

Technical Description

Joinery

Construction and Building Technology



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.

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1 INTRODUCTION

1.1 NAME AND DESCRIPTION OF THE SKILL COMPETITION

1.1.1 The name of the skill competition is

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 – Competition Rules
- WSI – WorldSkills Standards Specification framework
- WSI – WorldSkills Assessment Strategy
- WSI Online resources as indicated in this document
- WorldSkills Health, Safety, and Environment Policy and Regulations

2 THE WORLDSKILLS STANDARDS SPECIFICATION (WSSS)

2.1 GENERAL NOTES ON THE WSSS

The WSSS 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).

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

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. This is often referred to as the “weighting”. 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 WORLDSKILLS STANDARDS SPECIFICATION

SECTION		RELATIVE IMPORTANCE (%)
1	Work organization and management	5
	<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> • Health and safety legislation, obligations, and regulations which control the work process • The principles of working safely with electrical equipment or tools • Emergency procedures and reporting processes for accident, first-aid, and fire • 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 • Ways in which working practices can minimize wastage and help to manage/control the costs of the manufacturing process • Sustainability measures applying to the use of 'green' materials and recycling • The time normally required for key joinery processes • Principles and measures to carry out work in harmony • The significance of planning, accuracy, checking, and attention to detail in all working practices • The role of the individual in maintaining a successful business • The value of managing own continuing professional development 	
	<p>The individual shall be able to:</p> <ul style="list-style-type: none"> • 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 regularly to avoid financial penalties • Critically evaluate own work 	

2	Communication and interpersonal skills	3
	<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> • 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 	
	<p>The individual shall be able to:</p> <ul style="list-style-type: none"> • 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 and related trades to support customer requirements • Recognize, respect, and adapt to the changing needs of architects and related trades • Integrate, facilitate communication, and work positively within a team situation, e.g. on a building sited • Clearly communicate with colleagues where drawings, variations to the documents, and work restrictions are required • Follow instructions, meet deadlines and report on progress in the appropriate format 	
3	Problem solving, innovation, and creativity	3
	<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> • The common types of problem which can occur within the work process • Diagnostic approaches to problem solving • The challenges of restoration projects • Trends and developments in the industry 	

	<p>The individual shall be able to:</p> <ul style="list-style-type: none"> • 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 • Develop creative solutions to challenges when working on restoration projects • Recognize opportunities to contribute ideas to improve the product and overall level of customer satisfaction • Keep up to date with changes in the industry • Demonstrate a willingness to try new methods and embrace change 	
4	Produce a working drawing	10
	<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> • 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 	
	<p>The individual shall be able to:</p> <ul style="list-style-type: none"> • Check the location of the finished product and environmental conditions • Check the type and level of the floor area/walls • 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 • Identify drawing errors or items that require clarification • Determine and check quantities of materials required for construction 	
5	Preparing materials	6
	<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> • 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 	

	<p>The individual shall be able to:</p> <ul style="list-style-type: none"> • 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 • Select, order, and purchase additional materials e.g. 'door furniture' glass, plastic, and adhesives • 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	26
	<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> • 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 	
	<p>The individual shall be able to:</p> <ul style="list-style-type: none"> • Accurately produce mortices by hand and using a variety of machines e.g. hollow chisel morticer • Produce mortices which are parallel and free from cutter or chisel marks • Produce mortices and haunches to the correct size in the drawing • Produce tenons by 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
	<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> • 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 	

	<p>The individual shall be able to:</p> <ul style="list-style-type: none"> • 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' • Use filling where necessary/appropriate and ensure joints are complete and well finished 	
8	Measurements	16
	<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> • 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 	
	<p>The individual shall be able to:</p> <ul style="list-style-type: none"> • Produce joinery to the correct measurements using tape measures, folding rules, and other measuring devices • Check diagonals for squareness • Ensure that all components are the correct length and shape in according to the drawing 	
9	Finishing	16
	<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> • The use of hand tools in the finishing of a joinery project • Types of sanding paper, for the wood, and varnishing 	
	<p>The individual shall be able to:</p> <ul style="list-style-type: none"> • 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	7
	<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> • Different techniques of fixing • Range of glues and their preparations • Condensation and preventative actions 	

	<p>The individual shall be able to:</p> <ul style="list-style-type: none"> • Check quality and completeness of all components • Plan and schedule transportation and check all tools and machines are in good working order and available/are on site • Check the location of the installation e.g. for water pipes and wiring and liaise with plumbers and electricians/other trades for advice and support • Check with customer where changes may be necessary to the positioning/fixing and discuss options • Protect installation area as necessary e.g. floor coverings • Take care not to damage any flooring or wall finishes/contents • Work around the needs of customers to avoid disturbance/disruption to services as much as possible e.g. drilling on concrete • Maintain security of the premises/work area • Present the installation to meet customer and related trades needs and expectations 	
	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 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 Standards Specification and the Assessment Strategy. They will be submitted to WSI for approval together, in order to demonstrate their quality and conformity with the Standards Specification.

Prior to submission for approval to WSI, the Marking Scheme and Test Project will liaise with the WSI Skill Advisors in order to benefit from the capabilities of the CIS.

4 THE MARKING SCHEME

4.1 GENERAL GUIDANCE

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

The Marking Scheme is the pivotal instrument of the WorldSkills Competition, in that it ties assessment to the standards that represent the skill. 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 independent designer for the development of the Marking Scheme and Test Project. Please see the Rules for further details.

Experts and independent designers are required 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 a draft 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 as a whole must reflect the weightings in the Standards 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). It is advisable not to specify either the Assessment Criteria, or the allocation of marks, or the assessment methods, within this Technical Description.

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 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) specified 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, or instructions for how the marks are to be awarded. Aspects are assessed either by measurement or 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 skill in 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	WSS MARKS PER SECTION	VARIANCE
		A	B	C	D	E	F	G	H			
STANDARDS SPECIFICATION SECTION	1	5.00								5.00	5.00	0.00
	2		2.00					7.50		9.50	10.00	0.50
	3								11.00	11.00	10.00	1.00
	4			5.00						5.00	5.00	0.00
	5				10.00	10.00	10.00			30.00	30.00	0.00
	6		8.00	5.00				2.50	9.00	24.50	25.00	0.50
	7			10.00				5.00		15.00	15.00	0.00
TOTAL MARKS		5.00	10.00	20.00	10.00	10.00	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, in all circumstances. The marking teams must be organized to ensure that there is no compatriot marking in any circumstances. (See 4.6.)

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)
- 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, with a fourth to coordinate the marking and acting as a judge to prevent compatriot marking.

4.7 ASSESSMENT AND MARKING USING MEASUREMENT

Three Experts will be used to assess each aspect. 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.

4.8 THE USE OF MEASUREMENT AND JUDGEMENT

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

4.9 COMPLETION OF SKILL ASSESSMENT SPECIFICATION

A: Drawing/Setting out

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 50mm 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 mm 100%;
- Measurements over 1 mm and up to and including 2mm 50%;
- Measurements over 2 mm 0%.

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).

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 will be assessed as Judgment due to multiple faces and high degree of work to manufacture

External Joint: Measurement (M) - will be 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 0.3mm	100%
Up to and including 0.6mm	50%
Over 0.6mm	0%

Note:

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

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 1mm	100%
1.1mm up to and including 2mm	70%
2.1mm up to and including 3mm	40%
Over 3mm	0

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 will be determined by the CE, DCE, 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 will be deducted).

F: Measurement

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

Primary dimensions:

- Measurements up to and including 1 mm 100%
- Measurements 1.1 mm and up to and including 2 mm 50%
- Measurements over 2 mm 0%

Secondary dimensions:

- Measurements up to and including 1 mm 100%;
- Measurements over 1 mm 0%

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 - one-mark deduction;
- Replacement of subsequent pieces - one-mark deduction;
- Up to a maximum of two mark deduction per module

4.10 SKILL ASSESSMENT PROCEDURES

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

- The Chief and Deputy 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 will be 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 CE and DCE will confirm what form the assessment will be on C-3.

5 THE TEST PROJECT

5.1 GENERAL NOTES

Sections 3 and 0 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 WSSS.

The purpose of the Test Project is to provide full, balanced and authentic 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, as will be its relationship with actual work performance.

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.

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.

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 Specification. Section 2.1 refers.

5.2 FORMAT/STRUCTURE OF THE TEST PROJECT

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

5.3 TEST PROJECT DESIGN REQUIREMENTS

The Test Project consists of one 22hr project divided into three 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)

The Test Project design must comply with work typical of a Joiner stated in 1.1.2 2.1, and 2.2. Also in the design, the designer should consider the project for use after the competition. (If possible)

Eligible Experts designs be selected by the Skills Competition Manager and Director of Skills Competitions eight months prior to the Competition.

The Test Project is to have a maximum size of 0.3m³.

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 designer's 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 1-hour work. A minimum of 14 joints to a maximum of 18 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.

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 in a computer assisted drawing format to ISO-standards. First/Third angle projection will be 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 will be produced using Auto Desk – AutoCAD software only; no other drawing media will 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 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

Competitors can bring any material they want like MDF, ply, and solid timber.

Sheet material 1.5m², Timber species must be different to the Test Projects material, 0.05m²

5.4 TEST PROJECT 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 Who develops the Test Project or modules

The Test Project/modules are developed by all eligible Experts.

The Test Project comprises one design that must be completed in 22 hours. Included in this 22 hour, is drawing set-out that will take approximately one hour to complete, but can be more depending on Test Project complexity. It is important to remember that when designing the project, the Competitor will have approximately 20 hours minimum to build the project after the drawing set-out is complete.

5.4.2 How and where is the Test Project or modules developed

The Expert group will design the Test Project and communicate on the Discussion Forum using the following criteria:

In the case of project selection the Chief Expert and Deputy Chief Expert will moderate the group of Experts who design the Test Projects.

5.4.3 When is the Test Project developed

The Test Project is developed before the Competition by each Expert and then posted to the Joinery Discussion Forum.

The Test Project is developed according to the following timeline:

TIME	ACTIVITY
Nine (9) months prior to the Competition	<ul style="list-style-type: none"> • A timetable with the exact deadline dates for Test Project development must be placed on the Discussion Forum before this time. • Chief; Deputy Chief and all eligible Experts to design Test Project and submit by no later than month nine
Eight (8) months prior to the Competition	<ul style="list-style-type: none"> • All Test Project proposals are put on the Discussion Forum. • Experts discuss the proposed projects and ensure they are compliant with 5.3 in the Technical Description. • Experts of the non-compliant proposed modules have the opportunity to make their proposal compliant and re-submit it. • All Test Projects on the Discussion Forum are for all Experts and Competitors to see and practice if the Competitor wants to.
Six (6) months prior to the Competition	<ul style="list-style-type: none"> • All eligible uploaded Test Projects will be voted on by Experts who have submitted a Test Project. The Director of Skills Competitions posts the three highest voted Test Projects on the open Discussion Forum for all Experts to view. • Competitors can continue to practice these three shortlisted projects.

TIME	ACTIVITY
Five (5) months prior to the Competition	<ul style="list-style-type: none"> • All Experts will vote on remaining three projects with only the Skill Competition Manager (SCM) knowing the final vote. • A former Expert assigned to organize the change will prepare a minimum 30% change. The 30% change CANNOT change the material lists. The former Expert WILL NOT share their change proposals with the Experts or compatriot Competitor or country, or any individual involved with the skill directly or indirectly. • At this time the Skill Competition Manager will prepare the official CIS spreadsheet, • Note: The change is 30% minimum and • 50% maximum. This will preserve the design submitted by the author.
At the Competition – C-3	<ul style="list-style-type: none"> • The Test Project will be presented to the Experts to discuss and become familiar with the 30% change on afternoon of C-3. • The 30% change is accepted in its entirety and will not be modified. • At this time the CIS is finalized • Experts will not share the 30% change with their Competitor as it will be presented to them on C-2 • Drawings will not be modified at the competition site as this would have been completed prior to C-3. Experts can ensure that details are precise and complete.

5.5 TEST PROJECT VALIDATION

For a Test Project module to be compliant it must meet the following requirements:

- It meets all the requirements listed in the Technical Description;
- Test Project is able to be built in the 22-hour time requirement;
- Included in the 22 hours is a drawing set-out that will take approximately one hour to complete, or more if there is additional setting out required;
- The Test Project must be built under the supervision of the designing Expert by a person of similar competence to that of a Competitor.

5.6 TEST PROJECT SELECTION

Only compliant modules are eligible for selection.

The Test Project is selected by a closed vote of eligible Experts on the Discussion Forum five months prior to the Competition. The Director of Skills Competitions will advise which Experts are eligible to vote.

The Director of Skills Competitions monitors the vote by the eligible Experts and posts the selected modules in each of the flat and 3D modules on the open forum for all Experts to view.

5.7 TEST PROJECT CIRCULATION

The Test Project is circulated via the website as follows:

The Test Project is circulated to all Experts on the WorldSkills website Six months prior to the Competition.

5.8 TEST PROJECT COORDINATION (PREPARATION FOR COMPETITION)

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

5.9 TEST PROJECT CHANGE AT THE COMPETITION

A former Expert will be selected to work on a minimum 30% change to the Test Project. Changes must work within the materials already identified on the Infrastructure List including tooling where necessary. At the Competition on C-3, the minimum 30% change for the Test Project will be presented to all Experts.

The minimum 30% change is accepted in its entirety and will not be modified.

5.10 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.

Materials used for the project modules may be hardwood, manufactured panel products or combinations of these. Dressed material is to be supplied 0.5mm 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". Samples of materials and/or material data specification should be forwarded to all Experts and Competitors six months prior to the competition.

The Workshop Manager will have at their disposal a professional/competent machinist to monitor the shapers during the Competition. This will be 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) will be 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 will be 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 skill specific Discussion Forum (<http://forums.worldskills.org>). Skill related decisions and communication are only valid if they take place on the forum. The Skill Competition Manager (or an Expert nominated by the Skill Competition Manager) 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 Competitor Centre (www.worldskills.org/competitorcentre).

This information includes:

- Competition Rules
- Technical Descriptions
- Marking Schemes
- Test Projects
- 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 during the Competition is defined in the Skill Management Plan that is created by the Skill Management Team led by the Skill Competition Manager. The Skill Management Team comprises the Skill Competition Manager, Chief Expert, and Deputy Chief Expert. The Skill Management Plan is progressively developed in the eight months prior to the Competition and finalized at the Competition by agreement of the Experts. The Skill Management Plan can be viewed in the Expert Centre (www.worldskills.org/expertcentre).

7 SKILL-SPECIFIC SAFETY REQUIREMENTS

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

- All Competitors must use safety glasses when using any hand, power or machine tools or equipment likely to create chips or fragments that may injure the eyes;
- A first-aid kit and eye wash station must be available throughout the Competition;
- Experts will use the appropriate personal safety equipment when inspecting, checking or working in the machinery work area and Competitors' work areas;
- All Competitors must use respiratory protection when using any hand or power equipment which creates dust; local extraction machines are acceptable
- All machines will use the necessary safety guards, tooling, suction devices, auxiliary equipment and extraction system that meet the machine manufacturer's specifications;
- The Workshop Manager will be responsible for tooling and tooling changes on machinery. The Workshop Manager is not allowed to adjust any machinery for a Competitor but is required to provide supervision;
- The lighting level at bench height is to be a minimum of 500 lux;
- The competition site requires a smooth, flat and level floor. This floor must not have large cracks, gaps, irregularities or other tripping hazards
- Competitor work space must NOT be hidden from view, to facilitate the Expert team for Health, Safety, and Environment to observe safe working practice; the space must be visible 100% of the time.

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 Competition Manager on behalf of 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 Skill Competition Manager must review, audit, and update the Infrastructure List in partnership with the Technical Observer in preparation for the next Competition. The Skill Competition Manager must advise the Director of Skills Competitions of any requests for increases in space and/or equipment.

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

8.2 COMPETITOR'S TOOLBOX

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

Where the competitor work space is 5m x 3m, the following rule applies:

The working side that is 5m, the maximum permitted height of any object is not allowed to be greater than 1.5m.

The working side that is 3m, the maximum permitted height of any object is not allowed to be greater than 1m.

8.3 MATERIALS, EQUIPMENT, AND TOOLS SUPPLIED BY COMPETITORS IN THEIR TOOLBOX

The Competitor may bring the following tools to the Competition. The list is a suggestion only and is not limited; unless otherwise stated. However, only two bench-mounted static power tools are allowed.

ITEM	PICTURE
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;	
Portable compound mitre saw that may have sliding mechanism that is depth adjustable, having suitable rear guarding so as to protect other Competitors, the public and Experts from dust and flying materials;	
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;	
Sander;	
No premade jigs or holding devices for power tools to form joint to be used in the Competition;	
Set of drawing instruments;	
Awls;	
Planes;	
Chisels;	
Shaping tools;	
Rebate plane;	
Plough plane;	
Gauges;	
Squares;	
Mallet;	

Drill and bits;	
Hammer;	
Screwdrivers;	
Hand tool sharpening equipment;	
Trammel points;	
Portable vice;	

- Abrasive paper with a maximum grit of 250; with no specific profiles for sanding; paper must be new and unused, if in doubt it will be removed;
- Portable lamp; but no light that is excessively bright that could distract a Competitor;
- At the competition time the committee 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;
- 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 will be removed after a vote.
- Clamps can be over 1500 but not the clamp stand;
- 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 will be 50% max;
- 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.

8.4 MATERIALS, EQUIPMENT, AND TOOLS SUPPLIED BY EXPERTS

Not applicable

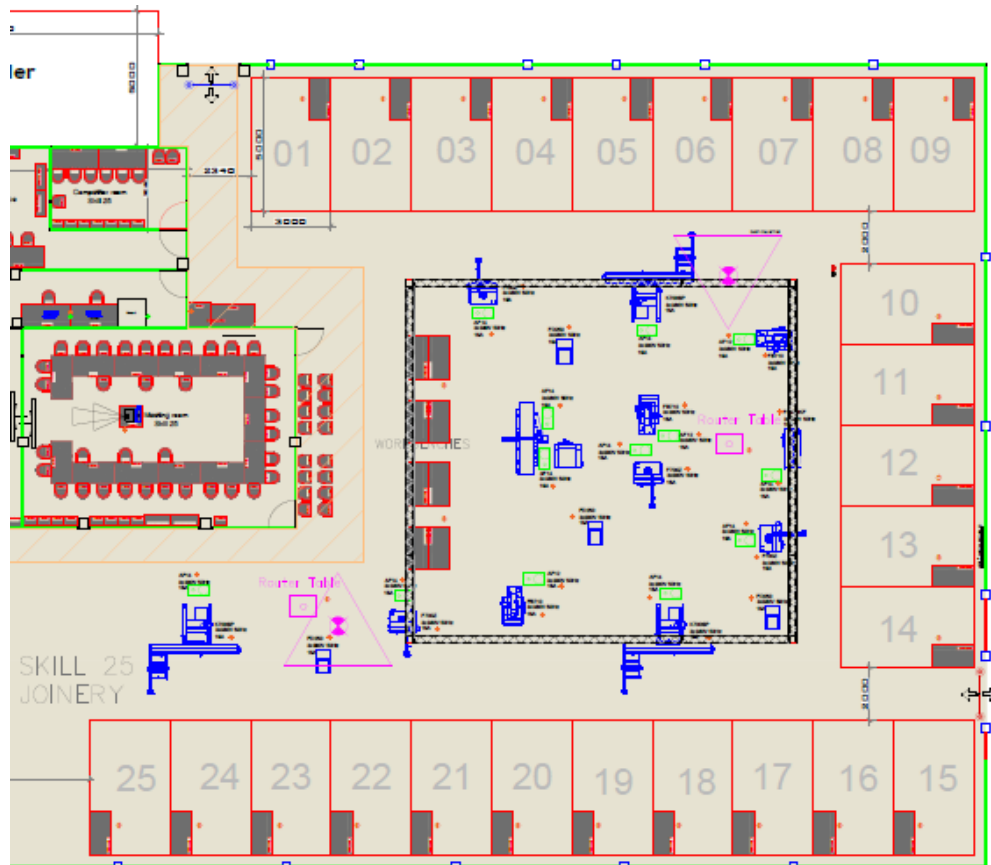
8.5 MATERIALS AND EQUIPMENT PROHIBITED IN THE SKILL AREA

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

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

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 work flow, and documentation management and distribution.

TOPIC/TASK	SKILL-SPECIFIC RULE
Use of technology – USB, memory sticks	<ul style="list-style-type: none"> Competitors, Experts, and Interpreters are not allowed to bring memory sticks into the workshop.
Use of technology – personal laptops, tablets and mobile phones	<ul style="list-style-type: none"> Competitors are not allowed to bring personal laptops, tablets or mobile phones into the workshop. Experts and Interpreters are allowed to use personal laptops or tablets for translation of Test Project documents only. If used, the personal laptop and/or tablet must remain locked in the workshop until the conclusion of the competition. Experts and Interpreters are allowed to bring a mobile phone into the workshop (see note for photo)
Use of technology – personal photo and video taking devices	<ul style="list-style-type: none"> 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 mobile phones. Competitors are allowed to use personal photo and video taking devices in the workshop at the conclusion of the competition only.
Templates, aids, etc.	<ul style="list-style-type: none"> Competitors are not permitted to bring prefixed or ensemble jigs, fixtures, or templates. A manufactured jig must only 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 will be addressed during toolbox checks.
Drawings, recording information	<ul style="list-style-type: none"> 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; sanctions may be applied if this rule is breached.
Health, Safety, and Environment	<ul style="list-style-type: none"> Refer to the WorldSkills Health, Safety, and Environment policy and guidelines document.

10 VISITOR AND MEDIA ENGAGEMENT

The Joinery competition area will maximize visitor and media engagement by including the following in their competition area:

- Try a trade – An area where 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

This skill competition will focus on the sustainable practices below:

- Recycling bins will be 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;

Compatriot countries/regions are only permitted to bring one shipping crate to transport ALL tools to the competition venue. The volume will be NO greater than 2m³ (2 metres cube) internal only. The structure of the shipping crate will not be included as part of this dimension. Any shipping crate with a larger internal volume, will have tools removed to the equivalent volume reduction and not used during competition time. As some countries are required to ship crates in advance of WorldSkills, and may require some items to train; Competitors can bring personal tools that they are able to carry to the venue.

12 REFERENCES FOR INDUSTRY CONSULTATION

WorldSkills is committed to ensuring that the WorldSkills Standards Specifications 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 Standards Specification 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/)

This WSSS (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.

The following table indicates which organizations were approached and provided valuable feedback for the Description of the Associated Role and WorldSkills Standards Specification in place for WorldSkills Kazan 2019.

ORGANIZATION	CONTACT NAME
James Ebenistes	Remi James, Company Manager