

The following rules are for the state contest only. Students/Teams that qualify for the national contest need to adhere to the rules and guidelines for that national contest. The rules can be found in the Skills USA Championships Technical Standards available from SkillsUSA Publication Sales. For both state and national contests, you should also watch for contest updates sent from the Wisconsin SkillsUSA state office. For national contests, you can find contest updates at the national SkillsUSA website.

PRECISION MACHINING

PURPOSE

To evaluate each contestant's preparation for employment and to recognize outstanding students for excellence and professionalism in the field of precision machining technology.

GENERAL REGULATIONS

People entering this contest must follow all rules listed below as well as the "General Regulations" of the Wisconsin Skills Championships. The "General Regulations" can be found at: http://www.skillsusa-wi.org/wordpress/?page_id=130. You will be held accountable for knowing and following all rules and guidelines of the Wisconsin Skills Championships.

Tie Breaker Policy

In the case of a tie between contestants the score from the Manual Lathe portion of the competition will be used to break the tie.

CLOTHING REQUIREMENT

Khaki work pants and khaki work shirt or other appropriate work clothing; leather work shoes; and safety glasses with side shields or goggles (Prescription glasses can be used only if equipped with side shields; otherwise they must be covered with goggles). **NOTE: No athletic type shoes or shorts may be worn by contestants in this event. Also contestants who place 1st, 2nd or 3rd and plan to attend closing ceremony to accept their medal on stage must be dressed in proper contestant clothing.** (Refer to Official Competition Uniform Chart)

RESUME-Is required

ELIGIBILITY

Open to active SkillsUSA members enrolled in vocational programs with precision machining technology as the occupational objective.

EQUIPMENT AND MATERIALS

Supplied by the Technical Committee:

- Stock blanks on which operations are to be performed for Lathe and Mill
- Working drawings with specifications of jobs to be performed.
- All necessary information for use by judges and technical committee.
- All necessary tooling to complete the Lathe and Mill (i.e. turning tools, end mills, drills and taps)

Supplied by Contestant:

- Safety Glasses
- Pencil
- Scale (6" or 12")
- 0-1 inch Micrometer
- 1-2 inch Micrometer

- Caliper (6 inch or larger) or a 0-1 inch Depth Mic
- Calculator
- Trig Table Book

SCOPE OF THE CONTEST

Each contestant in the Skills Championships is expected to demonstrate competency in the performance skills and companion knowledge (theory) skills of the workplace including:

- Meeting industrial safety and hygiene requirements
- Applying fundamental computational skills
- Interpreting blueprints, technical data and other graphics
- Applying physical science principles

Competency assessment involves demonstrating hands-on performance skills in setting up and operating machine tools, producing parts to specifications, and a written examination for measuring complementary knowledge skills.

Contestants will demonstrate their ability to perform jobs or skills selected from the following list of competencies determined by the Wisconsin Skills Championships Technical Committee.

Precision Machining students should be prepared for the following:

Written Test

- "JO" Block Problems
- Sine Bar Problems
- GD&T questions
- NC-CNC Programming questions
- Blue Print Reading
- Measure work piece to nearest .0005
- Calculate amount of material to be removed
- Calculate conversion of revolutions per minute (RPM) to surface feet per second
- Calculate dimensions of key seats
- Calculate machine RPM for a given material size
- Calculate tolerances
- Convert to metric measurement

CAD -CAM test

- Contestants use Esprit® or Master-Cam® software on a computer to generate a 2D CNC program
- Ability to generate 2D geometry
- Ability to generate 2D tool paths
- Calculation of feeds and speeds

G-code programming test

Students will be given a print, a tooling list, and a brief description of the machining operations to be performed. From that they must develop a program using basic G and M codes. No CAM or programming software will be used, only basic word processing programs such as Notepad.

Lathe Operation

- Set up manual lathe
- Rough cut and finish cut
- Align lathe centers using approximate method
- Align lathe centers using accurate measurement
- Bore ream, counter bore and countersink holes
- Cut external and internal tapered surfaces
- Cut external and internal threads
- Perform lathe de-burring

Milling Machines Operation

- Align milling machine mill vise
- Inspect and assemble mill work
- Cut keyway
- Mill an angle
- Perform end milling
- Set speeds and feeds for milling work
- Square up metal using table vice

******* Special Note*******

Contestant in both secondary and post-secondary that win 1st place at the State level and go on to the National Competition will be competing in the CNC Technician program at Nationals.