

# Competition Overview

## WorldSkills UK - CNC Milling 2022

### About the Competition

This competition assesses the skills and abilities of competitors entering the field of CNC Milling. CNC Milling, or computer numerical control milling, is a machining process that employs computerised controls and multi-point cutting tools to progressively remove material from the workpiece and produce a custom-designed part or product. This process is suitable for machining a wide range of materials and producing a variety of high precision manufactured products.

#### **The Skills you need to demonstrate:**

Understanding of Health and Safety

Maths

IT Skills

Safe handling of machinery

Familiarity with a CAD/CAM system

Problem-Solving

Interpret Engineering Drawings

Process Planning

Setting and operating CNC Milling machines

This WorldSkills UK competition is managed by Coleg Cambria in collaboration with DMG Mori, MasterCAM, Mitutoyo, QuickGrind, Sandvik, Jemtech and Gewefa

This competition consists of:

- A passive stage, a remote assessment in which you must complete work in your own time and submit this for judging;

- A qualifying heat, which can be either face to face or remote and you must attend and complete a series of tasks on a specific day Or a set of tasks that you will be sent and must be completed within a given timescale;
- A UK national final, taking place at the NEC in November as part of WorldSkills UK Live.
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Further information, including pre-competition sample materials, are available in the Technical handbook which is on the WorldSkills UK website.

[Find And Enter A National Skills Competition | WorldSkills UK](#)

## Core competencies

### CNC Milling

#### Example Standard(s):

**Engineering Technician Apprenticeship Standard ST0457 (Machinist Advanced Manufacturing Engineering)**

**Manufacturing Engineer (Degree) Apprenticeship Standard ST0025**

#### Example Qualification(s):

**EAL Level 3 Diploma in Advanced Manufacturing and Engineering -**

**CNC Machinist (Development Competence) 603/1034/0**

**City & Guilds 2850-207**

**City and Guilds 7682-214**

**EAL Level 2 Diploma in Advanced Manufacturing Engineering (Foundation Competence) 601/7179/0**

Passive Stage	Qualifiers	UK National Final

Competency One Work Organisation and Management				
Standards	Task			
All	Follow relevant safety practices	Yes	Yes	Yes
Competency Two Interpret Engineering Drawings and Follow the Specification				
Standards	Task			
All	Read engineering drawings	Yes	Yes	Yes
All	Understand tolerances	Yes	Yes	Yes
Competency Three Process Planning				
Standards	Task			

All	Create wireframe geometry	No	Yes	Yes
All	Create and modify solid models	No	No	Yes
All	Calculate speeds and feeds			
<b>Competency Four</b>				
Programming				
<b>Standards</b>	<b>Task</b>			
All	Program CNC toolpaths from solid models and wireframe	No	Yes	Yes
All	Produce CNC programs	No	Yes	Yes
<b>Competency Five</b>				
Metrology				
<b>Standards</b>	<b>Task</b>			
All	Accurately measure part and adjust tool information	No	Yes	Yes
<b>Competency Six</b>				
Operating				
<b>Standards</b>	<b>Task</b>			
All	Set a machine Vice	No	Yes	Yes
All	Set tool information on machine	No	Yes	Yes
All	Run CNC programs safely	No	Yes	Yes
All	Compete under time pressure	No	Yes	Yes
<b>Competency Seven</b>				
Machining				
<b>Standards</b>	<b>Task</b>			
All	Profile contours Pockets Slots, open or closed Drilled holes Chamfers Radii	No	Yes	Yes
All	Reamed holes Tapped holes Bosses Bores Engraving	No	No	Yes

## Entry Criteria

This is an Individual competition.

There are no limits to the number of competitors that can register for this competition. Competitors must be familiar with all of the core competencies listed, but must not have more than 5 years industry experience.

The competition is intended for those studying, training and/or working in the CNC Industry. Competitors can be in education and training or working in industry. Competitors will use CNC machines to cut, drill, shape and finish products and components used in engineering and manufacturing.

The competition is based on the standards attained by trainees who are studying or enrolled on a level 3 programme or who have achieved a level 3 qualification in the last 12 months. (Up to level 3 for England, Northern Ireland and Wales, up to level 6 for Scotland or up to five years' experience in a working environment).

Learners studying at Level 2 can still enter as long as they have relevant experience with CNC machines and CAD/CAM software.

<b>Marking and practical Assessment</b>			
<b>Criterion</b>	<b>Score Weighting</b>	<b>Qualifier</b>	<b>UK Final</b>
<b>Conformity to Drawing / Meeting Industry Standards:</b> Complete work on time to specifications and quality standards	10%	Yes	Yes
<b>Surface Finish:</b> Achieve required surface finish tolerances	10%	Yes	Yes
<b>Main Dimensions:</b> Produce the component, achieving high dimensional accuracy	50%	Yes	Yes
<b>Secondary Dimensions:</b> Produce the component achieving the more open dimensional limits	25%	Yes	Yes
<b>Use of material:</b> Produce component without using excess material	5%	Yes	Yes

## Test Project

The competition task will be to program and produce a component to the correct quality standards on a CNC Milling machine within a specified time limit. A 2D engineering drawing will be provided and in some instances, a 3D CAD model

At the start of the competition task, competitors will receive the test project and have 15 minutes to check the engineering drawings and ask the competition manager any questions. After 15 minutes, the timer will start.

Test project times can vary, depending on the complexity of the task, between 5 and 7 hours.

A portion of this time will be allocated for CAD/CAM tasks and the rest of the time will be allocated for machine set-up and running.

Once the allocated time is over competitors must stop machining and hand their completed test project components to the judging team for assessment.

## Materials and Equipment

You will be provided with all tools, equipment and materials on the day.

Please ensure that you bring the following with you:

- Safety Footwear (Steel toe caps)
- Safety glasses
- Workwear (Overalls or work trousers and top) we encourage apprentices to wear the workwear that their employers provide

Competitors will not be permitted to use the following:

- Personal Laptops, tablets or mobile phones
- Personal portable storage devices (USB's)



## Contact Details

### Coleg Cambria

Enquiries:

[competitions@cambria.ac.uk](mailto:competitions@cambria.ac.uk)

### For technical queries please contact:

Adam Youens

[adam.youen@cambria.ac.uk](mailto:adam.youen@cambria.ac.uk)

01978 267827

For general enquires please contact the WorldSkills UK Contact Centre 0800 612 0742 opt.2, [Enquiries@WorldSkillsUK.org](mailto:Enquiries@WorldSkillsUK.org).

## Competition Rules

A completed registration is an indication that you have agreed to the following:

- a) WorldSkills UK Competition Rules
- b) Skill specific rules (where applicable see below)
- c) WorldSkills UK Terms and Conditions

Please ensure that you are familiar with these documents ahead of any competition activity.

In addition to this, please familiarise yourself with the below rules which are specific to the CNC Milling competition:

### Competition specific rules

- All competitors will receive a health and safety briefing at the start of the competition and these rules must be adhered to throughout the competition.
- Competitors will start and finish work as instructed by the judges.

- Any competitor who wishes to leave the area during the competition must seek the permission of the judges.
- Competitors will not be allowed contact with tutors/coaches during the live competition non-compliance with this may result in deduction of points.
- If there is a power stoppage or accident, the competitors must act according to the instructions of the judges
- Competitors who break or damage equipment during the competition will not receive any additional time.
- Where a competitor is observed working in an unsafe manner they will be stopped and not permitted to continue unless willing to follow the judges' directions.
- The competition will be assessed and marked by a panel of judges (from Industry, Colleges or Training Providers) using the competition criteria and allocation of marks.
- Any questions during the competition activity should be addressed to the competition judging panel.
- Competitors should not communicate with other competitors during competition activity.
- It is the responsibility of each competitor to arrive on time for each competition session. No additional time will be allowed if you arrive late.
- Technical failure of your equipment should be reported immediately to the judging panel. Additional time will be allocated if the fault is beyond the control of the competitor.

### **Use of technology – USB, memory sticks**

- Competitors must only use memory sticks provided by the Competition Organiser. No other memory sticks are to be inserted into the Competitor computers
- Memory sticks or any other portable memory devices cannot be taken outside the workshop.
- Memory sticks or other portable memory devices are to be submitted to the Lead Judge at the end of each day for safekeeping and must not be taken out of the workshop.

### **Use of technology – personal laptops, tablets and mobile phones**

- Competitors, are not allowed to use personal laptops, tablets or mobile phones in the workshop when competing
- Listening to music via headphones is not permitted during competition activity.



## **Drawings, recording information**

- No drawings or information regarding the Test Project can be taken out of the workshop.
- The Competitor cannot bring their own drawings. During familiarisation, drawings are supplied.
- Notes in a written format are allowed and encouraged. No digital formats will be allowed.