

Technical Description

# Automobile Technology

Transportation and Logistics



  
worldskills

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

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# 1 INTRODUCTION

## 1.1 NAME AND DESCRIPTION OF THE SKILL COMPETITION

1.1.1 The name of the skill competition is

Automobile Technology

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

The modern Light Vehicle Automobile Technician is likely to be employed in a workshop that is closely associated with one major manufacturer of light vehicles. Their expertise may be greatest with that manufacturer's vehicles; however, depending on the situation and range of services offered by the workshop, they may also handle other manufacturers' vehicles. Automobile Technicians also work in garages and workshops that are not associated with particular manufacturers. Where this is the case they may experience a wider range of light vehicles and use alternative equipment, parts, and materials.

The trained and competent Light Vehicle Automobile Technician will service and repair a range of light vehicles. For diagnosis, repair and replacement, depending on the nature of the workshop, they may use the manufacturers' equipment, parts, materials, and procedures. Therefore, according to a workshop's relationship with manufacturers, the technician's experience may be deep or broad, or both. In every garage and workshop success is measured in time, correct fault finding and repair, and repeat business.

Most garages and workshops are small businesses or cost centres that work to tight financial parameters. The light automobile sector is volatile, being dependent on the wider economy and heavily affected by technological advances and environmental concerns. The highly skilled Automobile Technician keeps abreast of continuous changes in the sector, whether these are to do with performance, safety, or green energy sources. They will deeply understand vehicles' electrical and electronic systems, and their integration; have physical stamina, coordination, and kinaesthetic skills, and be versatile. They will be assigned the more complex diagnostic tasks, the most advanced vehicles, and those incorporating the latest technologies. This person may rapidly progress to more senior roles as trainer, supervisor, planner, and/or manager.

1.1.3 Number of Competitors per team

Automobile Technology is a single Competitor skill competition.

1.1.4 Age limit of Competitors

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

## 1.2 THE RELEVANCE AND SIGNIFICANCE OF THIS DOCUMENT

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

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

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

## 1.3 ASSOCIATED DOCUMENTS

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

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

## 2 THE WORLDSKILLS STANDARDS SPECIFICATION (WSSS)

### 2.1 GENERAL NOTES ON THE WSSS

The WSSS specifies the knowledge, understanding, and specific skills that underpin international best practice in technical and vocational performance. It should reflect a shared global understanding of what the associated work role(s) or occupation(s) represent for industry and business ([www.worldskills.org/WSSS](http://www.worldskills.org/WSSS)).

The skill competition is intended to reflect international best practice as described by the WSSS, and to the extent that it is able to. The Standards Specification is therefore a guide to the required training and preparation for the skill competition.

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

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

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

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

The Marking Scheme and Test Project will follow the allocation of marks within the Standards Specification to the extent practically possible. A variation of five percent is allowed, provided that this does not distort the weightings assigned by the Standards Specification.

## 2.2 WORLDSKILLS STANDARDS SPECIFICATION

SECTION		RELATIVE IMPORTANCE (%)
1	<b>Work organization and management</b>	10
	<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> <li>• The purposes, uses, care, maintenance of all equipment, materials, and chemicals together with their risks and safety implications</li> <li>• The difficulties and risks associated with related activities, together with their causes and methods of prevention</li> <li>• The time management and parameters associated with each activity</li> <li>• Sustainable environment, health, and work safety principles and their application in the work environment</li> </ul>	
	<p>The individual shall be able to:</p> <ul style="list-style-type: none"> <li>• Prepare and maintain a safe, tidy and efficient work station</li> <li>• Prepare self for the tasks in hand, including full regard for health, safety and environment</li> <li>• Plan, prepare, and complete each task within the time available</li> <li>• Schedule work to maximize efficiency and avoid disruption</li> <li>• Select and use all equipment and materials safely and in compliance with manufacturers' instructions</li> <li>• Clean, store, and test all equipment and materials safely and in compliance with manufacturers' instructions</li> <li>• Apply or exceed the health, safety, and environment standards applying to the environment, equipment, and materials</li> <li>• Restore the work area and vehicle to an appropriate state and condition</li> </ul>	
2	<b>Communication and interpersonal skills</b>	15
	<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> <li>• The range and purposes of documentation, including written and technical drawings including schematic and wiring diagrams, in both paper based and electronic forms</li> <li>• The technical language associated with the skill</li> <li>• The industry standards required for inspection and fault reporting in oral, written, and electronic formats</li> <li>• The required standards for customer service and care</li> </ul>	
	<p>The individual shall be able to:</p> <ul style="list-style-type: none"> <li>• Read, interpret, and extract technical data and instructions from workshop manuals in any available format</li> <li>• Communicate in the workplace by written and electronic means, using standard formats</li> <li>• Communicate in the workplace by oral, written, and electronic means to ensure clarity, effectiveness, and efficiency</li> <li>• Use a standard range of communication technologies</li> <li>• Complete reports and respond to issues and questions arising</li> <li>• Respond to customers' needs face to face and indirectly</li> </ul>	

3	Electrical and mechanical systems, and their integration	25
	<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> <li>• Spark Ignition and Compression Ignition engine management systems</li> <li>• Engine mechanical systems</li> <li>• Hybrid/electric vehicle systems</li> <li>• Forced induction, emission and exhaust systems</li> <li>• Body electrical and electronic systems</li> <li>• Braking and stability control systems</li> <li>• Suspension and steering systems</li> <li>• Drive line systems</li> <li>• HVAC systems</li> <li>• Air bag and safety restraint systems (SRS)</li> <li>• Consumer electronics (entertainment systems ETC)</li> <li>• How each system is interconnected and can have an effect on other systems</li> <li>• How sensors and information are shared between various management systems</li> </ul>	
	<p>The individual shall be able to:</p> <ul style="list-style-type: none"> <li>• Use test equipment to measure, check, and diagnose systems for mechanical and/or electronic faults</li> <li>• Perform tests to identify and isolate a fault</li> </ul>	
4	Inspection and diagnosis	35
	<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> <li>• The correct use and interpretation of relevant measuring devices and equipment</li> <li>• The principles and applications of all relevant numerical and mathematical calculations</li> <li>• The principles and applications of specialist diagnostic procedures, tooling, and equipment</li> </ul>	
	<p>The individual shall be able to:</p> <ul style="list-style-type: none"> <li>• Calibrate and use all measuring devices and equipment (mechanical and electrical) for diagnosis</li> <li>• Determine the precise location of component faults within a range of light vehicle systems</li> <li>• Select and apply the appropriate devices and equipment to make inspections and diagnose deficiencies and faults to:               <ul style="list-style-type: none"> <li>• Spark ignition systems</li> <li>• Compression ignition systems</li> <li>• Forced induction, emission and exhaust systems</li> <li>• Body electrical/electronic systems</li> <li>• Braking and stability control systems</li> <li>• Suspension and steering systems</li> <li>• Drive line systems</li> </ul> </li> <li>• Calculate, check, and interpret results as required</li> <li>• Review the options for repair or replacement</li> </ul>	

5	Repair, overhaul, and service	15
	The individual needs to know and understand: <ul style="list-style-type: none"> <li>• The options for repair or replacement</li> <li>• Repair methods/procedures, special tool requirements</li> <li>• Effects on other vehicle systems and associated repair work</li> </ul>	
	The individual shall be able to: <ul style="list-style-type: none"> <li>• Use manufacturers' and component suppliers' specification as required</li> <li>• Construct, justify and communicate appropriate proposals and decisions regarding repair or replacement</li> <li>• Use correct procedures for securing replacement parts</li> <li>• Repair vehicle electrical systems and electrical circuits, repair/overhaul charging, and starting systems</li> <li>• Repair/overhaul hydraulic braking systems (disc and drum) and/or associated components, including hand or parking brake</li> <li>• Repair electronically controlled antilock brakes and stability control systems</li> <li>• Remove/overhaul driveline components</li> <li>• Repair/overhaul steering systems/components, including mechanical, electrical, and hydraulic power assisted steering systems</li> <li>• Repair suspension systems and associated components</li> <li>• Carry out steering wheel alignment operations</li> <li>• Repair/overhaul four stroke engines and associated engine components</li> <li>• Repair/overhaul manual/automatic transaxles/transmissions and components</li> <li>• Repair diesel fuel systems including electronic compression ignition engine management systems and associated components</li> </ul>	
	<b>Total</b>	<b>100</b>



## 3 THE ASSESSMENT STRATEGY AND SPECIFICATION

### 3.1 GENERAL GUIDANCE

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

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

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

The Marking Scheme must follow the weightings within the Standards Specification. The Test Project is the assessment vehicle for the skill competition, and also follows the Standards Specification. The CIS enables the timely and accurate recording of marks, and has expanding supportive capacity.

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

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

## 4 THE MARKING SCHEME

### 4.1 GENERAL GUIDANCE

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

The Marking Scheme is the pivotal instrument of the WorldSkills Competition, in that it ties assessment to the standards that represent the skill. It is designed to allocate marks for each assessed aspect of performance in accordance with the weightings in the Standards Specification.

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

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

The Marking Scheme and Test Project may be developed by one person, or several, or by all Experts. The detailed and final Marking Scheme and Test Project must be approved by the whole Expert Jury prior to submission for independent quality assurance. The exception to this process is for those skill competitions which use an independent designer for the development of the Marking Scheme and Test Project. Please see the Rules for further details.

Experts and independent designers are required to submit their Marking Schemes and Test Projects for comment and provisional approval well in advance of completion, in order to avoid disappointment or setbacks at a late stage. They are also advised to work with the CIS Team at this intermediate stage, in order to take full advantage of the possibilities of the CIS.

In all cases a draft Marking Scheme must be entered into the CIS at least eight weeks prior to the Competition using the CIS standard spreadsheet or other agreed methods.

### 4.2 ASSESSMENT CRITERIA

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

Assessment Criteria are created by the person(s) developing the Marking Scheme, who are free to define criteria that they consider most suited to the assessment and marking of the Test Project. Each Assessment Criterion is defined by a letter (A-I). It is advisable not to specify either the Assessment Criteria, or the allocation of marks, or the assessment methods, within this Technical Description.

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

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

## 4.3 SUB CRITERIA

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

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

## 4.4 ASPECTS

Each Aspect defines, in detail, a single item to be assessed and marked together with the marks, or instructions for how the marks are to be awarded. Aspects are assessed either by measurement or 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 skill in the Standards Specification. This will be displayed in the Mark Allocation Table of the CIS, in the following format, when the Marking Scheme is reviewed from C-8 weeks. (Section 4.1)

	CRITERIA								TOTAL MARKS PER SECTION	WSS MARKS PER SECTION	VARIANCE
	A	B	C	D	E	F	G	H			
STANDARDS SPECIFICATION SECTION	1	5.00							5.00	5.00	0.00
	2		2.00				7.50		9.50	10.00	0.50
	3							11.00	11.00	10.00	1.00
	4			5.00					5.00	5.00	0.00
	5				10.00	10.00	10.00		30.00	30.00	0.00
	6		8.00	5.00				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, in all circumstances. The marking teams must be organized to ensure that there is no compatriot marking in any circumstances. (See 4.6.)

## 4.6 ASSESSMENT AND MARKING USING JUDGEMENT

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

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

Three Experts will judge each Aspect, with a fourth to coordinate the marking and acting as a judge to prevent compatriot marking.

## 4.7 ASSESSMENT AND MARKING USING MEASUREMENT

Three Experts will be used to assess each aspect. Unless otherwise stated only the maximum mark or zero will be awarded. Where they are used, the benchmarks for awarding partial marks will be clearly defined within the Aspect.

## 4.8 THE USE OF MEASUREMENT AND JUDGEMENT

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

## 4.9 COMPLETION OF SKILL ASSESSMENT SPECIFICATION

Competitors may be assessed on any combination of the following.

- Work health, safety (including housekeeping), and sustainable practices
- Preparation and completion of work
- Engine management system
  - Testing and diagnosis;
  - Repair and measurement;
- Steering, brake, and suspension systems
  - Testing and diagnosis;
  - Repair and measurement;
- Electrical and electronic systems
  - Testing and diagnosis;
  - Repair and measurement;
- Engine mechanical
  - Testing and diagnosis;
  - Repair and measurement;
- Drive line
  - Testing and diagnosis;
  - Repair and measurement.

## 4.10 SKILL ASSESSMENT PROCEDURES

- Competitors shall not be awarded marks for an item within a task they are unable to complete because of tool shortage in their own tool kit;
- If some or all Competitors are unable to complete one or more elements of a module due to shortfalls of the workstation itself, the marks of these elements of the module shall be awarded to all Competitors so as not to distort the scoring scheme;
- When an equipment failure occurs preventing a Competitor from completing one or more elements of a module, then all points for all elements affected will be awarded to all Competitors;
- Experts are to complete a Marking Form for each assessment area for each individual Competitor;
- Marks will vary according to the marking scale defined for the Competition, but will align to the ranges defined in paragraph 4.8 above;
- Expert marking teams are devised to include a mixture of WorldSkills experience, language, and culture;
- Experts will assess the same aspects for each Competitor

### Results

- The Chief Expert will nominate Experts with Special Responsibilities as required

## 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 skills in each section of the WSSS.

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

The Test Project will not cover areas outside the Standards Specification, or affect the balance of marks within the Standards Specification other than in the circumstances indicated by Section 2.

The Test Project will enable knowledge and understanding to be assessed solely through their applications within practical work.

The Test Project will not assess knowledge of WorldSkills rules and regulations.

This Technical Description will note any issues that affect the Test Project's capacity to support the full range of assessment relative to the Standards Specification. Section 2.1 refers.

### 5.2 FORMAT/STRUCTURE OF THE TEST PROJECT

The format of the Test Project is a series of assessments to be completed in rotation. All Competitors will do all assessments selected at the Competition.

### 5.3 TEST PROJECT DESIGN REQUIREMENTS

The total working time for the assessments will be between 15 and 22 hours.

- The Competitor shall carry out, independently, the assessments that will be selected from the table below. Each assessment can be made up of one or more areas contained in this section;
- Each assessment shall include:
  - Description of tests;
  - Competitor instructions for completing test;
  - Competitor report sheets (if necessary);
  - Instructions to the Workshop Manager.
- All assessments must be based on a minimum of four different world-known manufacturers' cars taking into consideration the Competitors' origin.

#### **Assessments for Automobile Technology competitions**

This description has two main functions:

1. It will be the basis on which Experts will select the assessments for their submission to the Competition Organizer;
2. It will act as a guideline to countries that do not have an Expert with Competitor preparation.

The number and specification of the assessments on the list must not be taken as complete or final as it is intended that regular amendments and additions will follow:

- In the light of its use over a period of time;
- In the interest of arriving at a more complete list;

- In regard to technological change and subsequent updating with respect for the regulations of the Competition Organizer.

Any instructions to Competitors should be provided in the format as per the instruction sheet. Each assessment can be made up of one area or a number of areas from the following table.

The assessments may involve the diagnosis, service, and repair of the following:

ASSESSMENT	MAY INCLUDE	EXCLUDING
<b>Engine Management</b> <b>The Competition Organizer will decide on availability to choose compression ignition or spark ignition engines</b>	<b>Spark Ignition</b> Pressure and flow testing Use Diagnostic tools Exhaust gas recirculation systems Catalytic converters Ignition Systems Engine Actuators and Sensors Electronic fuel Injection Engine analysers Exhaust gas analysers Starting system <b>Compression Ignition</b> Filtration systems Use Diagnostic tools Glow plug system Electronic pump control systems Engine Actuators and Sensors Particulate filters Common rail systems Forced induction systems Starting System Multiplex systems	Fuel tanks Injector servicing Any work that requires the fuel system to be opened to the atmosphere Work involving coolant  Bench testing injector pumps In-line fuel pump
<b>Steering, brake, and suspension</b>	Anti-skid braking systems Four-wheel disc systems Disc/drum systems Parking brake systems Brake assistance and electronic stability control Air suspension (low pressure) Hydraulic systems Tyre pressure monitoring system Four-wheel alignments Four-wheel steering systems Electronic suspension systems Electric/computer-controlled Power assisted steering	Air brake systems Shock absorber testing equipment.
<b>Body Electrical</b>	Charging systems Lighting systems Accessory circuits Dashboard gauges and warning devices Smart Power charging system Infotainment Multiplex systems Climate control systems	Air bag and S.R.S. systems Alarm systems and immobilizers Work involving refrigerant Work involving coolant High voltage systems

ASSESSMENT	MAY INCLUDE	EXCLUDING
<b>Engine Mechanical</b>	Cylinder head Engine block and internal mechanical components	Boring and honing cylinder Piston to connecting rod fitting by heating
<b>Driveline</b>	Electronic systems Hydraulic systems Mechanical systems Continuously variable transmission Conventional or transaxle Final drives Transfer case	Remove and refit transmission Flushing and changing oil

## 5.4 TEST PROJECT DEVELOPMENT

The Test Project MUST be submitted using the templates provided by WorldSkills International ([www.worldskills.org/expertcentre](http://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 assessments are developed by all Experts or an Independent Designer if available.

### 5.4.2 How and where is the Test Project or modules developed

The assessments are developed by all Experts or Independent Designer as follows:

- Assessments will be designed using the guidelines set out in 5.3 Test Project design requirements;
- The proposals or actual assessments may be prepared on or off the competition site by a team of industry experts according to the equipment provided by the Competition Organizer. The Competition Organizer is required to provide a sufficient choice of materials and spare parts in order to enable the Experts to set up a variety of assessment projects.

### 5.4.3 When is the Test Project developed

The Test Project is developed according to the following timeline:

TIME	ACTIVITY
Before or at the Competition	The Test Project assessments are developed prior to or during the preparation days by a team of Experts or an Independent Designer assigned to each assessment.

## 5.5 TEST PROJECT VALIDATION

Validation will be demonstrated by the Expert groups designing the Test Project/modules so each can be completed with the equipment, knowledge, and time constraints.

The Chief Expert will ensure that the individual assessments are endorsed by the Expert group which has designed the assessment.

## 5.6 TEST PROJECT SELECTION

Refer 5.4.2 how and where is the Test Projects or modules assessment tasks developed.

## 5.7 TEST PROJECT CIRCULATION

The Test Project is circulated via the website as follows:

Not circulated.

## 5.8 TEST PROJECT COORDINATION (PREPARATION FOR COMPETITION)

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

The Skill Management Team will be responsible for ensuring that:

- The assessments can be completed in the prescribed time of 15-22 hours;
- The material/equipment list is accurate;
- Competitor instructions are kept to a minimum of text, and that they do not exceed the available space permitted on the approved instruction sheet for any one module automobile technology Tests (refer section 5.3).

The Skill Management Team shall set up deadlines for all Test Project preparation work, detailing when assessments and the corresponding documentation must be completed as well as translated.

Skill Management Team is responsible for the quality assurance of each assessment in co-operation with the QA team of Experts.

## 5.9 TEST PROJECT CHANGE AT THE COMPETITION

Refer 5.4.2 How and where is the Test Projects or modules developed.

## 5.10 MATERIAL OR MANUFACTURER SPECIFICATIONS

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

There will be no notification of the suppliers prior to the Competition.



## 6 SKILL MANAGEMENT AND COMMUNICATION

### 6.1 DISCUSSION FORUM

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

### 6.2 COMPETITOR INFORMATION

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

This information includes:

- Competition Rules
- Technical Descriptions
- Marking Schemes
- Test Projects
- Infrastructure List
- WorldSkills Health, Safety, and Environment Policy and Regulations
- Other Competition-related information

### 6.3 TEST PROJECTS [AND MARKING SCHEMES]

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

### 6.4 DAY-TO-DAY MANAGEMENT

The day-to-day management of the skill during the Competition is defined in the Skill Management Plan that is created by the Skill Management Team led by the Skill Competition Manager. The Skill Management Team comprises the Skill Competition Manager, Chief Expert, and Deputy Chief Expert. The Skill Management Plan is progressively developed in the eight months prior to the Competition and finalized at the Competition by agreement of the Experts. The Skill Management Plan can be viewed in the Expert Centre ([www.worldskills.org/expertcentre](http://www.worldskills.org/expertcentre)).

## 7 SKILL-SPECIFIC SAFETY REQUIREMENTS

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

- Work clothes must comply with relevant codes. If the Host Country has any specific codes that are to be in place during the Competition, then these must be made known to the Competitors at least six months prior;
- All machinery and/or equipment must comply with the safety requirements of the Host Country;
- Competitors must keep their work area clear of obstacles and their floor area clear of any material, equipment, or items likely to cause someone to trip, slip, or fall;
- All Competitors must wear PPE at all times in the workshop area;
- Experts will use the appropriate Personal Protective Equipment when inspecting, checking, or working with a Competitor's project.

## 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](http://www.worldskills.org/infrastructure).

The Infrastructure List specifies the items and quantities requested by the Skill Competition Manager on behalf of the Experts for the next Competition. The Competition Organizer will progressively update the Infrastructure List specifying the actual quantity, type, brand, and model of the items. Items supplied by the Competition Organizer are shown in a separate column.

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

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

### 8.2 COMPETITOR'S TOOLBOX

Competitors are not required to bring a toolbox.

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

Note: The Competition Organizer may supply the toolbox as part of the Infrastructure List. Where this is the case registered Members will be notified twelve months prior to the Competition. The description and contents must be put on the Infrastructure List at least three months prior to the Competition.

Competitors can only bring their own PPE.

### 8.4 MATERIALS, EQUIPMENT, AND TOOLS SUPPLIED BY EXPERTS

Not applicable.

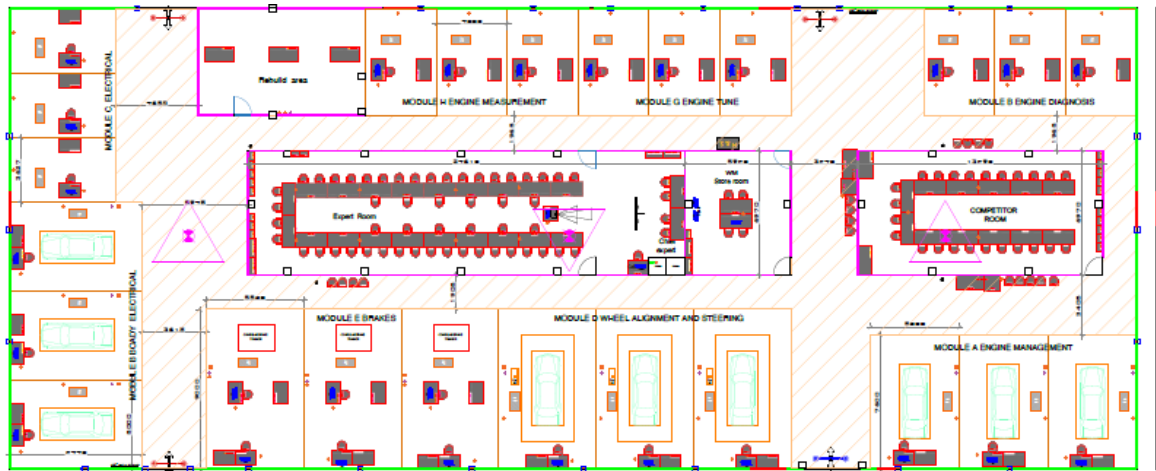
### 8.5 MATERIALS AND EQUIPMENT PROHIBITED IN THE SKILL AREA

Pneumatic tools are not to be used electric tools (electric ratchet screwdrivers etc.) can be used if supplied by the Competition Organizer.

## 8.6 PROPOSED WORKSHOP AND WORKSTATION LAYOUTS

Workshop layouts from previous competitions are available at [www.worldskills.org/sitelayout](http://www.worldskills.org/sitelayout).

Example workshop layout:



## 9 SKILL-SPECIFIC RULES

Skill-specific rules cannot contradict or take priority over the Competition Rules. They do provide specific details and clarity in areas that may vary from skill competition to skill competition. This includes but is not limited to personal IT equipment, data storage devices, internet access, procedures and work flow, and documentation management and distribution.

TOPIC/TASK	SKILL-SPECIFIC RULE
Use of technology – USB, memory sticks	<ul style="list-style-type: none"> <li>Competitors, Experts, and Interpreters are allowed to bring memory sticks into the workshop however when not in use they must remain in the locker until the end of C4.</li> </ul>
Use of technology – personal laptops, tablets and mobile phones	<ul style="list-style-type: none"> <li>Competitors, Experts, and Interpreters are allowed to bring personal laptops, tablets or mobile phones into the workshop however when not in use they must remain in the locker. Laptops and tablets must remain in the locker until the end of C4 however Mobile phones can be taken at the end of each day.</li> </ul>
Use of technology – personal photo and video taking devices	<ul style="list-style-type: none"> <li>Competitors, Experts, and Interpreters are allowed to use personal photo and video taking devices in the workshop however when not in use they must remain in the locker until the end of C4.</li> </ul>
Templates, aids, etc.	<ul style="list-style-type: none"> <li>Competitors are not allowed to bring any templates or aids into the workshop.</li> </ul>
Health, Safety, and Environment	<ul style="list-style-type: none"> <li>Refer to the WorldSkills Health, Safety, and Environment policy and guidelines document.</li> </ul>

## 10 VISITOR AND MEDIA ENGAGEMENT

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

- Try a trade;
- Display screens;
- Test Project descriptions;
- Enhanced understanding of Competitor activity;
- Competitor profiles;
- Career opportunities;
- Daily reporting of Competition status

## 11 SUSTAINABILITY

This skill competition will focus on the sustainable practices below:

- Recycling;
- Use of 'green' materials;
- Use of completed Test Projects after Competition.

## 12 REFERENCES FOR INDUSTRY CONSULTATION

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

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

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

This WSSS (Section 2) appears to relate to *Automotive Master Mechanics*:  
<https://www.onetonline.org/link/summary/49-3023.01>

And partly to *Automotive Engineering Technician*: <http://data.europa.eu/esco/occupation/444c9aa9-578d-4a9a-9949-99ef1bacb20e>

Adjacent occupations may also be explored through these links.

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

ORGANIZATION	CONTACT NAME
ASE	John Tisdale, Assistant Vice President