worldskills Europe

Technical Description

EuroSkills Graz 2020
Plumbing and Heating (15)

ES2020_TD

Contents

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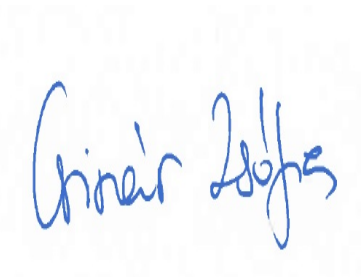

Ms Szofia Csiszar
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1 Introduction

1.1 Name and description of the Skill Competition

1.1.1 The name of the skills competition is

Plumbing and Heating

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

A plumbing and heating technician 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 practitioner has a continuing responsibility to work professionally in order to meet the requirements of the customer and thus maintain and grow the business. Plumbing and heating is closely associated with other parts of the construction industry, and with the many products that support it, normally for commercial purposes.

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

Whether the plumbing and heating technician 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 plumbing and heating 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 plumbing and heating technician faces rapidly expanding opportunities and challenges. For the talented practitioner there are many commercial and international opportunities; however these carry with them the need to understand and work with diverse needs, cultures and trends. The diversity of skills associated with plumbing and heating is therefore likely to expand.

1.2 The content, relevance and significance of this document

This document incorporates a Role Description and Standards Specification which follow the principles and some or all of the content of the WorldSkills Standards Specifications. 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 Standard Specification framework
- WSE – WorldSkills Europe Assessment Strategy
- WSE – Online resources as referenced in this document
- Host Country – Health and Safety regulations

2 The Standards Specification

2.1 General notes regarding WSSS / WSESS

Where appropriate WSE has utilised some or all of the WorldSkills International Standards Specifications (WSSS) 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 Standards Specification (WSESS) using the same principles and framework to that used for the development of the WSSS. For the purposes of this document the use of the words "Standards Specification" will refer to both WSSS and WSESS.

The Standards Specification 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. (www.worldskills.org/WSSS) *(TBA for WorldSkills Europe)* Helpfully, for the global consultation on the WSSS in 2014, around 50 per cent of responses came from European industry and business.

Each skill competition is intended to reflect international best practice as described by the Standards Specification, and to the extent that it is able to. The Standards Specification 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 Standards Specification is 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 Standards Specification. 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 Standards Specification. They will reflect the Standards Specification 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 Standards Specification to the extent practically possible. A variation of five percent is allowed, provided that this does not distort the weightings assigned by the Standards Specification.

2.2 Standards Specification

SECTION		RELATIVE IMPORTANCE %
1	**Work organization and self-management**	**10**
	The individual needs to know and understand: • The purposes, uses, maintenance and care of all equipment, together with their safety implications • The purposes, uses, care and potential risks associated with materials and chemicals • The purposes and uses of manufacturers' specifications and drawings • Search methods for specific and non-specific information, specifications and guidance • The time available an associated with each activity • The parameters within which activities need to be scheduled • The health and safety standards applying at any one time • The use of new technologies as a work aid • Principles and their application to good housekeeping in the work environment	
	The individual shall be able to: • The purposes, uses, maintenance and care of all equipment, together with their safety implications • The purposes, uses, care and potential risks associated with materials and chemicals • The purposes and uses of manufacturers' specifications and drawings • Search methods for specific and non-specific information, specifications and guidance • The time available an associated with each activity • The parameters within which activities need to be scheduled • The health and safety standards applying at any one time • The use of new technologies as a work aid • Principles and their application to good housekeeping in the work environment	
2	**Communication and interpersonal skills**	**10**

SECTION		RELATIVE IMPORTANCE %
	The individual needs to know and understand: • The range and purposes of documentation, including text, graphical, paper based and electronic • Drawing notation and the symbols for pipe work, fittings and appliances • The technical language associated with the skill • The standards required for routine and exceptional reporting in oral, handwritten and electronic form • The nature of the reports provided by measuring equipment, together with their interpretation • The required standards for customer service and care	
	The individual shall be able to: • read, interpret and extract technical data and instructions from manuals and other documentation • communicate in the workshop by oral, written and electronic means using standard formats with clarity, effectiveness and efficiency • use a standard range of communications technology • respond to customer's needs face to face and indirectly	
3	**Design and Adapt installation systems**	**10**
	The individual needs to know and understand: • The information requirement underpinning the design of any installation system: • The principles and conventions used in specifications and drawings • The range of specifications and drawings in use, and their purposes • The uses and limitations of the generally available drawing tools	
	The individual shall be able to: • Design installation systems within given parameters • Produce simple freehand sketches including isometric to support given architect drawings to aid install process, using standard conventions and symbols • Estimate the requirement for equipment and materials • Select the equipment and materials according to given criteria, including price • Check the price, recommend alternatives and either order the equipment and materials or amend the design of the system	
4	**Install plumbing and heating pipe-work brackets and clips and prefabricate the required pipe-work layouts into sub-assemblies**	**40**

SECTION	RELATIVE IMPORTANCE %

The individual needs to know and understand:

- The uses and limitations of the specified bending and jointing methods, materials and fittings in order to complete a leak-free installation
- Methods of connection to services from utilities provider
- The range and characteristics of bending / jointing methods, materials and fittings
- Properties of the piping material available:
- for example:
    - Copper
    - Steel
    - Stainless steel
    - Cast – iron
    - Polymer pipe
    - Plastic (single- or multi-layered)
- In order to handle, cut, bend, joint and form sub-assemblies
- The safe operation of the cutting, bending, threading, soldering, and testing equipment provided
- The applications appropriate to
    - Surface wall installation
    - Hot water installations
    - Cold Water Installations
    - Heating systems
    - Underfloor heating
- Air to water systems of heating

SECTION		RELATIVE IMPORTANCE %
	The individual shall be able to: • Read and interpret drawing for a range of systems and appliances • Interpret drawings to facilitate pipe-work fabrication and the installation of appliances • modify the area and surfaces, as required, to permit fixing and assembly • take and transfer measurements and angles from given drawings to surfaces and piping materials • Select suitable fixing methods for the available surfaces, appliances and environment • Fix an appropriate number and diameter of pipe brackets/clips in the correct or specified configuration • Determine the optimal way to use the given materials to complete the assembly in a sustainable manner • Create freehand sketches for the purposes of pipe bending and assembly • Limit the generation of scrap and waste • Determine and use the correct positions for cutting the piping material • Measure, set out and mark the materials and pipe-work • Determine the correct positions for bending the piping material • Select an appropriate method and safe method for cutting the piping material • Utilize the chosen method to bend the piping material safely • Utilize the chosen jointing method to form the pipe-work sub-assemblies • Install the pipe-work sub-assemblies utilising the previously fitted brackets/clips • Connect the pipe-work to the appliances/utilities • Build up gas, water, heating and effluent pipe installations • Process commercial materials into installations	
5	**Connect and test completed pipe-work modules / Commission plumbing and heating assemblies and appliances**	**15**

SECTION		RELATIVE IMPORTANCE %
	The individual needs to know and understand: • The procedures, equipment and legislative requirements for applying soundness tests to systems • The methods of establishing that utilities adequately supply all components within the system • The actions to take where pre-commissioning checks or tests reveal system or component defects • How to complete commissioning documentation confirming the safe commissioning of systems and components • The sources of information on the performance of systems or components • The procedures for establishing correct system or component performance and checking against the design specification • The routines and sequences for commissioning systems or components • The actions to take when components being commissioned do not meet design requirements • System handover procedures and demonstrating the operation of systems and components to end users	
	The individual shall be able to: • Perform all pre-commissioning / commissioning tasks • Connect test equipment to the pipe-work • Pressure test the pipe-work to ensure conformity to specification • Fill the pipe-work and appliance and assess the flow rate / pressures to specifications	
6	**Repair, maintain or replace a range of plumbing and heating appliances / Problem solving, innovation and creativity**	**15**

SECTION	RELATIVE IMPORTANCE %

The individual needs to know and understand:

- Features of excellent customer service
- Kinds of questioning and listening techniques would you use to find out what your customer is looking for
- The range of information that should be available on the routine and non-routine service and maintenance requirements of systems and components
- The methods of protecting customers' property within the range of locations in which the work is carried out
- The maintenance procedures necessary to ensure compliance with industry requirements for routine and non-routine maintenance activities
- How to complete records and reports of the maintenance of systems and components
- The action to take when the system or component does not work to full performance specification
- The measures to ensure that systems do not present a safety hazard to potential users, or the workforce, when carrying out rectification procedures
- Research the main features of each possible option, including risk factors
- Select and use different methods for exploring the problem, including dividing it into sub-problems, and analyse its features
- System handover procedures and demonstrating the operation of systems and components to end users

The individual shall be able to:

- Prepare the work area, safeguarding surrounding areas
- Diagnose the quality or deficiencies of appliances, components and systems
- Identify the relative advantages or possibilities of maintenance, repair or replacement
- Identify the method of maintaining, repairing or replacing the appliances or systems
- Acquire components or replacements as determined
- Maintain, repair or replace the appliances or systems, as advisable and agreed
- Open valves, recharge with air (2 bar) and check for leaks
- Re-commission system
- Check for correct function (flow, pressure, performance etc. as specification
- Restore the area to its former condition
- Hand over the installation to the customer
- Provide the customer with all appropriate user information and answer questions

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 Development Committee (CDC) 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. Where the earlier terms "objective" and "subjective" still occur, these must be understood to mean measurement and judgement for all procedural and practical purposes. All assessment 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 Standards Specification. The Test Project is the assessment vehicle for the skill competition, and also follows the Standards Specification. 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 Standard Specification.

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 EuroSkills Competition, in that it ties assessment to the standards that represent the skills to be tested. It is designed to allocate marks for each assessed aspect of performance in accordance with the weightings in the Standards Specification.

By reflecting the weightings in the Standards Specification, the Marking Scheme establishes the parameters for the design of the Test Project. Depending on the nature of the skill 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 Specification, if there is no practicable alternative.

The Marking Scheme and Test Project may be developed by one person, or several, or by all Experts. The detailed and final Marking Scheme and Test Project must be approved by the whole Expert Jury prior to submission for independent quality assurance. The exception to this process is for those skill competitions which use an external designer for the development of the Marking Scheme and Test Project.

In addition, Experts are encouraged to submit their Marking Schemes and Test Projects for comment and provisional approval well in advance of completion, in order to avoid disappointment or setbacks at a late stage. They are also advised to work with the CIS Team at this intermediate stage, in order to take full advantage of the possibilities of the CIS.

In all cases the complete and approved Marking Scheme must be entered into the CIS at least eight weeks prior to the Competition using the CIS standard spreadsheet or other agreed methods.

4.2 Assessment criteria

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

Assessment Criteria are created by the person(s) developing the Marking Scheme, who are free to define 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 Mark Summary Form generated by the CIS will comprise a list of the Assessment 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 of assessment 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 EuroSkills marking form.

Each marking form (Sub Criterion) has a specified day on which it will be marked.

Each marking form (Sub Criterion) contains Aspects to be assessed and marked by measurement or judgement. Some Sub Criteria have assessment by both measurement and judgement, in which case there is a separate marking form for each method

4.4 Aspects

Each Aspect defines, in detail, a single item to be assessed and marked together with the marks, or instructions for how the marks are to be awarded. Aspects are assessed either by measurement or judgement and appear on the appropriate marking form.

The marking form lists, in detail, every Aspect to be marked together with the mark allocated to it, the benchmarks, and a reference to the section of the Standards Specification.

The sum of the marks allocated to each Aspect must fall within the range of marks specified for that section of the Standards Specification. 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).

CRITERIA											Total marks per section
		A	B	C	D	E	F	G	H	I	
	1										
	2										
	3										
	4										
	5										
	6										
	7										
	8										
	9										
											100

4.5 Assessment and marking by judgement

In addition to measurement, Experts are expected to make professional judgements. These are normally judgements about quality. Benchmarks will be designed, agreed and recorded during the design and finalization of the Marking Scheme and Test Project in order to steer and support these judgements.

Marking through judgement uses the following scale:

- 0: performance below industry standard to any extent, including a non-attempt
- 1: performance that meets industry standard
- 2: performance that both meets industry standard and surpasses that standard to some extent
- 3: excellent or outstanding performance relative to industry standards and expectations.

4.6 Assessment and marking by measurement

Unless otherwise stated, only the maximum mark or zero will be awarded. Where they are used, partial marks will be clearly defined within the Aspect.

4.7 Assessment overview

For both measurement and judgement there will be three Experts in the assessment team.

Good practice in assessment comprises measurement and judgement applied both specifically and broadly. The final proportions of measurement and judgment, whether specific or broad, will be determined by the standards, their weightings and the nature of the Test Project.

4.8 Completion of skill assessment specification

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 content of this Table is advisory only and can be adapted as required.

Section	Criterion	Marks		
		Judgement	**Measurement**	**Total**
	Total=			**100**

Pressure test

- Directly after each successful pressure test, the two Experts who witnessed it must prove its validity by ensuring that the entire pipe-work installation was actually under test. Proving points provided at opposite ends of each pipe-work material Module, during the 30% change, would accommodate this;
- Competitors may pressure test their own work, as many times as they consider necessary, within the competition time;
- When the Competitor reaches the stage in a Module when the two Experts are requested to witness the pressure test, this test will be considered the last and final test for this Module and this result will be the one recorded for assessment. The Competitor will not be permitted under any circumstances to carry out further leak detection/repair work or request another pressure test for this Module.
- The entire witnessed pressure test must be completed within the competition time allocated to the Module for the result to be included in the Competitor's assessment total;
- Hot water, cold water, gas and heating pipes will be air tested to 200KPa (two bar) for two minutes;
- The duration of the pressure test is two (2) minutes and as such the Competitor must have his pressure test verified by the two Experts assigned at least two (2) minutes before time limit.
- The pressure test will ONLY be done if the complete module is done within time limit and according the test module drawing;
- The pressure gauge used for pressure testing gas, water and heating pipes to have a full-scale deflection of two bar;
- The testing of sanitation pipework may be done if the project and material from Competition Organizer makes this a possibility;

A log sheet must be installed at each workstation, in order to record the Competitors' pressure test results, safety warnings, extra material, and the material list check.

4.9 Skill assessment procedures

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. For equality of marking, each marking group should, where possible, mark a similar number of Aspects of a Sub Criterion.

As a general rule, the marking groups will be organised so that Experts do not mark their compatriot Competitors.

If the project is modular, this will be assessed in the evening or following morning of the day in which it was carried out. If the project is a short project on a shift system and not modular this will be assessed on the completion of the project/module. Sufficient measuring instruments to be available for all assessment teams e.g. rules, protractors, levels, etc. required for the assessment of the modules will be provided by the Competition Organizer and will be new and used solely by the Experts for this task. If templates are required, these will be prepared by an Expert nominated by the Chief Expert and checked by all of the Experts prior to their use. All pressure tests must be witnessed and signed off by two Experts and the result entered on the Competitor's log sheet. This duty will be fixed before the Competition among the Experts, by the SMT. Two Experts will be assigned daily to check that all Health, Safety and Environment regulations are observed by the Competitors. A record of each Competitor's safety warnings will be entered on his/her log sheet. This duty will be fixed the Experts

on a daily basis, by the Chief Expert. Verification of each Competitors material check list and the recording, on the log sheet, of any extra material requested by a Competitor will be carried out by two Experts, who will be assigned to this task on a daily basis. This duty will be rotated among the Experts on a daily basis, by the Chief Expert.

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 Standards Specification.

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

The Test Project will not cover areas outside the Standards Specification, or affect the balance of marks within the Standards Specification 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 assessed at end of Competition

[X] Test Project with separately assessed modules

[ ] Test Project assessed in stages

[ ] Series of standalone modules

[ ] Other

If other, please specify here:

NOTE: Each module must be completed in the prescribed order and pressure tested within the time allocated for that particular module. Each pressure test must be validated as set out in section 4.8. The Test Project may contain the following modules:

- Installation of plumbing systems into a pre-wall structure
- Design an installation;
- Effluent pipe installation;
- Gas pipe installation;
- Heating installation;
- Cold water installation;
- Hot water installation;
- Solar pipe installation

5.3 Test Project design requirements

- The accepted project shall reflect current commercial, domestic plumbing and heating standards and practices; please see Section 2 for these.

- The project should be as small as practical and materials available in the host country for sustainability.
- Copper pipe supplied by the Competition Organizer must be of a grade that permits bending by hand operated machines.
- All piping materials supplied by the Competition Organizer must be uniform wall thickness throughout.
- The use of solvent weld adhesives on PVC pipe – work and components is not permitted.
- The bronze welding of copper pipe and copper fittings is not permitted.
- The work may only involve the use of the following materials.
- Galvanized , Black Mild Steel , Stainless Steel and light cast iron pipes.
- Copper pipes (half hard temper bending quality in straight lengths).
- Plastic pipes (PE , PEX , PB , HDPE , PP , PVC , composite pipe) for water supply , heating.
- Commercially available fittings to suit all piping materials as required without any adaption.
- Jointing and sealing materials.
- Pipe brackets and fixing materials.
- Leak detection fluid or spray.

The Test Project must:

- Be a Computer Assisted Drawing (CAD) supplied on disk and in hard copy.
- Contain a detailed material list. Note: The materials must be available in the Host country / region.
- Be self–explanatory requiring a minimum of translation.

A comprehensive list of materials and components (including the relevant manufacturer's catalogues) for both the pipework and "' workstation "' components must accompany all projects and must be submitted six months prior the Competition.

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.

5.4.1 Who develops the Test Projects or modules

The Test Project / modules are developed under the supervision of the Jury President and Chief Expert by:

[ ] All Experts

[ ] Some Experts

[X] Nominated Experts

[ ] External designer

[ ] Chief Expert, Deputy Chef Expert under supervision of the Jury President

5.4.2 How and where is the Test Projects or modules developed

The Test Project or modules are developed:

[ ] Jointly on the Discussion Forum

[ ] By an external enterprise

[X] Independently

[ ] Other

5.4.3 When is the Test Project developed

The Test Project is developed according to the following timeline:

TIME	ACTIVITY
At the previous Competition	not applicable
6 months prior to the Competition	Until 6 months before the current Competition
At the Competition	not applicable

5.5 Test Project validation

The Test Project will be developed by the DCE`s and Experts, checked by the Chief Expert and validated by WorldSkills Europe.

It must be demonstrated that the Test Project/modules can be completed within the material, equipment, knowledge, and time constraints by a photograph being submitted with the Test Project proposal.

5.6 Test Project selection

[X] By vote of Experts at the previous Competition

[ ] By vote of Experts on the Discussion Forum

[ ] By vote of Experts at the current Competition

[ ] By random draw by Technical Director 3 months before the current Competition

[ ] Other

If other, please specify here

5.7 Test Project circulation

The Test Project is circulated via the website as follows:

[X] Submitted to the Secretariat for circulation 3 months before the current Competition

[ ] Not circulated

[ ] Other

If other, please specify here

5.8 Test Project coordination (preparation for competition)

Coordination of the Test Project will be undertaken by:

[ ] Skill Management Team

[ ] Chief Expert

[X] Chief Expert and Deputy Chief Expert

[ ] Chief Expert and Workshop Manager

[ ] Chief Expert with selected Experts

[ ] Chief Expert with Competition Organizer

[ ] Experts

[ ] Other

If other, please specify here:

5.9 Test Project change at the competition

A 30% change to the content of the Test Project will be organised through a method decided upon at the CPW following consultation with the Experts. The 30% change will not affect the infrastructure list.

5.10 Material or manufacturer specifications

Months before the current Competition by the Chief Expert on the Discussion Forum.

The Competition Organizer must make available the following information about the pipes and sanitary appliances and fixtures to be used for the competition.

- Technical data sheets;
- Jointing methodology;
- Tools and equipment related to the installation;
- Properties of the pipes;
- Installation brochures of sanitary appliances/fixtures

Copper, carbon steel and PEX pipes supplied by the Competition Organizer must be of a grade that permits bending by hand operated machines. A data sheet for such pipes from the Competition Organizer and details of the supplier or merchant must be made available to all participating Members via the Infrastructure List.

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
- Marking Schemes
- Test Projects
- Infrastructure List
- Health and Safety documentation
- Other Competition-related information
- List of material that can be used to build templates and not been provided by the host

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

Refer to Host Country/Region Health and Safety documentation for Host Country/Region regulations.

The Trade-Specific Safety Requirements will be published 6 months before the Competition by the Chief-Expert.

- Each Competitor MUST be equipped with the appropriate personal safety equipment as required by the Host Country's safety standards. As a minimum clear safety glasses and steel toe capped safety shoes must be worn during the Competition and familiarization
- All Competitors and Experts must always use clear safety glasses and steel toe capped safety shoes;
- During the whole work gloves are permitted to wear by the Competitor, but it is not obligatory. If the Competitor wear gloves they must be marked with a security code.
- Long sleeve apparel must be worn when carrying out any work involving heat;
- Laser Tools are prohibited;
- Ear plugs are permitted to be used.

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 Competition Organizer will progressively update the Infrastructure List specifying the actual quantity, type, brand, and model of the items. Items supplied by the Competition Organizer are shown in a separate column.

At each Competition, the Experts must review and update the Infrastructure List in preparation for the next Competition. Experts must advise the Technical Director 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 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 6 months prior the current competition.

Each Competitor is allowed toolboxes up to a maximum capacity of 500 litres. External measurements of the toolbox are used to determine the capacity. Note the container when measured will not include the wheels. Competitors are also allowed up to four battery powered tools. All to be stored within the 500-litre space. Competitors will also be allowed max. 2.1m in length for levels and rulers. Competitors who bring larger toolboxes to the Competition will not be permitted to keep them in the workshop area and they must be stored in an off-site location. When this occurs, Competitors will be permitted to take with them into the workshop area the equivalent of 500 litres of hand tools from the oversized toolboxes in one trip, using an appropriate container provided by the Competition Organizer. Please ensure that the overall packing around the toolbox is kept to a minimum size to accommodate the toolbox and battery tools. Hand tools of the trade required to complete the Test Project. The following minimum list of tools is provided for guidance only. A tool list will be developed and published six months prior to the competition. Competitors are provided with the tools specified in Infrastructure List. The designer of the Test Project must ensure that the project can be constructed by the usage of specified tools in the Infrastructure List. Only tools that are commercially available are to be used. A definitive tool list will be provided on the Forum for the competition when the final project is developed and subject to sponsors.

Recommended toolbox list:

Item	Amount	Item	Amount
600 mm rule	1	tip pens	4

Item	Amount	Item	Amount
300 mm rule	2	permanent markers	4
1500 mm rule	1	pencils	4
1000 mm rule	1	rubber	2
500 mm engineers square	1	magnetic level up to 1 m	1
250 mm square	1	chisel	2
150 mm square	1	calculator	1
digital levels up to 2 m	1-4	pens/markers – blue, red, green, orange, brown, yellow	6
0-180' protractor	1	set squares – 30, 45, 60 degrees	1
metal Adjustable square	1	ball- end hex wrench set	1
60/30 set square up to 500 mm	2	spare tube cutting wheels	4
45 set square up to 500 mm	2	driver bits	4
adjustable set square	1	18 and 24 TPI hacksaw blades	4
wrench set 6-32mm	1	alloy soft jaws	2

Item	Amount	Item	Amount
hacksaw	1	small magnetic holder for welding	1
300 mm adjustable wrench	1	conduit Cutter for PEX pipe	1
250 mm adjustable wrench	1	screwdriver set	1
200 mm adjustable wrench	1	flint gun	1
300 mm multigrips	1	battery operated power drills, drill sets	2
250 mm multigrips	1	cleaning fleece	5
tube cutter (pvc) set	1	calibration tool (cu, 15-18 mm)	1-1
tube cutter (cu) 6-35 mm	1	water pump plier set	1
deburrer (cu) 8-35 mm	1	cordless drill set	2
cleaning brush (15-18-22 mm)	1-1-1	5m tape measure	1
flux brushes set	1	hole template for the drawing	1
tube cutter (steel pipes) 6-42 mm	1	knife and blades	1

Item	Amount	Item	Amount
pipe deburrer (steel) 8-35 mm	1	wire brush	1
tube cutter (Polymer pipes)	1	assorted files - (½ round and flat)	4
ball pain hammer or claw hammer	2	safety googles	2
14" pipe wrench	1	safety gloves	2
10" pipe wrench	1	ear protection	2
Safety glasses	2		

8.3 Materials, equipment and tools supplied by the organizing country

All other items (see section 8.2) are supplied by the competition organizer.

8.4 Materials and equipment prohibited in the Skill area

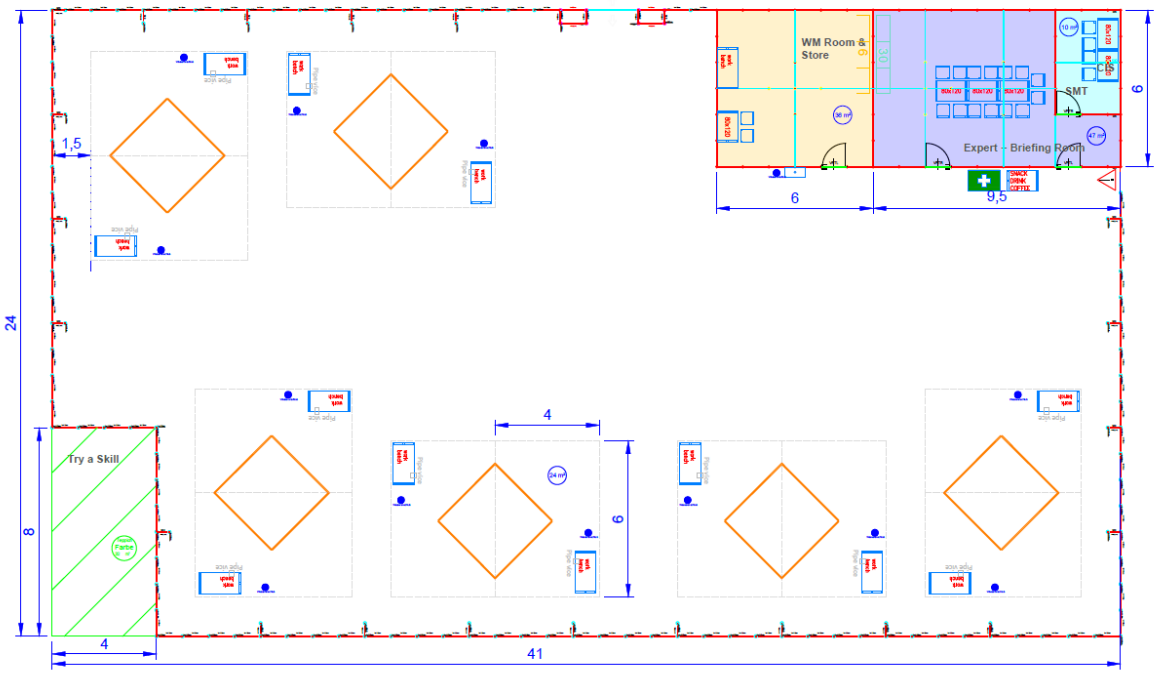
Competitors are not permitted to bring:

- electric powered equipment to the competition, other than re-chargeable battery operated hand drills, and other equipment, materials will be prescribed by the organisers in H&S regulations
- Competitor's own or any pre-made templates, jointing material, fluxes, and soldering consumables
  - Note: the use of solvent welded joints on PVC pipe and cupro-eutectic joints on copper pipe
- Pre-made jigs and pipe stands
- Battery operated disc cutters and grinders.

8.5 Proposed workshop and workstation

Workshop layouts from previous competitions are available by contacting the Competition and IT Coordinator at: jordy.degroot@worldskillseurope.org

For workshop development, please check the forums.


WM Room &
Store
SMT
Expert – Briefing Room
1,5
6
9,5
6
24
Try a Skill
8
4
4
6
4
41

9 Visitor and media engagement

- A full colour copy of the project drawing (without dimensions) should be prepared for displaying to the public, for information, at the skill area;
- A live timed water test may be carried out by Competitors, possibly three at a time with an explanation via load speaker to visitors and media to maximize engagement;
- Presentation of the pre-Competition task to visitors (not assessed).
- A model of a similar plumbing project (not the actual Test Project) could be prepared by the Competition Organizer and put on display to attract public interest and publicity
- Other ways to maximize engagement may include:
- Try a skill – for example the bending of copper pipe;
- Display screens;
- Enhanced understanding of Competitor activity;
- Competitor profiles;
- Career opportunities;
- Daily reporting of competition status.

10 Sustainability

- Recycling
- Use of 'green' materials
- Use of completed Test Projects after Competition

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