

# Technical Description

*EuroSkills Gdańsk 2023*  
*Mechanical Engineering CAD (05)*

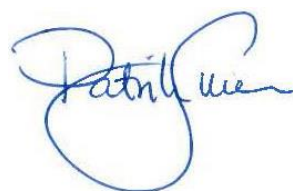
# Contents

Contents .....	2
1 Introduction .....	3
2 The Standards Specification .....	4
3 The assessment approach & principles .....	10
4 The Marking Scheme .....	11
5 The Test Project.....	15
6 Skill management and communication .....	22
7 Skill specific safety requirements.....	23
8 Materials and equipment.....	24
9 Skill-specific rules.....	29
10 Visitor and media engagement .....	30
11 Sustainability .....	31

Effective 16.03.2023



Mr. Guillaume Suteau  
Chair – Competition Committee



Mr. Patrik Svensson  
Vice Chair – Competition Committee

© WorldSkills Europe (WSE) reserves all rights in documents developed for or on behalf of WSE, including translation and electronic distribution. This material may be reproduced for non-commercial vocational and educational purposes provided that the WorldSkills Europe logo and copyright notice are left in place.

# 1 Introduction

## 1.1 Name and description of the Skill Competition

### 1.1.1 The name of the Skills Competition is

Mechanical Engineering CAD

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

Mechanical engineering computer aided design (CAD) is the use of computer systems to assist in the creation, modification, analysis, or optimization of an engineering design. CAD software is used to increase the productivity of the designer, improve the quality of design, improve communication through documentation, and create a database for manufacturing. CAD output is often in the form of electronic files for print, manufacturing documentation, or other manufacturing processes.

The technical and engineering drawings and images must convey information such as materials, processes, dimensions and tolerances according to application-specific conventions. CAD may be used to design curves and figures in two-dimensional (2D) space or curves, surfaces and solids in three dimensional (3D) space. CAD is also used to produce computer animation for the special effects used in, for example, advertising and technical manuals.

CAD is an important industrial art and is the way projects come true. It is extensively used in many applications, including automotive, ship building and aerospace industries, and in industrial design. The CAD process and outputs are essential to successful solutions for engineering and manufacturing problems.

CAD software helps us explore ideas, visualize concepts through photorealistic renderings and movies, and simulates how a design project will perform in the real world.

## 1.2 The content, relevance and significance of this document

This document incorporates a Role Description and Occupational Standards which follow the principles and some or all of the content of the WorldSkills Occupational Standards. In doing so WSE acknowledges WorldSkills International's (WSI's) copyright. WSE also acknowledges WSI's intellectual property rights regarding 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:

- WSE – Competition Rules
- WSI – WorldSkills Occupational Standard framework
- WSE – WorldSkills Europe Assessment Strategy
- WSE – Online resources as referenced in this document
- WSE – Code of Ethics and Conduct
- Host Country – Health and Safety regulations

## 2 The Standards Specification

### 2.1 General notes regarding WSOS / WSEOS

Where appropriate WSE has utilised some, or all, of the WorldSkills International Occupational Standards (WSOS) for those Skills Competitions that naturally align between the two international competitions. Where the Skill is exclusive to the EuroSkills Competition, WorldSkills Europe has developed its own Occupational Standards (WSEOS) using the same principles and framework to that used for the development of the WSOS. For the purposes of this document the use of the words “Occupational Standards” will refer to both WSOS and WSEOS.

The Occupational Standards 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. Helpfully, for the global consultation on the WSOS in 2014-2021, around 50 percent of responses came from European industry and business.

Each Skill Competition is intended to reflect international best practice as described by the Occupational Standards, and to the extent that it is able to. The Occupational Standards 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 not be separate tests of knowledge and understanding.

The Occupational Standards are 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 Occupational Standards. 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 Occupational Standards. They will reflect the Occupational Standards 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 Occupational Standards to the extent practically possible. A variation of five percent is allowed, provided that this does not distort the weightings assigned by the Occupational Standards.

## 2.2 Occupational Standards

SECTION		RELATIVE IMPORTANCE %
1	Work organization and self-management	10

### The individual needs to know and understand:

- The various purposes and uses for CAD designs
- Current internationally recognized standards (ISO)
- Standards currently used and recognized by industry
- Health and safety legislation and best practice including specific safety precautions when using a visual display unit (VDU) and in a workstation environment
- Relevant theory and applications of mathematics, physics, and geometry
- Technical terminology and symbols
- Recognized IT systems and related professional design software
- The importance of accurate and clear presentation of designs to potential users
- The importance of effective communications and inter-personal skills between co-workers, clients and other related professionals
- The importance of maintaining knowledge and skill in new and developing technologies
- The role of providing innovative and creative solutions to technical and design problems and challenges

**SECTION**
**RELATIVE  
IMPORTANCE %**
**The individual shall be able to:**

- Apply consistently the internationally recognized standards (ISO) and standards currently used and recognized by industry
- Apply and promote health and safety legislation and best practice in the workplace
- Apply a thorough knowledge and understanding of mathematics, physics and geometry to CAD projects
- Access and recognize standard component and symbol libraries
- Use and interpret technical terminology and symbols used in preparing and presenting CAD drawings
- Use recognized IT systems and related professional design software to consistently produce high quality designs and interpretations
- Deal with systems problems such as error messages received, peripherals which do not respond as expected, and faults with equipment or connecting leads
- Produce work that consistently meets high standards of accuracy and clarity in the design and presentation of designs to potential users
- Effectively communicate and use interpersonal skills with co-workers, clients, and other related professionals to ensure that the CAD process meets requirements
- Describe to clients and other professionals the role and purposes for CAD designs
- Explain complex technical images to experts and non-experts, highlighting key elements
- Maintain proactive continuous professional development in order to maintain current knowledge and skill in new and developing technologies and practices
- Provide and apply innovative and creative solutions to technical and design problems and challenges
- Visualize desired products in order to fulfil clients' briefs accurately

**2 Materials, software, and hardware**
**5**
**The individual needs to know and understand:**

- Computer operating systems to be able to use and manage computer files and software correctly
- Peripheral devices used in the CAD process
- Specific specialist technical operations within design software
- The range, types and uses of specialist product available to support and facilitate the CAD process
- The production process for designs
- The limitations of design software
- Formats and resolutions
- The use of plotters, printers, 3D printers and 3D scanners.

SECTION	RELATIVE IMPORTANCE %
<p><b>The individual shall be able to:</b></p> <ul style="list-style-type: none"> <li>• Power up the equipment and activate the appropriate modelling software</li> <li>• Set up and check peripheral devices such as keyboard, mouse, 3D mouse, plotter, and printer</li> <li>• Use computer operating systems and specialist software to create and manage and store files proficiently</li> <li>• Select correct drawing packages from an on-screen menu or graphical equivalent</li> <li>• Use various techniques for accessing and using CAD software such as a mouse, menu, or tool bar</li> <li>• Configure the parameters of the software</li> <li>• Plan production processes effectively to produce efficient work processes</li> <li>• Use plotters and printers to print and plot work</li> </ul>	
<p><b>3 3D modelling</b></p>	<p><b>30</b></p>
<p><b>The individual needs to know and understand:</b></p> <ul style="list-style-type: none"> <li>• Programmes in order to configure the parameters of the software</li> <li>• Computer operating systems in order to use and manage computer files and software</li> <li>• Mechanical systems and their functionality</li> <li>• Principles of technical drawing • How a component is assembled</li> </ul>	
<p><b>The individual shall be able to:</b></p> <ul style="list-style-type: none"> <li>• Model components, optimizing the constructive solid geometry</li> <li>• Create families of components</li> <li>• Ascribe characteristics to the materials (density)</li> <li>• Ascribe colours and textures to the components</li> <li>• Produce assemblies from 3D models of components</li> <li>• Structure assemblies (sub-assemblies)</li> <li>• Review base information to plan work effectively</li> <li>• Access information from data files</li> <li>• Model and assemble base components of project pieces</li> <li>• Estimate approximate values for any missing dimensions</li> <li>• Assemble modelled parts into sub-assemblies as required</li> <li>• Apply graphics decals such as logos as required onto images</li> <li>• Save work for future access</li> </ul>	
<p><b>4 Create photo rendered images (2D) and creation of animations</b></p>	<p><b>10</b></p>

SECTION	RELATIVE IMPORTANCE %
<p><b>The individual needs to know and understand:</b></p> <ul style="list-style-type: none"> <li>• The use of lighting, scenes and decals to produce photo rendered images</li> <li>• How to demonstrate the working of an image</li> </ul>	
<p><b>The individual shall be able to:</b></p> <ul style="list-style-type: none"> <li>• Save and label images to access for further use</li> <li>• Interpret source information and accurately apply to the computer generated images</li> <li>• Apply material properties using information supplied from source drawings</li> <li>• Create photo rendered images of components or assemblies</li> <li>• Adjust colours, shading, backgrounds and camera angles to highlight key images</li> <li>• Use camera settings to show better angles of the project</li> <li>• Print completed images for presentation purposes</li> <li>• Create functions relative to the operation of the system being designed, using industry programmes</li> <li>• Create animations that demonstrate how different parts work are assembled</li> </ul>	
<p><b>5 Reverse engineering of physical models</b></p>	<p><b>15</b></p>
<p><b>The individual needs to know and understand:</b></p> <ul style="list-style-type: none"> <li>• Castings</li> <li>• Welding</li> <li>• Machining</li> <li>• Simulation</li> <li>• The process to transfer real objects to 3D images/3D models and then to technical drawings</li> </ul>	
<p><b>The individual shall be able to:</b></p> <ul style="list-style-type: none"> <li>• Determine dimensions on physical parts by using industry accepted instruments</li> <li>• Create freehand sketches</li> <li>• Use measuring instruments to produce accurate replicas</li> <li>• Perform 3D Scans of models</li> </ul>	
<p><b>6 Technical drawing and measuring</b></p>	<p><b>30</b></p>



SECTION	RELATIVE IMPORTANCE %
<p><b>The individual needs to know and understand:</b></p> <ul style="list-style-type: none"> <li>• Working drawings in ISO standard together with any written instructions</li> <li>• Standards for conventional dimensioning and tolerancing and geometric dimensioning and tolerancing appropriate to the ISO standard</li> <li>• Rules of technical drawing and the prevailing latest ISO standard to govern these rules</li> <li>• The use of manuals, tables, list of standards, and product catalogues</li> </ul>	
<p><b>The individual shall be able to:</b></p> <ul style="list-style-type: none"> <li>• Generate working drawings in ISO standard together with any written instructions</li> <li>• Apply standards for conventional dimensioning and tolerancing and geometric dimensioning and tolerancing appropriate to the ISO standard</li> <li>• Apply the rules of technical drawing and the prevailing latest ISO standard to govern these rules</li> <li>• Use manuals, tables, lists of standards, and product catalogues</li> <li>• Insert written information such as explanation balloons and parts lists with more than one column using annotation styles that meet ISO standards</li> <li>• Create 2D and MBD detail technical drawings</li> <li>• Create exploded isometric views</li> </ul>	
<p><b>Total</b></p>	<p><b>100%</b></p>

## 3 The assessment approach & principles

### 3.1 General guidance

**Note: this Section and Section 4 summarize a great deal of new information and guidance regarding assessment. Please refer to the Competition Rules for greater detail.**

The Competition Committee (CC) establishes the principles and techniques to which assessment at the EuroSkills Competition must conform.

Expert assessment practice lies at the heart of the EuroSkills 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 EuroSkills Competition: the Marking Scheme, Test Project, and Competition Information System (CIS).

Assessment at the EuroSkills Competition falls into two broad types: measurement and judgement. All assessments will be governed by explicit benchmarks, referenced to best practice in industry and business.

The Marking Scheme must include these benchmarks and follow the weightings within the Occupational Standards. The Test Project is the assessment vehicle for the Skill Competition, and also follows the Occupational Standards. 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 Technical Description and the principles for assessment as set out in the WSE Assessment Strategy. They will be agreed by the Experts and submitted to WSE for approval together, in order to demonstrate their quality and conformity with the Occupational Standards.

Prior to submission for approval to WSE, the Marking Scheme and Test Project will be reviewed by the WSE 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 EuroSkills Competition, in that it ties assessment to the standards that represent the skills to be tested. It is designed to allocate marks for each assessed aspect of performance in accordance with the weightings in the Occupational Standards.

By reflecting the weightings in the Occupational Standards, 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 Occupational Standards, 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 Test Project designer for the development of the Marking Scheme and Test Project.

In addition, Experts are encouraged 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 the complete and approved 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.

In the interests of fairness and transparency, all experts should have the same knowledge of the Marking Scheme at any given time. If an expert, including the chief expert and deputy chief expert, is assigned some information on the Marking Scheme, it should be shared with the other experts without delay.

### 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 Occupational Standards; 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 must reflect the weightings in the Occupational Standards.

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).

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 of assessment 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 EuroSkills marking form.

Each marking form (Sub Criterion) has a specified day on which it will be marked.

Each marking form (Sub Criterion) contains Aspects to be assessed and marked by measurement or judgement. Some Sub Criteria have assessment by both measurement and judgement, in which case there is a separate marking form for each method

## 4.4 Aspects

Each Aspect defines, in detail, a single item to be assessed and marked together with the marks, or instructions for how the marks are to be awarded. Aspects are assessed either by measurement or judgement and appear on the appropriate marking form.

The marking form lists, in detail, every Aspect to be marked together with the mark allocated to it, the benchmarks, and a reference to the section of the Standards Specification.

The sum of the marks allocated to each Aspect must fall within the range of marks specified for that section of 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).

CRITERIA											TOTAL MARKS PER SECTION
		A	B	C	D	E	F	G	H	I	
OCCUPATIONAL STANDARDS SPECIFICATION SECTIONS	1										
	2										
	3										
	4										
	5										
	6										
	7										
	8										
	9										
TOTAL MARKS PER CRITERION											100

## 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 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 rigor and consistency, judgement must be conducted using:

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

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

## 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 Assessment overview

For both measurement and judgement there will be three Experts in the assessment team.

Good practice in assessment comprises measurement and judgement applied both specifically and broadly. The final proportions of measurement and judgment, whether specific or broad, will be determined by the standards, their weightings and the nature of the Test Project.

## 4.9 Skill Assessment Strategy

The Chief Expert will divide the Experts into assessment teams. They will ensure that there is a mixture of experienced and inexperienced WorldSkills and/or EuroSkills in each team.

Each team will be responsible for marking a balanced number of Aspects in one of the three Test Project modules.

There are no special processes to be followed during marking.

## 4.10 Skill Assessment Procedures

SECTION	CRITERION	MARKS		
		Judgement	Measurement	Total
A	Module 1	2	35	<b>37</b>
B	Module 2	3	34	<b>37</b>
C	Module 3	2	24	<b>26</b>
<b>Total =</b>		<b>7</b>	<b>93</b>	<b>100</b>

Each Test Project module will be worth 37/37/26 marks. Consistency shall be maintained for the weight of criteria with respect of the Test Project definition.

All Test Project marking schemes modules shall be based on 40 marking aspects. Total value of marking aspects shall be 37/37/26 marks for each Test Project module.

The trade assessment criteria are clear concise aspect specifications which explain exactly how and why a particular mark is awarded.

### 4.10.1 Module 1:

- Use of parametric functions
- Correctness of modification (partial Judgement)
- Necessary dimensions
- Simulation
- Number of parts modified

### 4.10.2 Module 2:

- Part positioning
- Assembly required for dimensions
- Exploded view (simulation)
- Nomenclature
- Presentation (Judgement)

### 4.10.3 Module 3:

- Presence of part features
- Accuracy of dimensions
- Limits and Fits
- Surfaces
- Presentation and View selection (Judgement)

## 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 Occupational Standards.

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

The Test Project will not cover areas outside the Occupational Standards, or affect the balance of marks within the Occupational Standards other than in the circumstances indicated by Section 2.1.

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 the EuroSkills Competition's 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 Standard Specification. Section 2.1 refers.

### 5.2 Format/ structure of the Test Project

- Test Project assessed at end of Competition
- Test Project with separately assessed modules
- Test Project assessed in stages
- Series of standalone modules
- Other

If other, please specify here:

### 5.3 Test Project design requirements

The Test Project must be developed on Autodesk Inventor Professional and/or Autodesk Fusion.

The Chief Expert will determine the software version, six (6) months before competition.

Skills that could be tested in the different modules could cover:

#### 5.3.1 Module one – Mechanical Design Challenge

- Fulfilment of the Design Brief (part judgement);
- Physical Simulation (part judgement);

- Exploded view (simulation) (part judgement);
- Photo rendering (part judgement);
- 3D Printing (part judgement).

### 5.3.2 **Module two – Mechanical Fabrication**

- Sheet Metal Parts and Assemblies;
- Frame Parts and Assemblies;
- Fabrication Drawing Details;
- Drawing Views and Presentation (part judgement).

### 5.3.3 **Module three - Mechanical Assemblies and Detail Drawing for Manufacture**

- Part Modelling;
- Assembly Modelling;
- Dimensioning including GDT;
- Drawing Views and Presentation (part judgement);

### 5.3.4 **Module four – Reverse Engineering from a Physical Model**

- Presence of part features;
- Accuracy of dimensions;
- Tolerances;
- Surface Texture;
- Presentation (judgement).
- 3D Scanning

A combination of the above skills is allowed in each module but different competencies must be tested in each module.

This Skill Competition is classed as “fault finding” on all days, therefore no Expert and Competitor communication during the competition time including breaks and lunch period will be allowed.

The Competition is divided into 3 modules covering the following categories:

### 5.3.5 **Drawings from a physical model:**

Data:

- Physical component(s) and assembly(ies)
- File of parts and assemblies
- All the necessary additional information
- Functionality informations

Work requested:

- Making files and layout from dimensions taken from a physical component using measuring instruments that are part of the official list
- Produce drawings for manufacturing, based on the dimensions taken from the part
- The use of systems enabling the memorization of scaled drawings or shapes is prohibited (Photographs, malleable putty, ink pad, etc)
- The Competitor could have to produce sketches on paper which will serve as the basis for producing the 3D modeling of the components or assemblies.
- The physical component(s) will be given to the Competitors for 2 hours and then confiscated.
- The Competitor will then continue his task on the basis of the sketches and information collected previously.
- The use of the computer is allowed during all the competition time.



Results expected:

- 3D models of components or assemblies
- Fabrication drawing of components or assemblies
- Rendered views

### 5.3.6 **Assembly drawings:**

Data:

- Finished drawings of components
- 3D models of components or assemblies
- Nomenclature
- All necessary additional information

Work requested:

- To produce an assembly
- Components not supplied in the form of files will have to be modeled

Results expected:

- Assembly file
- Drawing of the assembly (overall drawing)
- Nomenclature
- Exploded view
- Rendered views
- Simulation

### 5.3.7 **Detail drawings:**

Data:

- Assembly (File of the assembly + files of the components)
- Nomenclature
- Drawing of components or assemblies
- All necessary additional information

Work requested:

- To produce a fabrication drawing of one or more components

Results expected:

- 3D model(s) of one or more components
- Fabrication drawing(s) of parts or assemblies
- MBD
- Rendered views

### 5.3.8 **Modification of product (design change):**

Data:

- Assemblies (3D models)
- Layout (assemblies and components)
- Technical specifications for the design change to be applied
- All necessary additional information

Work requested:

- To implement the design change

- Update all files and drawings

Results expected:

- Modified files (components and assemblies)
- Fabrication drawing of the components
- Assembly drawing of the components
- Exploded view

### 5.3.9 Output format

- Use of Autodesk Inventor Professional/Autodesk Fusion. The version will be determined by the Chief Expert 6 months before the Competition
- Drawing plotted on sizes A1 and smaller
- Charts, table and documents printed by laser printers on paper sizes A3.
- Screenshots, rendering on colour printer to a maximum size of A3
- Files, components, assemblies, etc... according to the instructions for the test

During the competition, each competitor is allowed no more than 2 checking prints of each drawing. The final printing will take place at the end of each competition day.

## 5.4 Test Project development

The Test Project MUST be submitted using the templates provided by WSE. Use the Word template for text documents and DWG template for drawings. Please contact [jordy.degroot@worldskillseurope.org](mailto:jordy.degroot@worldskillseurope.org) for guidance.

If the Test Project is designed by an Independent Test Project designer, then the Test Project must be designed in accordance with the WSE Independent Test Project Guide v1.1.

If your Skill wishes to have an Independent Test Project designer, you must ensure that WorldSkills Europe is made aware of this, so that it can be assured that there is proper funding in place, or that the Independent Test Project designer is aware that he/she will do this task free of charge.

### 5.4.1 Who develops the Test Projects or modules

The Test Project / modules are developed under the supervision of:

- All Experts
- Some Experts
- Nominated Experts
- Independent Test Project designer/ Third party
- Chief Expert, Deputy Chief Expert

Add information if needed:

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

The Test Project or modules are developed:

- Jointly on the Discussion Forum
- Independent Test Project designer
- Other:

NOTE: The Independent Test Project designer to produce four Test Projects (Modules), three to use in the Competition and one more as a backup plan, including the marking scheme.

The Test Project must be developed in Autodesk Inventor Professional/Fusion, and all files must come along with the Test Project.

All the physical models to Module three (one for each Competitor), must be provided by the Independent Test Project designer to WorldSkills Europe, one month before Competition.

The presence of a Technical/Support Team from Autodesk and from IT Management, during all pre-competition and Competition period is mandatory. The presence of the Test Project designer is mandatory during all pre-competition and Competition period

### 5.4.3 When is the Test Project developed

The Test Project is developed according to the following timeline:

TIME	ACTIVITY
Eight (8) months before the current Competition	The Test Project is to be developed
Six (6) months prior to the Competition	The Independent Test Project designer must be guarantee that the Test Project it's inline with the Infrastructure List
Two (2) months before the Competition	The Test Project must be submitted to WorldSkills Europe for validation

## 5.5 Test Project validation

Three (3) months prior to the Competition the Test Project must be submitted to a WorldSkills Expert (chosen by the CE) for validation

Two (2) months before the Competition the Test Project must be submitted to WorldSkills Europe for validation

## 5.6 Test Project selection

- By vote of Experts at the previous Competition
- By vote of Experts on the Discussion Forums

- By vote of Experts at the upcoming Competition
- By random draw by the Competition Director, three months before the current Competition
- Test Project is designed by an Independent Test Project designer, therefore there is no selection process
- Other, please specify below:

## 5.7 Test Project circulation

Please note that if a Test Project is known by the Chief- and/or Deputy Chief Experts, and/or any of the other Experts, it must be shared via the forums before the start of the Competition. This also means that this Test Project is subject to a 30% change before the start of the Competition.

The Test Project is circulated via the website as follows:

- Submitted to the Secretariat for circulation ~~XX~~ months before the current Competition
- Not circulated
- Other, please specify below:

## 5.8 Test Project coordination (preparation for competition)

Coordination of the Test Project will be undertaken by:

- Skill Management Team
- Chief Expert
- Chief Expert and Deputy Chief Expert
- Chief Expert and Workshop Manager
- Chief Expert with selected Experts
- Chief Expert with Competition Organizer
- All Experts
- Other, please specify below:

## 5.9 Test Project change at the competition

Not applicable

## 5.10 Material or manufacturer specifications

Specific material and/or manufacturer specifications required to allow the Competitors to complete the Test Project will be supplied by the Host Organization and are available via the forums. 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 EuroSkills Competition, all discussion, communication, collaboration, and decision making regarding the Skill Competition must take place on the skill specific Discussion Forum, which can be reached via [www.worldskillseurope.org](http://www.worldskillseurope.org). Skill related decisions and communication are only valid if they take place on the forum. The Chief Expert (or an Expert nominated by the Chief Expert) will be the moderator for this Forum. Refer to Competition Rules for the timeline of communication and competition development requirements.

### 6.2 Competitor information

All information for registered Competitors is available from the WorldSkills Europe website [www.worldskillseurope.org](http://www.worldskillseurope.org). Please contact [jordy.degroot@worldskillseurope.org](mailto:jordy.degroot@worldskillseurope.org) for guidance.

The information includes:

- Competition Rules
- Technical Descriptions
- Marking Schemes
- Test Projects
- Infrastructure List
- Health and Safety documentation
- Other Competition-related information
- List of material that can be used to build templates and not been provided by the host

### 6.3 Test Projects and Marking Schemes

Circulated Test Projects will be available at the WorldSkills Europe website from [www.worldskillseurope.org](http://www.worldskillseurope.org). Please contact [jordy.degroot@worldskillseurope.org](mailto:jordy.degroot@worldskillseurope.org) for guidance.

### 6.4 Day-To-Day management

The day-to-day management of the Skill Competition during the EuroSkills Competition is defined in the Skill Management Plan that is created by the Skill Management Team led by the Chief Expert. The Skill Management Team comprises the Jury President, Chief Expert and Deputy Chief Expert. The Skill Management Plan is progressively developed in the six months prior to the Competition and finalized at the Competition by agreement of the Experts. The Skill Management Plan can be viewed at [www.worldskillseurope.org](http://www.worldskillseurope.org). Please contact [jordy.degroot@worldskillseurope.org](mailto:jordy.degroot@worldskillseurope.org) for guidance.

## 7 Skill specific safety requirements

Refer to Host Country/Region Health and Safety documentation for Host Country/Region regulations. This document will be shared via the forums. One overall Health and Safety document will be published, as well as Skill specific safety requirements.

## 8 Materials and equipment

### 8.1 Infrastructure List

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

The Infrastructure Lists will be available at the WorldSkills Europe website from [www.worldskillseurope.org](http://www.worldskillseurope.org). Please contact [jordy.degroot@worldskillseurope.org](mailto:jordy.degroot@worldskillseurope.org) for guidance.

The Infrastructure List specifies the items and quantities requested by the Experts for the next Competition. The Host Organization will progressively update the Infrastructure List specifying the actual quantity, type, brand, and model of the items.

At each Competition, the Experts must advise the Competition Manager of any increases in space and/or equipment.

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

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

### 8.2 Competitors toolbox

WorldSkills Europe aims to minimize the sending of toolboxes as much as possible. We therefore ask you to keep this in mind when writing the section below. Please be advised that competitors should bring as little as possible and what they do bring **MUST** be true hand tools. Only items are allowed that would significantly affect their ability to perform the task and deliver the Test Project to a high standard.

- Competitors may bring more than one toolbox with the total external volume not exceeding 0.32 m<sup>3</sup>.
- (Volume = Length x Height x Width, or  $V = L \times H \times W$ )
- Volume measurement does not include a packing crate, other protective packing material, palette for transportation, wheels, etc.

### 8.3 Materials, equipment and tools supplied by Competitors in their toolbox

- Competitors are required to supply their own Personal Protective Equipment as specified in section skill-specific safety requirements
- Compendium of standards
- Technical manuals
- Instruments for freehand sketching (plastic tools such as rulers, set square, angle protractor, etc.)
- Personal keyboard and mouse (including drivers), if different than the ones supplied by Competition Organizer
- “Space Mouse” (3D Mouse) is allowed. Different electronic equipment must be presented to the Expert team for validation
- Measuring instruments



### Digital Caliper (0-150mm or 0-200mm)



### Offset Centerline Caliper



### Digital or Universal Protractor



Radius Gages (0,4 to 25mm)



External Metric Thread Pitch Gage (0.35 to 6mm)



Internal Metric Thread Pitch Gage (0.35 to 6mm)

Use of screws/thread plugs is allowed

- 4 sizes – M6, M8, M10, and M12
- Use of screws/thread plugs is allowed



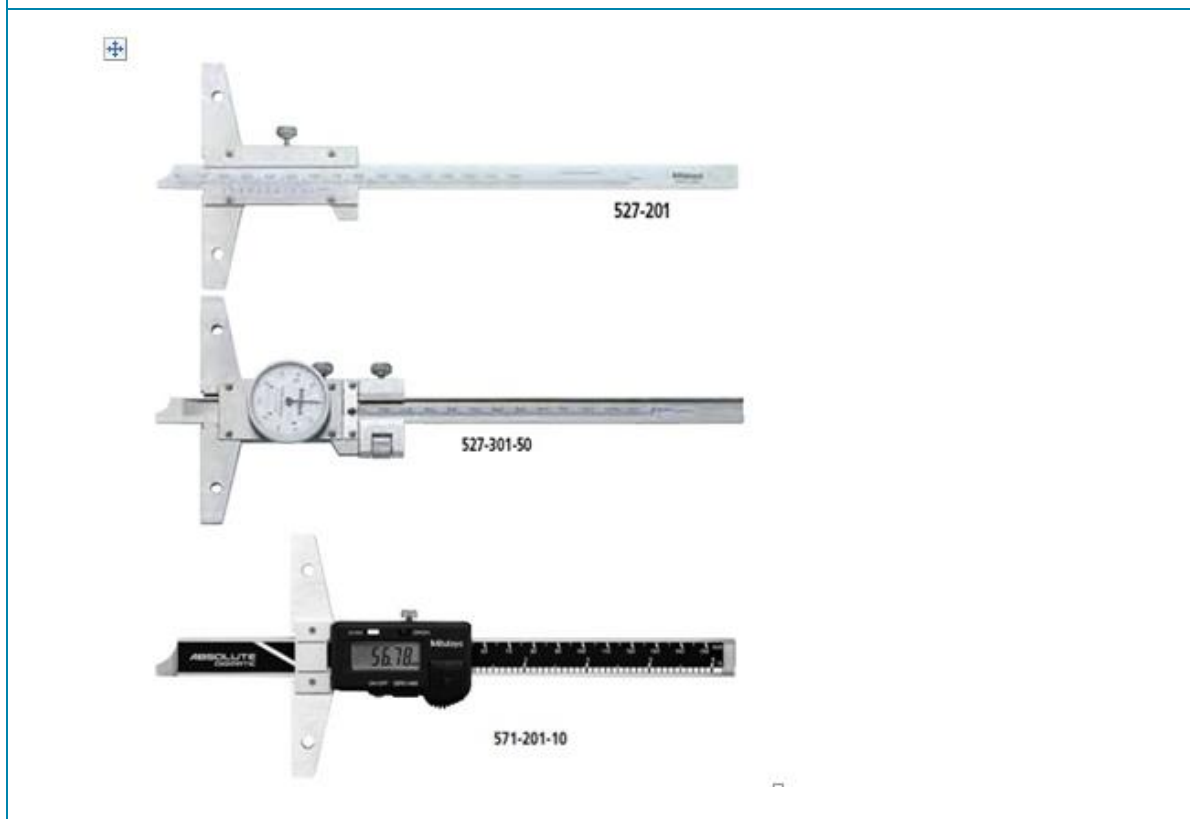
## Surface comparator gauges (Ra)



## Metallic Ruler (0-300mm)



Vernier/Dial/ Digital Depth Gage Caliper (0-150mm)



## 8.4 Materials, equipment and tools supplied by the Experts

- Experts are not required to bring materials, equipment, or tools. All is supplied by the Competition Organizer.
- Experts are required to supply their own Personal Protective Equipment as specified in section Skill specific safety requirements.

## 8.5 Materials, equipment and tools prohibited in the Skill area

- All materials and equipment brought by Competitors and Experts have to be presented to the Experts. The Experts shall rule out any items brought to the Competition that are not considered normal Engineering Drawing and CAD related tools and equipment, that will give any Competitor an unfair advantage.
- Competitors must work with the software provided only.

## 8.6 Proposed workshop and workstation

Workshop layouts from previous competitions are available by contacting the Competition and IT Coordinator at: [jordy.degroot@worldskillseurope.org](mailto:jordy.degroot@worldskillseurope.org). New Workshop Layouts will be communicated via the forums when completed.

Please be advised that you will have the opportunity to discuss your Workshop Layout proposal with the Host Organization during the Competition Preparation Meetings (CPM).

For workshop layout development, please refer to the forums.

## 9 Skill-specific rules

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

### 9.1.1 Personal laptops – USB – memory sticks– mobile phones

- No external memory devices are to be connected to the competition computer unless under the supervision of the Chief Expert and Deputy 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, Deputy Chief Expert, Experts, Competitors, and Interpreters are not allowed to bring and use personal memory sticks into the workshop.
- From C-4 to C1 Chief Expert, Deputy 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 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 day.

### 9.1.2 Personal photo cameras – video taking devices

- The use of personal photo and video taking devices is forbidden in the workshop until the last break on each competition day.

### 9.1.3 Communication between compatriot experts and competitors

- No communication during breaks or lunch time between Expert and Competitor from C1 to C4 (all days of competition are considered Fault Finding)
- Competitor and compatriot Expert cannot be outside the competition area at same time unless is approved by the Chief Expert.

### 9.1.4 General best practice procedure

Marking:

- For volumes marking, always check on the digital part file.
- A checklist is used and signed by the Competitor to verify the requested work
- 2D Drawing printed files must comply with professional use. Mark penalty can be applied according to the Marking Scheme (part Judgement). e.g. – over dimensioning, overlapping dimensions, unnecessary views, incorrect symbols, and abbreviations, incomplete title block, etc.

## 10 Visitor and media engagement

Following is a list of possible ways to maximize visitor and media engagement, within the remit of the Competition Rules:

- Try a trade
- Display screens
- Test Project descriptions
- Enhanced understanding of Competitor activity
- Competitor profiles
- Career opportunities
- Daily reporting of competition status
- Time based parts of the Test Project
- 3D Printing
- 3D Scanning
- Sponsors booth

# 11 Sustainability

This Skill Competition will focus on the sustainable practices below:

- Recycling
- Reduce of paper
- Use of 'green' materials
- Use of completed Test Projects after Competition