worldskills

Technical Description

Joinery

WorldSkills International, by a resolution of the Competitions Committee and in accordance with the Constitution, the Standing Orders, and the Competition Rules, has adopted the following minimum requirements for this skill for the WorldSkills Competition.

The Technical Description consists of the following:

1 Introduction

1.1 Name and description of the skill competition

1.1.1 The name of the skill competition is

Joinery

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

A joiner generally works on commercial and residential projects. There is a direct relationship between the nature and quality of the product required and the payment made by the customer. Therefore, the joiner has a continuing responsibility to work professionally in order to meet the requirements of the customer and thus maintain and grow the business. Joinery is closely associated with cabinet making and carpentry plus other parts of the construction industry and with the many products that support it, normally for commercial purposes.

The joiner is usually based in a workshop because the formation of various joints requires specialist machinery, but sometimes undertakes installations in the homes of customers and on building sites. He or she will produce and interpret drawings, set out and measure, cut, form joints, assemble, install, and finish to a high standard. The joiner usually produces items such as interior and exterior doors, windows, stairs, tables, and bookshelves.

Work organization and self-management, communication and interpersonal skills, problem solving, innovation and creativity, working precisely and accurately are the universal attributes of the outstanding joiner. Whether the joiner is working alone or in a team the individual takes on a high level of personal responsibility and autonomy. From working safely through to exceptional planning and organizing, accuracy, concentration, and attention to detail to achieve an excellent finish, every step in the process matters. Mistakes are largely irreversible and very costly.

With the international mobility of people, the joiner faces rapidly expanding opportunities and challenges. For the talented joiner 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 joinery is therefore likely to expand.

1.1.3 Number of Competitors per team

Joinery is a single Competitor skill competition.

1.1.4 Age limit of Competitors

The Competitors must not be older than 22 years in the year of the Competition.

1.2 The relevance and significance of this document

This document contains information about the standards required to compete in this skill competition, and 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:

- WSI – Code of Ethics and Conduct
- WSI – Competition Rules
- WSI – WorldSkills Occupational Standards framework
- WSI – WorldSkills Assessment Strategy
- WSI online resources as indicated in this document
- WorldSkills Health, Safety, and Environment Policy and Regulations
- WorldSkills Standards and Assessment Guide (skill-specific)

2 The WorldSkills Occupational Standards (WSOS)

2.1 General notes on the WSOS

The WSOS specifies the knowledge, understanding, skills, and capabilities that underpin international best practice in technical and vocational performance. These are both specific to an occupational role and also transversal. Together they should reflect a shared global understanding of what the associated work role(s) or occupation(s) represent for industry and business (www.worldskills.org/WSOS).

The skill competition is intended to reflect international best practice as described by the WSOS, to the extent that it can. The Standard 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 only be separate tests of knowledge and understanding where there is an overwhelming reason for these.

The Standard 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. This is often referred to as the “weighting”. The sum of all the percentage marks is 100. The weightings determine the distribution of marks within the Marking Scheme.

Through the Test Project, the Marking Scheme will assess only those skills and capabilities that are set out in the WorldSkills Occupational Standards. They will reflect the Standards as comprehensively as possible within the constraints of the skill competition.

The Marking Scheme will follow the allocation of marks within the Standards to the extent practically possible. A variation of up to five percent is allowed, if this does not distort the weightings assigned by the Standards.

2.2 WorldSkills Occupational Standards

Section		Relative importance (%)
1	**Work organization and management**	**5**
	The individual needs to know and understand: • Health and safety legislation, obligations, and regulations which control the work process • The principles of working safely with electrical equipment or tools • The situations when personal protective equipment (PPE) must be used • The uses, care, maintenance, and safety of tools, machines, and equipment • Care and safety of materials during storage • The significance of keeping a clean and tidy work area • Sustainability measures applying to the use of ‘green’ materials and recycling • The time normally required for key joinery processes	

Section		Relative importance (%)
	• The significance of planning, accuracy, checking, and attention to detail in all working practices	
	The individual shall be able to: • Follow health and safety standards, rules, and regulations • Maintain a safe working environment • Identify and use the appropriate personal protective equipment including safety footwear, ear and eye, and dust protection • Select, use, clean, maintain and store all hand and powered tools and equipment safely • Select, use, and store all materials safely • Plan the work area to maximize efficiency and maintain the discipline of regular tidying and cleaning • Measure accurately and avoid wastage • Work efficiently and check progress and outcomes • Critically evaluate own work	
2	**Communication and interpersonal skills**	**5**
	The individual needs to know and understand: • The importance of establishing and maintaining customer confidence and trust • Non-verbal communication • The negotiation process • The roles and requirements of architects and related trades and the most effective methods of communication • The value of building and maintaining productive working relationships with colleagues and managers • The importance of swiftly resolving misunderstandings and conflicting demands • Progress reporting methods	
	The individual shall be able to: • Gain trust of customer, interpret requirements, and manage expectations positively • Visualize and translate customer wishes, giving advice and making recommendations/providing options which meet/improve their design and budgetary requirements • Positively support and lead decision-making assertively • Liaise with suppliers to negotiate prices and place orders • Produce a cost and time estimates for customers • Introduce architects/ drafters and related trades to support customer requirements • Recognize, respect, and adapt to the changing needs of architects/ drafters and related trades • Clearly communicate with colleagues where drawings, variations to the documents, and work restrictions are required	

Section		Relative importance (%)
	• Follow instructions, meet deadlines and report on progress in the appropriate format	
3	**Problem solving, innovation, and creativity**	**5**
	The individual needs to know and understand: • The common types of problem which can occur within the work process • Diagnostic approaches to problem solving • The challenges of restoration projects • Trends and developments in the industry	
	The individual shall be able to: • Check work regularly for accuracy/standard to minimize problems at a later stage • Recognize and understand problems swiftly and follow a self-managed process for resolving • Challenge incorrect information to prevent problems • Recognize opportunities to contribute ideas to improve the product and overall level of Industry Quality • Keep up to date with changes in the industry • Demonstrate a willingness to try new methods and embrace change	
4	**Produce a working drawing**	**6**
	The individual needs to know and understand: • The essential information that must be included in a working drawing • The ISO standards which must be followed • Geometry and trigonometry • The significance of an accurate working drawing as a basis for accurate joinery • The importance of checking the working drawing for missing information or errors and pro-actively taking corrective action • The type and level of the floor area/walls	
	The individual shall be able to: • Check the location of the finished product and environmental conditions • Accurately measure and record the size/shape of the area in which the completed product will be installed • Produce lines which are: straight, crisp, accurate, meet clearly at intersections and are of a consistent thickness and correct weight • Produce a range of line types including object, fresh, hidden, and break • Produce joint details which are accurate and correctly proportioned • Ensure that all measurements meet specification	

Section		Relative importance (%)
	• Identify drawing errors or items that require clarification • Determine and check quantities of materials required for construction	
5	**Preparing materials**	**5**
	The individual needs to know and understand: • Different types of material and their process of manufacture to include: hardwood (elm, beech, ash, oak, mahogany, maple), softwood (spruce, redwood, douglas fir), and timber-based manufactured boards (chipboard, block and, lamin board, plywood) and other panels for heat conservation and noise reduction • Characteristics of timber, timber-based manufactured boards, and materials to include durability, weight, workability, compatibility with other materials, ability to take preservatives, and finishes • The range of faults found within wood and their causes • Eco-consciousness and the significance of using environmentally friendly material	
	The individual shall be able to: • Thoroughly inspect the material when purchasing to identify any defects to include knots, shakes, splits, cupping, bowing, rot, pith, stain, sap ducts, twist, worm infestation, case hardening • Saw to material list and leave for specified time for the drying process • Use correct machining techniques safety • Plane to achieve “squareness” and thickness • Use “face marks” in the setting out process • Use machines to final specification required and attach with glue as necessary	
6	**Internal and external joints**	**28**
	The individual needs to know and understand: • Different types of joint to include mortice-and-tenon, dovetail, biscuit, lap, and spline • The need for close fitting joints to form a good surface area for gluing • The importance of not fitting joints too tightly, requiring excessive force during assembly • The importance of correct joints and proportions	
	The individual shall be able to: • Accurately produce mortices by hand and using a variety of machines e.g. hollow chisel morticer/ portable powertools • Produce mortices which are parallel and free from cutter or chisel marks	

Section		Relative importance (%)
	• Produce mortices and haunches to the correct size in the drawing • Produce tenons by and hand and machine e.g. traditional tenon saws, Japanese pull saws, band saw, powered hand router, and mitre saw • Produce tenons that are parallel and free from undulations • Produce well-fitting mortice and tenon joints which fit together with a “push fit” • Check and confirm internal joint geometry conforms with the working drawing including length of tenon and depth of mortice • Accurately produce tight fitting joints without gaps • Produce joints which are parallel and clean • Produce joints to the correct size in the drawing • Ensure faces, edges, and all shoulders are square straight and to the drawing	
7	**Assembly**	**12**
	The individual needs to know and understand: • The need for perfect fitting joints to make the connection • Different types of glue and their purpose • Reactions of some woods to glue and negative impacts • Properties of any metals used e.g. screws • Cost of mistakes	
	The individual shall be able to: • Undertake a trial assembly to check it fits together, with no gaps, and conforms to the working drawing • Take any necessary corrective action • Sand the inside, select, and prepare the glue • Prepare the edging for protection e.g. wood, plastic; apply the glue evenly and attach the edging, ensuring there are no “twists” and that it is “square” • Ensure joints are complete and well finished	
8	**Measurements**	**15**
	The individual needs to know and understand: • How to make pieces of joinery to the correct specifications • How to interpret the working drawing to check the measurement of a project • Use of correct measurement tools	
	The individual shall be able to: • Produce joinery to the correct measurements using tape measures, folding rules, and other measuring devices • Check diagonals for squareness	

Section		Relative importance (%)
	• Ensure that all components are the correct length and shape in according to the drawing	
9	**Finishing**	**15**
	The individual needs to know and understand: • The use of hand tools in the finishing of a joinery project • Types of sanding paper, for the wood, and varnishing	
	The individual shall be able to: • Complete the product to the drawing specifications • Determine the quality standard required by customer/trades for further processes e.g. for staining, painting, lacquering/polishing, or oiling • Produce a smooth surface, curves, moulds, and edges through sanding by machine and hand • Control flush and regulate the edge during sanding • Check the quality of the surface e.g. free from glue and any defects or chips	
10	**Installing**	**4**
	The individual needs to know and understand: • Different techniques of fixing • Range of glues and their preparations • Condensation and preventative actions • Different techniques in using hardware • The need to schedule transportation and check all tools and machines are in good working order and available/are on site • The need to protect the installation area as necessary e.g. floor coverings • Methods for working around the needs of customers, e.g., to avoid disturbance/disruption to services as much as possible	
	The individual shall be able to: • Review options for using hardware and select the optimal techniques for each purpose • Check quality and completeness of all components • Check where changes may be necessary to the positioning/fixing and discuss options • Take care not to damage any finishes or make excessive noise or disturbance • Present the installation to meet customer and related trades needs and expectations • Leave the work area clean and damage-free.	

Section		Relative importance (%)
	Total	**100**

3 The Assessment Strategy and Specification

3.1 General guidance

Assessment is governed by the WorldSkills Assessment Strategy. The Strategy establishes the principles and techniques to which WorldSkills assessment and marking must conform.

Expert assessment practice lies at the heart of the WorldSkills 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 WorldSkills Competition: the Marking Scheme, Test Project, and Competition Information System (CIS).

Assessment at the WorldSkills Competition falls into two broad types: Measurement and Judgement. For both types of assessment, the use of explicit benchmarks against which to assess each Aspect is essential to guarantee quality.

The Marking Scheme must follow the weightings within the Standards. The Test Project is the assessment vehicle for the skill competition, and therefore also follows the Standards. The CIS enables the timely and accurate recording of marks; its capacity for scrutiny, support, and feedback is continuously expanding.

The Marking Scheme, in outline, will lead the process of Test Project design. After this, the Marking Scheme and Test Project will be designed, developed, and verified through an iterative process, to ensure that both together optimize their relationship with the Standards and the Assessment Strategy. They will be agreed by the Experts and submitted to WSI for approval together, to demonstrate their quality and conformity with the Standards.

Prior to submission for approval to WSI, the Marking Scheme and Test Project will liaise with the WSI Skill Advisors for quality assurance and 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
STANDARDS SPECIFICATION SECTION		A	B	C	D	E	F	G	H			
	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 The use of Measurement and Judgement

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 and procedures

WorldSkills is committed to continuous improvement including reviewing past limitations and building on good practice. The following skill assessment strategy and procedures for this skill competition take this into account and explain how the marking process will be managed.

Module A - Drawing/setting out

This is to be a working drawing. The Competitors can make small marks or screw holes for the marking out of a radius on their drawing. There can NOT be any marks or holes where there is linework in the drawing.

This marking aspect checks the Competitor's ability to set out the project. A drawing/set-out is only required in one projection of the project. This would possibly be the front elevation. The marking criteria will include:

- Line work;
- Joint details;
- Measurements.

Line work: Judgement Marking

Points to consider when marking (note: CAD drawing full size is available to have alongside for clarity and reference) are as follows:

- Lines are consistent;
- Line types are present: object lines, hidden lines, break lines, etc.;
- Lines have the correct line weights;
- Neatness;
- Lines may extend from edge of layout in order to transfer angles, sizes, location of joints and other details to the work piece, but no more than 50 mm and must be neat and distinct from object lines.

Joint details: Judgement and Measurement Marking

Points to consider when marking are as follows:

- Joint geometry and proportions are shown accurately.

Measurements: Measurement Marking

Points to consider when marking are as follows:

- Measurements within 1.0 mm 100%;
- Measurements over 1.0 mm and up to and including 2.00 mm 50%;
- Measurements over 2.0 mm 0%.

Module B - Interior Joints

This marking aspect checks the Competitor's ability to form accurately fitting joint surfaces by hand and machine as shown on the competition project drawing. Each joint is apportioned a mark according to its complexity.

All Competitors must identify each piece of material submitted for marking with their bench number only. After marking, Experts will identify which internal joints have been marked with a stamp or coloured marker.

Points to consider when marking are as follows:

- In all cases refer to aspect descriptors for assessment;
- The internal joint geometry conforms with the drawing – including length of tenon and depth of mortise; (it is permitted for machine marks at the base of a mortice as long as it is flat);
- Surfaces have clean even sheared or cut grain without irregularities; surfaces of joint can be adjusted by any means using hand/ power tools and abrasive tools or paper;
- No silicone, wax, or other foreign material is permitted in internal joints – just wood (additional glued timber to joint not permitted.

Marking of the internal joints will include:

- Internal joint according to drawing;
- Quality of the joint including the finish to the joint parts;
- Fit of the joint – how the joint fits together.

Module C - Exterior Joints: Measurement Marking

This marking aspect checks the Competitor's ability to produce an assembled project with good strong joints and no gaps.

Points to consider when marking are as follows:

External Joint: Judgement Marking (J) - all complex joints identified with end grain showing are assessed as Judgment due to multiple faces and high degree of work to manufacture

External Joint: Measurement Marking (M) - are for all other external joints including standard joints

• Inspect for gaps on the external joint;
• The joint is made according to the drawing;
• The joint is complete.

tolerance	points
Up to 0.2 mm	100 %
Up to and including 0.4 mm	50 %
Over 0.4 mm	0 %

Note:

• Any filling or piecing in gaps = 0%;
• Use of silicone, wax, or other foreign material in internal joints = 0%.

Module D - Finish and Appearance

This marking aspect determines the Competitor's ability to produce a project with a good visual and architectural appearance. The marking criteria will include:

• Twist of component;
• Surface finish of the component;
• Edge finish of the component;
• Squareness of the component;
• Fit of any panels;
• Alignment of components;
• Others may be added or some of the above subtracted depending on the nature of the project

Twist and squareness: Measurement Marking

tolerance	points
Up to and including 1.0 mm	100%
1.1 mm up to and including 2.0 mm	70%
2.1 mm up to and including 3.0 mm	40%
Over 3.0 mm	0

Module E - Conformity

This marking aspect determines the Competitor's ability to build the project exactly as described in the drawing. Penalties can be as follows but the final list are determined by the Chief Expert and the marking panel during the Competition.

Points to consider when marking are as follows:

• Missing panel;
• Missing frame component;
• Other non-conformities e.g. a repair;

- To a maximum loss of five marks. (If an error occurs under two or more criteria, then the greatest loss of marks is deducted).

Module F - Measurement

This aspect of the marking criteria determines the dimensional accuracy of the completed project, and is marked as follows:

Primary dimensions:

- Measurements up to and including 1.0 mm 100%;
- Measurements 1.1 mm and up to and including 2.0 mm 50%;
- Measurements over 2.0 mm 0%.

Secondary dimensions:

- Measurements up to and including 1.0 mm 100%;
- Measurements over 1.0 mm 0%.

Module G - Material

This aspect of marking allows for the penalizing of points for the replacement of non-usable components.

The penalties are as follows:

- Replacement of the first piece - 1 mark deduction;
- Replacement of subsequent pieces - 1 mark deduction;
- Up to a maximum of 2 mark deduction per module

The Experts that attend the Competition are divided into marking groups to assess each section of the marking criteria. When dividing the Experts, consideration is given to the composition of the module development groups;

- The Chief Expert will train Experts on each area of the Marking Scheme so they know what to look for when assessing the Competitors' work;
- The Chief Expert will discuss how each section of the marking criteria is assessed prior to adjudication to ensure conformity and consistency;
- All Experts must meet one of the following criteria:
  - A practicing wood trade worker;
  - A practicing wood trade educator;
  - Hold a wood trade qualification.

All Experts will complete a practical assessment at C-3 within the competition workshop; this will ensure industry standard can be maintained prior to and during assessment being conducted.

The Chief Expert will confirm what form the assessment will have on C-3.

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 applied knowledge, skills, and behaviours set out in each section of the WSOS.

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

The Test Project will not cover areas outside the Standards or affect the balance of marks within the Standards other than in the circumstances indicated by Section 2. This Technical Description will note any issues that affect the Test Project's capacity to support the full range of assessment relative to the Standards. Section 2.1 refers.

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 WorldSkills rules and regulations.

Most Test Projects and Marking Schemes are now designed and developed independently of the Experts. They are designed and developed either by the Skill Competition Manager, or an Independent Test Project Designer, normally from C-12 months. They are subject to independent review, verification, and validation. (Section 4.1 refers.)

The information provided below will be subject to what is known at the time of completing this Technical Description, and the requirement for confidentiality.

Please refer to the current version of the Competition Rules for further details.

5.2 Format/structure of the Test Project

The Test Project is a series of three (3) standalone modules.

All section sizes of timber need to be produced from standard sawn sections of timber. For example, 250 mm x 40 mm rough size is 240 mm x 32 mm maximum dressed and laminated if necessary.

5.3 Test Project design requirements

Test Projects should reflect the purposes, structures, processes, and outcomes of the occupational role they are based on. They should aim to be a small-scale version of that role. Before focusing on practicalities, SMTs should show how the Test Project design will provide full, balanced, and authentic opportunities for assessment and marking across the Standards, as set out in Section 5.1.

The Test Project consists of one 22 hour project divided into three (3) modules with the design from any eligible Expert to include:

- 2D – Must have frame with panels;
- 3D – Must be able stand upright under its own weight;

• Installation - Must have an installation component (can have more than one).

Included in the 22 hours, is drawing set-out that will take approximately 1.0 - 1.5 hours to complete, but can be more depending on Test Project complexity. It is important to remember that when designing the Test Project, the Competitor will have approximately 19-20 hours minimum to build the project after the drawing set-out is complete.

The Test Project design must comply with work typical of a joiner stated in section 1.1.2, section 2.1 and section 2.2. Also in the design, the Independent Test Project Designer (ITPD) should consider the project for use after the competition, if possible.

The Test Project is to have a maximum size of 0.3 m^3.

In general, the modules must require the Competitor to display a range of hand and machine skills. Each module must be designed to enable the least competent Competitors to achieve some good results, whilst also allowing the most skilled Competitors to demonstrate their ability without achieving 100%.

All Test Projects proposals must be in two languages, one in the language of the Independent Test Project Designer (ITPD) country/region and the other in English. For English-speaking Members, the other language must be German or French.

There must be at least a minimum of four different types of joints used in each module. For example, open mortise and tenon, wedged mortise and tenon, double mortise and tenon, dovetail, etc.

Dowels and biscuits may be used for no more than 10% of the joints in the module.

Suggested Design Guideline - one joint = about one hour work. A minimum of 14 joints to a maximum of 18 detailed joints are to be used in the module design.

Each module is limited to three profile shapes. These profiles include chamfers (45 degrees only), rebates, and grooves. For clarification, each module is limited to no more than three shapes in total. For example, if a module has two chamfers it may only have one other profile – a groove or a rebate. Rebate and groove tooling that would have been used on the selected project has to be the same on the minimum 30% change project for tooling at the competition and Competitor router bits. Only two joints can have a maximum of three components to make up the joint. All hardware required in the Test Project design is to be detailed in the submission to the Skill Competition Manager.

All joints to be formed using any or all of the following: by hand, portable router, mitre saw, mortice machine, band saw. (Please note that tenoners have been removed from the Infrastructure List.)

Project proposals must be submitted using the approved WorldSkills drawing template in a computer assisted drawing format to ISO-standards. First/third angle projection is used detailing plan, end, and elevation views, with section details for clarity. To assist complex joint details, exploded details will also be provided.

The working drawings are produced using Autodesk – AutoCAD software only; no other drawing media can be used, for example Inventor (original design will not be created in Inventor or similar and converted to AutoCAD).

All Test Project proposals submitted by Members have to include the following details and must be accompanied by:

1. Front cover;
2. Table of contents;
3. Working instructions;
4. Working drawings to scale full size (1:1);
5. Section details;

6. Exploded details of complex joints;
7. Detailed marking criteria in CIS format (refer to section 4.4);
8. Marking criteria for the Competitors showing divisions A-G and B-G for the module. (There is no drawing required for any 3D element;
9. Elevation showing joints for marking;
10. Elevations showing measurements for marking;
11. Materials list for the Workshop Manager to prepare the materials;
12. Elevations showing project materials;
13. Provide a photograph to show that the project has been made.

5.4 Test Project coordination and development

The Test Project MUST be submitted using the templates provided by WorldSkills International (www.worldskills.org/expertcentre). Use the Word template for text documents and DWG template for drawings.

5.4.1 Test Project coordination (preparation for Competition)

Coordination of the Test Project/modules will be undertaken by the Skill Competition Manager.

5.4.2 Who develops the Test Project/modules

Experts design and present a Test Project proposal to the Skill Competition Manager who will put eligible designs up of the WorldSkills Discussion Forum for all Experts to see.

The Final Test Project/modules are developed by an Independent Test Project Designer (ITPD) in collaboration with the Skill Competition Manager using the proposed Test Project designs submitted.

5.4.3 When is the Test Project developed

The Test Project/modules are developed according to the following timeline:

Time	Activity
Nine (9) months prior to the Competition	• A timeline with the exact deadlines for Test Project proposal submission must be placed on the WorldSkills Discussion Forum. • Experts can then develop and propose Test Project/modules individually. Proposals are sent to the Skill Competition Manager.
Eight (8) months prior to the Competition	• All Test Project proposals are put on the WorldSkills website for Experts to discuss on the WorldSkills Discussion Forum. • Experts discuss the proposed projects and ensure they are compliant with section 5.3 in the Technical Description. • Experts of non-compliant proposed modules have the opportunity to make their proposal compliant and re-submit it within a month (until seven (7) months prior to the Competition). • All Test Project proposals are for all Experts to see and practice with their Competitor. • There will not be a vote on the Test Project proposals.
Seven (7) – four (4) months prior to the Competition	• Independent Test Project Designer and Skill Competition Manager design Test Project incorporating aspects from all submitted Test Projects. • Independent Test Project Designer and Skill Competition Manager can change the cutting list in designing the Test Project.

Time	Activity
Three (3) months prior to the Competition	• The Skill Competition Manager releases competition cutting list to the WM to prepare material for the competition. • The Skill Competition Manager releases competition cutting list on the WorldSkills Discussion Forum for all Experts this will be at the same time the cutting list is released to the WSM to prepare the materials for the Competition.
Not later than one (1) month prior to the Competition	• The Test Project documents are sent to the WorldSkills International Skills Competitions Administration Manager.
At the Competition on C-2	• The final Test Project is presented to the Experts and Competitors without any technical information. No questions are allowed to be asked at this time. • After Competitors have left the workshop Experts are advised of the technical details. • The Test Project is accepted in its entirety. • Drawings **will not** be modified at the competition, but Experts can ensure that details are precise and complete.
At the Competition on C1	• Competitors receive the printed drawings and review them for one hour prior to Compatriot Communication: ◦ A2 printed drawing; ◦ A3 Primary/Secondary measurements; ◦ A3 Joint details 1:1 or 1:2; ◦ A3 List of materials; ◦ A3 Marking of joints; ◦ A3 3D exploded view of TP.

5.5 Test Project initial review and verification

The purpose of a Test Project is to create a challenge for Competitors which authentically represents working life for an outstanding practitioner in an identified occupation. By doing this, the Test Project will apply the Marking Scheme and fully represent the WSOS. In this way it is unique in its context, purpose, activities, and expectations.

To support Test Project design and development, a rigorous quality assurance and design process is in place (Competition Rules sections 10.6-10.7 refer.) Once approved by WorldSkills, the Independent Test Project Designer (ITPD) is expected to identify one or more independent expert(s), and trusted individuals initially to review the Independent Test Project Designer's ideas and plans, and subsequently to verify the Test Project, prior to validation.

A Skill Advisor will ensure and coordinate this arrangement, to guarantee the timeliness and thoroughness of both initial review, and verification, based on the risk analysis that underpins Section 10.7 of the Competition Rules.

5.6 Test Project validation

The Skill Competition Manager coordinates the validation of the Test Project/modules and will ensure that it can be completed within the material, equipment, knowledge, and time constraints of Competitors.

5.7 Test Project circulation

All proposed Test Project/modules proposed by Experts are circulated eight (8) months prior to the Competition via the WorldSkills website.

The final Test Project/modules developed by the Independent Test project Designer in collaboration with the Skill Competition Manager are not circulated and presented to Experts and Competitors on C-2 without technical or detailed information on the Test Project/modules.

5.8 Test Project change

Due to the Test Project being developed by an Independent Test Project Designer (ITPD), there is no change required to be made to the Test Project/modules at the Competition. Exceptions are amendments to technical errors in the Test Project documents and according to infrastructure limitations.

5.9 Material or manufacturer specifications

Specific material and/or manufacturer specifications required to allow the Competitor to complete the Test Project will be supplied by the Competition Organizer and are available from www.worldskills.org/infrastructure located in the Expert Centre. 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.

Materials used for the project modules may be hardwood, manufactured panel products, or combinations of these. Dressed material is to be supplied 0.5 mm oversize, moisture content should be between 10% and 13%, with the species acceptable to receive a glue joint that will not fail, wide material to be laminated to prevent cupping, and considered of high quality by the Workshop Manager. In all cases, the Workshop Manager is responsible for the preparation, quality, and suitability of material. Special consideration should be given to materials which exhibit a high degree of “green, enviro-friendly, and eco-consciousness”. Material data specifications are added to the Infrastructure List once the items are released.

All material is to be machined up by Workshop Manager, Workshop Managers Assistant, and/or Experts at the Competition.

The Workshop Manager will have at their disposal a professional/competent machinist to monitor the shapers during the Competition. This is at a preferred coverage rate of one professional to two shapers and a maximum of one professional to three shapers. A student or apprentice is not suitable for this role.

All shapers will have manual hold down devices that apply pressure in two directions, down to the bed of the machine and horizontal to the shaper fence.

To reduce the cost of tooling, shaper heads (cutters) are limited to the following profiles:

A – Chamfers at 45 degrees

B – Rebates

C – Grooves

A master rule is used to check all Competitors measuring devices against. If the Competitor's rule does not match, measurements are made with the Competitor's measuring device during measurement evaluation on the Competitor's Test Project.

6 Skill management and communication

6.1 Discussion Forum

Prior to the Competition, all discussion, communication, collaboration, and decision making regarding the skill competition must take place on the WorldSkills skill-specific Discussion Forum. (http://forums.worldskills.org). Skill related decisions and communication are only valid if they take place on the WorldSkills Discussion Forum. The Chief Expert (or an Expert Lead appointed by the Skill Management Team) will be the moderator for this Discussion Forum. Refer to the Competition Rules for the timeline of communication and competition development requirements.

6.2 Competitor information

All information for registered Competitors is available from the Competitor Centre (www.worldskills.org/competitorcentre).

This information includes:

- Competition Rules
- Technical Descriptions
- Mark Summary Form (where applicable)
- Test Projects (where applicable)
- Infrastructure List
- WorldSkills Health, Safety, and Environment Policy and Regulations
- Other Competition-related information

6.3 Test Projects and Marking Schemes

Circulated Test Projects will be available from www.worldskills.org/testprojects and the Competitor Centre (www.worldskills.org/competitorcentre).

6.4 Day-to-day management

The day-to-day management of the skill competition during the Competition is defined in the Skill Management Plan that is created by the Skill Management Team. The Skill Management Team comprises the Skill Competition Manager, Chief Expert, and the Expert Leads. The Skill Management Plan is progressively developed in the six (6) months prior to the Competition and finalized at the Competition. The Skill Management Plan can be viewed in the Expert Centre (www.worldskills.org/expertcentre).

6.5 General best practice procedures

General best practice procedures clearly delineate the difference between what is a best practice procedure and skill-specific rules (section 9). General best practice procedures are those where Experts and Competitors CANNOT be held accountable as a breach to the Competition Rules or skill-specific rules which would have a penalty applied as part of the Issue and Dispute Resolution procedure including the Code of Ethics and Conduct Penalty System. In some cases, general best practice procedures for Competitors may be reflected in the Marking Scheme.

7 Skill-specific safety requirements

7.1 Personal Protective Equipment

Refer to WorldSkills Health, Safety, and Environment Policy and Regulations for Host country or region regulations.

Task	Safety glasses with both protective sides	Dust mask	Safety shoes with protective cap	Sturdy shoes with closed toe and heel	Tight fitting work clothes (long trousers)	Hearing protection
General PPE for safe areas				√		
Machine sanding	√	√ Optional	√		√	√
Hand sanding	√	√ Optional	√		√	
Use of fixed machines	√	√ Optional	√		√	√
Use of portable machines	√	√ Optional	√		√	√

8 Materials and equipment

8.1 Infrastructure List

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

The Infrastructure List is available at www.worldskills.org/infrastructure.

The Infrastructure List specifies the items and quantities requested by the Skill Management Team for the next Competition. The Competition Organizer will progressively update the Infrastructure List specifying the actual quantity, type, brand, and model of the items. 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.

At each Competition, the Skill Management Team must review and update the Infrastructure List in preparation for the next Competition. The Skill Competition Manager must advise the Director of Skills Competitions 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 for the upcoming WorldSkills 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 Competitors toolbox

Competitors may bring one toolbox with the total external volume not exceeding 1.80 m³.

(Volume = Length x Height x Width, or V = L x H x W)

Volume measurement does not include a packing crate, other protective packing material, palette for transportation, wheels, etc.

The maximum open height of the toolbox MUST not exceed 1.5 m. No other object in the Competitor's area is to exceed 1.5 m in height: however, the following note must be observed, to ensure Competitors are conforming to Test Project manufacture.

Where the Competitor workspace is 5.0 m x 3.0 m, the following rule applies:

- The working side that is 5.0 m, the maximum permitted height of any object is not allowed to be greater than 1.5 m.
- The working side that is 3.0 m, the maximum permitted height of any object is not allowed to be greater than 1.0 m.

8.3 Materials, equipment, and tools supplied by Competitors

The following items are allowed to be carried in the toolbox:

The list is a suggestion only and is not limited; unless otherwise stated. However, only two bench-mounted static power tools are allowed.

Description	Photo
Electric powered routers, which may be bench mounted, with the necessary safety guards; and if mounted in a router table, have no fixtures to assist the manufacture of tenons or sliding accessories	
The only stationary machines allowed in a Competitor's area are a bench mounted router and a drop saw on a stand (mitre saw). All other power tools must be hand-held	
Hand-held routers x 2	
Set of drawing instruments	
Awls	
Planes	
Chisels	

Description	Photo
	  
Shaping tools	
Rebate plane	
Plough plane	 
Gauges	

Description	Photo
Squares	 
Mallet	  
Drill and bits	 

Description	Photo
Hammer	
Screwdrivers	
Hand tool sharpening equipment	
Trammel points	
Portable vice	
Clamps x 6 of any size Experts will vote on the WorldSkills Discussion Forum for the type of Clamp supplied at Competition for the IL	

Description	Photo
No premade jigs or holding devices for power tools to form joint to be used in the Competition	

- Abrasive paper with a maximum grit of 250; with no specific profiles for sanding; paper must be new and unused, if in doubt it is removed;
- At the competition the Skill Management Team may make other materials available to all Competitors if they are deemed necessary and/or suitable for the making of jigs and fixtures to safely hold small or complicated parts for machining;
- Clamps can be over 1500 but not the clamp stand;
- Competitors can bring any material they want like MDF, ply, and solid timber sheet material 1.5 m², timber species must be different to the Test Projects material, 0.05 m².
- Supplied bench light, ducting pipe and frame, and small flagpole can go over the 1500 mm height;
- No extra lights on Competitors site, Host Country to supply roof light and one bench light per Competitor if required;
- If water, oil, wax etc. is used on a joint, the marking for a perfect joint is 0%;
- No excessive dust from any power tool (mitre saw, router, sander, etc.) may enter the area of another Competitor or the general shop space;
- Upon arrival and unpacking of toolboxes, Competitors will show all tools and demonstrate all jigs and templates to the tool inspection team for validation prior to the commencement of the Competition.

Furthermore, Competitors are required to supply their own Personal Protective Equipment as specified in section 7 skill-specific safety requirements.

8.4 Materials, equipment, and tools supplied by Experts

Experts are required to supply their own Personal Protective Equipment as specified in section 7 skill-specific safety requirements.

Experts are responsible that Interpreters bring their PPE.

8.5 Materials and equipment prohibited in the skill area

Competitors and Experts are prohibited to bring any materials or equipment not listed in section 8.3 and section 8.4.

During the Competition, Competitors are prohibited from using mobile phones, cameras, personal music devices, google glasses, smart watches, radios, and any other devices deemed by the Chief Expert to be a distraction.

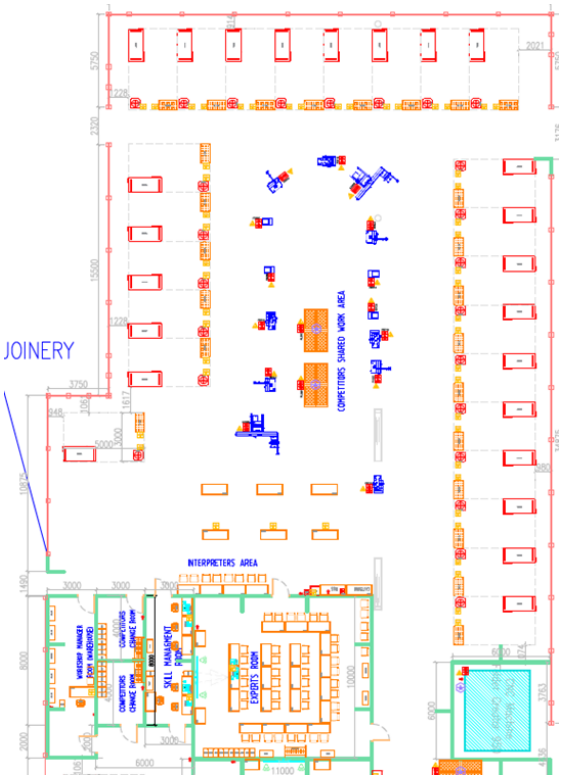
Competitors are not permitted prefixed or assembled jigs, fixtures, or templates.

No premade jigs or holding devices to form joints to be used in the competition in any form. All devices must be from a manufacturer's standard catalogue, not made to order specific to the Test Project; if in doubt, any device questioned during toolbox checks is removed after a vote.

8.6 Proposed workshop and workstation layouts

Workshop layouts from previous competitions are available at www.worldskills.org/sitelayout.

Example workshop layout



9 Skill-specific rules

9.1 General notes

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 Skill-specific rules

Topic/task	Skill-specific rule
Use of technology – USB, memory sticks	• Competitors, Experts, and Interpreters are not allowed to bring memory sticks into the workshop. If these are brought in they must be locked in the locker and only removed at the end of C4 to upload all the competition drawings. • Chief Expert is allowed to bring a memory stick from C-4 until C-1 for the Mandatory Assessment Training only. • The Skill Competition Manager is exempt from this rule.
Use of technology – personal laptops, tablets, and mobile phones	• Competitors are not allowed to bring personal laptops, tablets or mobile phones into the workshop. If these are brought in they must be locked in the locker and only removed at lunch time and at the end of each day. • Chief Expert, Experts, and Interpreters are allowed to use personal laptops or tablets in the Expert room only. When not in use the personal laptop and/or tablet must remain locked in the personal locker until the conclusion of the competition on C4. • Skill Competition Manager, Chief Expert, Experts, and Interpreters are allowed to bring a mobile phone into the workshop (see note for photo taking devices).
Use of technology – personal photo and video taking devices	• Skill Competition Manager, Chief Expert, Experts, and Interpreters are allowed to use personal photo and video taking devices in the workshop during the competition days only (C1 to C4), typically with mobile phones. • Competitors are allowed to use personal photo and video taking devices in the workshop at the conclusion of the competition on C4 only.

Topic/task	Skill-specific rule
Templates, aids, etc.	• Competitors are not permitted to bring prefixed or ensemble jigs, fixtures, or templates. • A manufactured jig must be available from a standard manufacturer's catalogue. Any other aid or device can be used if it is designed to improve safety; any other device can be used as long as it does not have pre-defined measurements or markings. All compliance is addressed during toolbox checks.
Drawings, recording information	• Chief Expert, Competitors, Experts, and Interpreters are not permitted to take the Test Project drawings out of the workshop. Photographs of Test Project drawings are strictly NOT permitted, by anyone one, or any delegate. This rule is valid from C-4 until the end of competition on C4. • The Skill Competition Manager is exempt from this rule.

10 Visitor and media engagement

10.1 Engagement methods

Following is a list of possible ways to maximize visitor and media engagement:

- Try-a-Skill – an area were spectators and media try joinery related skills;
- Demonstration of a CNC router;
- Display screens – a screen that shows visuals of joinery projects, communicates career opportunity, and Competitor profiles;

Test Project descriptions – a posting of the Test Project drawing that is in public view; display of completed modules – module one may be displayed at the completion of the assessment.

11 Sustainability

11.1 Sustainable practices

This skill competition will focus on the sustainable practices below:

- Recycling bins are provided for paper, cans, and bottles;
- Use of recycled paper for printing of Competition documents;
- Wood used in the Competition projects is harvested from sustainable sources;
- Use of laminated material (where possible) for components;
- Utilize recycled stock (where possible)

12 References for industry consultation

12.1 General notes

WorldSkills is committed to ensuring that the WorldSkills Occupational Standards fully reflect the dynamism of internationally recognized best practice in industry and business. To do this WorldSkills approaches a number of organizations across the world that can offer feedback on the draft Description of the Associated Role and WorldSkills Occupational Standards on a two-yearly cycle.

In parallel to this, WSI consults three international occupational classifications and databases:

- ISCO-08: (http://www.ilo.org/public/english/bureau/stat/isco/isco08/)
- ESCO: (https://ec.europa.eu/esco/portal/home)
- O*NET OnLine (www.onetonline.org/)

12.2 References

This WSOS (Section 2) appears to relate most closely to Construction Carpenters:
https://www.onetonline.org/link/summary/47-2031.01

and, at a higher level of generality, Carpenters and Joiners:
http://data.europa.eu/esco/isco/C7115

Adjacent occupations can also be explored through these links.

ILO 7115

The following table indicates which organizations were approached and provided valuable feedback for the Description of the Associated Role and WorldSkills Occupational Standards in place for WorldSkills Lyon 2024.

There were no responses to the requests for feedback this cycle.

13 Appendix

13.1 Appendix information

Not applicable.