

CNC MILLING SPECIALIST NYS



PURPOSE

To evaluate each contestant's preparation for employment in Computer Numeric Control Milling. In addition, recognize outstanding students for excellence and professionalism.

ELIGIBILITY

Open to active SkillsUSA members enrolled in programs with precision machining, automated manufacturing or CNC as the occupational objective.

CLOTHING REQUIREMENT

White crew neck short-sleeved T-shirt, work pants, safety glasses or goggles, leather or steel-toed work shoes, hardhat. (Prescription glasses can be used only if they are equipped with side shields. If not, they must be covered with goggles.)

Note: Contestants must wear their contest clothing to the contest orientation meeting. Also bring #2 pencil, resume, and safety assurance form.

EQUIPMENT AND MATERIALS:

- Supplied by the NY chair/committee:
 - CNC mill with proper work-holding devices, as well as vise-parallels
 - Workbench
 - Necessary hand tools and cutting tools
- Supplied by the contestant:
 - Nonprogrammable calculator
 - Pencils and paper
 - Machinery's Handbook (optional)

Note: Your contest may also require a hard copy of your résumé as part of the actual contest. Check the Contest Guidelines and/or the updates page on the NYS SkillsUSA Web site:

<http://www.nysskillsusa.org/>

SCOPE OF THE CONTEST

Knowledge Performance

The contest will include a written test evaluating a contestant's knowledge of Computer Numeric Control machining in such areas as: basic machining skills, CNC programming, setting up a CNC machine, performing mathematical calculations related to CNC, communication and inspection.

Skill Performance

The contest will assess the ability to write the CNC milling programs, interpret prints (including GDT). And measure/gauge parts. Participants also will demonstrate theoretical knowledge of CNC machine configuration, setup and operations.

Contest Guidelines

- Each contestant will be given a dimensional drawing and materials to produce a part on a CNC mill.
- Programming
 - Write and verify CNC program without the use of CAM software (competitor has the opportunity to correct any program errors on the machine)
 - Display complete knowledge of DIN/ISO programming (G and M codes)
 - Apply the correct use of cutter compensation (G41/G42)
 - Adjust speeds and feeds as needed
- Perform mathematical calculations
 - Calculate CNC speeds and feeds
 - Calculate programming coordinates from the drawing
 - Calculate radius tangent points
- Measuring
 - Measure test part to the nearest 0.001"
- Communication
 - Read and interpret technical blueprints
 - Understand all symbols on technical blueprints, such as geometric tolerances, surface-finish symbols, corner-break symbols, etc.
- Dimensions

This is an objective scoring. Scores will

only be granted if dimension is in compliance with the print. The score for each dimension will either be full points or zero points.

7. The CNC mill will be available for orientation on the day before the competition with technicians on hand to help competitors and their advisors familiarize themselves with the equipment.

Standards and Competencies

CNCM 1.0 — Apply basic machining skills per industry standards as set forth by the SkillsUSA technical committee

- 1.1 Demonstrate the basic math skills essential to CNC milling
- 1.2 Identify and use measuring tools that are basic to CNC milling
- 1.3 Interpret and apply information from prints and drawings
- 1.4 Measure part to nearest +/- .001"
- 1.5 Demonstrate safe working practices on machines
- 1.6 Use various precision measuring tools (i.e., micrometers, calipers, radius gages)
- 1.7 Define and calculate speed and feed rates (SFPM, CCS, IPM, IPR)
- 1.8 Demonstrate knowledge of cutting tools, clamping devices and materials
- 1.9 Perform mathematical calculations that enable the solving of complex trigonometric, geometric and algebraic problems applicable to CNC machining processes

CNCM 2.0 — Demonstrate knowledge of CNC programming per industry standards as set forth by the SkillsUSA technical committee

- 2.1 Manually write and verify the CNC program without the use of CAM software according to print specifications, dimensions and tolerances (competitor has the opportunity to edit any program errors on the machine)
- 2.2 Display complete knowledge of programming (G and M codes)
- 2.3 Apply the correct use of cutter compensation (G41/G42)
- 2.4 Demonstrate knowledge of incremental and absolute positioning
- 2.5 Demonstrate knowledge of coordinate system

- 2.6 Determine proper machining sequences from work piece drawing

CNCM 3.0 — Perform mathematical calculations as needed for calculating speeds, feeds, program coordinates, angles, radii and tangent points

- 3.1 Calculate CNC speeds and feeds
- 3.2 Calculate programming coordinates from the drawing
- 3.3 Calculate angles, radii and tangent points

CNCM 4.0 — Communicate and demonstrate an understanding of all symbols on a blueprint

- 4.1 Read and interpret technical blueprints
- 4.2 Understand all symbols on technical blueprints, such as geometric tolerances, surface-finish symbols, corner-break symbols, etc.

CNCM 5.0 — Inspect work per industry standards as set forth by the SkillsUSA technical committee

- 5.1 Inspect for conformity to print (shape and features of part to drawing)
- 5.2 Inspect for broken edges
- 5.3 Inspect for damage to part (clamp marks, scratches)