



CONTEST DESCRIPTION

# CNC Machining

POST-SECONDARY

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## **1 THE ESSENTIAL SKILLS FOR CAREERS IN THE SKILLED TRADES AND TECHNOLOGY**

SCC is currently working with Employment and Social Development Canada (ESDC) in order to bring awareness to the importance of Essential Skills that are absolutely crucial for success in the workforce. Part of this ongoing initiative requires the integration and identification of Essential Skills in contest descriptions, projects, and project documents. The next phase and very important aspect of our Essential Skills (ES) initiative is to provide an ES report card to each competitor at the Skills Canada National Competition. The purpose of the ES report card is to inform the competitor about their current level of essential skills based on their competition scores. With this knowledge, the competitor will be made aware which essential skill may require improvement. Full implementation is expected in the next Skills Canada National Competition.

The following 9 skills have been identified and validated as key essential skills for the workplace in the legend below:

<sup>1</sup>Numeracy, <sup>2</sup>Oral Communication, <sup>3</sup>Working with Others, <sup>4</sup>Continuous Learning, <sup>5</sup>Reading Text, <sup>6</sup>Writing, <sup>7</sup>Thinking, <sup>8</sup>Document Use, <sup>9</sup>Digital

These essential skills have been identified in section 2.4 and/or 3.2 of your Contest Description and if applicable, in your Project and all other supporting project documents.

## **2 CONTEST INTRODUCTION**

### **2.1 Description of the associated work role(s) or occupations(s).**

<http://skillscompetencescanada.com/en/skills/manufacturing-engineering/cnc-machining/>

### **2.2 Purpose of the Challenge.**

Assess the contestant's CNC machining operational skills and techniques utilizing CNC equipment and CAD/CAM software.

### **2.3 Duration of contest.**

2 days – 3 to 4 hours per day.

## 2.4 Skills and Knowledge that may be tested.

The contest involves manufacturing a precision component using a CNC turning centre and a CNC Vertical Milling centre.

- Reading and Interpreting engineering drawings<sup>8</sup>
- Proficient use of CAD-CAM (MasterCam) to program CNC machines.<sup>9</sup>
- (Turning Centre) May include external and internal turning, taper turning, threading, drilling, boring, face grooving and applied metrology.<sup>1</sup>
- (Machining Centre) May include pocketing, profiling, drilling, reaming, tapping, chamfering, thread milling and applied metrology<sup>1</sup>

*Essential Skills - <sup>1</sup>Numeracy, <sup>8</sup>Document Use, <sup>9</sup>Digital*

## 3 CONTEST DESCRIPTION

### 3.1 List of documents produced and timeline for when competitors have access to the documents.

DOCUMENT	DATE OF DISTRIBUTION VIA WEBSITE
No other competition document will be released prior to the competition	

### 3.2 Tasks that may be performed during the contest

- Interpret engineering drawings and follow the specifications ISO A (American) drawing representation<sup>8</sup>
- Identify and designate the different machining processes on a CNC machine
- Select and apply appropriate cutting technology according to the cutting parameters, the material, equipment and cutting tools<sup>7</sup>
- Setup and utilize CAD/CAM software (MasterCam)<sup>9</sup>
- Generate G-Code
- Setup a Operate CNC Equipment
- Select appropriate measuring tools or gauging instruments and use them correctly<sup>7</sup>
- Make accurate measurements using precision measuring tools<sup>1</sup>
- Inspect and maintain the accuracy of dimensions within the tolerances<sup>1</sup>

*Essential Skills - <sup>1</sup>Numeracy, <sup>7</sup>Thinking (Decision Making), <sup>8</sup>Document Use, <sup>9</sup>Digital*

## 4 EQUIPMENT, MATERIAL, CLOTHING

### 4.1 Equipment and material provided by Skills/Compétences Canada.

- CNC Machining Centre (Haas) – <http://www.hasscnc.com/>
- CNC Turning Centre (Haas)
- CAD-CAM system (MasterCam)
- Cutting Tools and Holders (Sandvik) - [www.sandvik.coromant.com/](http://www.sandvik.coromant.com/)
- Mastercam laptops and software
- All raw material (one part per competitor)
- Gauges, measuring instruments
- Parallels/soft blow hammers/wrenches/vices/deburring files
- Computers and Mastercam software
- Micrometer digital 0-100 mm
- Digital Caliber digital 0-200 mm
- Depth Micrometer digital 0-100 mm
- Thread micrometer digital 25-50 mm
- Test Dial indicator and base
- Edge finder
- Telescoping Gauges
- Thread pitch gage (metric)

### 4.2 Equipment and material provided by the competitor.

- Non programmable calculator/machinist calculator
- Machinery's Handbook/Machine manual (optional)
- No other cutting or non-cutting tools allowed
- No personal computers or other CAD CAM software allowed

**COMPETITORS WILL BE REQUIRED TO USE THE MATERIAL AND EQUIPMENT PROVIDED BY SCC. ALL OTHER MATERIAL AND EQUIPMENT WILL BE REMOVED FROM THE SKILL AREA.**

### 4.3 Required clothing provided by the competitor.

- Long pants (no shorts allowed)
- Short sleeve shirt
- Shop coat with rolled up sleeves (optional)

## 5 SAFETY REQUIREMENTS

### 5.1 Safety workshop

Upon arrival at the Skill area, Competitors will participate in a Safety workshop and they will be expected to work and maintain a safe working area during the competition. Any Competitor breaking any health, safety or environmental rules, may be required to undertake a second safety workshop, this will not affect the Competitor's competition time.

### 5.2 Personal protective equipment (PPE) provided by Skills/Compétences Canada

- N/A

### 5.3 Personal protective equipment (PPE) provided by the competitor.

- Safety Glasses
- CSA approved safety shoes
- Hearing protection (optional)

**Note:** Competitors will not be allowed to compete if the above items are not brought and used.

## 6 ASSESSMENT

### 6.1 Point breakdown

POINT BREAKDOWN	/100
Compliance with occupational health and safety regulations	5
Compliance with dimensions, tolerances, and surface finish specified in plans for Milling	45
Compliance with dimensions, tolerances, and surface finish specified in the plans for Turning	45
No additional part (material) per competitor. One piece per person	0
If a failure of a tool occurs as a result of a competitor's negligence, a loss of – 2.5 per tool will be deducted.	(2.5)
Practical set-up procedure for Turning Centre	2.5
Practical set-up procedure for Milling Centre	2.5

## 7 CONTEST SPECIFIC RULES

Contest specific rules cannot contradict or take priority over the Competition Rules. They do provide specific details and clarity in areas that may vary from contest to contest. Any additional contest rules will be reviewed during competitor orientation.

TOPIC/TASK	CONTEST SPECIFIC RULE
Use of technology – digital memory devices	<ul style="list-style-type: none"> <li>• Competitors are not allowed to bring digital memory devices into the workshop.</li> </ul>
Use of technology – personal devices	<ul style="list-style-type: none"> <li>• Competitors are not allowed to bring personal laptops, tablets or cellphones into the workshop.</li> </ul>
Drawings - recording information	<ul style="list-style-type: none"> <li>• Competitors are not permitted to take drawings or recorded information out of the workshop.</li> </ul>
Tools/infrastructure	<ul style="list-style-type: none"> <li>• Competitors are not allowed to bring their own tools and measuring instruments.</li> <li>• Competitors are not allowed to change the machine or computer parameters/settings.</li> <li>• No other software other than Mastercam permitted</li> <li>• No manual programming permitted (see additional information)</li> </ul>
Equipment failure	<ul style="list-style-type: none"> <li>• If equipment or tools supplied by Skills/Compétences Canada fail, extra time will be allowed only if the Technician of the sponsor or supplying company specifies and proves it is not a “user error”.</li> </ul>

## 8 ADDITIONAL INFORMATION

### 8.1 Interpreter

If a competitor requires the help of an interpreter once onsite during the competition, the Skills/Compétences Canada Provincial/Territorial offices must advise Skills/Compétences Canada National Secretariat a minimum of 1 month prior to the competition or this service might not be guaranteed.

### 8.2 Ties

- Tiebreaker #1: In the event of a tie, the competitor with the highest score in the Compliance with dimensions, tolerances, and surface finish specified in plans for Milling criteria will be declared the winner.
- Tiebreaker #2: If a tie still remains, the competitor with the highest score in the Compliance with dimensions, tolerances, and surface finish specified in the plans for Turning will be declared the winner.
- Tiebreaker #3: If a third tie occurs, the competitor with the highest score in the Compliance with occupational health and safety regulations criteria will be declared the winner.



### 8.3 Competition rules

Refer to the [competition rules](#) of the Skills Canada National Competition which can be found on our website.

### 8.4 CAD CAM Training.

If a competitor requires MasterCam access for training, contact In-House Solutions.  
Phone: 1-800-529-5517

## 9 NATIONAL TECHNICAL COMMITTEE MEMBERS

Member Organization	Name
British Columbia – Chair	Marte Arreola
Manitoba	Rob Ataman
Ontario	Louis Dropka
New Brunswick	Alain Lagacé
Saskatchewan	Phil Ursulescu
Nova Scotia – Co-Chair	Kimball Edwards
Prince Edward Island	Andrew Townshend
Quebec	Éric Bilodeau
Alberta	Brandon Walker

Contact the Skills/Compétences Canada national secretariat for any questions or concerns: Nathalie Maisonneuve ([nathaliem@skillscanada.com](mailto:nathaliem@skillscanada.com)).