significantly affect their ability to perform the task and deliver the Test Project to a high standard.

The Competitors are NOT allowed to send a toolbox. The tool list, as specified in section 8.3 is mandatory for competitors to bring to the Competition. These tools can however be brought as extra luggage on a plane or busride. The current tool list for the upcoming Competition will be posted in the forums.

8.3 Materials, equipment and tools supplied by Competitors in their toolbox

Information about materials, equipment and tools supplied by Competitors will be distributed with the Test Project at least 2 months prior the current competition.

The tool list clearly states which tools the Competitors have to bring to the Competition. The Competitors cannot bring more tools than those stated on the tool list.










The table below shows a tool list that only serves as an example. The brands of these examples are undefined at this stage.











Tool	Amount	Picture	Who organises it?
Table 800 x 1200	1		Organizer









			
Workbench 1200 x 800 with Butcher Block for Tools	1		Organizer
vice	1		organizer
Chair height adjustable	1		Organizer
garbage can	1		Organizer
Plastic boxes 600 x 400 x 300	3		Organizer
Plastic boxes 300 x 200 x 120	4		Organizer
Sortimo Box	1		Organizer










			
Dustpan	1		Organizer
Broom	1		Organizer
little ladder	1		Organizer
extension cord 3 m	1		Organizer
Power strip 3 m	1		Organizer
safety goggles	1		Competitor
ear protection	1		Competitor
Protective gloves	5		Competitor

			
Protective leather gloves	1		Competitor
Cordless drill incl. Charger	1		Organizer
Small cordless screwdriver incl. Charger	1		Organizer
Bit set long version	1		Competitor
HSS-G metal drill set 1-10 mm	1		Competitor
Step drill small 4 – 22 mm	1		Competitor
Step drill big 5 – 37 mm	1		Competitor
Hole-saw 20 mm Only WorldSkills	1		Competitor
Hole-saw 22.5 mm Only WorldSkills	1		Competitor

			
Hole saw 63 mm	1		Competitor
Holder for Hole saw	1		Competitor
Miter saw (a big one)	1		Organizer
Hacksaw bow	1		Competitor
Replacement saw blade	1		Competitor
Hacksaw bow small	1		Competitor
Replacement saw blade small	1		Competitor
Hammer 400 g	1		Organizer

Hammer small 100 g	1		Competitor
Heat gun Only WorldSkills	1		Organizer
Jigsaw	1		Organizer
Jigsaw blades metal	5		Organizer
Metal pipe cutter (for steel pipes) Only WorldSkills	1		Organizer
Plastic pipe cutter	1		Competitor
File round	1		Competitor
File flat	1		Competitor
knife	1	 SANP.89	Competitor
Cutter	1		Competitor
Lable printer	1		Competitor



			
scissors	1		Competitor
Screw clamp small	4		Organizer
Screw clamp middle	2		Organizer
Tube bending machine 20 mm Only WorldSkills	1		Organizer
Tube bending spring 20 mm Only WorldSkills	1		Organizer
Waterpump Pliers	1		Competitor
Pliers Wrench	1		Competitor
	1		Competitor

Carpenters' Pincers			
Pipe reamers	1		Competitor
Stop bracket / Mitre Square 200 mm	1		Competitor
Angle 90 degrees metal 200 mm	1		Competitor
steel rule 400 mm	1		Competitor
steel measuring tape	1		Organizer
folding meter 2 m	1		Competitor
bolt cutter	1		Competitor
Small spirit level	1		Organizer
spirit level 300 mm	1		Organizer

			
spirit level 1200 mm	1		Organizer
set square with protractor	1		Competitor
angle measuring tool	1		Competitor
Fixpencil 0.8 mm	2		Competitor
Replacement mine 0.8 mm	2		Competitor
Fixpencil 1.5 mm	1		Competitor
Replacement mine 1.5 mm	1		Competitor
Permanent marker 1.3 mm	1		Competitor
Masking tape 20 mm	1		Organizer
soldering gun	1		Organizer

Only WorldSkills			
soldering wire	1		Organizer
Only WorldSkills			
Second glue	1		Organizer
Screw holder	2 and 2		Competitor
tool belt	1		Competitor
Cable cutter	1		Competitor
Side cutter pliers	1		Competitor
Combination pliers	1		Competitor
Wire stripper pliers	1		Competitor
Wire stripper pliers	1		Competitor
Needle nose pliers	1		Competitor

Small side cutter pliers	1		Competitor
Cable stripper small 4 -8 mm	1		Competitor
Cable stripper large 8-13 mm	1		Competitor
Cable stripper	1		Competitor
Cable lug crimping pliers	1		Competitor
crimping pliers ferrules	1		Competitor
Adjustable wrench small	1		Competitor
Adjustable wrench big	1		Competitor
Ring and wrench set	1		Organizer
Allen key set	1		Organizer
Ratchet set small	1		Organizer
Screwdriver Gr 00	1		Competitor

Screwdriver Gr 0	1		Competitor
Screwdriver Gr 1	1		Competitor
Screwdriver Gr 2	1		Competitor
Screwdriver Gr 3	1		Competitor
Screwdriver Gr 4	1		Competitor
Screwdriver Gr 5	1		Competitor
Torx Screwdriver Gr 10	1		Competitor
Torx Screwdriver Gr 15	1		Competitor
Torx Screwdriver Gr 20	1		Competitor
Torx Screwdriver Gr 25	1		Competitor
Screwdriver Pozidriv Gr 0	1		Competitor
Screwdriver Pozidriv Gr 1	1		Competitor
Screwdriver Pozidriv Gr 2	1		Competitor
Screwdriver Pozidriv Gr 3	1		Competitor
Screwdriver Pozidriv Gr 4	1		Competitor
	1		Competitor

Screwdriver Phillips Gr. 0			
Screwdriver Phillips Gr. 1	1		Competitor
Screwdriver Phillips Gr. 2	1		Competitor
Screwdriver Phillips Gr. 3	1		Competitor
Socket screwdrivers Nr. 7	1		Competitor
Bradawl, light-duty model	1		Competitor
Center punch, knurled Only WorldSkills	1		Competitor
Tool box	1		Organizer
Trolley	1		Organizer
Multi meter like Fluke 175	1		Organizer
Fluke i410	1		Organizer

			
Test Meter like Fluke 1663/1664 Including Measuring accessories	1		Organizer
Fluke FEV300 Electric Vehicle Charging Station EVSE Test Adapter	1		Organizer
Fluke FEV300 Electric Vehicle Charging Station EVSE Test Adapter	1		Organizer
Lap Top with Siemens LOGO Soft actual ETS for KNX actual	1		Organizer

• Tools marked as "organizer" must be used and may not be exchanged.

- Tools marked "competitor" must be brought along.
- You cannot bring more tools than those stated on the tool list.
- The tool list above was discussed with the experts of trade 18 on the forums and CPM 2023 in Gdansk
- The idea is that the competitor can work with his own hand tool and the weight of the tool is not more than 20 kg.
 - This means you can take the tool with you on the plane with an additional piece of luggage à 23 kg. This is most likely the cheapest way for transport.
- The current tool list for the upcoming Competition will be posted in the forum

8.4 Materials, equipment and tools supplied by the Experts

Experts can't bring replacement equipment or tools.

8.5 Materials, equipment and tools prohibited in the Skill area

Section 8.2 refers.

8.6 Workshop Layout

Workshop layouts from previous competitions are available by contacting the Competition and IT Coordinator at: jordy.degroot@worldskillseurope.org. New Workshop Layouts will be communicated via the forums when completed.

Please be advised that you will have the opportunity to discuss your Workshop Layout proposal with the Host Organization during the Skills Development Workshop (SDW) and the Competition Preparation Meetings (CPM).

For workshop layout development, please refer to the forums.

9 Skill-specific rules

9.1 Introduction

Skill-specific rules cannot contradict or take priority over the Competition Rules. They do provide specific details and clarity in areas that may vary from Skill Competition to Skill Competition. This includes but is not limited to personal IT equipment, data storage devices, Internet access, procedures and workflow, and documentation management and distribution. Breaches of these rules will be solved according to the Issue and Dispute Resolution procedure including the Code of Ethics and Conduct Penalty System.

9.2 Personal laptops – USB – memory sticks – mobile phones

- Competitors are only allowed to use memory sticks provided by the Competition Organizer. No other memory sticks are to be inserted into the Competitor computers.
- Memory sticks or any other portable memory devices cannot be taken outside the workshop.
- Memory sticks or other portable memory devices are to be submitted to the Chief Expert at the end of each day for safe keeping and must not be taken out of the workshop.
- Only Competitors and Technical Support Team are allowed to work with the computers in Competitors workstation unless special permission is given by the SMT. No Expert can be given such permission to their compatriot Competition.

9.3 Personal photo cameras – video taking devices

- Competitors are not allowed to bring personal laptops, tablets, smart watches or mobile phones into the workshop on Familiarisation day, C1 to C3. If Competitors do bring these items into the workshop they must place them in their locker. They can use them at break times and take at the end of each day. Experts, Chief Expert, Deputy Chief Expert are exempt from this rule.
- Competitors, Chief Experts, Deputy Chief Experts, Experts are allowed to use personal photo and video taking devices in the workshop, however no photos can be taken of details of the Test Project documents and material or any marking forms.
- Workshop Managers are able to take photos to support technical matters.

9.4 Communication between compatriot experts and competitors

- Competitors may make drawings, document instructions, or take notes whilst in the workshop however they cannot be taken out of the workshop at any time.
- Chief Expert, Deputy Chief Expert, Experts may make notes to support the marking process.

9.5 Other

- Hearing protection with a radio is not permitted.
- Headphones with MP3 players are not permitted.
- Smart Watches and other portable smart devices are not permitted

10 Visitor and media engagement

10.1 Engagement

Following is a list of possible ways to maximize visitor and media engagement, within the remit of the Competition Rules:

- Try a trade
- Display screens
- Test Project descriptions
- Enhanced understanding of Competitor activity
- Competitor profiles
- Career opportunities
- Daily reporting of competition status
- Time based parts of the Test Project

11 Sustainability

11.1 Sustainability

This Skill Competition will focus on the sustainable practices below:

- Recycling (copper,PVC,metal, carton)
- Use of 'green' materials
- Use of completed Test Projects after Competition