CNC Milling Specialist NYS

**PURPOSE**
The purpose of this contest is to evaluate each contestant’s preparation for employment in Computer Numeric Control Milling. In addition, to 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 REQUIREMENTS**
Contest Specific – Machining
- White crew neck short-sleeved T-shirt
- Work pants or jeans,
- Leather or steel-toed work shoes.
- Hair must be contained.
- Safety glasses with side shields or goggles, (Prescription glasses can be used only if they are equipped with side shields approved by OSHA(Z-87). If not, they must be covered with goggles.)

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

**EQUIPMENT AND MATERIALS**
1. Supplied by the technical committee:
   a. CNC Mill with proper work-holder devices, as well as vise-parallels
   b. Workbench
   c. Necessary hand tools and cutting tools
2. Supplied by the contestant:
   a. Nonprogrammable calculator
   b. Pencils and Paper
   c. Machinery’s Handbook (optional)
   d. All competitors must create a one-page résumé and submit a hard copy to the technical committee chair at orientation. Failure to do so will result in a 10-point penalty.

*Note: Your resume may be judged as part of your contest” Check the Contest Guidelines and/or the updates page on the NYS SkillsUSA Web site: [http://www.nysskillsusa.org](http://www.nysskillsusa.org)*

**SCOPE OF THE CONTEST**

**Knowledge Performance**
The contest will include a written test to evaluate a contestant’s knowledge of Computer Numeric Control milling in such areas as: basic milling skills, knowledge of CNC programming, performing mathematical calculations related to CNC, communication and inspection.

**Skill Performance**
This contest will assess the ability to write 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**
1. Each contestant will be given dimensional drawings to program a part on a Haas CNC Controller.
2. Programming
   a. Write and verify CNC programs without the use of CAM software
   b. Display complete knowledge of programming (G and M codes)
   c. Apply the correct use of cutter compensation (G41/G42)
3. Perform mathematical calculations
   a. Calculate CNC speeds and feeds
   b. Calculate programming coordinates from the drawing
   c. Calculate radius tangent points
4. Measuring
   a. Measure sample parts within 0.005"
5. Communication
   a. Read and interpret technical prints
b. Understand all symbols on technical prints, such as geometric controls, surface-finish symbols, corner-break symbols, etc.

6. Dimensions
This is a contest of programming skills. Contestant parts will only run on machine if programs run without violating safety standards or damaging machines.

7. An overview of a Haas CNC controller will be available for orientation before the competition with technicians on hand to help competitors familiarize themselves with the interface.

Standards and Competencies

CNCM 1.0 — Apply basic machining skills per industry standards as set forth by the technical committee
1.1 Demonstrate the basic math skills essential for 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 solving 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 technical committee
2.1 Manually write and verify CNC programs 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 workpiece 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 print
4.1 Read and interpret technical prints
4.2 Understand all symbols on technical prints, such as geometric tolerances, surface-finish symbols, corner-break symbols, etc.

CNCM 5.0 — Inspect work per industry standards as set forth by the 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)
Championships for 2020
Special Instructions to Contestants

Due by Feb 1, 2020

Date submitted: __March 8, 2020___

Contest Name ___ CNC Milling and Turning

Chairperson: Leonard Hall  Leonard_Hall@boces.monroe.edu

Only Special Instructions received by Feb. 28, 2020 will be posted on the website!!

Additional Materials & Supplies:

EQUIPMENT AND MATERIALS

1. Supplied by the technical committee:
   a. Measuring tools and parts to complete the inspection routines
   b. Competition packet – Includes instructions and prints

2. Supplied by the contestant:
   a. Haas CNC simulator (with cord) and the spiral bound manual that comes with the machine
   b. 10 foot long (min) 3 prong extension cord
   c. Non-Programmable calculator
   d. Pencils and blank paper
   e. Machinery’s Handbook (optional)
   f. All competitors must create a one-page résumé and submit a hard copy to the technical committee chair at orientation. Failure to do so will result in a 10-point penalty

Other:

Changes to attire: No skills will be done on machinery

NYS Official Attire:

- Red SkillsUSA blazer, windbreaker, or sweater, or black or red SkillsUSA jacket. Also, the NYS SkillsUSA red/black jacket.
- Button-up collared, white dress shirt (accompanied by a plain, solid black tie), white blouse (collarless or small-collared) or white turtleneck, with any collar not to extend into the lapel area of the blazer sweater windbreaker or any jacket.
- Black dress slacks (accompanied by black dress socks or black or skin-tone seamless hose) or black dress skirt (knee-length, accompanied by black or skin-tone seamless hose)
- Black dress shoes - no open back or open toed shoes

Anyone attending without a Haas Simulator please contact the chairperson ASAP.