worldskills

Technical Description

Industrial Design Technology

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

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 wider communication skills

Design and development processes

Engineering practice, product analysis, and materials science/engineering

In modern, successful economies, industrial design follows a thinking process, which can be summarized as follows:

Inspiration: understand; observe; perspective/orientation

Ideation: develop ideas; prototype; test

Implementation: “story telling” (create value proposition); pilot; create the business model.

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 and methods for 1. Organizing own time efficiently and effectively 2. Setting and reaching goals for self and own areas of responsibility 3. Scheduling and organizing work assignments	

Section		Relative importance (%)
	4. 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 • Estimate time requirements for each phase of the design process, and create timelines • 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	**Market research and idea formation**	**15**
	The individual needs to know and understand: • Their organization's ◦ Brand ◦ Position in the market ◦ Range and nature of products and services ◦ Business strategies and plans • The sources of design commissions and requirements • Principles and methods for researching ◦ Customer satisfaction ◦ Market opportunities • Principles, methods and ethics for obtaining information by ◦ Observation ◦ Feedback ◦ Surveys ◦ Analysis ◦ Secondary (indirect) sources • 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)	

Section		Relative importance (%)
	The individual shall be able to • Receive and mentally process information and requests • Participate in new market research and product planning • Review the relationship of potential new products to the organization's product range and plans • Review and select alternative methods for obtaining market intelligence • Investigate the potential need and benefit of new products and product lines using suitable research methods • Draw conclusions from the market research • Maintain records of the market research and thinking process	
3	**The design process**	**15**
	The individual needs to know and understand: • Design as a process for creating and developing concepts and specifications, through strategic problem-solving • Principles of design • Design processes and steps for mass consumption products and services • 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: • Conduct research into trends in design • 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 • Market characteristics • Modify and refine design ideas, based on the above factors • Complete the design process within the parameters of the business or commission	

Section		Relative importance (%)
4	**Drawing, illustration, and graphics**	**20**
	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 within the industrial design process • The range of equipment and tools used to support sketching • The creative process for industrial design • The range of graphics equipment and tools that support the representation of the design idea • Principles and methods for generating desired impressions and impact on viewers • The range and sequence of information required for design documentation for mass consumption • The methods of manufacturing cost reduction • The relationship of design documentation to the whole development process • The available choices for IT hardware and software • International design documentation systems	
	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 ◦ Detailed drawings ◦ Illustrations ◦ Artwork or blueprints • Use drafting instruments and tools • Use CAD software • Draft, lay out, and specify technical devices, plants and equipment • Update sketches, drawings, and documentation as development proceeds • Maintain document control throughout the design process	
5	**Materials science and engineering**	**15**
	The individual needs to know and understand: • The practical application of engineering science and technology • The principles, techniques, procedures and equipment relevant to design and production • Machines and tools, including their design, uses, repair, and maintenance • Raw materials	

Section		Relative importance (%)
	• Production processes, quality control, and costs • Circuit boards, processors, chips, electronic equipment, hardware and software • Applied mathematics • Physical principles, properties, laws, interrelationships, and applications for ◦ Fluids ◦ Materials, ◦ Atmospheric dynamics ◦ Mechanics ◦ Electrics ◦ Atomic and sub-atomic structures and processes • Properties of materials • Trends in materials and their applications • Methods for identifying, testing, and selecting materials • Developments in the digitalizing of industrial processes	
	The individual shall be able to: • Consult with engineers and/or other knowledge sources to plan tests and prototypes • Select and specify machines and tools for prototyping • Avoid material waste during the prototyping • Identify and apply relevant procedures and regulations to the testing and prototyping process • Determine the purposes, range and scope of tests and prototypes • Put in place measures to ensure the validity of information and data collected • Conduct tests and prototyping • Collect planned information and data for analysis • Review the implications of the analysis for ◦ The manufacturing process, and outcomes ◦ The selection and use of materials	
6	**The development process**	**20**
	The individual needs to know and understand: • The technical standards governing the design idea and purpose • Ergonomics for the purpose of fitting users' needs and characteristics • Manufacturing processes and available options for given items • The impacts of manufacturing and assembly on the function and appearance of given items • The impact of materials and manufacture on the mass and weight of given items • Principles, methods and techniques for collecting test data • The options for use of testing and analytical products, methods, techniques and tools	

Section		Relative importance (%)
	The individual shall be able to: • Research production specifications, costs, production materials, and manufacturing methods • Provide cost estimates and itemized production requirements • Build models, patterns, or templates • Fabricate models or samples in a range of materials, using hand and power tools • Monitor processes, materials, and surroundings to detect or assess problems • Collect and process information by compiling, categorizing, calculating, and verifying information and data • Select and use suitable and robust testing equipment, tools, methods, and techniques • 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 • Present designs and reports to clients or managers for approval • Raise and discuss the needs for and benefits of modification • Techniques for optimizing manufacture and distribution • Review, adapt, and provide documentation, detailed instructions/ specifications, or drawings, for fabrication, construction, assembly, modification, maintenance and use	
7	**Implementation**	**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 ◦ Sales techniques • Sales control systems	
	The individual shall be able to: • Develop industrial standards and regulatory guidelines • Check the relationship of the product to the organization's business strategy and plan • Develop promotional strategies or plans for the product • Develop artistic or design concepts for decoration, exhibition, or commercial purposes • Design graphic material for use as ornamentation, illustration, advertising, and packaging • Present evaluation reports, including ◦ Handling and safety ◦ Market appeal	

Section		Relative importance (%)
	◦ Production efficiency ◦ Distribution ◦ Use ◦ Maintenance	
	Total	**100**

3 The Assessment Strategy and Specification

3.1 General guidance

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

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

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

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

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

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

4 The Marking Scheme

4.1 General guidance

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

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

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

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

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

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

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

4.2 Assessment Criteria

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

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

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

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

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

4.3 Sub Criteria

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

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

4.4 Aspects

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

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

		CRITERIA								TOTAL MARKS PER SECTION	WSSS MARKS PER SECTION	VARIANCE
		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: Design Research	3 hours
2	Module 2: Concept Design	4 hours
3	Module 3: CAD Modelling and 3D Printing	7 hours
4	Module 4: Prototyping	3 hours
5	Module 5: Design Proposal	3 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: Design Research

A1: Design analysis

- Brand vision **and** image analysis with market positioning
- User positioning and target user identification
- User pain point analysis and initial solution proposal
- Conclusion summarized with a mind map

A2: Design strategy

- Generate design strategy based on the design analysis

A3: Design exploration

- Explore design concepts by sketches according to the design strategy

Module 2: Concept Design

B1: Concept sketch

- Select one of the exploration concepts to refine
- Refine the selected concept by sketching
- Illustrate the concept with color rendering

B2: Color scheme

- Sketch initial color schemes of the product

B3: Exploded diagram

- Sketch an exploded diagram and define the materials and manufacturing of components

B4: User scenario

- Sketch the scenarios of product with user interaction

Module 3: CAD Modelling and 3D Printing

C1: Build 3D model of the design concept in 3D software

C2: Render 3D model of the design concept

C3: Develop color schemes of the product

C4: Make technical drawings of the general assembly and components

C5: Create a product exploded diagram including BOM list

C6: Accomplish 3D printing according to 3D modelling file

C7: Generate 3D animation to demonstrate design highlights

- Demonstrate the exploded and assembled process of the product
- Showcase the product by rotating the camera around
- Display the detail highlights of the product

C8: Save all files in the correct format and path specified in the task

Module 4: Prototyping

D1: Polish 3D printing components

D2: Paint the components with the selected color scheme

D3: Assemble all components into finished prototype

Module 5: Design Proposal

E1: Edit 3D animation video with background music to make a final demo

- Integrate 3D animation clips into a product demonstration video
- Edit background music to match the video

E2: Collect each module material to make the final design proposal

- Design the PowerPoint template
- Insert module materials into PPT file
- Complete the final design proposal

E3: Save the files as required in the module

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
Ten (10) months prior to the Competition	The ITPD is identified and a Confidentiality Agreement between WSI and the ITPD is organized.
One (1) month prior to the Competition	The Test Project documents are sent to the WorldSkills International Skills Competitions Administration Manager.

Time	Action
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
Use of technology – local software for translation	• From C1-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.

7 Skill-specific safety requirements

7.1 Personal Protective Equipment

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

Task	Sturdy shoes with closed toe and 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 PPE.

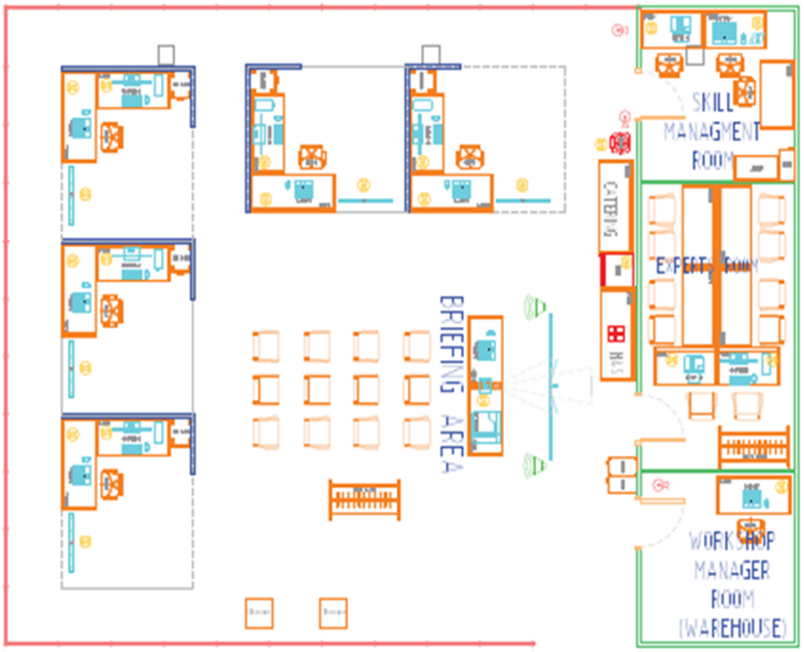
8.5 Materials and equipment prohibited in the skill area

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 – USB, memory sticks	• No external memory devices are to be connected to the competition computer unless under the supervision of the Chief Expert. • Competitors are not allowed to load any digital data to their competition computers. If needed, it must be approved first by the Chief Expert. The Chief Expert will nominate an Expert or group of Experts to execute the necessary installations. • Skill Competition Manager, Chief Expert, Experts, Competitors, and Interpreters are not allowed to bring and use personal memory sticks into the workshop.
Use of technology – personal laptops, tablets, and mobile phones	• From C-4 to C1 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.

Topic/task	Best practice procedure
Communication and contact between compatriot Expert and Competitor	• No communication during breaks or lunch time between Expert, Interpreter, and Competitor from C1 to C4. • Competitor and compatriot Expert/Interpreter cannot be outside the workshop at the same time unless is approved by the Chief Expert.
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.

10 Visitor and media engagement

10.1 Engagement methods

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

- Offer to try oneself in the profession: a site where visitors and representatives of the press can try themselves in computer modelling;
- 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.

11 Sustainability

11.1 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 programs that need to be installed on computers of Competitors.

12 References for industry consultation

12.1 General notes

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

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

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

12.2 References

This WSOS 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.

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

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

13 Appendix

13.1 Appendix information

Not applicable.