

SKILLS USA COMPETITION- Precision Machining

**Precision Machining
SKILLS USA
COMPETITION
DISTRICT#8**

PLACE: Western Area Career and Technology Center
DATE: Monday, January 20, 2020
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PURPOSE: To evaluate each contestant's skill level and preparation for employment.
To recognize outstanding students for excellence and professionalism in the field of Precision Machining.

ELIGIBILITY: Open to Skills USA members enrolled in programs with Machining Technology as an occupational objective.

CLOTHING REQUIREMENT: Safety glasses
Short sleeve t-shirt
Blue jeans or "Dickies-style" work pants
Protective footwear

EQUIPMENT/
MATERIALS: See attached sheets for hand tools required in each section. Students will be using Jet 14" tool room lathes and Haas tool room mills. Blueprints and Rubric are attached.

EVALUATION:	TURNING WORK:	Print Tolerance
	MILLING WORK:	Print Tolerance
	PROFESSIONALISM:	Conduct
	(judges check sheet)	Safety Housekeeping Quality

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GENERAL CONTEST RULES:

1. Contestant will use assigned machine.
2. During the entire contest, the contestant will work independently. No assistance will be given by other contestants, instructors, judges, or observes.
3. Contestants may only talk to judges if a problem arises.
4. Contestants are responsible to tell judge, if any problem arises with machine, stock, tools, or other contest materials.
5. Contestants are responsible for the security of their machined piece.
6. Contestants may only use the restroom in the shop area. One contestant at a time may be in the restroom. The restroom door may be locked.
7. Contestants may not leave the laboratory area during the contest.
8. Contestants may use the sink and water fountain at any time during the competition.
9. Contestants are not allowed in the storage room, locker rooms, or office for any reason.
10. Contestants may bring "Machinist Handbook", or one "Machinist Ready Reference." Reference materials may not contain personal sketches or notes.
11. Contestants shall be familiar with all rules, instructions, and contest regulations. All information will be reviewed before the start of the contests.
12. Observers are not allowed in the contest area, but may watch from the designated observer's area. Observers are not allowed to speak or communicate with the contestants.
13. Judges will be recording the start-time and finish-time for both parts. This will be the first criteria evaluated to determine tie breakers. If a tie remains after that point, the winner will be determined by a three judge panel vote.

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JUDGES NOTES

GENERAL:

- 01.) Contestants will be permitted to finish both contest projects unless they are disqualified.
- 02.) If a contestant is disqualified, the contestant will be graded on the work completed at the time of disqualification.
- 03.) Contestants will NOT be penalized for "forgetting" or "misplacing" the required tooling or measuring instruments. Trying to complete the projects without these items will be penalty enough.

SCORING
SHEETS:

- 01.) Be sure to mark all scoring sheets with the correct "Contestant Number".
- 02.) Be sure to record the "Actual Dimension" in the space provided.
- 03.) Circle the appropriate condition according to your measurements; subtract from, or add to the 10 possible points per line and place the final score in the "Total Points" column on the right hand side of the score sheet.
- 04.) 3/4-16 Class 2A thread will be checked with the provided GO and NOGO gages. Judges discretion on additional scoring based on how well the GO gage fits.
- 05.) 1/2-13 tapped holes will be a simple visual check using a threaded stud and asquare. Judges discretion on scoring the perpendicularity /fit /finish.
- 06.) Please record the start-time and finish time at the bottom of each score sheet. This criteria will be used to determine a tie breaker. If a tie remains after that point, the judges will determine the winner by voting.

STATION #1

TURNING

SUGGESTED SET-UP PROCEDURES

This project consists of a piece of CRS, approximately 3.12" long.

The project has been designed to challenge the accuracy and precision capabilities of the contestant. Workpiece complexity has been spared in order to provide time for achieving greater accuracy.

Be sure to study the drawing carefully and plan the most practical machining method. Pay close attention to the tolerance specifications.

Points will be awarded on all dimensions within print tolerance.

Poor finish and burr will lose points.

TOOLING REQUIRED THAT CONTESTANTS MUST BRING

3/8 sq. turning tool (roughing)
3/8 sq. turning tool (finishing)
3/8 sq. facing tools
3/8 sq. threading tool
3/8 sq. necking tool (1/8 wide at tip)
center gage

CONTESTANTS MUST BRING THESE MEASURING INSTRUMENTS

bevel protractor
0-1" micrometer
0-1" blade micrometer
0-6" vernier or dial calipers
6" scale

THE FOLLOWING TOOLS WILL BE SUPPLIED BY THE HOST

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STATION #2
MILLING PROJECT

This project consists of a piece of aluminum (1/2 x 2 x 3).

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Contestants should complete the project within the allotted time; judges will award total points if dimension is within the tolerance limit.

Additional points will be awarded for working to the mean dimension.
Pay close attention to the tolerance specifications.

The following tooling and measuring instruments must be provided by the contestant.

TOOLING REQUIRED THAT CONTESTANTS MUST BRING

1/4" dia. 2 flute end mill (double or single end)
1/4" dia. 4 flute end mill (double or single end)
1/2" dia. 4 flute end mill (double or single end) (optional addition)
3/4" dia. 4 flute end mill (double or single end) (optional addition)
27/64 dia. Straight shank drill
1/2-13 tap
#2 center drill
edge finder
fine aluminum file

CONTESTANTS MUST BRING THESE MEASURING INSTRUMENTS

bevel protractor ·
0-6" vernier or dial calipers
0 -1" micrometer
0 -1" depth micrometer

THE FOLLOWING TOOLS WILL BE SUPPLIED BY THE HOST

PROFESSIONALISM CHECK SHEET

CONTESTANT NUMBER:

Safety	Subtract 5 points from raw score for each safety violation, <i>Disqualify on 3rd violation.</i>
Incident #1 Description:	
Incident #2 Description:	
Incident #3 Description:	

Total Safety Deductions:

Conduct	Subtract 5 points from raw score for each violation of the General Contest Rules. Disqualify on 3rd violation.
Incident #1 Description:	
Incident #2 Description:	
Incident #3 Description:	

Total Conduct Deductions:

Housekeeping	Subtract 3 points from raw score for each violation.
Fail to clean mill	
Fail to sweep floor (m)	
Fail to clean lathe	
Fail to sweep floor (l)	

Total Housekeeping Deductions:

Quality	Subtract 3 points from raw score for each violation.
Fail to clean part - (m)	
Fail to deburr part - (m)	
Rough/poor finish - (m)	
Fail to clean part - (l)	
Fail to deburr part - (l)	
Rough/poor finish - (l)	

Total Quality Deductions:

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FINAL POINT TOTAL

CONTESTANT
NUMBER:

Grade Area:	Score
Turning Project	
Milling Project	
Conduct	
Safety	
Housekeeping	
Quality	

Final Score: |

TOLERANCES: XXX +/- .005

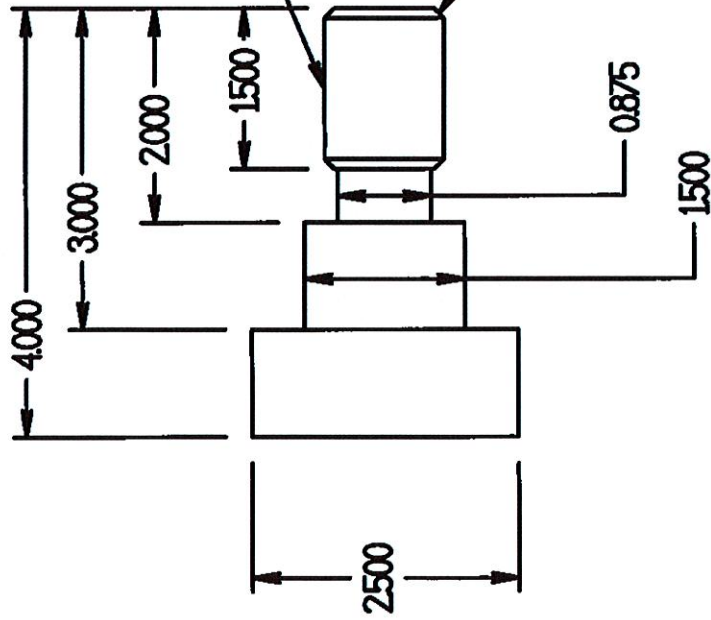
GO-GAGE ON
NO-GO NO MORE THAN TWO THREADS ON

ANGLES +/- 5°

COMPOUND INFEED = .708/ TPI

1:125-12 UNF 2B

45° X .093,
2 PLCS.



TOLERANCES: XXX +/- .005

