

Trade Profile

Tool and Die Maker



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RED SEAL

TRADE PROFILE

TOOL AND DIE MAKER



STRUCTURE OF THE TRADE PROFILE

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 Tool and die maker 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 TOOL AND DIE MAKER TRADE

“Tool and Die Maker” is this trade’s official Red Seal occupational title approved by the CCDA. This standard covers tasks performed by tool and die makers 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
Tool and Die Maker	■	■	■	■		■	■			■			
Die Maker					■								
Mouldmaking Machinist					■								
Tool Maker					■								

Tool and die makers design, create, repair and test prototypes and production tools such as dies, cutting tools, jigs, fixtures, gauges, and specialty tools using various metals, alloys and plastics. In some jurisdictions, they also build and repair moulds. They produce tooling used to manufacture and stamp out parts and they supply tooling and dies for the automotive, aerospace, transportation, consumer goods, forestry, mining, farming, medical and electronics industries. Tool and die makers usually work indoors in tool rooms, machine shops and manufacturing environment. They lay out, set up, machine, fit and finish metal, alloys and plastic components. They design and make items to meet exacting standards in dimensions, strength and hardness.

Tool and die makers use machining tools such as lathes, mills, saws, grinders, drills, computer numerical control (CNC) machines, coordinate-measuring machines (CMM) and electrical discharge machines (EDM). They also use hand tools and measuring equipment to ensure accuracy and close tolerances. They may use 3D printers. They work from sketches, drawings, computer-aided designs/computer-aided manufacturing (CAD/CAM), specifications and their own concepts to calculate dimensions, tolerances and types of fit. They should be knowledgeable about the properties of metal and non-metallic materials such as plastic, rubber and composite materials.

Some tool and die makers may specialize in design, prototyping, automation equipment fabrication, tool and cutter making, heat treating, test equipment, gauge making, jig and fixture making, die making, mould making, assembly, inspection and programming. They may be involved in research and development for the industries mentioned above.

Safety is important at all times. There are risks of personal injury working with moving machine parts, flying chips, sharp edges and extreme heat from heated materials. Tool and die makers may be lifting and moving heavy components. Precautions are required while working with manufacturing chemicals, airborne irritants, compressed gasses, toxic lubricants and cleaners.

Some attributes for people entering this trade are: communication skills, mechanical aptitude, attention to details, hand-eye coordination, manual dexterity, ability to troubleshoot and to work independently and in teams, logical reasoning ability, advanced knowledge of mathematics and applied science, creativity, resourcefulness, above average spatial ability and ability to plan and think sequentially. The work often requires considerable physical activity and stamina as tool and die makers spend long periods of time on their feet. Tool and die makers may work with other professionals such as machinists, mould makers, industrial mechanics (millwrights), designers, programmers and engineers.

Experienced tool and die makers may become team leaders, supervisors, managers, instructors or business owners. With additional training, they may transfer their skills to design and engineering responsibilities. Their skills are also transferable to related occupations such as machinist, mould maker, pattern maker, industrial mechanic (millwright) and CNC programmer.

TOOL AND DIE MAKER

TASK MATRIX

A – Performs common occupational skills

15%

Task A-1 Performs safety-related functions 22%	1.01 Maintains safe work environment	1.02 Uses personal protective equipment (PPE) and safety equipment	1.03 Uses hoisting, lifting, rigging and supporting equipment
Task A-2 Maintains machine-tools, accessories and cutting tools 17%	2.01 Maintains machine-tools and accessories	2.02 Maintains cutting tools	
Task A-3 Organizes work 27%	3.01 Interprets drawings, specifications and applications	3.02 Plans project activities	
Task A-4 Performs benchwork 24%	4.01 Performs layout	4.02 Finishes workpiece	4.03 Inspects workpiece
Task A-5 Uses communication and mentoring techniques 10%	5.01 Uses communication techniques		5.02 Uses mentoring techniques

B – Operates machine-tools

33%

<p>Task B-6 Operates power saws 9%</p>	<p>6.01 Sets up power saws</p>	<p>6.02 Saws straight and angle cuts</p>	<p>6.03 Cuts irregular shapes</p>
<p>Task B-7 Operates drill presses 9%</p>	<p>7.01 Sets up drill presses</p>	<p>7.02 Drills holes using drill presses</p>	<p>7.03 Cuts countersinks, counterbores, chamfers and spot faces using drill presses</p>
	<p>7.04 Performs tapping using drill presses</p>	<p>7.05 Finishes holes using drill presses</p>	
<p>Task B-8 Operates conventional lathes 19%</p>	<p>8.01 Sets up conventional lathes</p>	<p>8.02 Faces surface using conventional lathes</p>	<p>8.03 Turns internal and external surfaces using conventional lathes</p>
	<p>8.04 Creates holes using conventional lathes</p>		
<p>Task B-9 Operates conventional milling machines 20%</p>	<p>9.01 Sets up conventional milling machines</p>	<p>9.02 Mills surfaces using conventional milling machines</p>	<p>9.03 Creates holes and hole features using conventional milling machines</p>
<p>Task B-10 Operates grinding machines 21%</p>	<p>10.01 Sets up grinding machines</p>	<p>10.02 Grinds flat surfaces using a surface grinder</p>	<p>10.03 Grinds profiles</p>
	<p>10.04 Grinds internal and external cylindrical and tapered surfaces</p>	<p>10.05 Grinds tools and cutters</p>	<p>10.06 Finishes holes using a honing machine</p>

Task B-11
Operates computer numerical control (CNC) machines
14%

11.01 Performs CNC programming

11.02 Inputs program data into control memory

11.03 Establishes workpiece datum

11.04 Verifies programs

11.05 Monitors machining processes

Task B-12
Operates electrical discharge machines (EDM)
8%

12.01 Determines flushing methods

12.02 Sets cutting conditions

C – Performs heat treatment

10%

Task C-13
Heat treats materials
73%

13.01 Selects heat treatment process

13.02 Hardens materials

13.03 Tempers materials

13.04 Anneals materials

13.05 Normalizes materials

13.06 Case hardens materials

Task C-14
Tests heat treated materials
27%

14.01 Performs visual inspection

14.02 Performs hardness test

D – Performs design and development of prototypes and production tools

42%

Task D-15
Performs production tool design
15%

15.01 Identifies production tool requirements

15.02 Prepares shop sketches

15.03 Determines production tool material specifications and engineered components

15.04 Prepares information for designing and drafting

Task D-16
Develops prototype
11%

16.01 Selects prototyping technique and materials

16.02 Fabricates prototype components

16.03 Assembles prototype components

16.04 Inspects prototype

16.05 Proves out prototype

Task D-17
Fits and assembles production tools
27%

17.01 Verifies dimensions of production tool components

17.02 Performs production tool assembly

17.03 Sets production tool timing

Task D-18
Proves out production tools
24%

18.01 Sets up production tools

18.02 Verifies production part material

18.03 Develops blank/strip

18.04 Cycles equipment with production tools

18.05 Evaluates production part

18.06 Checks production tool for damage

18.07 Modifies production tools to enhance productivity

Task D-19
Repairs and maintains production tools
23%

19.01 Identifies condition of production tools

19.02 Identifies repair procedures

19.03 Adjusts production tool components

19.04 Reconditions production tool components