WORLDSKILLS SINGAPORE 2025
TECHNICAL DESCRIPTION
CNC TURNING

Skill Competition

1. This competition covers the processing of work pieces through metal cutting with CNC lathes.

2. Programming of the CNC lathes through well-known control (Siemens) and latest version of MasterCAM system or equivalent

3. Conducted as an individual event, competitors are given 15 hours over 3 days to complete all Test Projects.

4. The test project is structured into modules and each module may consist of a maximum of two (2) parts. Step files will be provided to generate CAD for the 3 days of competition.

Scope of Work

5. Competitors must be able to demonstrate competencies in the following areas:

   5.1 Write NC part programs for components to be machined on the CNC lathe using machine controller and/or CAD CAM system

   5.2 Machine and measure assigned test projects on CNC lathe

   5.3 Produce components to dimensional accuracy of 0.01mm

   5.4 Control components to geometrical tolerance of form and position within the 0.02 mm

   5.5 Obtain surface roughness according to drawing specifications

   5.6 Interpret technical drawings in first angle and third angle projections

   5.7 Apply knowledge of materials used and the appropriate cutting conditions

   5.8 Apply knowledge of CNC turning programming written with G-codes, M-codes and canned-cycles

   5.9 Apply knowledge of programming and transferring data using provided CAM software

   5.10 Apply knowledge about sustainability in the use of 4Rs (Reduce, Reuse, Recycle and Regenerate) principle

Technical Support

6. Training will be provided on the competition machine (maximum 5 working days).

7. The specialists and services staff for the CAM software and the CNC lathes will be available at all times on competition site to ensure that the competition runs smoothly.

Assessment

8. Competitors will be assessed based on measurement (objective) and judgement (subjective) marking.

9. The assessment criteria and relative weighting of marks are as follows:

Criterion		Marks
A	Conformity to drawing	10
B	Surface finish	10
C	Main dimensions	50
D	Secondary dimensions	25
E	Use of material	5
Total		**100**

Major Tools & Materials

10. The following tools and materials will be used in the competition:

10.1. Measuring Tools

a) Outside micrometers (0 ~ 25, 25 ~ 50, 50 ~ 75 & 75 ~ 100 mm)
b) Internal 3-point micrometers (12 ~ 20, 20 ~ 30, 30 ~ 40 mm)
c) Depth micrometers (0 ~ 25 & 25 ~ 50 mm)
d) Blade micrometer (0 ~ 25 & 75 ~ 100 mm)
e) Vernier callipers (0 ~ 150 mm)
f) Vee block (For holding Dia 80 mm)
g) Thread micrometer (0 ~ 25 mm) with anvil and spindle & insert 2.0 ~ 2.5 mm
h) Thread ring gauge, GO & NO GO
i) Thread plug gauge, GO & NO GO
j) Surface finish template
k) Pin gauge

l) Surface plate, Digital height gauge (accuracy 0.01 mm)
m) Radius gauge

10.2. Cutting Tools Holder

	Cutting Tools	Inserts
a)	O.D. Roughing tool:	R 0.2 to 0.8 mm
b)	O.D. Finishing tool:	R 0.2 to 0.8 mm
c)	O.D. Grooving tool:	R 0.2 to 0.8 mm
d)	O.D. Threading tool:	60 degrees angle
e)	U-Drill diameter up to 25.0 mm	U-drill insert
f)	Center - Drill	
g)	I.D. Roughing Boring tool	
h)	I.D. Finishing Boring tool	
i)	I.D. Threading tool	60 degrees angle

10.3. Equipment

a) CNC lathe with standard accessories, hydraulic 3-jaw chuck (minimum 2” (50mm) - bore hole), 1 set of hard jaw, min. 3 sets of soft jaws; tailstock and revolving center.

b) One set of soft jaws per set up; and

c) Basic set of cutters and inserts for internal and external machining (listed under 10 above) and suitable holders including drill chucks, collet holders and collets adapters for twist drill and U-drills.

10.4. Materials

a) Medium carbon steel (equivalent to AISI/DIN standard)

b) Aluminum (good machinability quality) – 6 series

c) The size of the raw material shall not exceed Ø 100mm and 150 mm length.