worldskills

Technical Description

Industrial Design Technology

Skill 59

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

The Technical Description consists of the following:

1 Introduction

1.1 Name and description of the skill competition

1.1.1 The name of the skill competition is

Industrial Design Technology

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

Industrial design technology is the creation of a product designed for mass consumption. It must succeed in both form (appearance) and function and promote efficient manufacture. It must be technically feasible to produce, and meet a genuine need in the marketplace, at an acceptable price.

To fulfil the role of an industrial design technician, knowledge, skills, and qualities are required in each of the following broad areas:

- Market research, graphic and communication skills
- Design and development processes
- Engineering practice, and materials science/engineering

In start-ups and small companies, industrial design technicians may themselves cover all steps in this process. In larger organizations, they may support and contribute to either each phase of the process, or one or two phases only. For industrial design in larger organizations, teamwork is advantageous, to capitalize on a range of perspectives, attitudes, knowledge and skills.

Industrial design technology combines two disciplines: design, and engineering, in order to innovate with success as measured by the customer's response and the producer's viability and profit. It is essentially disruptive to current ways of doing and making things. This means that the industrial designer must stay constantly alert to new materials, technologies, markets, and consumer demand and benefit.

In summary: the sequence of steps, starting with market research, ideas development, and design, before physically making and testing, often many times, distinguishes industrial design from craft-based design. This is a very important difference to the process of the craft-based designer, whose creativity is embedded in the act of making. Good industrial design technicians respect the importance of inspiration and ideation as a separate set of activities, before testing, improvement, and manufacture.

1.1.3 Number of Competitors per team

Industrial Design Technology is a single Competitor skill competition.

1.1.4 Age limit of Competitors

The Competitors must not be older than 25 years in the year of the Competition.

1.2 The relevance and significance of this document

This document contains information about the standards required to compete in this skill competition, and the assessment principles, methods, and procedures that govern the competition.

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

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

1.3 Associated documents

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

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

2 The WorldSkills Occupational Standards (WSOS)

2.1 General notes on the WSOS

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

The skill competition is intended to reflect international best practice as described by the WSOS, to the extent that it can. The Standard is therefore a guide to the required training and preparation for the skill competition.

In the skill competition the assessment of knowledge and understanding will take place through the assessment of performance. There will only be separate tests of knowledge and understanding where there is an overwhelming reason for these.

The Standard is divided into distinct sections with headings and reference numbers added.

Each section is assigned a percentage of the total marks to indicate its relative importance within the Standards. This is often referred to as the “weighting”. The sum of all the percentage marks is 100. The weightings determine the distribution of marks within the Marking Scheme.

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

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

2.2 WorldSkills Occupational Standards

Section		Relative importance (%)
1	**Work organization and management**	**5**
	The individual needs to know and understand: • The role and responsibilities of the industrial design technician, and how it differs from craft-based design, creativity, and production • The importance of effective communications between co-workers, clients and other related professionals • Principles and practices for safe working practice across different work settings • Principles of sustainable workflow planning and resource optimization • Principles and methods for ◦ Organizing own time efficiently and effectively	

Section		Relative importance (%)
	◦ Setting and reaching goals for self and own areas of responsibility ◦ Scheduling and organizing work assignments ◦ Establishing priorities and rescheduling • Good practice in generating and maintaining records • Ethical principles for safeguarding and maintaining clients' and organizations' security and proper business advantage • The norms and expectations for best practice in one's role.	
	The individual shall be able to: • Use effective communications skills to ensure that the design process meets requirements • Apply safe working methods personally and for others • Select and keep to efficient and effective work methods and habits • Develop work plans that incorporate sustainability goals • Select and use appropriate planning and management tools • Maintain orderly and secure work areas • Maintain work records as required and helpful • Minimize distractions that impact on own effectiveness and efficiency • Respond positively to formal and informal opportunities to learn and update knowledge and expertise.	
2	**Design planning**	**10**
	The individual needs to know and understand: • Their organization's ◦ Brand ◦ Position in the market ◦ Range and nature of products and services • The sources of design commissions and requirements • Principles and methods for researching ◦ Market opportunities ◦ User positioning ◦ User painpoints • Principles, methods and ethics for obtaining information by ◦ Observation ◦ Analysis • Principles and techniques for drawing conclusions from data and inputs: ◦ Inductive reasoning (combining information in order to generalize) ◦ Deductive reasoning (applying general rules to situations) ◦ Analysis of sustainable market trends and green consumer demands.	

Section		Relative importance (%)
	The individual shall be able to • Receive and mentally process information and requests • Participate in new market research and product planning • Evaluate environmental benefit required for new products • Review the relationship of potential new products to the organization's product range and plans • Investigate the potential need and benefit of new products and product lines using suitable research methods • Integrate green market data to inform design concepts • Draw conclusions from the market research • Make design strategies for the development.	
3	**Design ideation**	**10**
	The individual needs to know and understand: • Design as a process for creating and developing concepts and specifications, through strategic problem-solving • Sustainable design methodologies (e.g. eco-design, circular economy principles) • Constraints and opportunities as they relate to the client and organization • Principles for visual and physical realization • The available techniques, methods, tools, and aids to support design and development • The impacts of innovation on design and the design process for mass consumption.	
	The individual shall be able to: • Conceive or receive a design idea • Through market research and consultation, create, realize, and evaluate design concepts for manufacturing • Evaluate the feasibility of design ideas, relative to ◦ Appearance ◦ Safety ◦ Function ◦ Serviceability ◦ Budget ◦ Production methods and costs • Modify and refine design ideas, based on the above factors • Optimize design concepts using Life Cycle Assessment (LCA) • Evaluate the environmental feasibility of design proposals (e.g. material recyclability, energy consumption) • Select the optimal concept for further development.	
4	**Sketching and 3D modelling**	**25**

Section		Relative importance (%)
	The individual needs to know and understand: • The essential characteristics of visualization for industrial design, including colour, visual materials' properties, composition, and typography • Principles, purposes, and techniques for sketching • The range of equipment and tools used to support sketching • Principles and methods for generating desired impressions and impact on viewers • Visual representation of sustainable designs (e.g. eco-material labeling, ecological benefit diagrams) • The range and sequence of information required for design documentation for mass consumption • The methods of manufacturing cost reduction • The available choices of IT hardware and software for 3D modelling • The techniques for 3D modelling.	
	The individual shall be able to: • Explore ways of articulating design ideas visually • Prepare sketches, iteratively, exploring options and results • Implement decisions regarding colour, visual materials' properties, and composition • Create sketches for detailed design • Visually present sustainable design solutions • Use CAD software to build the 3D model of design concept • Align 3D model with conceptual solutions • Reflect eco-friendly design elements in technical drawings • Maintain document control throughout the design process.	
5	**Technical development**	**25**
	The individual needs to know and understand: • The practical application of engineering science and technology • The technical standards governing the design idea and purpose • Ergonomics for the purpose of fitting users' needs and characteristics • The principles, techniques, procedures and equipment relevant to production • Production processes, quality control, and costs • Circuit boards, chips, electronic equipment, hardware and software • Properties and applications of sustainable materials (bio-based materials, recycled materials) • Material Life Cycle Assessment (LCA) and circular utilization technologies • Methods for identifying, testing, and selecting materials • The simulation of stress and movement	

Section		Relative importance (%)
	• The impacts of manufacturing and assembly on the function and appearance of given items.	
	The individual shall be able to: • Provide cost estimates and itemized production requirements • Build models, patterns, or templates • Analyse and evaluate information to determine compliance with standards • Estimate or quantify sizes, numbers, or amounts, of items relevant to production • Determine time, costs, resources, or materials needed for production • Collaborate with engineers to select environmentally friendly materials • Analyze the impact of material selection on production and the environment • Make the animations for simulation and function demonstration • Raise and discuss the needs for and benefits of modification • Review, adapt, and provide documentation, detailed instructions/ specifications, or drawings, for fabrication, construction, assembly, modification, maintenance and use.	
6	**Prototyping and testing**	**15**
	The individual needs to know and understand: • Machines and tools, including their design, uses, repair, and maintenance • Types and characteristics of materials used in prototyping • Importance of accuracy in detail and dimension • Methods of polishing prototype • Methods of painting prototype • Properties of paints and pigments • Green manufacturing processes (e.g. low-carbon production, energy-saving technologies).	
	The individual shall be able to: • Operate specified machines and tools for prototyping • Prototype with eco-friendly materials (e.g. 3D printing with recycled materials) • Fabricate models or samples in a range of materials, using hand and power tools • Minimize material waste during prototyping • Finish prototype surfaces • Assemble parts • Identify and apply relevant procedures and regulations to the prototyping and testing process • Put in place measures to ensure the validity of information and data collected	

Section		Relative importance (%)
	• Collect planned information and data for analysis • Review the implications of the analysis for design outcomes • Provide cost estimates for sustainable production solutions.	
7	**Presentation and promotion**	**10**
	The individual needs to know and understand: • Principles and methods for showing, promoting, and selling products or services ◦ Marketing strategy and tactics ◦ Product demonstration • Sustainable marketing (e.g. environmental certifications, carbon footprint labeling) • Product life cycle service models (e.g. leasing programmes, recycling programmes).	
	The individual shall be able to: • Develop industrial standards and regulatory guidelines • Develop sustainable promotional plans for products • Develop artistic or design concepts for decoration, exhibition, or commercial purposes • Design eco-friendly packaging and marketing materials • Present evaluation reports, including ◦ Operation and safety ◦ Market appeal ◦ Production efficiency ◦ Application • Communicate product environmental benefits to clients.	
	Total	**100**

3 The Assessment Strategy and Specification

3.1 General guidance

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

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

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

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

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

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

4 Assessment Design and Practice

4.1 General guidance

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

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

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

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

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

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

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

4.2 Assessment Criteria

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

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

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

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

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

4.3 Sub Criteria

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

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

4.4 Aspects

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

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

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

4.5 Assessment and marking

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

4.6 Assessment and marking using Judgement

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

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

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

4.7 Assessment and marking using Measurement

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

4.8 The use of Measurement and Judgement

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

4.9 Skill assessment strategy and procedures

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

The Assessment Criteria will follow the WorldSkills Occupational Standards. The final understanding on measurement marking and judgement marking is available when the Marking Scheme and the Test Project are approved.

Assessment is based on process and outcome, using measurement and judgement. There is daily marking to the extent that does not limit Competitors' reasonable choice of timing and sequence.

5 The Test Project

5.1 General notes

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

Whether it is a single entity, or a series of stand-alone or connected modules, the Test Project will enable the assessment of the applied knowledge, skills, and behaviours set out in each section of the WSOS.

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

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

The Test Project will enable knowledge and understanding to be assessed solely through their applications within practical work. The Test Project will not assess knowledge of WorldSkills rules and regulations.

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

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

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

5.2 Format/structure of the Test Project

The Test Project is a series of five (5) modules.

Module	Description	Module completion time
1	Module 1: Concept Design	6 hours
2	Module 2: CAD Modelling and 3D Printing	6 hours
3	Module 3: Prototyping	6 hours
4	Module 4: Design Proposal	2 hours
5	Module 5: Design Promotion	2 hours

5.3 Test Project design requirements

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

The Test Project consists of the following modules:

Module 1: Concept Design

A1: Design planning

• Design planning based on the given information

A2: Design exploration

• Concept exploration and expression by paper sketches

A3: Concept initiative

• Concept detailed design by digital sketches

Module 2: CAD Modelling and 3D Printing

B1: Build 3D model of the concept in 3D software

B2: Render 3D model of the concept

B3: Make technical drawings of the general assembly and components

B4: Make user scenario renderings by the provided materials

B5: Generate 3D animations to demonstrate design highlights

B6: 3D printing according to the 3D model

Module 3: Prototyping

C1: Finish 3D printing of all components

C2: Polish 3D printed components

C3: Paint the components according to the selected color scheme

C4: Assemble all components into a finished prototype

Module 4: Design Proposal

D1: Collect the output of each module to make the design proposal

D2: Make a product demonstration video

Module 5: Design Promotion

E1: Make a poster to promote the design.

5.4 Test Project coordination and development

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

5.4.1 Test Project coordination (preparation for Competition)

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

5.4.2 Who develops the Test Project/modules

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

5.4.3 When is the Test Project developed

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

Time	Action
Fifteen (15) months prior to the Competition	The ITPD is identified and a Confidentiality Agreement between WSI and the ITPD is organized.
Two (2) months prior to the Competition	The Test Project documents are sent to the WorldSkills International Skills Competitions Administration Manager.
At the Competition every morning of each Competition Day	The full Test Project/modules are presented to the Competitors and Experts.

5.5 Test Project initial review and verification

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

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

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

5.6 Test Project validation

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

5.7 Test Project circulation

The Test Project/modules are not circulated prior to the Competition. The Test Project/modules are presented to Experts and Competitors every morning of each Competition Day.

5.8 Test Project change

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

5.9 Material or manufacturer specifications

Specific material and/or manufacturer specifications required to allow the Competitor to complete the Test Project will be supplied by the Competition Organizer and are available from www.worldskills.org/infrastructure located in the Expert Centre. However, note that in some cases details of specific materials and/or manufacturer specifications may remain secret and will not be released prior to the Competition. These items may include those for fault finding modules or modules not circulated.

6 Skill management and communication

6.1 Discussion Forum

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

6.2 Competitor information

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

This information includes:

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

6.3 Test Projects and Marking Schemes

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

6.4 Day-to-day management

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

6.5 General best practice procedures

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

Topic/task	Best practice procedure
Equipment failure	• In the occurrence of equipment failure Competitors must notify Experts immediately by raising their hand. Experts will take note of the time that the Competitor is not able to make use of their equipment. Any time lost due to equipment failure is to be recorded on the “Competitor Time Out” form. Additional time is provided to the Competitor at the end of the standard Module time. No extra time will be given for work that has not been saved before the equipment failure.

7 Skill-specific safety requirements

7.1 Personal Protective Equipment

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

Task	Sturdy shoes with closed toe and no heel	Nitrile gloves
General PPE for safe areas	√	
Competitor workstations	√	
Prototype polishing and painting		√

8 Materials and equipment

8.1 Infrastructure List

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

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

The Infrastructure List specifies the items and quantities requested by the Skill Management Team for the next Competition. The Competition Organizer will progressively update the Infrastructure List specifying the actual quantity, type, brand, and model of the items. Note that in some cases details of specific materials and/or manufacturer specifications may remain secret and will not be released prior to the Competition. These items may include those for fault finding modules or modules not circulated.

At each Competition, the Skill Management Team must review and update the Infrastructure List in preparation for the next Competition. The Skill Competition Manager must advise the Director of Skills Competitions of any increases in space and/or equipment.

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

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

8.2 Competitors toolbox

Competitors are not allowed to send a toolbox to the Competition. All tools are provided by the Competition Organizer.

8.3 Materials, equipment, and tools supplied by Competitors

It is not applicable for Competitors to bring materials, equipment, and tools to the Competition.

However, Competitors are allowed to bring personal tools on the Familiarization Day as defined below and the tools must remain in the Competitors area while the competition is underway.

- Sketching pens and tools
- Model making and polishing tools
- Model painting tools and pigments

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

8.4 Materials, equipment, and tools supplied by Experts

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

Experts are responsible that Interpreters bring their own PPE.

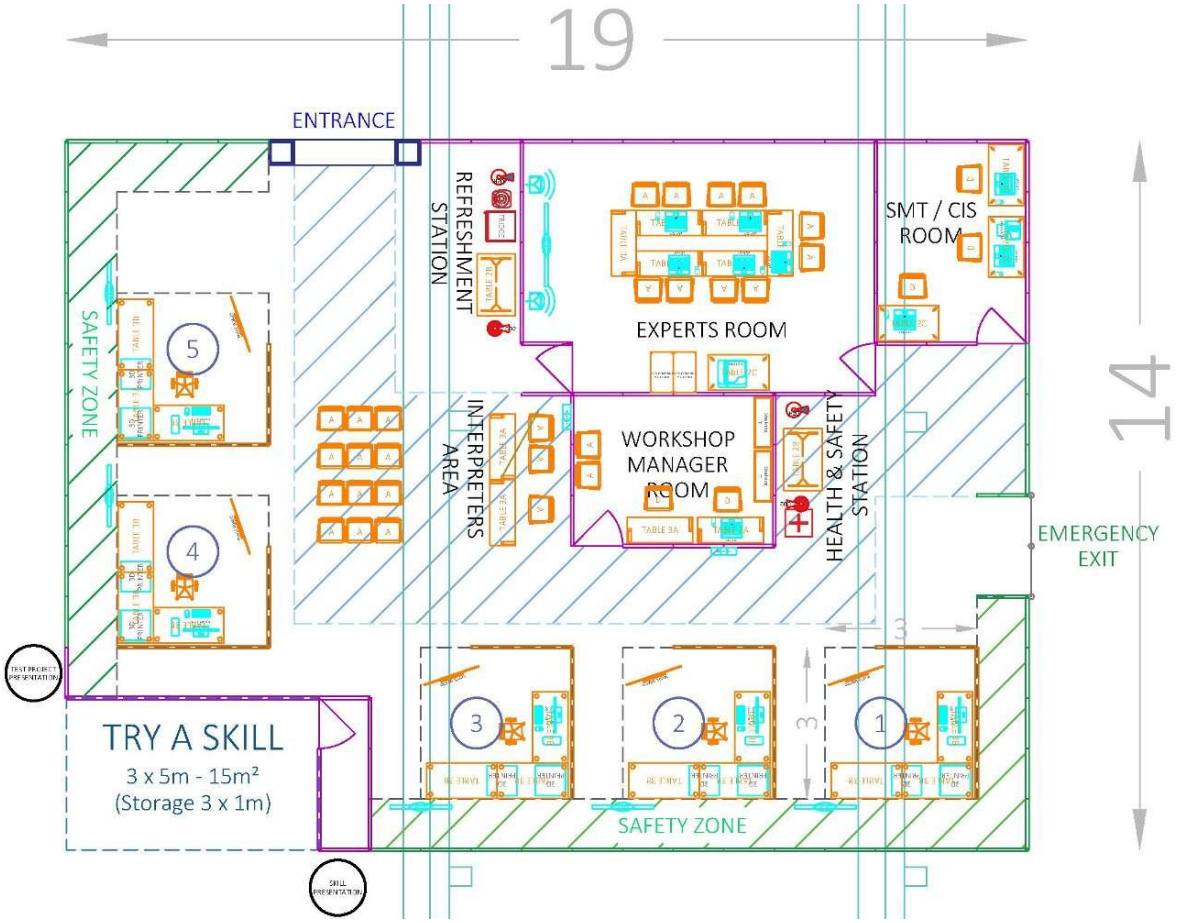
8.5 Materials and equipment prohibited in the skill area

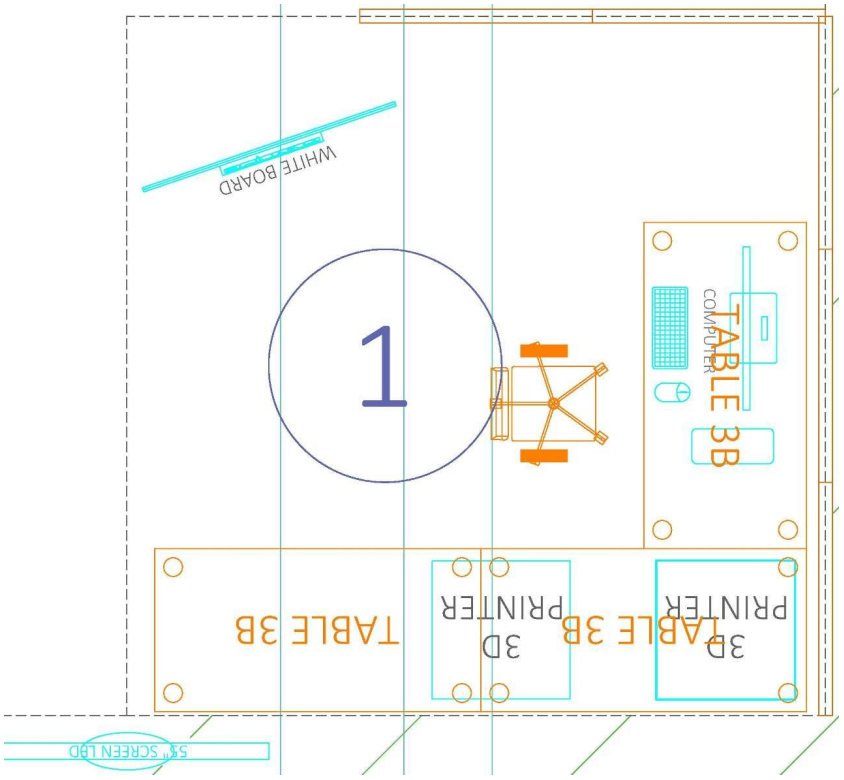
Competitors and Experts are prohibited to bring any materials or equipment not listed in section 8.3 and section 8.4.

8.6 Proposed workshop and workstation layouts

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

Example workshop layout





9 Skill-specific rules

9.1 General notes

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

9.2 Skill-specific rules

Topic/task	Best practice procedure
Use of technology – personal laptops, tablets, and mobile phones	• From C1 to C4 Chief Expert, Experts and Interpreters are allowed to use personal laptops, tablets, and mobile phones in the Expert room only. Exceptions are possible with the Skill Competition Manager approval. • The Skill Competition Manager is allowed to use his laptop, tablet and mobile phone at all times. • Competitors are not allowed to bring personal laptops, mobile phones, and tablets into the workshop. If these items are brought into the workshop, then they must be locked in the personal locker and only removed at the end of the day. • Wireless headphones and smartwatches are not allowed for the Competitors. If these items are brought into the workshop, then they must be locked in the personal locker and only removed at the end of the day.
Use of technology – personal photo and video taking devices	• The use of personal photo and video taking devices is forbidden in the workshop until the last break of each Competition day.
Use of technology – personal tools for sketching and prototyping	• From C1 to C4 Competitors are allowed to check and use tools from their toolbox to do the tasks from Test Project relating to sketching and prototyping.
Use of technology – local software for translation	• From C1 to C4 Competitors are allowed to use the local software, according to the Infrastructure List, to translate the signs/labels on the sketches and any text in the presentation according to the instructions in the Test Project.
Use of technology – 3D printing process	• Competitors are allowed to leave the 3D printing in the prototyping process during the lunchtime however they will take full responsibility and have to deal with any after effects. If the process goes wrong, the Workshop Manager is allowed to stop the 3D printer, but the Competitor's time is not extended.

Topic/task	Best practice procedure
Documentation	• All paperwork presented to Experts and Competitors must remain in the workshop until Competition Completion on C+1.
Attendning to a Competitor	• Experts must not attend a Competitor at their workstation without another Expert. The compatriot Expert may attend at this time to observe or translate if there is no Interpreter. Interpreters can only interpret when they are asked to do so.

10 Expert knowledge and experience

10.1 Requirements

Experts appointed for this skill competition must have the following knowledge and experience for the appropriate occupation or work role as documented in **section 1.1.2**.

- A recognized qualification in Industrial Design, Product Design Engineering, or a directly related engineering/design field
- At least 3 years of professional experience within the industrial design, product development, or advanced manufacturing sectors
- Proven experience (minimum 3 years) in teaching, training delivery, or curriculum development within Industrial Design, Product Design, or relevant TVET programs
- Expertise in the entire industrial design process, from research, ideation, and concept sketching through prototyping, refinement, detailed design, and design for manufacture
- Expert-level proficiency in industry-standard 3D Computer-Aided Design (CAD) software (e.g., SolidWorks, Creo, Fusion 360,) for modeling, surfacing, assembly, and drawing generation
- In-depth knowledge of creating and interpreting detailed engineering drawings, including comprehensive application of Geometric Dimensioning and Tolerancing standards
- Extensive knowledge of a wide range of materials (polymers, metals, composites, woods) and their properties, coupled with a thorough understanding of relevant manufacturing processes (injection molding, CNC machining, sheet metal fabrication, additive manufacturing, casting)
- Proven ability to design components and products optimized for cost-effective, efficient, and reliable manufacturing and assembly
- Strong grounding in user research methodologies, ergonomic principles, and designing products focused on user needs, safety, and comfort
- Hands-on experience with various prototyping techniques (3D printing, traditional modelmaking) to create functional and aesthetic prototypes
- Knowledge of sustainable design principles, materials selection for reduced environmental impact, and considerations for product life cycle
- Expertise in creating compelling design presentations integrating sketches, renderings, CAD models, and animations to effectively communicate design intent and solutions
- Thorough understanding and experience applying the specific WorldSkills Industrail Design Technology Competition technical descriptions, rules, marking schemes, and competition procedures
- Proven ability to objectively assess design work against strict criteria, provide constructive feedback, and mentor young designers/competitors effectively and ethically
- Knowledge of relevant international and regional design, safety, and manufacturing standards applicable to consumer and industrial products

11 Visitor and media engagement

11.1 Engagement methods

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

- Try-a-skill: a site where visitors and representatives of the press can try computer modelling themselvers;
- The displays showing the process of work and the information about the competitors which advertise the career prospects;
- Test Project text description: public display of Test Projects;
- Demonstration of completed modules: the result of each module can be published after the assessment is finished.

12 Sustainability

12.1 Sustainable practices

This skill competition will focus on the sustainable practices below:

- Recycling;
- Use of environmentally friendly materials;
- Use of completed projects in practice;
- Minimization of printing;
- Use of pdf-files and electronic documents in the maximum number of cases;
- Reduce the number of programmes that need to be installed on Competitors computers.

13 References for industry consultation

13.1 General notes

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

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

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

13.2 References

This WSOS is a junior version of the role of industrial designer: http://data.europa.eu/esco/occupation/ab7bccb2-6f81-4a3d-a0c0-fca5d47d2775

and industrial and commercial designers:
https://www.onetonline.org/link/summary/27-1021.00

These links can be used to explore adjacent occupations.

ILO 2163.

Unfortunately no feedback was received from business and industry for WorldSkills Shanghai 2026.

14 Appendix

14.1 Appendix information

Not applicable.