

CONSTRUCTION AND BUILDING TECHNOLOGY

Cabinetmaking



Technical Description

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:

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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

Cabinetmaking

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

Cabinetmaking covers the manufacture of free-standing and built-in furniture and units, using wood at the sole or main material. It may include the design of furniture, but normally comprises the creation of furniture and units from designs prepared by others. Cabinetmaking differs from joinery through the quality of the wood and associated materials used, and the intricacy and aesthetic quality of the finished items. There is, however, some overlap between cabinetmaking and joinery.

A cabinetmaker generally works on commercial and residential assignments of a high quality and value. They will therefore exhibit very high standards of skill and professionalism in order to justify clients' expectations and willingness to pay. Most cabinetmakers work in small companies which have to be very sensitive to their reputation and market in order to sustain their businesses' viability.

The cabinetmaker will produce furniture and fittings in a workshop, at least until installing fitted items. However, in order to meet clients' needs, including for the items to add to the aesthetic qualities of their environment they are placed in, they will know intimately where bespoke items are intended to be placed. For items produced speculatively rather than for known clients, the cabinetmaker will have a clear view of the types of location and setting that will show the items at their best.

The cabinetmaker will produce, interpret and/or adapt drawings, set out and measure, cut, form joints, assemble, install if need be, and finish to a high standard. The quality of their work will show in:

The selection of the wood and other materials;

The placing of the wood to bring out its particular characteristics;

Construction techniques which allow for the natural movement of timber to achieve longevity and quality in the furniture piece;

The selection of additional materials including veneers and fittings;

The near-perfect fit of each part following accurate measurement, cutting and assembly, and the final appearance of the item.

Work organization and self-management, communication and interpersonal skills, problem solving, innovation and creativity, working precisely and accurately are the universal attributes of the cabinetmaker. They assume 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 and mistakes are largely irreversible and very costly.

Modern technology and mass production have enabled furniture and fittings, previously available only to the wealthy, to be more widely available. However, for those with disposable income and an eye for quality, the cabinetmaker is able to produce furniture and fittings that are a lasting pleasure both to use and to look at. In this discerning market the outstanding cabinetmaker will always be in demand.

1.1.3 Number of Competitors per team

Cabinetmaking 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.

2 The WorldSkills Occupational Standards (WSOS)

2.1 General notes on the WSOS

The WSOS 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/WSOS).

The skill competition is intended to reflect international best practice as described by the WSOS, and to the extent that it is able to. 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 that are set out in the Standards Specification. 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, provided that this does not distort the weightings assigned by the Standards.

2.2 WorldSkills Occupational Standards

Section	Relative importance (%)
1 Work organization and management	10

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 and tools
- Emergency procedures and reporting processes for accidents, first-aid, and fire
- The situations when personal protective equipment (PPE) must be used
- The uses, care, maintenance, and storage of tools, machines, equipment, and materials
- The significance of keeping a clean and tidy work area
- Ways in which working practices can minimize wastage and manage/control costs
- Sustainability measures applying to the use of 'green' materials and recycling
- Principles of work planning, operations, and time management
- 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

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, 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
- Plan and work efficiently, checking progress, and outcomes regularly to avoid unnecessary costs or other penalties
- Critically evaluate own work

Section	Relative importance (%)
2 Communication and interpersonal skills	5

The individual needs to know and understand:

- The importance of establishing and maintaining client confidence and trust
- Non-verbal communication
- The negotiation process
- The roles and requirements of associated trades and professions
- Effective methods of communication with different groups and individuals
- The value of building and maintaining productive working relationships with colleagues and managers
- The importance of swiftly resolving misunderstandings and conflicting demands
- Reporting methods

The individual shall be able to:

- Gain the trust of clients and manage expectations positively
- Visualize and interpret clients' wishes, giving advice and making recommendations or providing options which meet/improve their design and budgetary requirements
- Liaise with suppliers to negotiate prices and place orders
- Produce estimates for clients
- Recognize, respect, and adapt to changing circumstances and requirements
- Order components from other departments, allowing for enough time for production, and in a timely manner for own production to continue without hinder
- Communicate with others with reference to drawings, variations to documents, and restrictions
- Follow instructions, meet deadlines, and report on progress in the appropriate format

3 Problem solving, innovation, and creativity	5
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The individual needs to know and understand:

- Principles of style, form, and aesthetics
- The available options for enhancing quality through style and technique
- The common types of problem which occur during the work process
- Diagnostic approaches to problem solving
- The challenges of complex projects
- Trends and developments in the industry

Section	Relative importance (%)
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The individual shall be able to:

- Consider, explore, and discuss style, form, and aesthetics with clients and specialists
- Check work regularly to minimize problems at a later stage
- Recognize, clarify, and resolve problems swiftly, and through appropriate processes
- Develop creative solutions to challenges when working on complex projects
- Contribute ideas to improve the product and overall level of client satisfaction
- Keep up to date with changes and trends in the industry
- Show willingness to try new methods

4	Working with drawings	15
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The individual needs to know and understand:

- The essential information that should be included in a working drawing
- The ISO standards which govern drawings
- Geometry and trigonometry
- The significance of an accurate working drawing as a basis for high quality work
- The importance of identifying and correcting errors and omissions
- The options for adding value through construction style and technique

The individual shall be able to:

- Establish the required uses and environment of the finished product
- Establish the required or appropriate materials for the product
- Establish the dimensions, characteristics, and style of the required product
- Produce drawings both to scale and full size
- Produce drawings which clearly indicate the type of construction
- Interpret given drawings, optimizing the potential for high quality construction
- Clarify and correct missing or incorrect information
- Determine the types and quantities of the required materials for the product

Section	Relative importance (%)
5 Selecting and preparing materials	25

The individual needs to know and understand:

- The importance of thinking through each project to ensure that everything is in place to enable completion
- The implications for the business/organization of not setting out correctly
- Calculations to assist accuracy and the efficient use of time and materials
- The characteristics and uses of hardwood and softwood
- The characteristics and uses of board materials
- The characteristics and uses of veneers
- Methods for identifying defects and limitations in the materials selected
- The characteristics of the selected material when in use by the client
- The basis for selecting fittings for hinges, locks, catches, stays, handles, and shelves

The individual shall be able to:

- Visualize whole projects to identify and resolve challenges
- Select the material in order to avoid defects and enhance appearance
- Select fittings for use and appearance
- Set out materials in order to determine all the measurements, sections, angles, mitres, and joints
- Use geometric methods to determine complex angles, joints, and intersections
- Label material and items as appropriate
- Transfer points, measurements, and angles accurately from plans to materials
- Set out directly on materials where appropriate
- Produce components which will fit together with items from CNC machines.
- Make jigs for stationery machines, based on drawings and within safety requirements
- Produce shaped elements, using jigs on stationery machines

6 Joining and assembly	25
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The individual needs to know and understand:

- How solid wood and manufactured panel material components are joined to create and assemble items
- The balance to be struck between the quality of joinery and the available time
- The properties, uses and limitations of glues, and other fixing materials

Section	Relative importance (%)
<p>The individual shall be able to:</p> <ul style="list-style-type: none"> • Use prepared solid wood to set out the required type and size of joints for an assembly • Use traditional hand tools, portable power tools and assorted stationary woodworking machines including the option of CNC to cut and prepare a wide range of joints including mortise and tenon, finger joints, mitres, dowel joints, halving joints, and dovetail joints, etc. • Use woodworking machines or a combination of machines and hand tools to produce woodworking joints of various types • Use woodworking machines to form grooves, rebates, and mouldings • Cut manufactured panel materials and prepare joints using a dimension saw • Apply edging strips and face veneers to panels • Work with parts from external suppliers, such as mechanical parts for drawers and doors. • Incorporate parts of the projects made by other departments, including parts made on CNC machines. 	
7 Preparation of surfaces and finishing	15
<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> • How various components are prepared for polishing (finishing) with clear coating such as lacquer and the like • The uses and limitations of preparatory techniques and materials such as abrasives • Methods of fitting doors and drawers into cabinet carcases • The uses and limitations of polishing materials and agents • The importance of checking finish against client requirements and expectations and personal standards 	
<p>The individual shall be able to:</p> <ul style="list-style-type: none"> • Position and fit hinges • Control the fit around door edges • Fit drawers and other moving items into carcases to achieve a glide fit • Produce surfaces that are free from defects • Produce surfaces on complete assemblies that are free from defects • Produce soft edges to components or assemblies • Polish components or assemblies • Review items for harmony, proportion, fit, and finish 	
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, in order 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 people 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 Rules for further details.

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

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

4.2 Assessment Criteria

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

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

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

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

4.3 Sub Criteria

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

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

4.4 Aspects

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

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

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

4.5 Assessment and marking

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

4.6 Assessment and marking using judgement

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

- benchmarks (criteria) for detailed guidance for each Aspect (in words, images, artefacts or separate guidance notes)
- 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

WorldSkills is committed to continuous improvement. This particularly applies to assessment. The SMT is expected to learn from past and alternative practice and build on the validity and quality of assessment and marking.

Sections A to G

A Dimensions

Specific dimensions are measured. All dimensional marking is done by templates supplied by the Workshop Manager.

B Conforming to drawing

The project must conform to the drawing in all instances

C Face marking and joints before gluing

Indication of face marking system. The inside of the joints is assessed before gluing, including fit, and accuracy. Dowels and biscuits must be inserted in a uniform manner for presentation/marketing.

A selected dovetail joint(s) to be made with hand tools only. No electric tools are permitted.

D Joints after gluing

Inspection of joints at assessment time. The joints should have no gaps and show no evidence of fillings (glue, sawdust, wax, etc.).

E Fitting and movable parts

Hardware fitting to doors, drawers etc. according to drawing and information sheets. Fit and function of moving parts. Incorporating of parts made from external departments or external supplier. Wax or lubricant only allowed on moving parts.

F Surfaces

The quality of finish of all surfaces e.g. solid wood, veneered panels, and edges should be ready for polishing. The surfaces should show no evidence of fillings (glue, sawdust, wax, etc.). Surfaces are prepared to a maximum of 240 abrasive paper. Surfaces should be level with no visible cross scratches.

G Use of material

A penalty for the use of extra materials due to mistake up to a maximum of 3 points. 1/2 point per mistake.

H Safety

- Follow health, safety, and environment standards, rules and regulations;
- Maintain a safe working environment;
- Identify and use the appropriate personal protective equipment including safety footwear, ear, eye, and dust protection;
- Follow safety guide and instructions for use of jigs on stationery machines;
- Select, use, clean, maintain, and store all hand and powered tools and equipment safely.

4.10 Skill assessment procedures

Assessment and marking are an intense process that depends upon skilful leadership, management, and scrutiny.

When marking is carried out by a team of Experts, only the allocated team, and a member of the SMT may be present. Experts not involved in marking are not to be in the marking area. Experts can apply to the SMT to observe marking for a short time at close quarters but not their compatriot Competitor's work, with the intention to learn more about the marking procedure. At all other times Experts not involved in assessment can observe marking from two metres away.

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 Developer, 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 single Test Project assessed in stages.

An element of the Test Project may be carried out under control conditions and with restricted equipment.

5.3 Test Project design requirements

- The drawings for a Test Project proposal must be created in AutoCAD format DWG and also saved as a PDF file on the WorldSkills template and include the correct specifications.
- The drawings must be to the scale of 1:1, 1:2 or other suitable scale, and the format should include a maximum of two drawings of size A1. Smaller sizes are allowed if suitable to expedite work at the Competition.
- The orthographic drawing can be produced at an identified reduced scale. Test Project proposals should be produced considering the need for 30% change;
- Test Project proposals must be in English;
- Test Project proposals must have a drawer and a hinged component;
- Maximum clamping dimension shall be 900 mm. This means that the maximum jaw-to-jaw dimension of the clamp should 1000 mm or less to allow for clamping blocks (cauls). The maximum dimension of a project (height + width + depth) is to be 2500 mm.
- Test Project can be completed in 22 hours;

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 independently by all Experts.

5.4.2 When is the Test Project developed

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

Time	Activity
Prior to the previous Competition	Experts develop and propose Test Project modules individually.
At the previous Competition	All proposals that meet the design requirements are submitted to the WorldSkills Skill Competition Administration Manager to be discussed by all Experts on the WorldSkills Discussion Forum.
Twelve (12) months prior to the Competition	All the Test Project proposals are circulated on the WorldSkills website.
One (1) month prior to CPW	Experts shortlist three proposals by vote on the WorldSkills Discussion Forum.
Six (6) months prior to the Competition	The three (3) shortlisted Test Projects are circulated on the WorldSkills website as “pre” version of the Test Project.

Time	Activity
At the Competition on C-4	The Skill Competition Manager presents the chosen Test Project to all Experts.
At the Competition on C-3	The Independent Test Project Designer presents the 30% change of the Test Project to the Experts. The Experts advise Competitors accordingly.
After the competition	Experts will have the option of submitting proposals for consideration for two (2) months following the end of the Competition and if deemed worthy will also be voted on by Experts on the Discussion Forum, pending submission of a complete proposal.

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 is expected to identify one or more independent, expert, and trusted individuals initially to review the 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 and will ensure that the Test Project/modules can be completed within the material, equipment, knowledge, and time constraints of Competitors.

5.7 Test Project selection

Experts shortlist all proposals to three (3) Test Project proposals by a vote on the WorldSkills Discussion Forum. The final Test Project is selected by the Skill Competition Manager in collaboration with the Independent Test Project Designer.

5.8 Test Project circulation

The Test Project is circulated via the website as follows:

All Test Project proposals are circulated twelve (12) months prior to the Competition on the WorldSkills website.

The three shortlisted Test Project/modules are circulated six (6) months prior to the competition as "pre"-version.

The final decision on the Test Project is not circulated prior to the Competition. The Test Project/modules are presented to Experts on C-4.

5.9 Test Project coordination (preparation for Competition)

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

The selected Test Project is provided confidentially to an Independent Test Project Designer to prepare the 30% change.

5.10 Test Project change

The Independent Test Project Designer shall develop the 30% change to the secret final Test Project as required by WorldSkills. This change is presented to the Experts at the Competition on C-3.

5.11 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 such items may include those for fault finding modules or modules not circulated.

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 Chief Expert (or an Expert nominated by the Chief Expert) will be the moderator for this Forum. Refer to Competition Rules for the timeline of communication and competition development requirements.

6.2 Competitor information

All information for registered Competitors is available from the 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 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 six 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).

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.

Topic/task	Best practice procedure
Stationary machines	<ul style="list-style-type: none"> • Shared tools for stationary machines must be returned to the tool station after use (except for blades on the panel saw and bandsaw) • All stationary machines should be set to zero (squared) after use. It is always the Competitors' responsibility to check the machine before work begins • Competitors should arrive at machines prepared. Calculations and cutting list should be made before arriving at the machine • Competitors should use their ID cards to book machines and if they are not ready to use them their card will be placed at the bottom of the list. • It is the Competitor responsibility for the placement of the panel and veneer in the vacuum bag. Competitor should wait until they are satisfied with the press.
Competitor workshop area	<ul style="list-style-type: none"> • No drawing boards attached to chat/trolleys in shared workshop area. Documents attached to a clip board are allowed. Maximum clipboard size A3 • Competitors should set up workshop area, with minimal obstruction to spectator or Expert side
Tools	<ul style="list-style-type: none"> • Competitors must return clamps to the clamp rack immediately after use • Competitors must return shared power tools to the tooling area immediately after use • Competitors should use their ID card to book shared machines and if they are not ready to use them, their card will be placed at the bottom of the list.
Use of technology – personal photo and video taking devices	<ul style="list-style-type: none"> • Skill Competition Manager, Chief Expert, Deputy Chief Expert , Experts, Workshop Manager, Workshop Manager Assistant, and Interpreters are allowed to use personal photo and video taking devices in the workshop during the competition days only (C1 to C4) as long as it is not disturbing a Competitor. • The use of digital and/or communications devices inside the workshops area is allowed if it is relevant for carrying out a needed task.

Topic/task	Best practice procedure
Assessment	<ul style="list-style-type: none"> When marking is carried out by a team of Experts, only the allocated team, a member of SMT may be present. Experts not involved in marking are not to be in the marking area. Experts can apply to SMT to observe marking for a short time at close quarters but not their own compatriot Competitors work, with the intention to learn more about the marking procedure. At all other times experts not involved in assessment can observe marking from two meters away.
Shared workshop area	<ul style="list-style-type: none"> No drawing boards attached to chat/trolleys in shared workshop area. Documents attached to a clip board are allowed. Maximum clipboard size A3.

7 Skill-specific safety requirements

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)	Hairnet/hat (long hair only)	Hearing protection
General PPE for safe areas				√	√		Optional
Machine sanding	√	√	√		√	√	√
Hand sanding	√	√	√		√	√	Optional
Use of fixed machines	√	Optional	√		√	√	√
Use of portable machines	√	Optional	√		√	√	√

- All machines should be properly guarded and in accordance with the manufacturers' recommendations;
- All circular saws must have a riving knife and top guard;
- For all machines wooden safety aids may be requested by Experts;
- Compressed air is not to be used;
- A designated team of Experts (the machine safety team) are to check safety of all machines and to make a decision "safe" or "not safe";
- The selected Test Project is provided confidentially to an Independent Test Project Designer to prepare the 30% change.

- The light conditions must be uniform for all Competitors and must be a minimum 300 lux at each bench top and machine working surface;
- Each Competitor will have a working area of 15 m² (3 m x 5 m). Each bench must have a minimum of one vice with wooden chops mounted on the long side;
- The work surface of the bench must be height adjustable;
- No item in the Competitor's workspace can be above 1500 mm including the drawing board not including vacuum hose and lamp.
- Chop (Drop) Saw may not face the public;
- Electricity 220/240 V with minimum of 20 A fuse in each Competitor's area.

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 such 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.

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 up to three (3) toolboxes with the total external volume not exceeding 1.25 m³.

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

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

If the toolboxes are found to be oversize, then the compatriot Expert is asked to remove items till the SMT are satisfied the remaining equipment would fit within a 1.25 m³. This is tested by inserting a cube representing the volume into the toolboxes and asking the compatriot Expert to repack them incorporating the cube.

8.3 Materials, equipment, and tools supplied by Competitors






All conventional power tools listed below, but not limited to:

A power tool is defined as and tool which has a motor, this includes drill, screwdriver, and vacuum pump.

Power tools	Quantity	Photo
Domino joiner		
Router table		
Lamello/biscuiter machine		
Router		
Orbital sander		
Edge trimmer		
Jigsaw		

All conventional hand tools used by cabinetmakers including, but not limited to:

Hand tools	Quantity	Photo
Hand planes		
Bench Chisels		
Hand scrapers		
Rasp for wood working		
Handsaw		
Mallet		
Marking Gauge		
Router Bits		

Hand tools	Quantity	Photo
Tape Measure		
Steel ruler		
Combination square		
Sliding bevel		
Digital Calliper		

- Every power tool that is equipped with an attachment for dust exhaustion need to be connected to the supplied extraction unit when in use.
- There is only one extraction unit allowed per Competitor, and this is supplied by the Competition Organizer.
- If required Competitors must bring extra hose, fittings, and adaptors to accommodate different brands of power tools they are using;
- The only permitted stationary mounted machine the Competitor may bring, are one inverted router table including a selection of cutters.
- Competitors may not bring any tooling for stationary machinery supplied by the Competition Organizer except for drill bits;
- Solid timber and practice pieces are supplied by the Competition Organizer;
- Competitors may bring any conventional hand tools they wish;
- Competitors may bring sanding blocks, cauls, clamping block, straight edges, fence liners as long as they are not the same wood as the Test Project;

- In addition, each Competitor may bring a maximum of five (5) portable power tools of their choice except if the power tool listed below are being supplied by the competition organizer.
 - Biscuit joiners (one for every four Competitors);
 - Lipping planers (one for every four Competitors);
 - Domino machines (one for every four Competitors);
 - Dowelling machines (one for every four Competitors);
- The Competition Organizer and/or Sponsor will provide each Competitor with:
 - An MFT table or similar arrangement;
 - A chop/drop saw with a high-quality cross cutting blade. The blades supplied must be deemed acceptable by the Skill Management Team and must be of a very high standard;
 - An extraction system suitable for use with the portable power tools, table router and chop/drop saw;
 - Cordless drill on for every Competitor, minimum 13 mm chuck;
 - A cart/trolley for moving materials around the workshop for each Competitor.
- The Competition Organizer and/or Sponsor also provides.
 - An array of clamps for each Competitor which the Skill Competition Manager will specify;
 - Consumables (glue, biscuits, dowels, abrasives, etc.). As well, dust extraction is provided at each bench. The Competitors may bring a limited amount of abrasives, glue, and tape;
 - The Competition Organizer must provide ear plugs, safety glasses, and dust masks for all allowed on the workshop during competition.

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.

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.

Competitors are not permitted to bring prefixed or ensemble jigs, fixtures, or templates.

No rigid clamps over 400 mm long are allowed.

Competitors may not bring any solid wood, plywood, or MDF.

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 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.

Topic/task	Skill-specific rules+
Use of technology – personal laptops, tablets and mobile phones	<ul style="list-style-type: none"> • Competitors are not allowed to use personal laptops, tablets, or mobile phones inside the workshop area during the competition time. Any digital communication device must be stored in the Competitor locker during competition time. These can be removed during lunch time or at the end of each Competition day. • The Chief Expert, Deputy Chief Expert, Experts, and Interpreters are allowed to use personal laptops or tablets inside the Expert room. • Competitors can only use certified hearing protection, that does not have any communication or music capabilities. • The Skill Competition Manager is exempt from this rule.
Use of technology – personal photo and video taking devices	<ul style="list-style-type: none"> • It is forbidden to take pictures of the Test Project drawings, or any documents or information that is related to assessment and marking
Compatriot Communication time	<ul style="list-style-type: none"> • CC time must be held outside Competitor’s workstation. • During CC time Competitors and Experts can only communicate verbally. The use of drawings, sketches, notes etc. is not permitted.
Competitor workstation	<ul style="list-style-type: none"> • Experts cannot enter any Competitor’s workstation, from C-1 to C4 without permission by the SMT, unless in case of an emergency, injury or illness. • Chopsaw must not be placed facing the public, and with minimal interference to other Competitors. • No items can be above 1500mm except for vacuum hose and lamp.

Topic/task	Skill-specific rules+
Tools	<ul style="list-style-type: none"> • Competitors cannot bring any rigid clamps over 400 mm long. • There will be only one extraction unit allowed per competitor. • The only stationary power tool the competitor can bring is an inverted router table. • Competitors may not bring any tooling for stationary machinery supplied by the Competition Organizer except for drill bits • Competitors may not bring any solid wood, plywood, or MDF. Competitors may bring sanding blocks, cauls, clamping block, straight edges, fence liners as long as they are not the same wood as the Test Project • Competitors can bring up to five (5) portable power tools • Competitors are not permitted to bring prefixed or ensemble jigs, fixtures, or templates.
Test Project	<ul style="list-style-type: none"> • A selected dovetail joint(s) will be made with hand tools only No electric tools or saw guides is permitted. • Surfaces will be prepared to a maximum of grit 240 abrasive paper • Wax or lubricant only allowed on moving parts.
Drawings, recording information	<ul style="list-style-type: none"> • Test Project drawings and documents in paper or digital format are not allowed to be removed from the competition area until the conclusion of competition on C4.
Stationery machines	<ul style="list-style-type: none"> • Only designated Expert or Workshop Manager Assistant can assist Competitors in fitting tooling to machines. Expert cannot fit for compatriot Competitor.

10 Visitor and media engagement

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

- Try-a-Skill;
- Display screens;
- Test Project display;
- Career opportunities;
- Daily reporting of competition status.

11 Sustainability

This skill competition will focus on the sustainable practices below:

- Recycling;
- Use of completed Test Projects after Competition;
- If possible, certified wood is used for Test Project;
- If possible, project materials should be local to the Competition Organizer.

12 References for industry consultation

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/>) ILO 7522
- ESCO: (<https://ec.europa.eu/esco/portal/home>)
- O*NET OnLine (www.onetonline.org/)

The WSOS (section 2) appears most closely to relate to Cabinetmakers and Bench Carpenters: <https://www.onetonline.org/link/summary/51-7011.00>

and Cabinet Maker:

<http://data.europa.eu/esco/occupation/e1416610-ad08-4f37-8b46-9f99632a5c0f>

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 Occupational Standards in place for WorldSkills Shanghai 2021.

Organization	Contact name
Edward Johnson Ltd. (United Kingdom)	Edward Johnson, Designer, Cabinetmaker, and Director

13 Appendix

13.1 Responsibilities of the Independent Test project Designer making the 30% change

The Independent Test Project Designer making the 30% change has the following responsibilities:

- Provide 30% change to the Test Project;
- Provide the Material List for the Test Project;
- Collaborates with Skill Competition Manager and Skill Advisor to develop the Marking Scheme;
- Ensure that the Test Project adheres to the Infrastructure List;