

*Technical Description*  
**CNC Turning**

*MANUFACTURING AND ENGINEERING TECHNOLOGY*



*The following minimum requirements have to be adopted for CNC Turning Skill Competition.*

***The Technical Description consists of the following:***

- 1. Introduction*
- 2. Skill Standard specification*
- 3. The Assessment Strategy And Specification*
- 4. Safety*
- 5. Infrastructure List*

## **INTRODUCTION**

### **NAME AND DESCRIPTION OF THE SKILL COMPETITION**

*The name of the skill competition is CNC Turning*

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

*CNC Turning is a branch of engineering.*

*A CNC Lathe is a machine on which material turns around an axis at high speed, and where cutting tools driven by computer software are moved to cut away excessive material to get the expected part.*

*Each part of an assembly is made of different materials, and needs different geometries, dimensions and surface qualities. The engineer brings all these requirements into technical drawings which are called “blueprints”.*

*The CNC Turning Machinist has to use a computer to tell the Lathe how to move the tools and cut the part. He/she also has to set up the lathe with all the cutting tools. These tools can cut almost every material (stainless steel, plastic, soft steel, aluminium, bronze, and so on) but we have to choose well. We also choose the clamping method. This is where the material will be held firm.*

*When the machine starts cutting material, the Machinist makes sure that the dimensions exactly fit the blueprint specifications. For this, very accurate inspection tools are used. A smart machinist will get the part to fit the blueprint specifications at the first attempt.*

### **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.*

## ***SKILLS STANDARDS SPECIFICATION (SSS)***

*The Standards Specification is 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.*

*The individual needs to know and understand:*

- *The different steps that lead to the setup of the machine*
- *The different modes of machine operation*
- *Programming, setting and operating of CNC lathe*
- *Mathematics, especially calculations in trigonometry*
- *Mounting tools, setting tool parameters*
- *How to modify clamping device, such as jaws, etc.*
- *How to clamp the part, correctly, and safely*
- *How to set the work shift and offset system*
- *How to run the program safely*
- *Stopping and restarting a cycle*
- *Emergency stopping*
- *Safety equipment (how to use, when to use, etc.)*
- *Use of appropriate measuring- or gauging instruments*
- *Quickly react if anything goes wrong*

## **THE ASSESSMENT STRATEGY AND SPECIFICATION**

*Assessment at the Skills 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**

*The Marking Scheme is the pivotal instrument of the Skills 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*

## **ASSESSMENT CRITERIA**

*The main headings of the Marking Scheme are the Assessment Criteria. These headings are derived in conjunction with the Test Project. There will be normally between five and nine Assessment Criteria.*

## **SUB CRITERIA**

*Each Assessment Criterion is divided into one or more Sub Criteria. Each marking form (Sub Criterion) contains Aspects to be assessed and marked by measurement or judgement.*

## **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 and a reference to the section of the skill as set out in 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 skill in the Standards Specification.*

## **ASSESSMENT AND MARKING USING JUDGEMENT**

*Judgement uses a scale of 0-3. 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*

## **COMPLETION OF SKILL ASSESSMENT SPECIFICATION**

### ***A) Main dimensions – 50 marks (50% of the total score)***

*Total marks per module depend on the allocated duration of the module, and shall be approx. 50% of the total marks of the module.*

- Each main dimension shall carry the same weight in points.*
- There shall not be more than ten marking aspects per module.*

### ***B) Secondary dimensions – 25 marks (25% of the total score)***

*Total marks per module depend on the allocated duration of the module, and shall be approx. 25% of the total marks of the module.*

- There shall not be more than 15 marking aspects per module.*
- Each main dimension shall carry the same weight in points*

***C) Conformity to drawing – 10 marks (10% of the total score)***

*Total marks per module depend on the allocated duration of the module, and shall be approx. 10% of the total marks of the module.*

- *Visual check if features and characteristic of the test part according to print, if features are missing, or if additional features (unwanted) are on the part;*
- *Check for corner break and chamfers and for burrs on the part;*
- *Check for damage to part (scratches, clamp-imprints, crash-marks etc.);*
- *Visual check of surface finishes not specified for measuring.*

***D) Surface finish – 10 marks (10% of the total score)***

*Total marks per module depend on the allocated duration of the module, and shall be approx. 10% of the total marks of the module.*

- *Measure specified locations (marked on print).*

***E) Use of material – Five marks (5% of the total score)***

*Award marks only if no additional material is used by the Competitor.*

## **Safety**

*Work must only be carried out if the required Personal Protective Equipment is available and ready for use (without defects). Depending on the work to be conducted, this includes:*

*Safety footwear*

*Protective gloves*

*Safety helmet*

*Protective glasses/face protection, if required*

*Hearing Protection, if required*

*Respiratory protection (dust masks for when milling slots), if required*

*Jewellery and long hair are a safety hazard and shall be taken off or covered;*

*Protective clothing must be selected according to the activity and related risk  
When working with rotating machines, individuals must ensure that close-fitting clothing is worn, in order to avoid clothing becoming entangled in the equipment.*

*Should protective equipment become damaged, the Competitor must contact the Authorized person for replacement equipment before any work continues.*