PROGRAM PROGRAMME
EXCELLENCE
RED SEAL · SCEAU ROUGE

TRADE PROFILE

Machinist

INTERPROVINCIAL STANDARD
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RED SEAL TRADE PROFILE

MACHINIST

STRUCTURE OF THE OCCUPATIONAL STANDARD

This profile has two sections that provide a snapshot of the trade's description, and all trade activities as they are organized in the Red Seal Occupational Standard:

Description of the Machinist trade: An overview of the trade's duties, work environment, job requirements, similar occupations and career progression

Task Matrix: a chart which outlines graphically the major work activities, tasks and sub-tasks of this trade

Major Work Activity (MWA): the largest division within the standard that is comprised of a distinct set of trade activities

Task: distinct actions that describe the activities within a major work activity

Sub-task: distinct actions that describe the activities within a task

A complete version of the occupational standard, which provides additional detail for the trade activities, skills and knowledge can be found at www.red-seal.ca.

DESCRIPTION OF THE MACHINIST TRADE

"Machinist" is this trade's official Red Seal occupational title approved by the CCDA. This standard covers tasks performed by machinists whose occupational title has been identified by some provinces and territories of Canada under the following names:

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
General Machinist						■							
Machinist	■	■	■	■	■		■	■	■	■	■	■	■

Fully qualified machinists possess the knowledge and abilities to set up and machine using conventional, portable and Computer Numerical Control (CNC) machines that cut or grind metal and other materials into products with precise dimensions. These machines include lathes, milling machines, saws, grinding machines, drilling machines, boring machines, electrical discharge machines (EDM), line borers and portable milling machines.

Machinists work from drawings, specifications and their own measurements to calculate dimensions, tolerances and types of fit. Precise measurements are critical to machinists' work. They must be knowledgeable about the properties of metals and non-metallic materials.

Machinists may work in industries where machines are manufactured, repaired or used. These may include industries that manufacture machinery equipment, motor vehicle or aerospace parts. Machinists produce precision parts that are used in all aspects of manufacturing. They may also work in shipyards, rail yards, refineries, pulp and paper mills, mines, smelters, metal fabricating and repair shops. Some sectors that employ machinists may include oil and gas, medical, research and development and forestry. Shiftwork is common in some companies. Machinists tend to work indoors.

Safety is important at all times. There are risks of injury working with moving machine parts, sharp edges, flying debris and extreme temperatures from heated or chilled materials. Precautions are required while working with manufacturing chemicals and airborne irritants.

Key attributes for people entering this trade are: communication skills, mechanical aptitude, hand-eye coordination, manual dexterity, an ability to work independently and knowledge of mathematics and physics. The work often requires considerable standing and the handling of heavy objects. This standard recognizes similarities or overlaps with the work of other tradespeople such as tool and die makers, mould makers, welders and industrial mechanics (millwrights).

Experienced machinists may move into mentoring or supervisory positions. They may transfer their skills to related occupations such as tool and die maker, mould maker, industrial mechanic (millwright) or CNC programmer.

MACHINIST
TASK MATRIX

A - PERFORMS COMMON OCCUPATIONAL SKILLS

Task A-1 **Performs safety-related tasks**	**1.01 Maintains safe work environment**	**1.02 Uses personal protective equipment (PPE) and safety equipment**	
Task A-2 **Organizes work**	**2.01 Interprets documentation**	**2.02 Plans sequence of operations**	
Task A-3 **Uses communication and mentoring techniques**	**3.01 Uses communication techniques**	**3.02 Uses mentoring techniques**	
Task A-4 **Processes workpiece material**	**4.01 Selects workpiece material**	**4.02 Uses hoisting, lifting and rigging equipment**	**4.03 Marks workpiece for identification**
	4.04 Performs heat treatment	**4.05 Performs quality control of workpiece**	**4.06 Deburrs workpiece**
	4.07 Sketches parts		
Task A-5 **Maintains machines, tooling and inspection equipment**	**5.01 Cleans machines**	**5.02 Lubricates machines**	**5.03 Sharpens tooling**

5.04 Applies cutting fluid and coolant	5.05 Troubleshoots equipment	5.06 Maintains machine alignment
5.07 Maintains inspection equipment		

B - PERFORMS BENCHWORK

Task B-6 Performs hand processes	6.01 Performs layout	6.02 Saws workpiece	6.03 Files workpiece
	6.04 Performs hole making operations	6.05 Performs threading operations	6.06 Installs thread inserts
	6.07 Broaches workpiece	6.08 Performs pressing operations	6.09 Forms workpiece
	6.10 Finishes workpiece		
Task B-7 Refurbishes components	7.01 Disassembles components	7.02 Analyzes components	7.03 Assembles components

C – MACHINES USING POWER SAWS

Task C-8 **Sets up power saws**	**8.01 Selects power saw types**	**8.02 Selects saw blades**	**8.03 Installs saw blades**
	8.04 Selects power saw speeds and feeds	**8.05 Makes power saw adjustments**	**8.06 Sets up workpiece on power saw**
Task C-9 **Operates power saws**	**9.01 Saws straight and angle cuts**	**9.02 Cuts irregular shapes**	

D – MACHINES USING DRILL PRESSES

Task D-10 **Sets up drill presses**	**10.01 Selects drill press types**	**10.02 Plans operation of drill presses**	**10.03 Selects drill press speeds and feeds**
	10.04 Sets up jigs, fixtures and work holding devices for drill presses	**10.05 Sets up tooling for drill presses**	
Task D-11 **Operates drill presses**	**11.01 Drills holes using a drill press**	**11.02 Cuts countersinks, counterbores, chamfers and spot faces using a drill press**	**11.03 Performs tapping using a drill press**
	11.04 Finishes holes using a drill press		

E – MACHINES USING CONVENTIONAL LATHES

Task E-12 **Sets up conventional lathes**	**12.01 Selects conventional lathe types**	**12.02 Plans operation of conventional lathes**	**12.03 Sets up work holding devices for conventional lathes**
	12.04 Sets up tooling for conventional lathes	**12.05 Sets up conventional lathe accessories**	**12.06 Sets up workpiece on conventional lathe**
	12.07 Selects conventional lathe speeds and feeds		
Task E-13 **Operates conventional lathes**	**13.01 Faces surfaces using a conventional lathe**	**13.02 Turns external surfaces using a conventional lathe**	**13.03 Drills using a conventional lathe**
	13.04 Bores holes using a conventional lathe	**13.05 Reams holes using a conventional lathe**	**13.06 Turns tapers using a conventional lathe**
	13.07 Knurls using a conventional lathe	**13.08 Cuts grooves using a conventional lathe**	**13.09 Cuts threads using a conventional lathe**
	13.10 Parts off workpiece using a conventional lathe		

F – MACHINES USING CONVENTIONAL MILLING MACHINES

Task F-14 **Sets up conventional milling machines**	**14.01 Selects conventional milling machine types**	**14.02 Plans operation of milling machines**	**14.03 Sets up work holding devices for conventional milling machines**
	14.04 Sets up tooling for conventional milling machines	**14.05 Sets up milling accessories**	**14.06 Sets up workpiece on a conventional milling machine**
	14.07 Selects conventional milling machine speeds and feeds		
Task F-15 **Operates conventional milling machines**	**15.01 Mills surfaces using a conventional milling machine**	**15.02 Mills profiles and pockets using a conventional milling machine**	**15.03 Mills slots, grooves and keyways using a conventional milling machine**
	15.04 Cuts gears and splines using a conventional milling machine	**15.05 Drills holes using a conventional milling machine**	**15.06 Reams holes using a conventional milling machine**
	15.07 Cuts countersinks, counterbores, chamfers and spot faces using a conventional milling machine	**15.08 Performs tapping using a conventional milling machine**	**15.09 Bores holes using a conventional milling machine**

G – MACHINES USING PRECISION GRINDING MACHINES

Task G-16 **Sets up precision grinding machines**	**16.01 Selects precision grinding machine types**	**16.02 Plans operation of grinding machines**	**16.03 Sets up work holding devices for precision grinding machines**
	16.04 Mounts grinding wheel	**16.05 Sets up grinding accessories**	**16.06 Sets up workpiece on precision grinding machines**
	16.07 Selects precision grinding machine speeds and feeds		
Task G-17 **Operates precision grinding machines**	**17.01 Grinds flat surfaces using a surface grinder**	**17.02 Grinds profiles**	**17.03 Grinds internal and external cylindrical and tapered surfaces**
	17.04 Grinds tools and cutters	**17.05 Finishes holes using a honing machine**	

H – MACHINES USING COMPUTER NUMERICAL CONTROL (CNC) MACHINES

Task H-18 **Performs CNC programming**	**18.01 Creates process documentation**	**18.02 Creates manual input program**	**18.03 Transfers program to and from control memory**
	18.04 Optimizes program	**18.05 Creates 2D and 3D models**	**18.06 Programs using computer-aided manufacturing (CAM)**
Task H-19 **Sets up CNC machines**	**19.01 Selects tooling and tool holders for CNC machines**	**19.02 Sets up tooling and tool holders on CNC machines**	**19.03 Sets up workpieces on CNC machines**
	19.04 Establishes work datum	**19.05 Verifies program**	
Task H-20 **Operates CNC machines**	**20.01 Adjusts offsets**	**20.02 Monitors machining processes**	**20.03 Interrupts program cycle**
	20.04 Restarts program cycle		