



**Skilled  
Trades**  
Ontario

**Métiers  
spécialisés**  
Ontario

Apprenticeship  
Training Standard  
Logbook

**Tool and Die Maker**

430A

# Apprenticeship Training Standard

The Apprenticeship Training Standard or herein after referred to as “Logbook” is a document issued to Apprentices who sign a Registered Training Agreement in the Province of Ontario as an official record of training. It is to be used by the Apprentice and Sponsor/trainer to guide the process of skills development in a particular trade.

## Training As An Apprentice

- ✓ Ensure you, your sponsor, and your witness sign a Training Agreement with the Ministry of Labour, Immigration, Training and Skills Development. Once it is registered, you will receive a copy of the registered Training Agreement for your records.
- ✓ Notify the local Service Delivery Office **immediately** if any changes to contact information or training agreement, especially if you change sponsors.
- ✓ Review the Logbook regularly with your trainer and sponsor to discuss your progress, ask questions, seek feedback and have the trainer **sign off on competencies**
- ✓ Keep an accurate record of the hours you work.
- ✓ Attend classroom training when it is offered.
- ✓ Apply for the financial incentives for which you are eligible.

## Completing Your Logbook

- ✓ **Complete the Sponsor Record Form** – A form must be completed for each Sponsor/Trainer used during your apprenticeship.
- ✓ **Confirm Skill Sign-off is Complete**
  - **You and your trainer** sign-off each required skill to confirm that you have demonstrated competency in that skill.
  - Shaded boxes in your Logbook mean the skills are optional and do not have to be confirmed by your trainer or sponsor. However, you are encouraged to complete them as part of your training.
- ✓ **Confirm Skill Set Sign-off is Complete**
  - After you and your trainer have signed-off all the required skills in a skill set, your sponsor signs the signature box on the form in **Appendix C – “Skill Set Completion for Sponsor”** to confirm your completion of all competencies within each skill set.

This document is the property of the apprentice named inside and represents the official record of your training. For information about completing your apprenticeship, see inside of back cover.



Apprentice Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

Phone Number: \_\_\_\_\_

Email Address: \_\_\_\_\_

Trade: \_\_\_\_\_

**Training Agreement # (for Compulsory and Non-Compulsory trades):**

**STO Account No. (for Compulsory trades only):**

**This document is the property of the Apprentice named herein and represents the official record of their training.**

**If you have questions about the use of this Logbook or about your Apprenticeship program, contact your local Service Delivery Office (see Appendix D in this book) or the Employment Ontario hotline at: 1-800-387-5656.**

# Apprenticeship Pathway to a Certificate of Qualification

Phase 1: Registration

**Submit Application for Apprenticeship Training through the on-line portal or to local Service Delivery Office**



For on-line portal, please follow instructions for registration. You will need to create a *My Ontario* account to access online services.

**Training agreement signed and registered by both apprentice and sponsor**

**Access your Apprenticeship Training Standard Logbook\*\***  
skilledtradesontario.ca/about-trades/trades-information



\*\* This is the official record of your training progress. You are responsible for keeping it up-to-date.

**Complete on-the-job training**

*Demonstrate and receive sign-off on the competencies/skills in your Apprenticeship Training Standard Logbook*

**Complete in-school training**

*Attend and complete the in-class training set out in the Curriculum Training Standard*



Apprentices eligible to apply for apprenticeship incentive grants (Red Seal trades) and loans.

**Review and finalize your logbook with your sponsor**

**Submit proof of apprenticeship completion**  
via email, in-person or digital portal



Your Apprenticeship Training Standard Logbook details completion requirements. Submit the following:

- completed Apprenticeship Training Standard Logbook with signatures
- proof of hours

**Certificate of Apprenticeship is issued**

Trades without examination

**CofA is the final step of the program**

Trades with examination (compulsory and non-compulsory trades)\*

**Provisional Certificate of Qualification issued for a 12 month term**



To prepare for the CofQ examination download the Provincial and/or Red Seal Exam preparation guides.

**Make payment for your Certificate of Qualification examination**



Call to make a payment (647-847-3000 or 1-855-299-0028)

**Schedule a date to write your Examination**



To schedule your examination, contact your local Service Delivery Office.

**Pass Certificate of Qualification examination**



Apprentices eligible to apply for Apprenticeship Completion Grant (Red Seal trades) or Apprentice Completion Bonus (non-Red Seal)

**Certificate of Qualification is issued**



Upon completion, Sponsors may be eligible for Apprenticeship grants, incentives, bonuses or tax credits

Phase 2: Apprenticeship

Phase 3: Certification

\* For a list of trades subject to a certification examination, visit: skilledtradesontario.ca

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Any updates to this publication are available on-line; to download this document in PDF format, please follow the link: [Skilled Trades Ontario.ca](http://SkilledTradesOntario.ca).

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## **Foreword: Purpose, Terms and Conditions of the registered Training Agreement**

### **Purpose:**

- Prior to starting official apprenticeship activities, the apprentice, sponsor and a witness are required to sign a Training Agreement.
- The Training Agreement that you have signed is an important legal document that outlines your responsibilities as an apprentice and the responsibilities of your sponsor. Once registered, this training agreement (or contract) marks the start of your formal agreement between the apprentice, the sponsor and the Ministry.
- For compulsory trades, the apprenticeship registration document must be accessible when working.

### **The Apprentice agrees:**

- **To inform the local Service Delivery Office of any change to your contact information or change in sponsor within 7 days;**
- To follow the Sponsor's and Trainer's lawful instructions and make every effort to acquire the skills identified in the Logbook for the Trade which is part of the apprenticeship program established by Skilled Trades Ontario for the trade;
- To obtain written verification from the Sponsor and the Trainer(s) that the requirements in the Logbook for the trade have been met.
- When you receive an "Offer of Classroom Training", confirm your attendance by following the instructions in the offer. Failure to do so may result in losing your opportunity to attend school which delays the completion of your apprenticeship.

### **The Sponsor agrees:**

- To ensure that the Apprentice is provided with the training required as part of the apprenticeship program established by Skilled Trades Ontario for this trade;
- To review the progress of training with the Apprentice, and with the Trainer(s) where the Sponsor and the Trainer are not the same party.
- Release your apprentice from work to attend in-school training without penalty to the apprentice.
- To maintain the journeyperson/apprentice ratio for your trade, if applicable.
- To monitor their apprentice(s) progress
- To ensure that the Trainer(s) verifies, in writing, when each skill identified in the Logbook for the trade has been successfully completed by the Apprentice;
- To contact the ministry should any changes in your capacity to train, your contact information, or your apprentice's status in the program change.

Trade Specific Resource	Link
Red Seal Program	<a href="http://red-seal.ca">red-seal.ca</a>
Apprenticeship in Ontario	<a href="http://ontario.ca/page/apprenticeship-ontario">ontario.ca/page/apprenticeship-ontario</a>
Employment Ontario	<a href="http://employmentontario.ca">employmentontario.ca</a>
Service Canada	<a href="http://servicecanada.gc.ca">servicecanada.gc.ca</a>
<i>Building Opportunities in the Skilled Trades Act, 2021</i>	<a href="http://ontario.ca">Building Opportunities in the Skilled Trades Act, 2021, S.O. 2021, c. 28 - Bill 288 (ontario.ca)</a>
Ministry of Labour, Immigration, Training and Skills Development	<a href="http://ontario.ca/page/ministry-labour-training-skills-development">ontario.ca/page/ministry-labour-training-skills-development</a>
Exam Preparation Guide	<a href="#">Exam Resources – Skilled Trades Ontario</a>
Skills Zone (Ontario Skills Passport)	<a href="http://www.skillszone.ca/">http://www.skillszone.ca/</a>
Canadian Tool and Machining Association (CTMA)	<a href="https://www.ctma.com/">https://www.ctma.com/</a>

*\*Please note, all website addresses are current at time of printing.*

### Methodology-Standard Development

A standard is developed with a broad group of trade representatives who form the initial working group. This includes subject matter experts/ tradespeople/ instructors and employers from a cross section of the sector/industry, with varying years of work experience in the field. The working group reviews, develops and recommends revision to the content of the standard. Their role also involves harmonizing and updating other supporting content for the product.

An essential part of the standard development is the validation process. This is the opportunity to have a broader representation of the sector and provide feedback on the content of draft standard. This process is conducted in various ways and may include sending out a survey or the draft document (or both) directly to the sector. The comments received are reviewed by the working group and revisions are made as required based on a consensus model.



### Introduction to the Logbook

This “on-the job” Logbook is the training standard for Tool and Die Maker was developed by Skilled Trades Ontario in consultation with representatives from industry. It identifies all the skills associated with and required to learn the trade.

The Logbook is divided into skill sets, which are further divided into skills. These skill sets and skills are written in statements that describe what the Apprentice must perform and to what standard, in order to be considered competent in that skill.

The successful performance of these skills is tracked in the Logbook. Once achieved, this skills’ sign-off, along with the completion of in-school program requirements or equivalent, is how the apprenticeship program is completed and apprentices receive a Certificate of Apprenticeship.

The Sponsor/trainer and Apprentice are required to sign-off and date each skill after the Apprentice has demonstrated proficiency in these skills. However, if a skill is shaded, it is optional and does not need to be signed-off, though it has been defined as a part of the scope of practice for the trade.

All practices described in this standard must be performed by the apprentice according to the specific criteria identified. In general, the standard of performance for the trade of Tool and Die Maker (430A) are to be performed according to all applicable jurisdictional codes and standards and all health and safety standards must be respected and observed. These include the following:

### Standard of Performance

All skills within the Tool and Die Maker (430A) Apprenticeship Training Standard are to be performed, as applicable, according to and in compliance with the following:

- Occupational Health and Safety Legislation and Regulations;
- Other applicable legislation, regulation, codes and standards;
- Industry best practices;
- Company policies and procedures.

The information presented in this standard is, to the best of our knowledge, current at time of printing and is intended for general application. Please refer to the Skilled Trades Ontario website for the most accurate and up-to-date information: [skilledtradesontario.ca](http://skilledtradesontario.ca)

## Roles and Responsibilities

Under the [Building Opportunities in the Skilled Trades Act, 2021 \(BOSTA\)](#)

**Skilled Trades Ontario (STO)** is responsible for:

- Establishing and maintaining qualifications;
- Establishing Apprenticeship Programs and other training programs including training Standards, curriculum standards and certifying examinations;
- Issuing certificates for the purposes of this Act such as Certificates of Qualification;
- Maintaining a Public Registry for compulsory trades [skilledtradesontario.ca/public-register/](https://skilledtradesontario.ca/public-register/);
- Determining whether the experience and qualifications obtained by applicants for a certificate of qualification who do not complete an apprenticeship are equivalent to those received through completing an apprenticeship (Trade Equivalency Assessments)
- Promoting the skilled trades and conducting research.
- Conducting research and evaluate whether a trade should be prescribed as a trade for the purposes of this Act and to make recommendations on these matters to the Minister.

**Ministry of Labour, Immigration, Training and Skills Development (MLITSD)** is responsible for:

- Classifying trades as compulsory trades;
- Prescribing scopes of practice for trades;
- Approving which persons may provide in-class training for apprenticeship programs (TDAs);
- Registering Training Agreements;
- Providing those who successfully complete an apprenticeship program with a certificate of apprenticeship (CofA);
- Administering examinations, including certifying examinations;
- Promoting the skilled trades and conducting research.
- Exercising such other powers and perform such other duties and functions as are provided for in this Act or the regulations.

***For any matter related to your registered Training Agreement or completing your apprenticeship, you must contact your local Service Delivery Office.***

## Roles and Responsibilities of the Apprentice

An Apprentice is an individual who has entered into a registered Training Agreement (refer to Foreword: *“Purpose, Terms and Conditions of TA” page 1*) with a Sponsor to receive training in a trade as part of an apprenticeship program established by Skilled Trades Ontario. As an Apprentice, you have certain roles and responsibilities to follow throughout your apprenticeship training:

1. As an Apprentice, you signed the Training Agreement and have entered into a contract with the Ministry of Labour, Immigration, Training and Skills Development and your Sponsor.
2. If you are registered as an Apprentice in a compulsory trade, your name will automatically appear in the Skilled Trades Ontario Public Register.
3. You are responsible for informing the staff at your local Service Delivery Office regarding changes to the following:
  - Your Sponsor’s address;
  - Your name and address; and/or,
  - Your Sponsor, including starting employment with a new Sponsor
4. As an Apprentice, you are responsible for completing skills or skill sets in this Logbook (as detailed in the *“Eligibility for Apprenticeship Program Completion”* section of this document) and ensuring that they are dated and signed by both you and your Trainer.
5. Once you have demonstrated competency in all the mandatory skills and received a sign off on each skill by your sponsor/trainer, you must have the Skill Set Completion Form completed and signed by your current Sponsor.
6. Submit your Logbook to your local Service Delivery Office.
7. Present your Apprentice Completion Form (Please refer to Appendix B), along with your authorized Logbook to your local Service Delivery Office.

## Roles and Responsibilities of Sponsors and Trainers

**Sponsors** are responsible for ensuring all terms are met as per the registered Training Agreement. They are named on the registered Training Agreement as the entity responsible for ensuring Apprentices receive the training required as part of an apprenticeship program. As a signatory to this agreement, they are designated as the ‘Signing Authority’ for the Apprentice’s Skill Set Completion Form and are required to attest to successful achievement by signing the appropriate box at the completion of each skill set. Some sponsors may also act as the Trainer.

A **Trainer** is an individual who oversees the performance of a task and sets the workplace expectations and practices for the Apprentice.

In compulsory trades, a Trainer must hold a valid Certificate of Qualification and be registered with Skilled Trades Ontario.

In non-compulsory trades, a Trainer is an individual who holds one of the following:

- A Certificate of Qualification;
- A Certificate of Apprenticeship in the trade; or,
- Has completed both the workplace-based training (competencies and/or hours as applicable) and classroom training components of the trade’s apprenticeship program; or,
- Has workplace experience equivalent to the apprenticeship program) and has the skills outlined in the Logbook.

Competency means being able to perform to the required standard (please refer to *“Introduction to the Logbook”*). Trainers/Sponsors and Apprentices are required to sign-off and date the skills in the Logbook following each successful acquisition. The Logbook forms a record of this achievement.

The Trainer must provide their signature based on their assessment and professional judgment that the apprentice is competent in the skills described above. The Trainer’s signature is not a general warranty or guarantee of the apprentice’s future conduct.

Sponsors participating in this training program will be designated as the Signing Authority and are required to attest to successful achievement by signing the appropriate box included at the end of each skill set.

## Health and Safety

Safe working procedures and conditions, accident prevention and the preservation of health are of primary importance for apprenticeship programs in Ontario. These responsibilities are shared and require the joint efforts of government, sponsors, employers, supervisors, workers, apprentices and the public to achieve the goal of making Ontario's workplaces safe and healthy.

The [Occupational Health and Safety Act](#) (OHSA) provides us with the legal framework and the tools to do this. It sets out the rights and duties of all parties in the workplace, placing ultimate responsibility on the employer for the health and safety of workers (in this case apprentices) by ensuring procedures, controls, and training are established for dealing with workplace hazards. Therefore, it is imperative that all parties become aware of circumstances that may lead to injury, illness or harm. Safe learning experiences and environments can be created by controlling the variables and behaviours that may contribute to or cause an accident, injury or illness.

A sponsor who is not the employer is reminded that the employer has legal responsibilities respecting health and safety over the apprentice who is their worker. The sponsor should encourage safe work habits and adherence to the employer's occupational health and safety requirements for the workplace.

It is generally recognized that a positive attitude about safety in partnership with health and safety competency contributes to an accident-free environment. Everyone will benefit as a result of a healthy attitude towards the prevention of accidents.

Workers and apprentices can be exposed to a multitude of hazards and, therefore, should be familiar with the Occupational Health and Safety Act and regulations.

### **The Internal Responsibility System:**

One of the primary purposes of the Occupational Health and Safety Act (OHSA) is to facilitate a strong Internal Responsibility System (IRS) in the workplace. To this end, the OHSA lays out the duties of employers, supervisors, workers, apprentices, constructors and workplace owners.

Workplace parties' compliance with their respective statutory duties is essential to the establishment of a strong IRS in the workplace.

Simply put, the IRS means that everyone in the workplace has a role to play in keeping workplaces safe and healthy. Workers and apprentices in the workplace who see a health and safety problem such as a hazard or contravention of the OHSA in the workplace have a statutory duty to report the situation to the employer or a supervisor. Employers and supervisors are, in turn, required to address those situations and acquaint workers with any hazard in the work that they do.

The IRS helps support a safe and healthy workplace. In addition to the workplace parties' compliance with their legal duties, the IRS is further supported by well-defined health and safety policies and programs, including the design, control, monitoring and supervision of the work being performed.

### **Roles and Responsibilities under the Occupational Health and Safety Act**

#### **Employer's Responsibilities include but are not limited to the following:**

- Instruct, inform and supervise workers and apprentices to protect their health and safety.
- Appoint competent persons as supervisors.
- Inform a worker, apprentice, or a person in authority, about any hazard in the workplace and train them in the handling, storage, use, disposal and transport of any equipment, substances, tools, material, etc.
- Take every precaution reasonable in the circumstances for the protection of a worker/apprentice.
- In workplaces in which more than five workers are regularly employed, prepare and post a written occupational health and safety policy and set up and maintain a program to implement it.
- Prepare and post policies with respect to workplace violence and workplace harassment and develop programs supporting workplace harassment and workplace violence policies.
- Ensure knowledge of applicable legislative, regulatory, codes and standards so requirements to be followed are clear to all workers/apprentices.

#### **Trainer/Supervisor Responsibilities include but are not limited to the following:**

- Ensure that a worker or apprentice works in compliance with the Act and regulations.
- Ensure that any equipment, protective device or clothing required by the employer is used or worn by the worker or apprentice.
- Advise a worker/apprentice of any potential or actual health or safety dangers known by the supervisor.
- Take every precaution reasonable in the circumstances for the protection of workers.

#### **Worker/Apprentice Responsibilities include but are not limited to the following:**

- Work in compliance with the Act and regulations.
- Use or wear any equipment, protective devices or clothing required by the employer.
- Report to the employer or supervisor any known missing or defective equipment or protective device that may endanger the worker or another worker.
- Report any hazard or contravention of the Act or regulations to the employer or supervisor.
- Not remove or make ineffective any protective device required by the employer or by the regulations.
- Not use or operate any equipment or work in a way that may endanger any worker.

### **The Three Rights of Workers/Apprentices**

The OHSA gives workers and apprentices three important rights:

1. The right to know about hazards in their work and get information, supervision and instruction to protect their health and safety on the job.
2. The right to participate in identifying and solving workplace health and safety problems either through a health and safety representative or a worker member of a joint health and safety committee.
3. The right to refuse work that they believe is dangerous to their health and safety or that of any other worker in the workplace.

### **Ministry of Labour, Immigration, Training and Skills Development**

The Ministry of Labour, Immigration, Training and Skills Development conducts periodic inspections of workplaces to ensure that safety acts and regulations are being followed. Please direct any questions to the Occupational Health and Safety Contact Centre at 1-877-202-0008.

## Apprenticeship Program Summary/Guidelines

### Scope of Practice

The Scope of Practice for the trade of Tool and Die Maker is set out in section 136 of Ontario Regulation 875/21 under BOSTA and reads as follows:

The scope of practice for the trade of tool and die maker includes the following:

1. Reading and interpreting complex engineering drawings, die and tooling drawings and work-process documentation.
2. Designing, making, changing and repairing dies, forms, cutting tools, gauges, jigs and fixtures in the manufacturing sector.
3. Building precision dies, tooling and prototypes using metal cutting machines and equipment, including saws, drills, grinders, lathes, mills and electrical discharge machines.
4. Performing work-in-process measuring and checking using specialized and precision dies, tools and equipment.

\*While the Logbook draws on the scope of practice regulation (Section 136 of Ontario Regulation 875/21 under BOSTA). The Logbook does not purport to add to or modify the scope of practice as provided in regulation.\*

### Program Guidelines

#### On-the-Job Training Duration

Industry has identified 7,280 hours as the benchmark necessary for any Apprentice to become competent in the skills required. There may be circumstances in which the duration varies from this guideline.

#### In-Class Training Duration

Industry has identified 720 hours of in-school training as the duration necessary for an Apprentice to complete the in-school curriculum for this program.

#### Total Training Hours

8,000 hours

#### Journeyman to Apprentice Ratio

While some of the trades regulated under BOSTA are subject to Journeyman to Apprentice ratios set out in regulation, this trade is not one of them. Instead, **industry has recommended a Journeyman to Apprentice ratio guideline of 1 Journeyman (or individual who is deemed equivalent to a journeyman) to 1 Apprentice** as the ratio necessary for an Apprentice to be properly trained on the job in this program.



### **Ratios in Regulation:**

If a trade has been prescribed as being subject to an apprentice to journey person ratio, the number of apprentices who may be sponsored or employed by a person in the trade in relation to the number of journeypersons employed or otherwise engaged by the person in the trade **shall not exceed one apprentice for each journey person**; Further information can be found in the Apprenticeship section of the Government of Ontario website at [ontario.ca/page/hire-apprentice](https://www.ontario.ca/page/hire-apprentice)

### **Program Requirements**

#### **Compulsory and Non-compulsory Classification**

Regulations *Building Opportunities in the Skilled Trades Act, 2021* and the classification of each trade as either “compulsory” or non-compulsory.” The trade of Tool and Die Maker is non-compulsory.

#### **Eligibility for Apprenticeship Program Completion**

The Apprentice must:

- Achieve competency in all mandatory (unshaded) skills as identified in the Logbook.
- Complete the in-school training as outlined in the Curriculum Standard.

It is the responsibility of an Apprentice to maintain a training record in the form of a Logbook. The Sponsor and Trainer are required to sign-off when competencies in the trade are achieved.

### **Skills for Success Summary**

Skills for Success are needed in a quickly changing world for work, learning and life. They are foundational for building other skills and important for effective social interaction. Everyone benefits from having these skills as they help individuals get a job, progress at their current job and change jobs. They also help individuals become active members of their community and succeed in learning.

Through extensive research and consultations, the Government of Canada launched the new Skills for Success model renewing the previous Essential Skills framework to better reflect the needs of the current and future labour market.

The occupational specific Essential Skills profiles are available online. These will be updated over time to align with the new Skills for Success model found here: [Skills for Success model](#).

### **Standard of Performance**

In general, the standard of performance for the trade of Tool and Die Maker (430A) are to be performed, as applicable, according to and in compliance with the following:

Industry Safety Standards which are based upon:

- Occupational Health and Safety Legislation and Regulations;
- Jurisdictional legislation and regulations, codes and standards (municipal bylaws etc.)
- Company policies and procedures
- All applicable manufacturers specifications and engineering specifications

### **Other Suggested or Required Certification(s) and Training**

While an apprentice receives health, safety and occupational specific training and/or certification in a variety of fields during their apprenticeship, it is important to be aware that other occupational health and safety training and certification renewal or updating may also be required during their career before performing new types of work.

## Training the Apprentice - Tips for Apprentices, Sponsors and Trainers

### Tips for Apprentices

Remember, it takes time to learn. The following is a list of additional tips and tools to help make the most of your apprenticeship training:

- Practice safe work procedures early to create good habits;
- Use your Logbook as a journal to keep track of the skills you have achieved;
- Review your training plan with your Training Consultant, Trainer, or Sponsor;
- Discuss your training needs with your Trainer and/or Sponsor;
- Listen to the suggestions of your Trainer;
- Ask your Trainer questions if you are unsure of any skill you need to perform or any tools or equipment you need to use to perform your duties;
- Show enthusiasm and develop good work habits; and,
- Upon demonstration of competency, ensure that you and your Trainer sign-off the individual skills.

***To get the most from this mentoring experience, request exposure to the full scope of the trade; meet regularly with your Sponsor/Trainer to discuss your progress, ask questions and seek feedback.***

### Tips for Sponsors

- Select Trainers with good communication skills and who work well with others;
- Ensure that the Apprentice always works under the direction of or has access to a qualified Trainer;
- Encourage Trainers to take upgrading courses (e.g. Train the Trainer, Mentor, Coach, etc.);
- Set out clear expectations and involve both the Apprentice and Trainer in developing the training plan
- Encourage safe work habits;
- Allow time for the Trainer to train and demonstrate skills to the Apprentice;
- Provide opportunities and time for the Apprentice to learn the trade;
- Ensure that the Apprentice receives the varied on-the-job trade training experience outlined in this document;
- Recognize good performance;
- Observe frequently;
- Provide constructive feedback and conduct regular performance reviews involving the Apprentice and Trainer;
- Use the Logbook as a monitoring tool and a part of regular performance evaluations; and,
- Complete the Skill Set Completion Form once the Apprentice has demonstrated competency in the skills.
- The detailed content listed for each skill is not intended to represent an inclusive list; rather, it is included to illustrate the intended direction for the skill acquisition.

### Tips for Trainers

Trainers are responsible for ensuring the Apprentice is developing the skills outlined in this document. Here is a list of tips and tools to help Trainers in their supervision of Apprentices:

- Demonstrate model safe work habits;
- Provide opportunities and time for the Apprentice to learn the trade;
- Treat Apprentices fairly and with respect;
- Review the Logbook with the Apprentice and develop a training plan;
- Set out clear expectations and recognize good performance;
- Expose Apprentices to the full scope of the trade by providing training on the skills outlined in this document;
- Encourage and respond to all questions;
- Be patient;
- Explain, show and demonstrate the skill;
- **Meet regularly with the Apprentice to discuss the apprentice's progress**
- Provide continuous feedback;
- Sign-off skills when your Apprentice demonstrates competency, and,
- Use the Logbook as a guide to evaluate competence in each skill area. By using the Logbook, Trainers will be able to guide the process to and assist Apprentices to develop skills outlined in this document.

***The best mentoring experience is when an Apprentice is given as much training/exposure to the full scope of the trade as possible. If this is not possible, help them to determine other ways this may be possible.***

## Notice of Collection of Personal Information

1. At any time during your apprenticeship training, you may be required to show this Logbook to the local Service Delivery Office. You will be required to submit the signed Apprenticeship Completion form to the Service Delivery Office in order to complete your program. The Service Delivery Office will use your personal information to administer and finance Ontario's apprenticeship training system, including confirming your completion and issuing your Certificate of Apprenticeship.
2. The Service Delivery Office will disclose information about your program completion and your Certificate of Apprenticeship to the Skilled Trades Ontario, as it is necessary for the Skilled Trades Ontario to carry out its responsibilities.
3. Your personal information is collected, used and disclosed by the Ministry of Labour, Immigration, Training and Skills Development under the authority of the *Building Opportunities in the Skilled Trades Act, 2021 (BOSTA)*.
4. Questions about the collection, use and disclosure of your personal information by the Ministry may be addressed to the:

Manager, Employment Ontario Contact Centre  
Ministry of Labour, Immigration, Training and Skills Development  
33 Bloor St. E, 2nd floor, Toronto, Ontario M7A 2S3  
Toll-free: 1-800-387-5656; Toronto: 416-326-5656  
TTY: 1-866-533-6339 or 416-325-4084

List of Trainers

Trainer's Name (Please Print)	Trainer Signature	Date of start with Trainer (day/month/year)

**9485 Protect Self, Others and the Environment**

**Skill Set Descriptor**

Tool and Die Makers integrate safety practices, such as wearing personal protective equipment (PPE), throughout every task included in the scope of their trade. They maintain a safe work environment through awareness of work surroundings and the potential impact on the environment.

**Skills**

**9485.01 Comply with acts, regulations and legislation** such as Occupational Health and Safety Act, Workplace Hazardous Materials Information System (WHMIS) and the Environmental Protection Act by:

- identifying the applicable acts, regulations, codes and standards;
- identifying the requirements to work safely in all working conditions;
- locating and confirming site and employer specific policies and procedures;
- reviewing notices and information posted on health and safety boards;
- reading and interpreting labels and Safety Data Sheets (SDS);
- adhering to fire safety protocols;
- confirming receipt of training in WHMIS/GHS regulations and practices;
- interpreting and applying the requirements; and
- staying current with changes/updates

according to job specifications, company policies and procedures, manufacturer's standards, industry standards, OH&S, WHMIS, regulations and legislation.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

**\* A Trainer may be a Supervisor or the competent employee designated by the Apprentice's Sponsor**

**9485.02 Use personal protective equipment (PPE) and safety equipment** such as hard hats, safety glasses, goggles, face shields, hearing protection, respirators, safety footwear, gloves, safety vests and fall arrest (harnesses and lanyards), fire extinguishers, eye wash stations, first aid kits, spill kits and defibrillators by:

- selecting the PPE and safety equipment required for specific tasks;
- identifying workplace hazards such as personal and environmental that require the use of PPE and safety equipment;
- locating PPE and safety equipment;
- checking certifications and expiry dates;
- inspecting for defective, deficient and damaged PPE such as excessively worn safety footwear, cracked safety glasses and expired safety equipment;
- inspecting condition of safety equipment for breaks, signs of wear, tears, cracks, leakage, holes, loose and defective components for safety of the user and extend service life of the equipment;
- calibrating as required;
- confirming fit of PPE and safety equipment and adjusting for optimum protection; and
- analyzing PPE and safety equipment performance and function

according to job specifications, company policies and procedures, manufacturer's standards, industry standards, OH&S, WHMIS, regulations and legislation.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature



**9485.03 Maintain personal protective equipment (PPE) and safety equipment by:**

- checking certifications and expiry dates;
- identifying defective and damaged PPE such as excessively worn safety footwear, cracked safety glasses;
- inspecting safety equipment for breaks, signs of wear, tears, cracks, leakage, loose, defective components and expired safety equipment;
- analyzing PPE and safety equipment for performance and function;
- cleaning and storing PPE and safety equipment in designated locations;
- replacing defective PPE and safety equipment, as required;
- tagging defective PPE and safety equipment and removing from service;
- documenting and reporting damaged or expired PPE and safety equipment;
- reporting all damaged or expired PPE and safety equipment to supervisor; and
- inspecting and recommending recertification of safety equipment, if required

according to job specifications, company policies and procedures, manufacturer’s standards, industry standards, OH&S, WHMIS, regulations and legislation.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

**9485.04 Maintain safe work environment to prevent injury to self, the public and other workers and damage to the environment, structures, tools and equipment by:**

- complying with lock-out and tag-out procedures;
- identifying workplace hazards such as slippery/dirty floors, tangled air lines and power cords, hazardous fumes, electrical hazards, dust, inadequate lighting, shop/facility organization, mechanical, stored energy, ventilation/fumes, fire, environmental (discharge/spills, material and energy waste) and biological hazards;
- identifying machine hazards such as hot or irregular chip formation, insecurely mounted workpiece, defective equipment, contaminated coolant and improperly secured accessories;
- following hot-runner, hydraulic and pneumatic safe-testing procedures;
- following welding procedures for Shielded Metal Arc Welding (SMAW/ STICK), Gas Metal Arc Welding (GMAW/MIG), Gas Tungsten Arc Welding (GTAW/TIG) and Brazing;

- stacking and storing parts and materials in designated locations and formations;
- practising safe work habits such as staying outside of guards and barricades, wearing required clothing (not loose or torn), confining long hair and removing jewelry;
- setting up barricading devices and signage such as caution tape, fences, barriers and welding screens to define work perimeters and contain contaminants or other hazards;
- staying alert of surroundings and assessing hazards for severity;
- maintaining a clean and tidy work area;
- maintaining an ergonomic work environment to include required bending/lifting procedures, height of bench and work equipment and reaching requirements (e.g., having things close by as not to reach too far, etc.)
- maintaining heat, light and ventilation, if possible;
- complying with safety and emergency procedures and participating in safety meetings and discussions, as necessary;
- verifying that all manufacturers' safeguards are present and functioning as intended;
- documenting safety-related issues such as faulty PPE and safety equipment, inspections, potential hazards, safety meetings, injuries, safety training, transportation and WHMIS-related; and
- reporting hazards

according to job specifications, company policies and procedures, manufacturer's standards, industry standards, OH&S, WHMIS, regulations and legislation.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

**9485.05 Handle hazardous workplace materials** such as garolite, graphite, lead, gases, acids and solvents cleaning solvents, cutting fluids, machine and hydraulic oil, to protect individuals from injury and the environment from contamination by:

- reading and following labels and SDS sheets;
- following WHMIS procedures for storing, disposal, labelling, use of PPE and training;
- using required PPE;
- using all materials solely for their intended purpose;
- identifying hazardous waste and preventing unauthorized release of hazardous waste to the environment;
- using specified handling and storage equipment, sealing containers and disposing of the hazardous waste based on required timelines;
- arranging to have waste picked up or transported to a local hazardous materials facility;
- verifying safety measures are taken to secure shipping of materials;
- cleaning up spills immediately; and
- verifying required ventilation is maintained using natural ventilation and/or installing positive and/or negative air systems (fans)

according to job specifications, company policies and procedures, manufacturer’s standards, industry standards, OH&S, WHMIS, regulations and legislation.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

**9485.06 Follow first aid procedures by:**

- identifying emergency stations and locations of SDS, telephones, first aid kits, fire extinguishers, defibrillators and eye/shower wash stations;
- familiarizing oneself with emergency procedures and contact numbers;
- replenishing kits and units, if required;
- treating minor conditions such as such as sudden illness, burns, cuts, abrasions, sprains, chemical inhalations, falls, and contaminants in eyes, so that the condition of the victim is stabilized and prepared for further first aid treatment;
- identifying types and capacities of fire extinguishers; and
- documenting and reporting accidents and incidents

according to job specifications, company policies and procedures, manufacturer's standards, industry standards, OH&S, WHMIS, regulations and legislation.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

**9485.07 Follow fire safety procedures by:**

- locating and assessing the severity of the fire;
- locating fire extinguishers, fire alarms, muster points, power cut-offs and emergency exits;
- using barrier creams and fire blankets, if required;
- activating alarms;
- using fire safety equipment such as fire extinguishers;
- suppressing minor fires; and
- reporting incidents

according to job specifications, company policies and procedures, manufacturer's standards, industry standards, OH&S, WHMIS, regulations and legislation.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

**9485.08 Protect the environment by:**

- removing and disposing hazardous and unwanted materials using waste management company, if required;
- positioning equipment such as forklifts and cranes, to avoid damage to natural environment;
- reducing idling time of equipment to reduce contamination, emissions and noise pollution;
- storing hazardous materials in designated areas;
- following legislated and recommended protocols when handling chemicals/substances;
- preventing and containing hazardous spills;
- reducing, reusing and recycling waste materials and consumables including all packaging;
- maintaining separate waste streams for water and solvents; and
- encouraging sustainability

according to job specifications, company policies and procedures, manufacturer’s standards, industry standards, OH&S, WHMIS, regulations and legislation.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

**9486 Use and Maintain Tools and Equipment**

**Skill Set Descriptor**

Tool and Die Makers use a wide variety of tools and equipment to complete their work. They use hand and power tools, machine and layout tools, cutting tools, measuring tools, heat treatment equipment and accessories/work holding devices.

**Skills**

**9486.01 Use hand tools** such as files, hammers, hex keys, tap and tap handle, and abrasive stones by:

- using applicable PPE for the task;
- identifying the tools for the job such as type and size;
- verifying that the hand tools are in working condition;
- inspecting tools for defects such as wear, damage or expiry;
- cleaning and lubricating as required;
- removing defective tools and accessories from service;
- replacing defective tools and accessories; and
- storing in designated areas

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

**\* A Trainer may be a Supervisor or the competent employee designated by the Apprentice’s Sponsor**

**9486.02 Maintain hand tools by:**

- inspecting tools for defects for wear, damage, or expiry;
- cleaning and lubricating tools;
- removing, repairing or replacing defective tools and accessories;
- tagging and disposing of defective tools;
- storing in designated areas
- ordering and replacing accessories and components as required;
- reporting and documenting defects as required;
- taking equipment out of service as required; and
- documenting and reporting findings

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

**9486.03 Use power tools** such as air grinder, bench grinder, die grinder, disc grinder, drill press, pencil grinder and portable drill by:

- selecting and using personal protective equipment (PPE);
- identifying the tools for the job;
- verifying that the tool and accessory matches the application;
- verifying that the tool is in safe working condition;
- verifying that the operator has been trained on the tool;
- inspecting tools for wear, damage, defects or expiry including inspecting cords, connecting devices, control devices;
- cleaning and lubricating as required;
- monitoring tool function and performance;
- tagging defective tools;
- removing and replacing defective tools and accessories; and
- storing in designated areas

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

**9486.04 Maintain power tools by:**

- selecting and using personal protective equipment (PPE);
- inspecting power tools and accessories for defects and taking remedial action such as repairing, replacing;
- tagging defective tools;
- cleaning and lubricating as required;
- repairing or disposing of defective tools and accessories;
- ordering and replacing accessories and components;
- storing in designated areas;
- taking equipment out of service as required; and
- documenting and reporting findings

according to job specifications, company policies and procedures, manufacturer's standards, Machinery's Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature



**9486.05 Use machine-tools** such as abrasive cut-off saw, CNC machine, CNC turning centre, milling centre, die spotting press, drilling machines, EDM machine, grinders (surface, cylindrical, jig, tool cutter), jig bore, lathe, milling machines, power saws and press (hydraulic, pneumatic, mechanical) by:

- selecting and using applicable PPE for the task;
- identifying the tools and accessories for the job;
- verifying that the machine-tools and accessories are in working condition including inspecting cords, connecting devices, housings, control devices;
- inspecting tools for wear, damage, defects or expiry;
- verifying the tool is ground fault circuit interrupted as required;
- monitoring tool and equipment function and performance; and
- cleaning and lubricating as required;
- removing defective tools and accessories from service;
- replacing defective tools and accessories; and
- storing in designated areas

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

**9486.06 Maintain machine-tools by:**

- selecting and using applicable PPE for the task;
- identifying the tools and accessories for the job;
- cleaning machine-tools and accessories;
- checking and applying lubricants;
- checking and maintaining cutting fluids such as oils, water-soluble fluids and synthetic fluids;
- checking and maintaining coolant levels; and
- complying with maintenance schedule
- inspecting tools for wear, damage, defects and expiry;
- removing, repairing or replacing defective machine tools;
- tagging and disposing of defective tools such as including for ferrous and non-ferrous tooling;
- storing in designated areas;
- ordering and replacing machine tools, accessories and components, as required;
- reporting and documenting as required;
- taking equipment out of service; and
- documenting and reporting findings

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

**9486.07 Use cutting tools** such as abrasive wheels, boring bars, broaches, counterbore, countersink, drill bits, EDM electrodes, grinding wheels, knurling tools, milling cutters, parting-off tools, reamers, saw blades, spot faces, taps and die and turning tools by:

- selecting and using personal protective equipment (PPE) for the task;
- identifying the tools for the job;
- checking cutting characteristics;
- inspecting tools for wear, damage, defects or expiry;
- verifying that the tool and accessory matches the application;
- verifying that the tool is in safe working condition;
- monitoring tool function and performance;
- cleaning and lubricating as required;
- storing in designated areas;
- tagging defective tools;
- replacing defective or expired tools and accessories;
- removing defective tools and accessories from service; and
- ordering and/or replacing accessories and components

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

**9486.08 Maintain cutting tools by:**

- selecting and using applicable PPE for the task;
- identifying the cutting tools for the job;
- cleaning and lubricating cutting tools;
- sharpening cutting tools base on tooling requirements;
- protecting sharpened cutting tools;
- inspecting tools for wear, damage, defects and expiry;
- tagging defective tools;
- repairing or disposing of defective tools and accessories and removing from service;
- storing in designated areas;
- ordering and replacing accessories and components;
- reporting defects; and
- documenting and reporting findings

according to job specifications, company policies and procedures, manufacturer's standards, Machinery's Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

**9486.09 Use hoisting, lifting, rigging and supporting equipment** such as mobile cranes, overhead cranes, jib cranes, forklifts, pallet jacks, telescopic booms, hydraulic die lift table, hydraulic die separator, chain falls, ropes, slings, magnets, chains, hooks, spreader bars, shackles, horses, flip blocks, lifting rings and eye bolts by:

- selecting and using personal protective equipment (PPE) for the task;
- identifying the equipment for the job;
- inspecting hoisting, lifting, rigging and supporting equipment for wear, damage, defects and expiry;
- determine approximate weight of load to stay within capacity of available equipment;
- selecting hoisting, lifting, rigging and supporting equipment based on lifting characteristics such as size, shape, orientation, location, sling points, eye bolts and lift weight;
- determining load’s approximate centre of gravity based on size and volume;
- performing a test lift;
- following lifting procedures;
- confirming that rigging, lifting and hoisting operations are performed by competent personnel and meet lifting characteristics; and
- storing equipment in clean and dry locations

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

**9486.10 Maintain hoisting, lifting, rigging and supporting equipment by:**

- selecting and using applicable PPE for the task;
- identifying the equipment for the job;
- cleaning hoisting, lifting, rigging and supporting equipment;
- lubricating hoisting, lifting, rigging and supporting equipment if applicable;
- inspecting tools for wear, damage, defects and expiry;
- complying with maintenance schedule;
- removing, repairing or replacing defective equipment;
- ordering and replacing accessories and components as required;
- reporting and documenting defects as required; and
- tagging and disposing of equipment;
- storing in designated areas such as clean and dry locations; and
- documenting and reporting findings

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

**9486.11 Use layout equipment** such as combination set, dividers and trammels, etchers, height gauge, hermaphrodite calipers, layout dye, layout table, punches, scribes, squares, surface gauges and surface plates/surface tables by:

- selecting and using personal protective equipment (PPE) for the task;
- identifying the equipment for the job;
- inspecting layout equipment for wear, damage, defects and expiry;
- verifying that the equipment matches the application;
- verifying that the equipment is in safe working condition;
- monitoring function and performance;
- cleaning and lubricating as required;
- replacing defective or expired tools and accessories;
- tagging and removing defective equipment from service; and
- ordering and/or replacing equipment; and
- storing in designated areas

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

**9486.12 Maintain layout equipment** by:

- selecting and using applicable PPE for the task;
- identifying the equipment for the job;
- cleaning and lubricating layout equipment;
- complying with maintenance schedule;
- inspecting tools for wear, damage, defects and expiry;
- removing, repairing or replacing defective equipment;
- tagging and disposing defective equipment;
- storing equipment in designated areas such as clean and dry locations;
- taking equipment out of service as required; and
- documenting and reporting findings;

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

**9486.13 Use measuring tools** such as vernier caliber, height gauge/micrometer, telescopic gauge, gauge blocks, sine bar, thread gauges, plug gauges, thread measuring wires, tooling ball, indicators and hardness tester by:

- selecting and using personal protective equipment (PPE) for the task;
- identifying the tools for the job;
- inspecting measuring tools for wear, damage, defects and expiry;
- inspecting for calibration as required;
- verifying that the tool matches the application;
- verifying that the tool is in safe working condition;
- monitoring tool function and performance;
- cleaning and lubricating as required;
- tagging defective tools;
- replacing defective or expired tools;
- removing defective tools from service;
- ordering and/or replacing accessories and components; and
- storing in designated areas such as clean and dry locations

according to job specifications, company policies and procedures, manufacturer's standards, Machinery's Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature



**9486.14 Maintain measuring tool by:**

- selecting and using applicable PPE for the task;
- identifying the equipment for the job;
- cleaning and lubricating the tools;
- complying with maintenance schedule;
- inspecting tools for wear, damage, defects and expiry;
- calibrating tools;
- removing, repairing or replacing defective tools;
- tagging and disposing defective tools;
- ordering and replacing accessories and components as required;
- reporting and documenting defects as required;
- taking equipment out of service as required;
- storing in designated areas such as clean and dry locations; and
- documenting and reporting findings

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

**9486.15 Use heat treatment equipment** such as fire brick, furnaces, ladles, quenching mediums, shot/sand blaster, stainless steel wrap, tongs and torches by:

- selecting and using personal protective equipment (PPE) for the task;
- identifying the equipment for the job;
- inspecting equipment for wear, damage, defects and expiry;
- verifying that the equipment matches the application;
- verifying equipment settings and controls;
- verifying that the equipment is in safe working condition;
- verifying the temperature of the equipment for safe handling;
- confirming that the work area is set up for optimal protection and equipment operation efficiency;
- monitoring function and performance;
- cleaning equipment;
- replacing defective or expired equipment;

- tagging and removing defective equipment from service;
- ordering and/or replacing equipment; and
- storing in designated areas such as clean and dry locations

according to job specifications, company policies and procedures, manufacturer's standards, Machinery's Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

**9486.16 Maintain heat treatment equipment by:**

- selecting and using applicable PPE for the task;
- identifying the equipment for the job;
- cleaning and lubricating equipment;
- complying with maintenance schedule;
- inspecting equipment for wear, damage, defects and expiry;
- calibrating temperature gauges on furnaces;
- removing, repairing or replacing defective tools;
- tagging and disposing defective tools;
- ordering and replacing accessories and components as required;
- reporting and documenting defects as required;
- taking equipment out of service as required;
- storing in designated areas such as clean and dry locations; and
- documenting and reporting findings

according to job specifications, company policies and procedures, manufacturer's standards, Machinery's Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

**9486.17 Use accessories and work holding devices** such as adaptors, angle plates, anvils, arbor press, arbors, boring heads, centre and edge finders, centres, chucks, clamps, collets, crane, degreasing tanks, drive plates and jacks by:

- selecting and using personal protective equipment (PPE) for the task;
- identifying the accessories and devices for the job;
- inspecting accessories and devices for wear, damage, defects and expiry;
- inspecting for calibration as required;
- verifying that the accessories and devices matches the application;
- verifying that the accessories and devices are in safe working condition;
- monitoring accessories and device function and performance;
- cleaning and lubricating as required;
- tagging defective accessories and devices;
- replacing defective or expired accessories and devices;
- removing defective accessories and devices from service;
- ordering and/or replacing accessories and devices; and
- storing in designated areas such as clean and dry locations

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

**9486.18 Maintain accessories and work holding devices by:**

- selecting and using applicable PPE for the task;
- identifying the accessories and devices for the job;
- cleaning and lubricating the accessories and devices;
- complying with maintenance schedule;
- inspecting accessories and devices for wear, damage, defects and expiry;
- calibrating accessories and devices;
- removing, repairing or replacing defective tools;
- tagging and disposing defective tools;
- ordering and replacing accessories and components as required;
- reporting and documenting defects as required;
- taking equipment out of service as required;
- storing in designated areas such as clean and dry locations; and
- documenting and reporting findings

according to job specifications, company policies and procedures, manufacturer's standards, Machinery's Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

**9487            Communicate, Mentor and Use Documentation**

**Skill Set Descriptor**

Tool and Die Makers communicate with other tradespeople, colleagues, apprentices, supervisors, clients/customers, designers, engineers and manufacturers to coordinate tasks and diagnose/resolve issues with equipment and production tools. They regularly use documentation for resources and reporting in the form of revised drawings, written change orders, and milestone tracking documents/computer files. With experience, they also become mentors passing on their skills and knowledge to apprentices, as well as sharing knowledge among themselves and give instructions, provide directions and offer explanations. Tool and Die Makers regularly use documentation for resources and reporting.

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**Skills**

**9487.01            Communicate with colleagues, tradespeople, vendors and the public** such as supervisors, office, planning and engineering staff, and joint health and safety committees to relay work processes, reports and documentations by:

- responding in a timely manner using two-way communication practices such as verbal, written, electronic and visual methods;
- practising effective non-verbal communication skills such as eye contact, facial expressions, gestures, posture and body language;
- using active listening practices such as paraphrasing or interpreting, listening and asking questions;
- receiving and responding to feedback to confirm that information is understood checking for comprehension;
- reflecting and responding to feedback by asking questions to improve communication and understanding;
- drafting content for intended audience and purpose that is accurate, clear, concise and comprehensive; and
- participating in work-related meetings

according to company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

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**9487.02 Mentor apprentices and co-workers** to support their learning by:

- identifying and communicating learning objective(s);
- relating lesson to other lessons and the job;
- demonstrating performance of a skill/task to the learner;
- setting up conditions to enable the mentee to practice the skill;
- providing on-going support and guidance;
- assessing apprentice or colleague's ability to perform tasks with increasing independence;
- providing feedback and assisting apprentices/colleagues in pursuing technical training opportunities;
- creating an open and supportive climate for discussion such as sharing personal job experiences with learner; and
- supporting a culture of diversity and anti-harassment in the workplace

according to company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

**9487.03 Perform customer service functions by:**

- actively listening to address customers’ concerns and needs;
- acknowledging the customer’s request;
- explaining, in detail, the problem and solution for the issue at hand; and
- making recommendations and suggestions for future service

according to company policies and procedures.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

**9487.04 Estimate costs of project/service by:**

- determining corrective actions or options;
- calculating time frames, labour, parts, or equipment costs, if required;
- identifying parts and components used, time taken, unit identification, warranty coverage and obligations, tools and equipment, completion dates and system operation parameters;
- scheduling requirements;
- using documentation such as work orders, costing lists and manuals;
- communicating with employer or shop personnel to confirm the estimates;
- completing estimation sheet and bill of materials;
- reviewing quotes with client;
- confirming signature of client/customer for approval prior to undertaking service or maintenance work; and
- documenting labour costs, nature and scope of service or maintenance work;

according to company policies and procedures.

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**9487.05**      **Complete job documentation** such as tracking sheets, sign-off sheets, time sheets, work orders, logbooks, inspection reports, procedure sheets and maintenance reports by:

- identifying report requirements/parameters;
- drafting content for intended audience and purpose;
- facilitating traceability of work-in-process and completed jobs;
- recording information on manufacturers or company servicing;
- recording maintenance check lists and warranty forms; and
- documenting in a clear, legible and concise manner

according to job specifications, company policies and procedures, manufacturer's standards, Machinery's Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9488 Plan and Prepare for Machining Job**

**Skill Set Descriptor**

Tool and Die Makers prepare for machining jobs by interpreting documents, determining machining requirements, planning activities and performing calculations, as required.

**Skills**

**9488.01 Interpret drawings, specifications and their applications** such as engineering, blueprints, CAD data (2D and 3D geometry), working drawings, machining processes, procedures, solid models and sketches by:

- reviewing drawings and sketches including isometric and orthographic views;
- reading information such as line types, projections, dimensions, notes, lay/surface finish symbols, welding symbols, material and processing specifications, machine surface designations and allowances, standards and geometric dimensioning and tolerancing (GD&T); and
- performing mathematical calculations as required

according to job specifications, company policies and procedures, manufacturer's standards, Machinery's Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9488.02 Determine requirements for machining by:**

- identifying and confirming resources required for the job such as components, machinery, materials, processes and procedures;
- identifying and organizing workpiece materials such as round stock, bar stock, flat stock, rolled stock, tubing, structural and raw material;
- verifying workpiece for size and type by checking colour codes, lettering or numerical stamps;
- analyzing material characteristics such as composition, properties, application and machinability;
- selecting type and features of workpiece material;
- selecting cutting tools such as end mills, drills, grinding wheels, saw blades and taps to maximize machining efficiency without damage to workpiece, cutter or machine;
- selecting machines/equipment such as mills, lathes, grinders, drills, power saws, electrical discharge machine (EDM) and computer numerical control (CNC) machine based on component requirements;
- selecting work holding devices as vises, clamps, jigs, chucks, face plates, centers, steady rest, tailstocks and mandrels;
- selecting cutting fluids such as oils, water-soluble fluids and synthetic fluids;
- selecting measuring instruments and checking devices such as micrometers, verniers, bore gauge, go/no go gauge and dial test indicator to obtain the dimensions and tolerances; and
- selecting and inspecting lifting and rigging equipment such as hoists, overhead cranes, chain falls, lift pins, cables, eye bolts, chains, slings and magnets

according to job specifications, company policies and procedures, manufacturer's standards, Machinery's Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9488.03 Plan project activities by:**

- identifying tasks required to manufacture production tools (dies, jigs, fixtures, cutting tools, moulds), prototypes and one-offs;
- determining job operation, sequencing of job, method of machining and set-up based on workpiece and equipment;
- determining which work needs to be sent to external specialists or specialized firm due to limitations of equipment and tooling;
- estimating timelines for each task and establishing milestones based on machinery availability, machine capability, company policies and practices and client requirements
- identifying and checking machine controls and systems such as switches, buttons, levers, controls, and safety devices to confirm operation and functionality;
- preparing cutting tools (sharpening or replacing tools) for optimum cutting;
- calibrating measuring instruments and checking devices;
- laying out features on to the workpiece using precision measuring instruments and layout equipment such as scribe, center punch, vernier height gauge, surface plate, combination set, and layout medium or dyes;
- performing visual inspection; and
- maintaining material identification by marking or stamping workpiece and completing shop documentation, to facilitate traceability of the final product or work-in-process and to maintain inventory control

according to job specifications, company policies and procedures, manufacturer's standards, Machinery's Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9488.04 Perform calculations for machining operations by:**

- determining speed and feed rates using formulas and charts;
- establishing cutting tool positions;
- checking workpiece alignments;
- establishing dimensions to be measured using Metric or Imperial System;
- considering type and hardness of workpiece materials and cutting tool material and size, so that the machines perform optimum cutting without damage to workpiece, cutting tools, or machines;
- verifying calculations; and
- determining specifications and parameters to machine the workpiece

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9489 Perform Benchwork**

**Skill Set Descriptor**

Tool and Die Makers perform benchwork that is multifunctional. This includes critical elements such as part layout and part assembly, in order to produce a finished component to exacting standards.

**Skills**

**9489.01 Perform layout** using layout tools and instruments such as surface plates, prick punches, angle plates, scribes, dividers and trammels, hermaphrodite calipers, squares, rulers, combination set, universal bevel protractor, sine bar, gauge blocks, height gauges, feeler gauges, radius gauges and surface gauges by:

- determining shape and requirement of layout;
- selecting layout tools and instruments;
- laying out workpiece; and
- verifying the layout

according to job specifications, company policies and procedures, manufacturer's standards, Machinery's Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9489.02 Perform manual operations by:**

- hand-filing using flat, diamond, needle, smooth, bastard, rat-tail, lathe and half-round to remove excessive material;
- hand-sawing using required blade for material type and thickness to cut workpiece to specified dimensions;
- hand-drilling holes using power drill and drill bits so that the dimensions of the drilled holes meet specifications;
- hand-reaming using straight, spiral-fluted, tapered and line reamers to remove excessive material;
- repairing threads using hand taps and dies, thread files, thread inserts, die nuts to repair or clean damaged threads;
- heating using equipment such as oxy-fuel torches, induction heaters and ovens to facilitate cutting, bending, forming, fitting and repairing; and
- hand-finishing (grinding, lapping and honing) using pneumatic or electric hand grinders, hones, stones, abrasives, carbide burrs and files to remove excess material and tool and cutter marks

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9489.03 Finish workpiece by:**

- selecting finishing process such as lapping, honing, deburring, polishing, scraping and filing;
- selecting abrasives such as hones, stones, lapping compounds, emery papers and fibres;
- selecting work holding devices such as vice, soft jaws, parallel clamp, mandrel and c-clamp;
- setting up workpiece in work holding device to protect workpiece and operator;
- perform finishing technique to achieve required finish;
- deburring workpiece;
- cleaning workpiece to remove debris;
- measuring workpiece throughout the process to make finishing adjustments

and to verify that finishing process meets specifications without compromising the integrity of the workpiece;

- marking workpiece with identification markings such as heat numbers, part numbers, composition, country of origin, trade name, material, custom identification, colour codes and number system, if required; and
- protecting finished workpiece using material such as rust inhibitor, paper, crating, packing and coating

according to job specifications, company policies and procedures, manufacturer's standards, Machinery's Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9489.04** **Inspect workpiece** to verify integrity of workpiece through a basic non-destructive inspection by:

- using inspection equipment such as calipers, micrometers, dial indicators, optical comparators, profilometers, coordinate measuring machines (CMM), gauges and hardness testers;
- performing visual inspection of workpiece to identify defects such as cracks, inadequate surface finish, distortions, surface deviation and damage; and
- verifying workpiece features and dimensions meets specifications

according to job specifications, company policies and procedures, manufacturer's standards, Machinery's Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9490 Perform Power Sawing**

**Skill Set Descriptor**

Tool and Die Makers perform horizontal and vertical power sawing to cut material for other machining processes to produce an efficient cut. Workpieces are then finished using other machining operations.

**Skills**

**9490.01 Determine power sawing requirements by:**

- selecting specific PPE and safety equipment required for the job;
- identifying power sawing operations and sequence to be performed;
- identifying machine requirements such as machine type and component features (type and dimensions of material);
- selecting power saw and accessories;
- selecting saw blade and saw blade width and gauge;
- selecting lubrication requirements, as required;
- identifying work holding devices such as fixtures, vice and clamps; and
- calculating, selecting, and adjusting speeds and feeds

according to job specifications, company policies and procedures, manufacturer's standards, Machinery's Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9490.02**      **Set up power saws** such as vertical, horizontal, reciprocating/power hacksaws, cold circular, abrasive, cutoff, contour and friction by:

- visually inspecting blade;
- checking blade pitch and set;
- verifying cutting direction of blade;
- installing blade on drive wheel and idler wheel(s);
- matching saw guides to blade width and gauge on vertical and horizontal band saws to prevent damage to blades and guides and to confirm required cut;
- adjusting blade tension;
- securing blade of power hacksaw using location pins;
- welding, grinding and annealing band saw blades to saw internal contours;
- calculating, selecting, and adjusting speeds and feeds; too
- installing and test-running blade to check alignments and movements to prevent machine or blade damage; and
- adjusting guide arms, blade guides, clamping pressure, table angles, vertical band saw's fence, length stop and coolant

according to job specifications, company policies and procedures, manufacturer's standards, Machinery's Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9490.03 Saw straight and angle cuts by:**

- positioning workpiece in saw to required operational clearances;
- setting up work holding devices such as clamps, nesting fixtures, vises or roller supports;
- guiding workpiece into vertical band saw blade using accessories such as push block, clamps, guard, air blast, coolant and lubricant;
- guiding blade into workpiece using a machine control;
- applying consistent cutting pressure to protect blade;
- adjusting angle of saw;
- squaring-off end of material (reference cut) for accuracy of measurement;
- monitoring operation to identify problems such as incorrect speeds and feeds, binding and overheating blade and wandering;
- checking straight cuts using precision measuring instruments such as micrometer, verniers, calipers, squares, straight edge, dial indicator, and surface comparator to verify accurate size, finish, parallelism, and squareness of straight cuts;
- implementing solutions;
- completing cut from opposite side when blade becomes damaged;
- deburring workpiece; and
- verifying workpiece meets specifications using inspection equipment such as protractors, tape measures, square, calipers and steel rule

according to job specifications, company policies and procedures, manufacturer's standards, Machinery's Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9490.04 Saw irregular shapes by:**

- guiding workpiece into vertical band saw blade using accessories such as push blocks;
- using clamps, guard, air blast, coolant and lubricant, as required;
- applying consistent cutting pressure to protect blade;
- monitoring profile of cut to identify problems such as incorrect speeds and feeds, binding and overheating blade, incorrect pitch of blade and lack of lubrication;
- checking shapes using precision measuring instruments and checking devices such as radius gauges, squares, comparators, and verniers to verify the profile conforms to the specifications;
- implementing solutions;
- deburring workpiece; and
- verifying workpiece meets specifications using inspection equipment

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9491 Perform Drilling Using Drill Press/Machine**

**Skill Set Descriptor**

Tool and Die Makers use drill presses/machines to perform cutting operations such as drilling, reaming, boring and tapping holes, countersinking, counterboring, chamfering and spot facing. Drill presses are an integral part of a machine shop. Setting up drill presses is an important task which must be done to maximize quality and efficiency.

**Skills**

**9491.01 Determine drill press requirements by:**

- selecting specific PPE and safety equipment required for the job;
- determining drilling operations and sequence to be performed based job traveller and other documentation;
- determining type and dimensions of material of workpiece;
- selecting drill press for the job;
- selecting cutting tools such as drills, reamers, taps, countersinks, counterbores, hole saws and gun drill;
- selecting drill press tooling such as drill chucks, collets, tapered sleeves and tapping heads;
- determining orientation of workpiece;
- select jigs, fixtures and work holding devices such as vices (plain, angular, compound, swivel) and clamps;
- calculating surface speed, spindle feed (rpm) and feed rate; and
- adjusting machine settings as required

according to job specifications, company policies and procedures, manufacturer's standards, Machinery's Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9491.02 Set up drill press by:**

- mounting, aligning and securing jigs, fixtures and work holding devices;
- clamping workpiece into jig or fixture;
- adjusting table and column height to maximize rigidity, if required;
- inspecting cutting tool for wear such as chipped, damaged or worn cutting edges and margins, and dullness;
- inspecting and cleaning tooling mounting surfaces to verify that they are free of nicks and burrs;
- installing tool in spindle securely and true;
- adjusting stop to required tool depth;
- verifying drill process by performing inspection and adjusting as necessary; and
- readjusting machine controls to cutting performance

according to job specifications, company policies and procedures, manufacturer's standards, Machinery's Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9491.03 Drill holes using drill presses by:**

- selecting centre drill based on the workpiece, hole size and operation to be performed;
- centre-drilling the workpiece;
- installing drill press tooling such as twist drills, hole saws and gun drills;
- installing workpiece;
- drilling into workpiece to produce hole;
- measuring and checking hole and adjusting as necessary;
- monitoring operation to identify problems such as drill wandering, oversized holes, damage to cutting tool and out of specification surface finish;
- implementing solutions;
- deburring workpiece; and
- verifying feature meets specifications using inspection equipment such as telescopic gauges, small hole gauge, calipers, micrometers and limit gauges

according to job specifications, company policies and procedures, manufacturer's standards, Machinery's Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9491.04 Cut countersink, counterbore, chamfer and spot face using drill presses by:**

- installing required cutting tool and drill press tooling;
- using cutting tools such as countersink, counterbore, chamfer and spot face to produce feature;
- completing operations to required procedures;
- measuring and checking feature of hole and adjusting as necessary; and
- monitoring operation to identify problems such as chatter, damage to cutting tool, burring, insufficient depth, incorrect speed and feed, drill wandering and oversized holes;
- implementing solutions;
- deburring workpiece; and
- verifying feature meets specifications using inspection equipment

according to job specifications, company policies and procedures, manufacturer's standards, Machinery's Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9491.05 Tap using drill presses by:**

- using required tap, tap drill and tap drill size;
- drilling workpiece;
- setting up tap in drill press using accessories such as centre, tapping heads, collets and chucks to secure tap;
- tapping hole using tapping fluid to produce a thread;
- monitoring operation to identify problems such as damaged threads, broken taps, cross threading and insufficient or incorrect tapping fluid;
- checking threads using precision measuring instruments, checking devices, and various checking methods such as thread gauges and thread plug gauges to verify that the accuracy of pitch and thread geometry meets specifications;
- implementing solutions;
- deburring workpiece; and
- verifying feature meets specifications using inspection equipment

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9491.06 Finish holes using drill presses by:**

- setting up and using hole finishing cutting tools such as drills, reamers, boring bars, laps and hones;
- measuring and checking hole and adjusting as necessary;
- monitoring operation to identify problems such as surface finish defects, under/oversized holes and damage to cutting tool;
- implementing solutions;
- deburring workpiece; and
- verifying hole meets specifications using inspection equipment

according to job specifications, company policies and procedures, manufacturer's standards, Machinery's Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9492 Perform Lathe Work**

**Skill Set Descriptor**

Tool and Die Makers set up conventional lathes such as engine, turret and vertical lathes to turn, bore and thread.

**Skills**

**9492.01 Determine lathing requirements by:**

- selecting specific PPE and safety equipment required for the job;
- identifying lathing operations and sequence of operations to be performed;
- selecting lathe such as engine, toolroom, speed and vertical based on workpiece characteristics;
- selecting, preparing and setting up lathe cutting tools such as drill bits, boring, parting, threading, knurling, facing and turning tool;
- selecting work holding device such as three-jaw chuck, four-jaw chuck, faceplate, collet chuck, between centers, magnetic chuck and clamps;
- selecting conventional lathe tools and accessories such as steady rest, taper attachment, lathe dog, turning tool, centres and follower rest;
- cleaning and checking spindle and work holding device for damage and debris;
- identifying type and dimensions of material to be turned;
- establishing surface speed using reference materials such as cutting tool manufacturers' specifications, charts and Machinery's Handbook;
- calculating spindle speed (rpm) using cutting speed of material and workpiece diameters;
- calculating feed rate using depth of cut and surface finish; and
- adjusting machine settings based on calculations

according to job specifications, company policies and procedures, manufacturer's standards, Machinery's Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9492.02 Set-up conventional lathes by:**

- protecting bedways;
- mounting workpiece in lathe either manually or using hoisting and rigging equipment such as chain block, crane, lifting eye and sling;
- securing work holding device using tools such as wrench, key, hook spanner and chuck wrench;
- installing and using feed stops as required;
- performing a trial cut;
- establishing a reference or starting point (datum);
- adjusting cutting tool angle such as turning tool, boring bar, threading tool, knurling tool and part-off blade;
- adjusting cutting tool to machine centre height;
- inspecting conventional lathe accessories for damage;
- cleaning conventional lathe accessories;
- adjusting, positioning and securing conventional lathe accessories;
- monitoring operations to identify problems such as misalignment, run-out, insufficient clearance, improper adjustments and incorrect cutting tool geometry and coating
- implementing solutions;
- placing workpiece in position;
- securing workpiece with work holding device;
- checking and adjusting workpiece using inspection equipment such as dial indicator, micrometer, surface gauge and calipers; and
- counterbalancing setup

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9492.03 Face surface using conventional lathes by:**

- determining operations and sequence to be performed;
- touching off tool on workpiece;
- cutting and measuring workpiece to establish starting length;
- rough-facing workpiece to remove excess material;
- measuring workpiece throughout the process and adjusting as required;
- monitoring operation to identify problems such as chatter, tool wear, incorrect tool height setting and chip management
- implementing solutions;
- finish-facing workpiece;
- deburring workpiece; and
- verifying workpiece meets specifications using inspection equipment

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9492.04 Turn internal and external surfaces using conventional lathes for turning internal and external surfaces, knurling, turning tapers, threading, grooving and parting-off by:**

- determining operations and sequence to be performed;
- confirming the centre height and alignment of tool;
- touching off tool on workpiece;
- performing trial cut and measuring workpiece using inspection equipment;
- rough-turning and rough-boring workpiece to remove excess material;
- measuring workpiece throughout the process and adjusting as required;
- monitoring operation to identify problems such as external surfaces (chatter, tool deflection, taper, run-out, incorrect tool geometry), knurling (galling, flaking, incorrect form, workpiece deflection, insufficient lubrication, double cutting), grooving (chattering, galling, tool wandering, tool wear, chip management, incorrect tool geometry), threading (chatter, tool deflection, taper, tool misalignment, incorrect tool geometry) and parting-off (chattering, galling, tool wandering, chip management, tool misalignment, incorrect tool height, incorrect tool geometry);

- checking features using precision measuring instruments, checking devices, and various checking methods such as micrometer and taper gauge to verify that the accuracy of feature geometry meets specifications;
- implementing solutions;
- finish-turning and finish-boring workpiece;
- verifying workpiece meets specifications;
- setting compound rest, attachment or tailstock offset for cutting tapers to achieve required angle;
- checking angle of taper for accuracy using inspection equipment;
- finish-tapering workpiece;
- selecting, engaging and feeding knurling tool;
- finish-knurling workpiece;
- feeding grooving and parting tool into workpiece;
- measuring and checking groove throughout the process and adjusting as necessary;
- finishing grooving and parting-off operation;
- setting quick-change gear box to required thread pitch/threads per inch (TPI);
- machine-testing pass to verify thread pitch or TPI;
- machining workpiece for threading operations;
- measuring thread; and
- finishing and deburring threaded workpiece to remove sharp edges

according to job specifications, company policies and procedures, manufacturer's standards, Machinery's Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9492.05 Create holes using conventional lathes** for drilling, boring, reaming, tapping and countersinking by:

- determining operations and sequence to be performed;
- installing centre drill;
- centre-drilling workpiece;
- installing drill for application;
- touching-off tool on workpiece;
- drilling workpiece;
- measuring and checking hole as required;
- monitoring operation to identify problems such as drilling (drill wandering, oversized holes, misalignment of tail stock/turret, damage to cutting tool, chip management, incorrect drill geometry), boring (insufficient chip and tool clearance, chatter, tool deflection, taper, run-out), reaming (chatter, oversized holes, misalignment of tail stock/turret, damage to cutting tool, bell-mouth); and tapping (breaking tap, insufficient coolant, incorrect tap drill size [TDS])
- implementing solutions;
- verifying feature meets specifications using inspection equipment;
- boring hole concentric to required eccentricities and pre-reamed to size;
- measuring workpiece to establish starting diameter;
- installing reamer in tail stock/turret;
- feeding reamer into bored or drilled workpiece to create a finished hole;
- tapping hole in part using conventional lathe; and
- deburring workpiece

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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9493

**Perform Milling**

**Skill Set Descriptor**

Tool and Die Makers use conventional milling machines to make precision parts. Conventional milling machines are also used for repair work, prototypes and tool room work.

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**Skills**

9493.01

**Determine conventional milling machine requirements by:**

- selecting specific PPE and safety equipment required for the job;
- determining milling operations and sequence of operations to be performed;
- identifying machining requirements such as machine type and accessories such as dividing head, rotary table, angle plates, parallels, edge finder and vices;
- cleaning accessories and inspecting for wear;
- installing, aligning and securing accessories;
- selecting and setting up work holding devices such as chucks, vices, dividing head, fixtures and clamping kits;
- selecting, preparing and setting up cutting tools such as end mills, shell mills, indexable carbide tooling, boring bars, face mills and fly cutters;
- inspecting and cleaning table;
- performing required alignment using measuring devices such as indicators, squares, gauge blocks, digital readout, micrometers and calipers;
- adjusting and securing work holding device using required clamping forces;
- determining type and dimensions of material to be cut; and
- cleaning tooling and inspecting for wear;
- determining surface speed;
- calculating spindle speed (rpm) using diameter of cutter and surface speed;
- calculating feed rate using rpm, number of cutter teeth and chip load per tooth; and
- adjusting machine settings using calculations

according to job specifications, company policies and procedures, manufacturer's standards, Machinery's Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9493.02 Set up conventional milling machines** for contouring, facing, keyways, straddle, gang, t-slot, end milling, slitting, slotting, stepping, cut-outs, angles, open slots, pockets, dovetail, boring and drilling by:

- installing and securing tooling using work holding devices;
- preparing workpiece and eliminating burrs and debris;
- installing and securing workpiece in work holding device or directly on conventional milling machine table;
- checking alignment of workpiece using inspection equipment such as indicators, squares and gauge blocks; and
- establishing workpiece datum using tooling balls, edge of the part and tools such as pointer, wiggler, indicator and edge finder

according to job specifications, company policies and procedures, manufacturer's standards, Machinery's Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9493.03 Mill surfaces using conventional milling machines by:**

- measuring workpiece to determine amount of excess material using inspection equipment such as digital readout, indicators, squares, gauges, calipers, micrometers and height gauges;
- locating reference point or datum surface using tooling balls, edge of the part and tools such as pointer, wiggler, indicator and edge finder;
- touching off milling cutter to workpiece surface to establish a reference point or datum;
- roughing out workpiece to remove excess material;
- monitoring operation to identify problems such as incorrect speeds and feeds, wrong depth of cut, incorrect cutter geometry, tool wear, lack of lubrication, improper work holding device, wrong geometry (flat taper), tool deflection and backlash;
- implementing solutions;
- measuring roughed-out workpiece to make finish adjustments;
- finishing workpiece;
- deburring workpiece; and
- verifying workpiece meets specifications

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9493.04 Create holes and hole features** using tooling such as drilling (centre drills, spot drills, drills, edge finders); reaming (tapered reamer, rose reamer, straight reamer, expansion reamer); countersinking, counterboring, chamfering, spot facing (countersinks, counterbores, chamfering tool, spot faces, drills); tapping (centre drills, tap drills, taps, tapping heads, collets, chucks) and boring (centre drills, drills, boring heads, indexable tooling, boring bar) by:

- determining tooling for the job;
- determining reference point or datum surface using tooling balls, edge of the part and tools such as pointer, wiggler, indicator and edge finder;
- adjusting speeds and feeds;
- center-drilling (spot-drilling) workpiece;

- touching off drill to workpiece surface to establish a reference point;
- pre-drilling based on size to be drilled, if required;
- drilling workpiece to size, if required;
- measuring hole size;
- boring and reaming workpiece;
- touching off reamer to workpiece surface to establish a reference point;
- verifying existing hole size based on reaming allowance;
- tapping workpiece;
- counterboring, countersinking, chamfering and spot facing workpiece;
- monitoring operation to identify problems such as drilling (incorrect speeds and feeds, wrong depth of cut, incorrect cutter geometry, tool wear, lack of cutting fluid, chip evacuation), reaming (incorrect speeds and feeds, incorrect cutter geometry, tool wear, insufficient cutting fluid, chip evacuation), countersinking, counterboring, chamfering, spot facing (chatter, vibration, incorrect cutter geometry, tool wear, insufficient cutting fluid, chip evacuation), tapping (incorrect speeds and feed, incorrect tap geometry, incorrect tap drill size, cross-threading, tool wear, incorrect or insufficient cutting fluid, chip evacuation) and boring (incorrect speeds and feeds, incorrect depth of cut, incorrect cutter geometry, tool wear, lack of lubrication, chip evacuation);
- implementing solutions;
- deburring workpiece; and
- verifying workpiece meets specifications

according to job specifications, company policies and procedures, manufacturer's standards, Machinery's Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9494 Perform Grinding**

**Skill Set Descriptor**

Tool and Die Makers select, plan and set up grinding machines and their accessories to achieve requirements such as tight tolerance for assembly and high-quality surface finishes.

**Skills**

**9494.01 Determine grinding machines requirements by:**

- selecting specific PPE and safety equipment required for the job;
- identifying grinding operations and sequence of operations to be performed;
- identifying machining requirements such as grinding machine type and grinding procedures such as surface grinding, cylindrical grinding and tool and cutter grinding;
- identifying work holding devices such as chucks, face plates, fixtures, magnetic chucks, angle plates, precision vice, whirly jig, magnetic sub-plate and indexing fixture;
- selecting accessories such as angle plate, collets, steady rest, chucks, drive dogs, mandrels, sine bars and sine plates;
- determining type and dimensions of material to be ground;
- determining types, size and grades of grinding wheel;
- identifying workpiece setup procedure for surface, cylindrical and, tool and cutter grinder;
- determining and calculating grinding machine speeds based on wheel size, part diameter and material; and
- adjusting feed control to required rate

according to job specifications, company policies and procedures, manufacturer's standards, Machinery's Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9494.02 Set up grinding machines and accessories** such as surface, universal cylindrical, centreless, tool and cutter, dressing stone, coolant systems, angle/radius dresser, wheel dressers and conditioning stone by:

- preparing workpiece, mounting surfaces and eliminating burrs and debris;
- position work holding device to accommodate workpiece and operation;
- aligning and securing work holding devices;
- inspecting and ring testing grinding wheel for defects such as cracks, stains, gouges, improper surface finish, burnishing and fish tails;
- securing wheels on adapters using blotters and flanges;
- balancing grinding wheels using wheel balancing equipment such as mandrels, weights and static balancer;
- installing balanced wheel assembly on machine;
- trueing and dressing mounted grinding wheel using dressing tools;
- assessing further balancing requirements and adjusting, if required;
- inspecting accessories for damage and defects;
- cleaning and checking mounting surface;
- positioning, aligning, fastening and adjusting accessories to accommodate workpiece, machine and specifications;
- securing workpiece on surface grinder using surface grinder accessories such as magnetic chuck, vice and fixture;
- securing workpiece on cylindrical grinder using cylindrical grinder accessories such as magnetic chuck, chuck and centres with drive dogs;
- securing workpiece on tool and cutter grinder using tool and cutter grinder accessories such as centres, universal vice and collets;
- checking alignment of workpiece before grinding using inspection equipment such as indicator, gauges, precision squares, sine bars, calipers, micrometers and digital readout; and
- shimming workpiece to eliminate stressing of the material, if required

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9494.03 Grind flat surfaces using a surface grinder by:**

- measuring workpiece to determine amount of excess material using inspection equipment such as micrometers, gauge blocks, dial indicators, profilometers, surface finish comparators, depth micrometers, surface plate and sine bar;
- touching off grinding wheel on workpiece surface to establish a reference point;
- removing excess material;
- monitoring operation to identify problems such as incorrect speeds and feeds, incorrect depth of cut, wheel glazing or loading, incorrect consistency of coolant, wheel wear and incorrect wheel;
- implementing solutions;
- verifying flat surface meets specifications using inspection equipment; and
- demagnetizing workpiece

according to job specifications, company policies and procedures, manufacturer's standards, Machinery's Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9494.04 Grind profiles by:**

- dressing grinding wheel to desired profile using tools such as radius/angle dresser, form dresser, dressing stick (stone) and diamond dressing to establish a reference point;
- touching off grinding wheel on workpiece surface to establish a reference point;
- measuring workpiece to determine amount of excess material using inspection equipment;
- roughing out workpiece profile to remove excess material leaving a finish grinding allowance;
- redressing wheel to desired profile;
- finishing grinding;
- verifying profile meets specifications using inspection equipment; and
- demagnetizing workpiece

according to job specifications, company policies and procedures, manufacturer's standards, Machinery's Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9494.05 Grind internal and external cylindrical and tapered surfaces by:**

- dressing grinding wheel using tools such as radius/angle dresser, form dresser, dressing stick (stone) and diamond dressing;
- adjusting table based on required orientation such as taper and parallelism;
- touching off grinding wheel on workpiece surface to establish a reference point;
- measuring workpiece using inspection equipment such as micrometers, sine bars, indicators, bore gauges, surface finish comparators, taper gauges and Prussian blue to determine amount of excess material;
- roughing out workpiece to remove excess material leaving a finish grinding allowance;
- redressing wheel;
- finishing grinding;
- remeasuring workpiece; and
- demagnetizing workpiece, if required

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9494.06 Grind tools and cutters by:**

- dressing grinding wheel using tools such as radius/angle dresser, form dresser, dressing stick (stone) and diamond dressing;
- mounting cutting tools such as end mills, reamers and form relief cutters;
- setting cutting tool rest to establish required relief angle and clearance;
- touching off grinding wheel on workpiece surface to establish a reference point;
- grinding cutting edge of tools to establish required tool geometry; and
- demagnetizing workpiece, if required

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9494.07 Finish holes using a honing machine** such as horizontal, vertical, CNC and drill by:

- selecting honing machine for the job;
- identifying type of material to be honed such as steel, cast iron and bronze;
- selecting honing stones and fluid such as oil and water;
- monitoring stone pressure to eliminate distortion and optimize material removal;
- matching stroke to rpm to achieve finish;
- monitoring operation to identify problems such as bell mouth, lack of cylindricity, chatter, lack of lubrication and glazing;
- implementing solutions; and
- checking dimensions of holes using inspection equipment such as bore gauges, inside micrometers and telescopic gauge

according to job specifications, company policies and procedures, manufacturer's standards, Machinery's Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9495 Perform Computer Numerical Control (CNC) Machining**

**Skill Set Descriptor**

Tool and Die Makers use computer numerical control (CNC) machines to manufacture tooling due to technological advancements and new practices. Programming this equipment requires knowledge of conventional machining methods as well as CNC programming skills and an understanding of machine controls.

**Skills**

**9495.01 Perform CNC programing by:**

- locating information such as part origin, orientation, location of work holding devices and part material required for CNC machining;
- determining types of cutting tools and recording on setup sheet;
- generating program points using mathematics and coordinate systems;
- generating cutter paths using manual methods to input CNC code;
- generating cutter paths using computer aided manufacturing (CAM) software and built-in features of the machine control;
- designating offsets for measurements such as tool nose radius, cutter radius, approach vectors and tool length compensation;
- planning entry and exit moves;
- establishing safety blocks of code;
- confirming safe program restart point to cancel previous code and initialize machine at a start point; and
- optimizing program on CNC machine and/or simulation software

according to job specifications, company policies and procedures, manufacturer's standards, Machinery's Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9495.02 Input program data into control memory by:**

- selecting and downloading program from personal computer (PC), network or storage devices to CNC controller;
- manually inputting program data into CNC controller;
- interpreting and reviewing program codes; and
- editing program using input functions on the CNC controller such as insert, alter, delete, send and receive

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9495.03 Establish workpiece datum by:**

- setting up workpiece on machine-tool based on planning sheet;
- verifying location of work datum based on setup sheet;
- using tooling balls, edge of the part, and tools such as probes, pointers, wigglers, indicators and edge finders;
- manually adjusting machine axes to locate designated datum surfaces of workpiece using tools such as probes, dial indicators, edge finders and tool/height setters;
- loading tools into tool holder based on setup sheet and program requirements;
- establishing tool length and touching off tool on suitable reference surface; and
- inputting datum information into specific machine offset register

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9495.04 Verify programs by:**

- confirming program reference number;
- identifying and correcting interferences such as work holding devices, tool carousel, part features, insufficient tool clearance, hazardous tool change
- performing dry run or graphic simulation of program to verify datum, tool path and tool sequence;
- stepping-through program to identify interferences and errors using controller features such as single block, optional stop, feed control and rapid control;
- making program modifications based on program requirements;
- confirming and saving program modifications for repeatability and consistency; and
- updating and recording master file to maintain program and setup data

according to job specifications, company policies and procedures, manufacturer's standards, Machinery's Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9495.05 Monitor machining processes by:**

- identifying and assessing effects of tool wear such as poor finish, excessive noise, overheating, vibration and chatter;
- applying procedures such as visual inspection, reading spindle and drive axis load meters, checking surface finish and workpiece sizes;
- identifying and correcting chip control problems;
- using machine overrides such as rapid override, speed and feed override to verify workpiece quality and machine maintenance;
- using required coolant or airflow for chip removal, surface finish, tool life and optimal temperatures;
- monitoring operation to identify process problems such as chatter, vibration, tool failure, poor finish, abnormal chip formations by adjusting speed and feed overrides, coolant and air flow, and setup rigidity;
- implementing solutions;
- restarting the program after adjustments;
- measuring workpiece dimensions; and
- adjusting offset values, as required, based on calculated deviations of the workpiece dimensions

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9496 Perform Electrical Discharge Machining (EDM)**

**Skill Set Descriptor**

Tool and Die Makers use electrical discharge machines (EDM) to accurately remove materials by eroding cavities, contours and profiles in hardened and soft ferrous and non-ferrous material in a precise and controlled manner with electrodes and wires with electrical discharges.

**Skills**

**9496.01 Determine EDM requirements by:**

- selecting specific PPE and safety equipment required for the job;
- identifying EDM process and machine for the job to be performed and sequence of operation;
- identifying and selecting EDM components such as electrodes, tool holders, and EDM wire specifications and guides to pre-determined reference points;
- identifying and selecting machine parameters such as rotations, flushing methods, and power settings using speed and feed charts;
- identifying and selecting electrode material such as graphite, copper (tungsten, beryllium) and brass;
- determining the type, size, grade, and hardness of material to be cut so that the workpiece is machined efficiently and safely without damage to tooling, machine or workpiece; and
- selecting power setting based on the electrode material, surface area to be removed and surface finish

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9496.02 Set up EDM** such wire or sink by:

- setting up EDM components;
- setting machine parameters;
- positioning, aligning and securing workpiece in EDM machine to specified datums and required alignments using work holding devices;
- preparing electrode flushing holes and setting up flushing nozzles to confirm that excess material is removed from area;
- verifying optimal flushing during operation to prevent arcing out and confirm machine efficiency;
- cutting the workpiece and measuring/checking the dimensions using verniers, depth micrometers and indicators;
- monitoring control panel for information such as voltage, amperage, flushing and burn rate; and
- maintaining cutting conditions during operation to optimize material removal and adjusting for size as necessary

according to job specifications, company policies and procedures, manufacturer's standards, Machinery's Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9497 Perform Heat Treatment and Hardness Testing**

**Skill Set Descriptor**

Tool and Die Makers perform heat treatment to change the properties of materials. The processes are used to harden, improve machinability and reduce internal stress. They perform simple heat treatment operations such as torch hardening, annealing, quenching and tempering of steels and alloys. Tool and Die Makers also test heat-treated materials to determine the relative hardness.

**Skills**

**9497.01 Select heat treatment process** such as annealing, normalizing, hardening, tempering, quenching, case hardening and stress-relieving by:

- selecting fire-retardant PPE and safety equipment such as gloves, aprons, face shields, hats, jackets and protective footwear;
- selecting heat treatment process for the workpiece;
- selecting heat treatment equipment such as torches, furnace/oven, quenching media and induction heater, and heat treatment supplies;
- selecting material handling equipment such as tongs, hoists, cranes and wires;
- determining temperature for each heat treatment process; and
- selecting quenching medium such as oil, water and air

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9497.02 Harden materials using heat treatment equipment** such as furnaces and torches by:

- setting furnace cycle;
- determining torch settings;
- preparing and cleaning part to remove contaminants using cleaning methods such as polishing, sandblasting, ultrasonic cleaning, descaling and degreasing;
- checking/monitoring quenching media temperature to verify it is at desired temperature;
- moving quenching media to proximity of furnace to reduce heat loss of part, if required;
- heating part in the oven to specified temperature and holding for required time;
- submerging and agitating part in quenching media to achieve hardness; and
- removing part from quenching media when suitable temperature is attained

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9497.03 Temper materials using heat treatment equipment** such as furnaces and torches by:

- setting furnace cycle;
- determining torch settings;
- preparing and cleaning part using cleaning methods such as polishing, sandblasting, ultrasonic cleaning and descaling;
- heating part to set temperature;
- confirming specified temperature is reached using equipment such as temperature sticks and infrared thermometer; and
- interpreting tempering colours using colour chart

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.



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**9497.04 Anneal materials using heat treatment equipment** such as furnaces and torches by:

- setting furnace cycle;
- cleaning part to remove oil prior to heating process;
- heating part to set temperature; and
- controlling cool down rate following the annealing procedures

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9497.05 Normalize materials using heat treatment equipment** such as furnaces and torches by:

- setting furnace cycle;
- preparing and cleaning part using cleaning methods such as polishing, sandblasting, ultrasonic cleaning and descaling;
- heating part to set temperature; and
- controlling cool down rate following normalizing

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9497.06 Case harden materials using heat treatment equipment** such as furnaces and torches by:

- setting furnace cycle;
- selecting case hardening methods such as carburizing using gas, pack hardening, submerging, induction heating and nitriding;
- determining torch settings;
- preparing and cleaning part using cleaning methods such as polishing, sandblasting, ultrasonic cleaning, descaling and degreasing;
- heating part to set temperature;
- placing part into carburizing material such as carbon powder and carbon monoxide to completely cover the part;
- checking quenching media temperature using tools such as thermometers and infrared scopes to verify it is at required temperature;
- moving quenching media to proximity of furnace to reduce heat loss of part, if required;
- submerging and agitating part in quenching media;
- removing part from quenching media when suitable temperature and time are reached; and
- cleaning part to remove oil and scale using cleaning methods

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9497.07 Perform inspection of workpiece** using tools and equipment such as magnifiers, dye penetrant, microscopes by:

- conducting a visual inspection;
- cleaning and removing oxidization to prepare workpiece surface;
- identifying surface imperfections such as scratches, cracks and craters; and
- identifying geometric deformations

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9497.08 Perform hardness test** using tools and equipment such hardness testers, charts, indenting tools, V-blocks and standard calibration samples by:

- selecting hardness tester required for the operation;
- using manual methods and comparison charts;
- cleaning and removing scale and high spots to prepare workpiece surface;
- verifying hardness tester is functioning accurately using standard calibration samples;
- aligning with indenting tool to set up workpiece on hardness tester;
- activating mechanisms to initiate hardness test; and
- recording results of hardness test

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9498 Perform Production Tool Design**

**Skill Set Descriptor**

Tool and Die Makers design production tools such as dies, jigs, fixtures, cutting tools and moulds to make parts to meet customer’s part requirements.

**Skills**

**9498.01 Identify production tool requirements** using production tools such as forging dies, jigs, fixtures, cutting tools and moulds by:

- evaluating client production requirements such as volume, precision, quality and work centre capacity;
- determining type of tooling for the job; and
- determining tooling capability such as rigidity, accuracy, repeatability, and functionality

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9498.02 Prepare shop sketches** using sketching resources such as paper and pencils, measuring tools and computers by:

- conceptualizing design;
- selecting sketching resources for the job; and
- applying sketching techniques such as Computer-Aided Design (CAD), drafting and freehand to show all relevant features and dimensions as required for the design of the finished tool

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9498.03 Determine production tool material specifications and engineered components** by:

- selecting tooling material;
- determining processes that are required for finishing tooling components such as machining operations, benchwork, surface treatments and heat treatment;
- determining availability and feasibility of engineered components such as bushings, hinges, screws, dowels, die sets and wear plates; and
- selecting engineered components

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9498.04 Prepare information for designing and drafting by:**

- finalizing tool design criteria such as final dimensions and tolerances;
- compiling list of engineered components such as bushings, hinges, screws and dowels by catalogue number for purchasing requirements; and
- compiling list of raw materials required for production tool components such as dies, jigs, fixtures, cutting tools and moulds

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9499 Develop Prototype**

**Skill Set Descriptor**

Tool and Die Makers build prototypes to confirm design specifications by providing a physical model to demonstrate the targeted characteristics of a finished product to the client. Prototypes are developed during part development but prior to production tooling. Prototypes may be a single piece or an assembly of components or tooling.

**Skills**

**9499.01 Create prototype building plan by:**

- determining prototyping process and sequence of operations including assembly and fabrication;
- selecting types of machines;
- selecting materials such as composites, woods, metals, plastics and resins;
- determining required fixtures, tooling and tooling aids;
- matching prototype application with material characteristics;
- selecting fabrication method such as electronic modelling, hand forming, machining, rapid prototyping, 3D printing and welding; and

- determining fastening and joining techniques such as adhesive bonding, soldering, welding and mechanical fastening based on hardness, weight and mechanical properties of the workpiece;
- building tooling aids for the prototype using predetermined machining processes; and
- measuring, checking and verifying the size, shape, and finish of the tooling aids are accurately produced to assist in the prototype-building process

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9499.02 Fabricate prototype components by:**

- selecting and applying fabrication method such as electronic modelling, hand forming, machining, rapid prototyping and welding;
- drawing sketches of prototype and components showing views of part relationships and assemblies;
- using aids such as fabricated tooling, fixtures and press;
- verifying that the prototype components and assemblies are sketched for shape, dimensions, functions, tolerances, surface finish and assembly interrelationship and process;
- preparing components for special treatment such as heat treatment and coating;
- preparing components for assembly using hand finishing techniques such as filing, polishing and honing; and
- inspecting components

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9499.03 Assemble prototype components** using tools and equipment such as clamps, indicators, hand tools, welding equipment and presses by:

- setting up components based on the job;
- developing special tool aids such as clamps, fasteners and custom hand tools for ease of assembly; and
- attaching components to each other using fastening techniques such as mechanical fasteners, welding, bonding and brazing

according to job specifications, company policies and procedures, manufacturer's standards, Machinery's Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9499.04**      **Inspect prototype** using measurement equipment such as calipers, indicators, CMM, micrometers and gauges by:

- performing visual inspection to confirm appearance as per intended conceptualization;
- verifying movements and interactions of components;
- confirming completeness of prototype prior to final evaluation; and
- preparing quality assurance documentation to meet performance standards and traceability

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9499.05**      **Prove out prototype** by:

- setting up prototype for preparation and evaluation;
- installing pneumatic, hydraulic and robotic systems based on the prototype application;
- testing prototype functions as per intended use;
- diagnose malfunctions of prototype using evaluation methods such as visual inspection, measurement and functionality run to isolate the problem;
- disassembling, modifying and repairing affected components to fix identified problems; and
- repeating evaluation procedures to confirm functionality of altered prototype

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9500 Fit and Assemble Production Tools**

**Skill Set Descriptor**

Tool and Die Makers fit and assemble production tool components. The setting of tool timing is important to achieve accurate part and tool specifications.

**Skills**

**9500.01 Verify dimensions of production tool components** for features specifications by:

- selecting measuring instruments such as micrometers, calipers, indicators, gauge blocks/pins, CMM, height gauge and sine bar or plate
- taking measurements of holes, angles and profiles; and
- comparing measurements to drawings and sketches for conformity, fit and clearance

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9500.02 Perform production tool assembly by:**

- organizing production tool components such as die and form blocks;
- organizing engineered components such as bushings, hinges, screws and dowels;
- verifying that all required parts are ready for use;
- temporarily fastening production tool components, if required, to permit adjustments for alignment and fit;
- making necessary adjustments for fit and function;
- drilling, tapping and reaming locating holes to permanently locate components, if required;
- permanently fastening components using fastening techniques such as mechanical fasteners, welding, bonding and brazing; and
- verifying assembly for fit and function

according to job specifications, company policies and procedures, manufacturer's standards, Machinery's Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

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**9500.03 Set production tool timing by:**

- determining shut height based on tool design;
- verifying final height of cutting punches to achieve punch penetration;
- verifying final position of forming punches to achieve form of the part using lead check;
- verifying timing of shedders and pads;
- verifying cam engagement of stamping dies to achieve required penetration or form;
- verifying cam engagement of moulds to achieve required seal;
- verifying tooling components such as stripper plates, ejectors, compression springs, bumper blocks, pressure pads and nitrogen cylinders;
- adjusting tooling components to achieve required functioning; and
- documenting changes to tooling

according to job specifications, company policies and procedures, manufacturer's standards, Machinery's Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

**9501 Prove Out Production Tools**

**Skill Set Descriptor**

Tool and Die Makers prove out new and reconditioned production tools by performing an initial tryout of a tool to verify its safety, functionality and accuracy.

**Skills**

**9501.01 Set up production tools** such as forging dies, jigs, fixtures, cutting tools and moulds by:

- determining equipment for operation of production tool and sequence of operations;
- installing, aligning and securing production tool to equipment based on type of tool;
- performing set up calculations such as shut height and stock feeder height;
- connecting press accessory systems such as stock feeders, hydraulic lines, pneumatic lines, electrical connections and parts catchers;
- connecting mould accessory systems such as water lines, misters, parts catchers, conveyor systems and electrical connections; and
- connecting fixture accessory systems such as pneumatic lines and electrical connections

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

**\* A Trainer may be a Supervisor or the competent employee designated by the Apprentice’s Sponsor**

**9501.02 Verify production part material by:**

- referencing material identification such as conformance documents, trace identification tags and markings on the material to confirm material conforms to part requirements;
- identifying materials based on physical properties such as camber, crowning, longitudinal bow, hardness and magnetism; and
- confirming feed stock is free from defects such as damage, foreign matter and other contamination that may impact final product quality or damage tool

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

**9501.03 Develop blank/strip by:**

- calculating amount of material for finished shape;
- selecting press and settings;
- performing circle grid analysis to assess material flow;
- changing the form radii and changing clearances;
- developing draw radius and adjusting clamping force on the blank/strip using draw beads to achieve uniform material thickness;
- evaluating material changes such as thinning, thickening, folding, flow and wrinkling to main dimensions to specifications;
- verifying profile geometry against part drawing using measurement instruments such as micrometers, calipers, indicators, gauge blocks/pins, CMM, height gauge, sine bar or plate;
- recording final blank/strip dimensions to manufacture production blanks/strips; and
- finalizing cutting steels and applying the required cutting clearances

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

**9501.04 Cycle equipment with production tools** such as jigs, fixtures, dies and moulds by:

- using machine-tools such as lathes, drills, grinders, saws and milling machines at reduced rate to verify function and minimize risk of damage to equipment and production part;
- trying-out and troubleshooting dies using procedures such as press try-out, checking for workpiece failures such as worn, dull or chipped edges, misalignment, clearance and inadequate or improper lubrication, scrap shed, part removal, installing die components/tooling;
- measuring and checking, adjusting, and modifying, and continuing to re-try until the die passes final quality inspection;
- verifying clearances and interferences between equipment, production tool and workpiece to verify function and minimize risk of damage to equipment and production part;
- setting up and checking die protection and sensors;
- verifying and adjusting timing to optimize tool performance;
- adjusting die components such as stripper plate, die springs, punches, pilots, strip levels, forms and horns;
- adjusting accessories such as feeders, coils, straighteners, air blower, lubrication system;
- performing press adjustments such as shut height, pressure pads, limit switches, counterbalance and temperature; and
- assessing production at normal conditions to verify that part volume and consistency are optimal and to observe trends in production

according to job specifications, company policies and procedures, manufacturer's standards, Machinery's Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

**9501.05 Evaluate production part by:**

- inspecting part visually for deficiencies such as poor surface finish, burrs, part damage, splits or wrinkles, surface deformation and accuracy;
- measuring part dimensions to confirm that measurements conform to part specifications using measuring instruments and checking devices such as inside, outside and depth micrometers, height gauges, vernier calipers, indicators, gauge blocks, pin gauges, inspection fixtures, scan data and CMM (coordinate measuring machine); and
- documenting results of evaluation including data such as critical dimensions, surface finish, tolerances, functionality and repeatability

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

**9501.06 Check production tool for damage by:**

- visually inspecting tools for damage such as cracks, breaks, deformities and misalignments using optical aids such as loupe eyeglasses, magnifiers and flashlight, if required; and
- documenting damage

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature



**9501.07 Modify production tools to enhance productivity by:**

- adjusting mechanisms such as stock feeders, limit switches, air blowers, air clamps, equipment fixtures and lubrication systems;
- changing tool materials and components, if necessary;
- recommending surface treatments such as coatings, nitride, plating, anodizing, cryogenic and titanium to enhance productivity and wear resistance of production tools; and
- streamlining load and unloading processes to reduce cycle time

according to job specifications, company policies and procedures, manufacturer's standards, Machinery's Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

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**9502 Repair and Maintain Production Tools**

**Skill Set Descriptor**

Tool and Die Makers repair and maintain production tools to their required accuracy. They must recognize the need for repair, identify the correct repair procedure and perform reconditioning of these tools.

**Skills**

**9502.01 Identify condition of production tools** such as forging dies, jigs, fixtures, cutting tools and moulds by:

- monitoring and evaluating production part;
- observing operation of production tool for defects such as worn components, broken clamps, worn surfaces and broken edges;
- determining need for repair and adjusting and reconditioning, as required;
- comparing condition of production tools to original specifications using measuring instruments such as micrometers, calipers, indicators, gauge blocks/pins, CMM, height gauge, sine bar or sine plate and digital measuring media; and
- documenting production tool defects

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

**\* A Trainer may be a Supervisor or the competent employee designated by the Apprentice’s Sponsor**

**9502.02 Plan repair procedures by:**

- identifying production tool defects such as chips, cracks and edge wear; and
- determining repair procedures such as disassembling, resurfacing, polishing, adjusting timing of die mechanisms, sharpening

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

**9502.03 Adjust production tool components by:**

- adjusting jigs and fixtures using methods such as shimming, realigning, levelling and relocating stops based on observations and measurements;
- adjusting dies using methods such as shimming, peening, realigning and welding based on observations and measurements;
- adjusting moulds using methods such as shimming and realigning based on observations and measurements;
- verifying that production part conforms to specifications; and
- documenting production tool adjustments

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

**9502.04 Recondition production tool components by:**

- preparing and cleaning component to remove contaminants using cleaning methods such as polishing, sandblasting, ultrasonic cleaning, descaling and degreasing;
- removing excess production part material using finishing tools and equipment such as abrasive stones, polishing media, grinder and polisher;
- determining reconditioning method such as machining, applying surface treatments, replacing components, welding and coating based on part and component condition;
- fabricating new components for production tools such as forging dies, jigs, fixtures, cutting tools and moulds when components are damaged beyond repair;
- replacing engineered components such as bushings, hinges, screws and dowels;
- inspecting reconditioned component to confirm completion;
- sharpening dies and resurfacing moulds based on part condition; and
- recording production tool reconditioning

according to job specifications, company policies and procedures, manufacturer’s standards, Machinery’s Handbook, industry standards, OH&S, WHMIS, regulations and legislation.

mm/dd/yy	Trainer Print Name	*Trainer Signature
mm/dd/yy	Apprentice Print Name	Apprentice Signature

**Tools and Equipment**

Hand Tools		Power Tools	Machine Tools
abrasive stones	metal stamps	air grinder	abrasive cut-off saw
bearing extractor	oil cans/guns	bench grinder	computer numerical control (CNC) machine milling center
brushes	pliers	die grinder	CNC turning center
chisels	punches and bars	disc grinder	die spotting press
chuck key	rasps	drill press	drilling machines
clamp	scrapers	pencil grinder	electrical discharge machine (EDM)
deburrers	screwdrivers	portable drill	grinders (surface, cylindrical, jig, tool cutter)
dressing stick	soft jaws		jig bore
drill drift	spotting blue (prussian blue)	<b>Cutting Tools</b>	lathe
drill gauge	tap extractors	abrasive wheels	milling machines
file cards	tap wrenches	boring bars	power saws
files	tap wrenches	broaches	press (hydraulic, pneumatic, mechanical)
grease guns	temperature sticks	counterbore	
hacksaws and blades	tin snips	countersink	
hammers/mallets	torch strikers	drill bits	
hand reamers	wheel dressers (hand-held)	EDM electrodes	
hex keys	wrenches	grinding wheels	
honing stones		knurling tools	
lapping plate		milling cutters	
loupe eyeglass		parting-off tools	
magnifying screens and glasses		reamers	
		saw blades	
		spot faces	
		taps and die	
		turning tools	

**Tools and Equipment**

Measuring Tools	
angle block or slip	precision blocks
angle plate	precision level
bore gauge	protractor
calipers	radius gauge
combination square	refractometer
coordinate measuring machine (CMM)	sine bar (compound)
deflection tester	sine plate (compound)
depth gauge	small hole gauge
destructive testing equipment	squares
dial indicators	steel rules
die maker square	surface finish comparator
electronic measuring devices	surface plate
feeler gauge	telescopic gauge
gauge blocks	temperature block
gauge pins	tensile strength tester
hardness tester	thermometer
height micrometer	thread gauge
measuring rods	thread measuring wires
measuring tape	tooling ball
micrometers	vernier caliper
non-destructive testing equipment	vernier height gauge
optical comparator (shadow graph)	vernier protractor
optical flats	

**Equipment and Devices**

Heat Treating Equipment	Accessories and Work Holding Devices	
fire brick furnaces ladles quenching mediums shot/sand blaster stainless steel wrap tongs torches	adaptors angle plates anvils arbour press arbours boring heads centre and edge finders centres chucks	hoists indexing heads jacks lathe centres lathe dogs machine vice mandrels parallels precision stop
Layout Equipment		
combination set dividers and trammels etchers height gauge hermaphrodite calipers layout dye layout table punchers scribes squares surface gauges surface plates / surface tables	clamps collets crane degreasing tanks die light die stands dividing head drill chuck drive dogs drive plate electronic devices and software faceplates follower/travelling rest forklift chariot grinding attachment grinding wheel balancers grinding wheel dressers	quick change rigging equipment and accessories rotary grinding attachments rotary table shim stock spacers steady rest tail stock taper sleeves taper turning attachment tapping head tool holders trip dogs turret toolpost v-block vices
Personal Protective Equipment (PPE) and Safety Equipment		
dust mask eye wash station fall arrest equipment fire blanket fire extinguishers fire hoses first aid station goggles/safety glasses/face shield/side shield	hand protection hearing protectors protective head gear respirators safety barrier tapes safety boots thermal hand protection thermal outerwear	

<b>Acronyms</b>	
BOSTA	Building Opportunities in the Skilled Trades Act
CAD	Computer-aided design
CAM	Computer-aided manufacturing
CMM	Coordinate measuring machine
CNC	Computer numerical control
EDM	Electrical discharge machine
GD&T	Geometric dimensioning and tolerancing
GMAW/MIG	Gas Metal Arc Welding
GTAW/TIG	Gas Tungsten Arc Welding Tungsten Inert Gas
OH&S	Occupational Health and Safety
PC	Personal computer
PPE	Personal protective equipment
SDS	Safety data sheet
SMAW/ STICK	Shielded Metal Arc Welding
TDS	Tap drill size
TPI	Threads per inch
WHMIS	Workplace Hazardous Materials Information System



## Definitions

### Apprentice

- An individual who, pursuant to a registered Training Agreement, is receiving or is to receive training in a trade that is required as part of an apprenticeship program
- Holds a Training Agreement in either a compulsory or non-compulsory trade;
- Are subject to any ratios or wage rates that have been set out in regulation and or recommended by industry for their trade(s);
- Remain as an Apprentice until they receive their Certificate of Apprenticeship

### BOSTA

*Building Opportunities in the Skilled Trades Act, 2021 (BOSTA)*

### Certificate of Apprenticeship (C of A)

A certificate issued to individuals who have demonstrated that they have completed an apprenticeship program in Ontario.

### Certificate of Qualification (C of Q)

A certificate issued to an individual who has completed an apprenticeship or equivalent AND passed the Certificate of Qualification examination.

### Competence

The ability of an individual to perform a skill, consistently without assistance, in the workplace as set out in the Logbook.

### Competency Analysis Profile (CAP Chart)

A chart that identifies the training needs of an individual trade and details the skills/skill sets that must be demonstrated during an apprenticeship program.

### Journey person

Journey person means an individual who holds a certificate of qualification (in a compulsory or non-compulsory trade) and/or an individual who practices as a journey person in a non-compulsory trade who does not hold a certificate of qualification and has equivalent experience in that trade.

### Mandatory Skill

Status assigned to unshaded individual skills, skill sets or general performance objectives which must be signed-off for the Apprentice to complete their program.

### Optional Skill

Status assigned to shaded individual skills, skill sets or general performance objectives for which sign-off is not required for the Apprentice to complete the program.

### **Provisional Certificates of Qualification**

- A Provisional Certificate of Qualification is issued to an individual who has obtained a Certificate of Apprenticeship (in both compulsory and non-compulsory trades) in a program that has a Certificate of Qualification examination, to which the individual has not yet passed the Certificate of Qualification examination.
- A Provisional Certificate of Qualification shall have the prescribed term or, if no term is prescribed, a term of one year.
- In a compulsory trade, the Provisional Certificate of Qualification allows a person to continue working legally in the trade for up to 12 months while they work to pass the certifying exam.
- Individuals with a Provisional Certificate of Qualification are subject to any ratios and/or wage rates that have been set out for their trade(s).

### **Ratios**

For the purpose of an Apprenticeship program, a ratio is the maximum number of Journeypersons to Apprentices. The purpose of ratios is to provide consistent supervision, training and continuity of work.

### **Red Seal Program**

The Interprovincial Standards Red Seal Program (also known as the Red Seal Program) was established more than 50 years ago to provide greater mobility across Canada for skilled workers and represents a standard of excellence for industry. Through the program, individuals are able to obtain a Red Seal endorsement on their provincial/territorial certificates by achieving 70% or higher on an interprovincial Red Seal examination.

The Interprovincial Standards Red Seal Program acknowledges their competence and ensures recognition of their certification throughout Canada without further examination. There are currently over 50 Red Seal designated trades. **The Red Seal Program is recognized as the interprovincial *standard of excellence in the skilled trades*.** The Interprovincial Standards Red Seal Program is a partnership between the Government of Canada, the Provinces, the Territories and various stakeholders.

### **Sign-off**

Signature of the Sponsor of record, or an individual to whom that Sponsor has delegated signing authority, (e.g. Trainer) indicating an Apprentice's demonstration of competence.

### **Skill**

Individual competency/task described in the Logbook.

### **Skill Sets**

Group or selection of individual skills found in the Logbook.

### **Skill Set Completion for Sponsors**

Listing for all skill sets and includes space for sign-off by Sponsor of record.

**Sponsor**

Means a person that has entered into a registered Training Agreement under which the person is required to ensure that an individual is provided with workplace-based training in a trade as part of an apprenticeship program.

**Sponsor of Record**

Refers to the Sponsor documented as being signatory to the registered Training Agreement or Contract of Apprenticeship. In order for a Sponsor to be considered for the training of Apprentices, they must identify that the workplace has qualified persons or the equivalent on site, and can identify that the workplace has the tools, equipment, materials, and processes which have been identified by the Industry representatives for the trade.

**Trainer**

An individual who oversees the performance of a task and sets the workplace expectations and practices for the Apprentice. For a compulsory trade, a qualified Trainer is an individual who holds a Certificate of Qualification. In a non-compulsory trade, a Trainer is an individual who either holds a CofQ, CofA, or is considered equivalent.

## Ready to Write Your Exam?

Many of the skilled trades in Ontario have a final certification examination that you must pass to become certified in your trade. Passing the examination gives you the right to hold yourself out as a Journeyperson and receive a Certificate of Qualification in your trade.

There are two types of trade certification examinations in Ontario:

1. Provincial (Ontario) examinations - which lead to a Certificate of Qualification.
2. Red Seal examinations – which lead to a Certificate of Qualification with an Interprovincial Red Seal endorsement.

If a trade is designated as Red Seal in Ontario, you will be writing the Red Seal examination. To access the Red Seal preparation guide please visit: [red-seal.ca](http://red-seal.ca)

## Ontario's Exam Preparation Guide

[Exam Resources – Skilled Trades Ontario](#)

### Basic Examination Details for You to Know

- You will have **up to four hours to write your examination.**
- Accommodations must be requested and approved prior to scheduling your examination.
- You can leave the examination centre if you complete the examination in less than four hours.
- Exam questions are multiple choice with four options from which you must choose the correct answer. Your examination may have between 90 and 150 multiple choice questions.
- You need a mark of 70% to pass.

### Scheduling Your Examination

The examination scheduling process is currently outlined in detail on the Skilled Trades Ontario website: [Exam Scheduling – Skilled Trades Ontario](#)

### Remember these 3 basic steps:

1. Confirm your eligibility to write the examination with the Skilled Trades Ontario.
2. Contact Client Services at the Skilled Trades Ontario to pay your examination fee.
3. Contact the local Service Delivery Office to schedule your examination in their examination centre: <https://www.ontario.ca/page/employment-ontario-apprenticeship-offices>

### **Instructions for Recording a Change in Sponsor**

1. Record your first sponsor's information in Sponsor Record #1 – this would be the sponsor who has signed your initial apprenticeship Training Agreement for this trade.
2. If you do change sponsors prior to completing this apprenticeship, please contact your local Service Delivery Office immediately to update your sponsor record.
3. Please make sure you do record all of the information regarding any additional sponsors of record towards your apprenticeship using the Sponsor Records on the following pages (if applicable).

**You must fill out a Change of Sponsor Record each time you change your sponsor.**

**Sponsor Record #1**

Sponsor Information		
Apprentice Name		
Training Agreement #		Date (mm/dd/yy)
Sponsor Name		
Address		
Telephone		
E-mail Address		

Summary of Training	
Employment Start Date	
Employment End Date	
Total hours of training & instruction between dates of employment.	
Skill Sets Completed	

As the Sponsor, I hereby confirm that the above information is true and accurate to the best of my knowledge.

Signature: \_\_\_\_\_ Date: (mm/dd/yy)\_\_\_\_\_

The Sponsor is required to sign-off and date the skills after the Apprentice has proven competence in those skills. However, if a skill is shaded, it is optional and does not need to be signed-off.

**\*If you need additional copies of the Sponsor Record, visit [Skilled Trades Ontario](#) and search Sponsor Record Form**

**Change of Sponsor Record #2**

Sponsor Information		
Apprentice Name		
Training Agreement #		Date (mm/dd/yy)
Sponsor Name		
Address		
Telephone		
E-mail Address		

Summary of Training	
Employment Start Date	
Employment End Date	
Total hours of training & instruction between dates of employment.	
Skill Sets Completed	

As the Sponsor, I hereby confirm that the above information is true and accurate to the best of my knowledge.

Signature: \_\_\_\_\_ Date: (mm/dd/yy)\_\_\_\_\_

The Sponsor is required to sign-off and date the skills after the Apprentice has proven competence in those skills. However, if a skill is shaded, it is optional and does not need to be signed-off.

**\*If you need additional copies of the Sponsor Record, visit [Skilled Trades Ontario](#) and search Sponsor Record Form**

### Change of Sponsor Record #3

Sponsor Information		
Apprentice Name		
Training Agreement #		Date (mm/dd/yy)
Sponsor Name		
Address		
Telephone		
E-mail Address		

Summary of Training	
Employment Start Date	
Employment End Date	
Total hours of training & instruction between dates of employment.	
Skill Sets Completed	

As the Sponsor, I hereby confirm that the above information is true and accurate to the best of my knowledge.

Signature: \_\_\_\_\_ Date: (mm/dd/yy) \_\_\_\_\_

The Sponsor is required to sign-off and date the skills after the Apprentice has proven competence in those skills. However, if a skill is shaded, it is optional and does not need to be signed-off.

**\*If you need additional copies of the Sponsor Record, visit [Skilled Trades Ontario](#) and search Sponsor Record Form**



## Appendix A — Instructions for Apprenticeship Program Completion

**Once an Apprentice has completed all the classroom training and benchmark on-the-job hours specified for the trade and has acquired all the mandatory skills included in this Logbook.**

The Apprentice and the Sponsor complete the Apprentice Completion Form and the Skill Set Completion for Sponsors Form located on the following pages.

1. They sign the forms and submit them to their local Service Delivery Office. To find the closest office, check the contact information at [ontario.ca/page/employment-ontario-apprenticeship-offices](http://ontario.ca/page/employment-ontario-apprenticeship-offices) or call the Employment Ontario toll free number at (1-800-387-5656).
2. For All Trades: All mandatory skills (or the combination indicated in the completion requirements for the trade) in the Logbook must be signed-off. The recommended hours are a benchmark. If the Sponsor is completing the Apprentice before the industry recommended training hours are done, staff may request further information regarding the Apprentice's on-the-job training. An example of a request would be a letter from the Sponsor confirming the Apprentice worked for some time in the trade before the initial Training Agreement was registered, thereby acquiring some skills beforehand.

If Apprentices are submitting the completion request form and supporting documentation to their local Service Delivery Office by mail, fax, or email (as a scanned document), they should not include their Logbook; if they are presenting this form in person at the local Service Delivery Office, they should bring their Logbook with them.

After staff verifies all the information in the completion request, they may contact either the Apprentice or the Sponsor for further information or documentation. Once the completion has been confirmed, the local Service Delivery Office will issue a Certificate of Apprenticeship to the Apprentice.

Skilled Trades Ontario will receive notification of this completion.

- If the Apprentice has completed a program in a **compulsory trade**, the Skilled Trades Ontario will automatically register the Apprentice for a Provisional certificates of qualification to continue to work legally for one year while preparing for the certification examination.
- If an Apprentice completes their apprenticeship in a **non-compulsory trade** and there is a Certificate of Qualification exam, they must write and pass the exam to receive a Certificate of Qualification from Skilled Trades Ontario.

For permission to schedule an exam once completion is confirmed, the individual must first contact the Skilled Trades Ontario Client Services Department at 647-847-3000 or toll free at 1-855-299-0028 to pay the certification examination fee. Once you have paid your exam fee with Skilled Trades Ontario, book your exam by contacting your nearest Employment Ontario local Service Delivery Office.

## Appendix B — Apprentice Completion Form

Please fill out both sides of this form, including the Skill Set Completion for Sponsors (see back of form). Once both sides are completed, submit the form to your local Service Delivery Office (find contact information at [ontario.ca/page/employment-ontario-apprenticeship-offices](http://ontario.ca/page/employment-ontario-apprenticeship-offices) or by calling Employment Ontario at (1-800-387-5656).

Apprentice Information	
Name (print)	
Client ID # Issued by Ministry	
Telephone Number(s)	

Sponsor Information	
Legal Name	
Address	
Telephone Number(s)	
Sponsor's Signing Authority ( <i>print name</i> )	
E-mail Address	

Program Information			
Trade Name			
Number of hours required as per Training Agreement ( <i>for hours-based trades only</i> )			
Hours completed? ( <i>documentation attached</i> )	Yes ( )	No ( )	Not applicable ( )
Classroom training completed or exempt?	Yes ( )	No ( )	Not applicable ( )

I hereby confirm that the information submitted on both sides of this form is true and accurate.

**X** \_\_\_\_\_  
Apprentice's Signature                      Date

**X** \_\_\_\_\_  
Signature of Sponsor's Signing Authority                      Date

## Appendix C — Skill Set Completion for Sponsors

You will find the skill set numbers and titles in the Logbook's Table of Contents. By signing off each skill set in the table below, you are providing final confirmation, as the Apprentice's Sponsor, that the Apprentice has demonstrated competency in all the mandatory skills included in the skill set.

Skill Set #	Skill Set Title	Signing Authority Signature
9485	Protect Self, Others and the Environment	
9486	Use and Maintain Tools and Equipment	
9487	Communicate, Mentor and use Documentation	
9488	Plan and Prepare for Machining Job	
9489	Perform Benchwork	
9490	Perform Power Sawing	
9491	Perform Drilling Using Drill Press/Machine	
9492	Perform Lathe Work	
9493	Perform Milling	
9494	Perform Grinding	
9495	Perform Computer Numerical Control (CNC) Machining	
9496	Perform Electrical Discharge Machining (EDM)	
9497	Perform Heat Treatment and Hardness Testing	
9498	Perform Production Tool Design	
9499	Develop Prototype	
9500	Fit and Assemble Production Tools	
9501	Prove Out Production Tools	
9502	Repair and Maintain Production Tools	

**Ministry of Labour, Immigration, Training and Skills Development use only:**

Sponsor verified as most recent sponsor of record:                      Yes ( )                      No ( )  
 Documentation to support completion of hours attached:                      Yes ( )                      No ( )  
 Completion of classroom training verified:                      Yes ( )                      No ( )

Staff Name \_\_\_\_\_ Signature \_\_\_\_\_ Date \_\_\_\_\_

## Appendix D — local Service Delivery Offices in Ontario

For current office listings visit: [ontario.ca/page/employment-ontario-apprenticeship-offices](http://ontario.ca/page/employment-ontario-apprenticeship-offices)

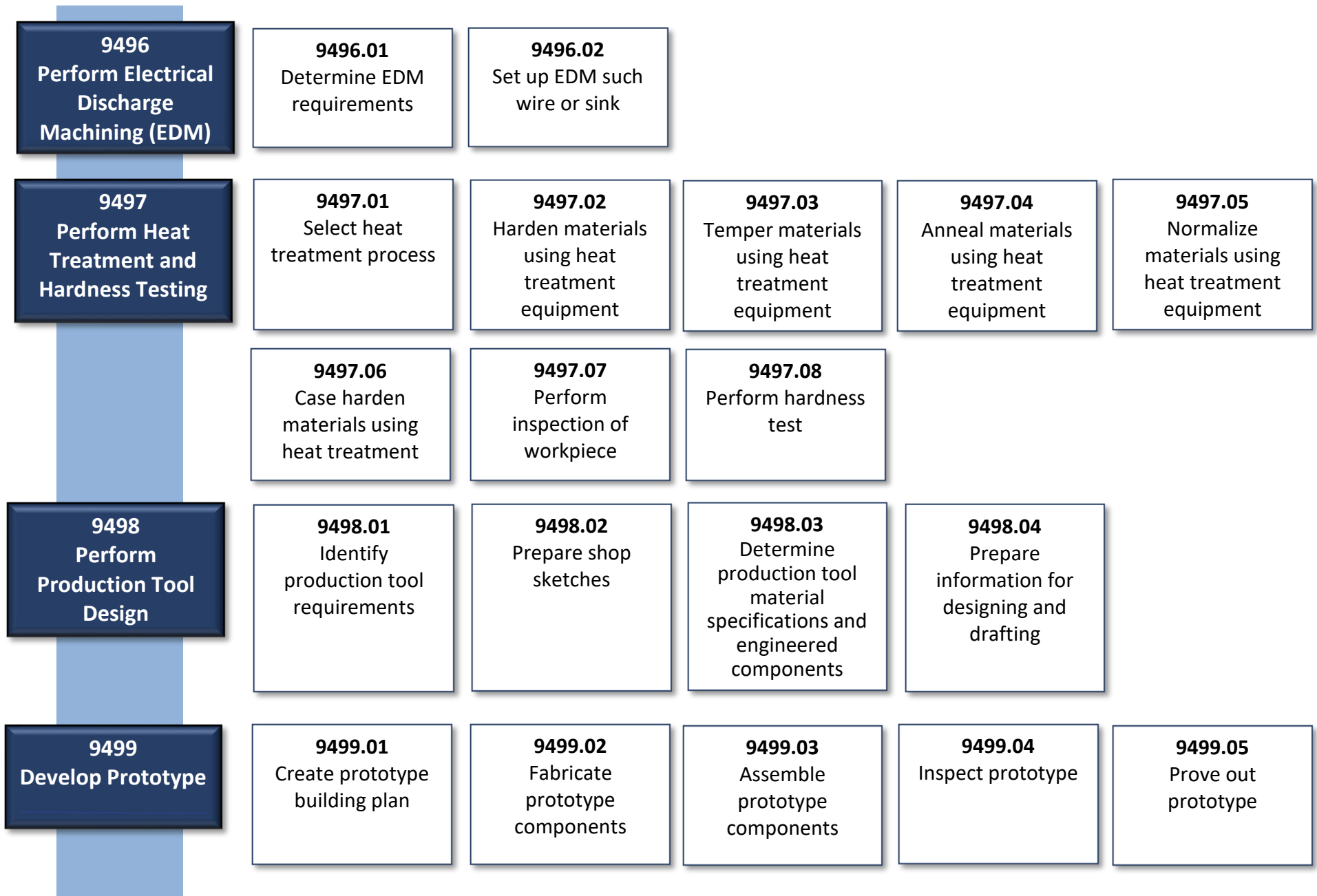
Location	Contact	Location	Contact
<b>Barrie</b> 705-737-1431	55 Cedar Pointe Dr Unit 609, Barrie, ON L4N 5R7	<b>Marathon</b> 807-346-1550	52 Peninsula Road, Suite 103 Marathon, Ontario, P0T 2E0
<b>Belleville</b> 613-968-5558 1-800-953-6885	135 North Front St, Belleville, ON K8P 3B5	<b>Markham</b> 905-513-2695	140 Allstate Parkway, Suite 505, Markham, Ontario L3R 5Y8
<b>Brantford</b> 519-756-5197	505 Park Rd North Suite 201, Brantford, ON N3R 7K8	<b>North Bay</b> 705-495-8515 1-800-236-0744	200 First Ave West, North Bay, ON P1B 3B9
<b>Chatham</b> 519-354-2766 1-800-214-8284	870 Richmond St West 1st Floor, Chatham, ON N7M 5J5	<b>Ottawa</b> 613-731-7100 1-877-221-1220	Preston Square, 347 Preston Street, Suite 310, Ottawa, ON K1S 3H8
<b>Cornwall</b> 613-938-9702 1-877-668-6604	132 Second St East Ste 202, Cornwall, ON K6H 1Y4	<b>Owen Sound</b> 519-376-5790 1-800-838-9468	1450 1st Ave West, Suite 100, Owen Sound, ON N4K 6W2
<b>Dryden</b> 807-456-2665 1-800-734-9572	Provincial Government Building, 479 Government St, Dryden, ON P8N 3K9	<b>Peel</b> 905-279-7333 1-800-736-5520	The Emerald Centre, 10 Kingsbridge Garden Circle, Suite 404, Mississauga, ON L5R 3K6
<b>Durham</b> 905-433-0595 1-800-461-4608	78 Richmond Street West, Oshawa, ON L1G 1E1	<b>Pembroke</b> 613-735-3911 1-800-807-0227	615 Pembroke St East, Pembroke, ON K8A 3L7
<b>Elliot Lake</b> 1-800-236-8817	50 Hillside Dr North, Elliot Lake, ON P5A 1X4	<b>Peterborough</b> 705-745-1918 1-877-433-6555	901 Lansdowne St West, Peterborough, ON K9J 1Z5
<b>Fort Frances</b> 807-274-8634	922 Scott St 2nd Flr, Fort Frances, ON P9A 1J4	<b>Sarnia</b> 519-542-7705 1-800-363-8453	Bayside Mall, 150 Christina St North, Sarnia, ON N7T 7W5
<b>Geraldton</b> 807-854-1966	208 Beamish Avenue West Geraldton, Ontario P0T 1M0	<b>Sault Ste. Marie</b> 705-945-6815 1-800-236-8817	477 Queen St East 4th Flr, Sault Ste Marie, ON P6A 1Z5
<b>Halton</b> 905-842-5105 1-844-901-5105	700 Dorval Dr., Suite 201, Oakville, ON L6K 3V3	<b>St Catharines</b> 905-704-2991 1-800-263-4475	Garden City Tower, 301 St Paul St East, 10th Flr, St Catharines, ON L2R 7R4
<b>Hamilton</b> 905-521-7764 1-800-668-4479	Ellen Fairclough Bldg, 119 King St West 8th Flr, Hamilton, ON L8P 4Y7	<b>Sudbury</b> 705-564-3030 1-800-603-5999	159 Cedar St Ste 506, Sudbury, ON P3E 6A5
<b>Kapuskasing</b> 705-465-5785 705-235-1950	Ontario Government Complex, 122 Government Rd West, Kapuskasing, ON P5N 2X8	<b>Thunder Bay</b> 807-346-1550 1-800-439-5493	189 Red River Rd Suite 103, Thunder Bay, ON P7B 1A2
<b>Kenora</b> 807-468-2879 1-800-734-9572	227 1/2 Second St South, Kenora, ON P9N 1G4	<b>Timmins</b> 705-235-1950 1-877-275-5139	Ontario Government Complex, 5520 Highway 101 East Wing B, South Porcupine, ON P0N 1H0
<b>Kingston</b> 613-548-1151 1-866-973-4043	Alliance Business Centre, 299 Concession St Ste 201, Kingston, ON K7K 2B9	<b>Toronto Centre</b> 416-927-7366 1-800-387-5656	2 St Clair West, 11 <sup>th</sup> floor Toronto, ON M4A 1L5
<b>Kitchener</b> 519-653-5758 1-866-877-0099	4275 King St East, Kitchener, ON N2P 2E9	<b>Toronto South</b> 416-326-5800	625 Church St 1st Fl, Toronto, ON M7A 2B5
<b>London</b> 519-675-7788 1-800-265-1050	1200 Commissioners Rd E, Unit 72, London, ON N5Z 4R3	<b>Windsor</b> 519-973-1441	Roundhouse Centre, 3155 Howard Ave 2nd Fl, Suite 200, Windsor, ON N8X 4Y8

Competency Analysis Profile: Tool & Die Maker 430A (all unshaded skill sets must be completed)

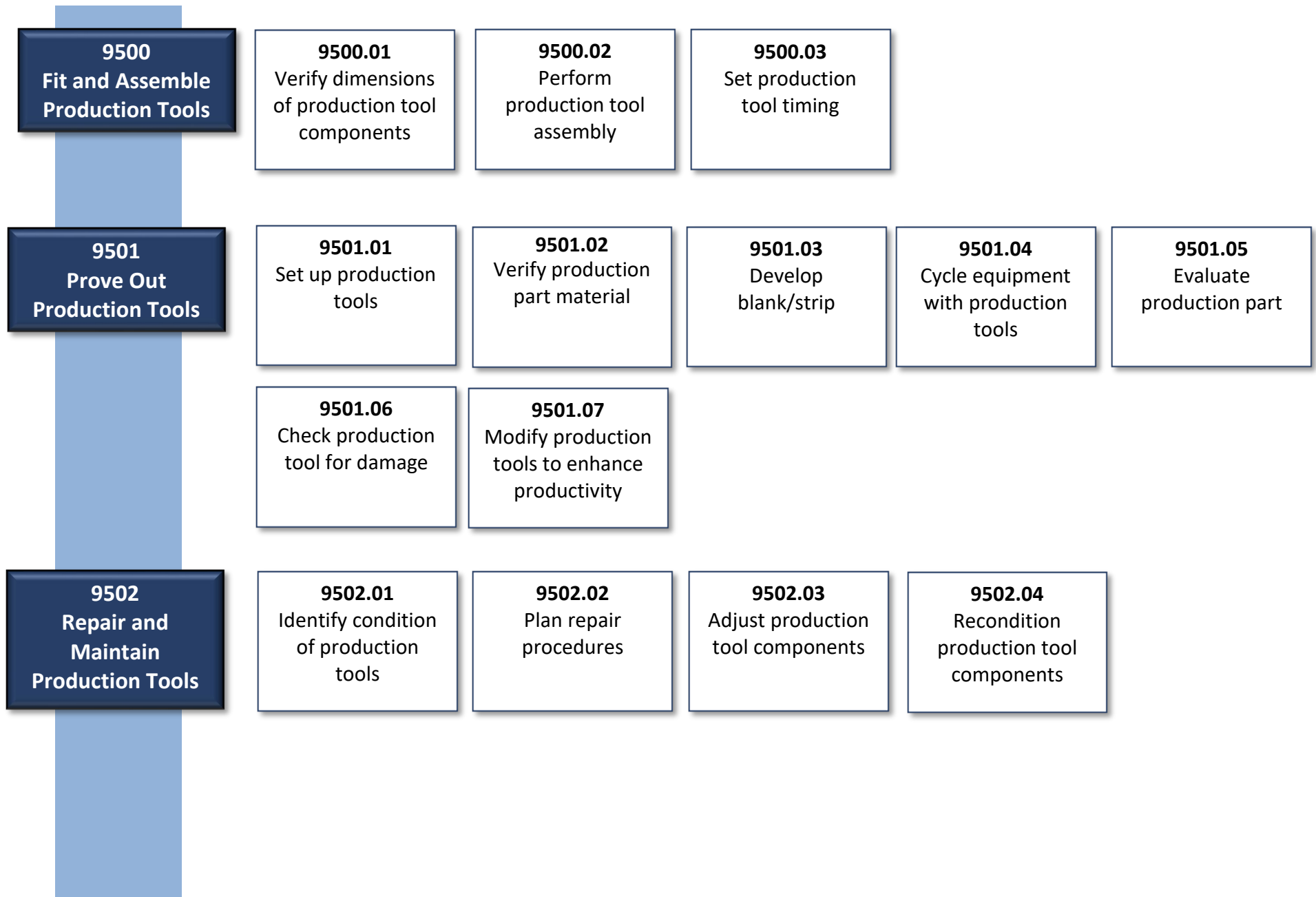
<b>9485</b> <b>Protect Self, Others and the Environment</b>	<b>9485.01</b> Comply with acts, regulations and legislation	<b>9485.02</b> Use personal protective equipment (PPE) and safety equipment	<b>9485.03</b> Maintain personal protective equipment (PPE) and safety equipment	<b>9485.04</b> Maintain safe work environment	<b>9485.05</b> Handle hazardous workplace materials
	<b>9485.06</b> Follow first aid procedures	<b>9485.07</b> Follow fire safety procedures	<b>9485.08</b> Protect the environment		
	<b>9486.01</b> Use hand tools	<b>9486.02</b> Maintain hand tools	<b>9486.03</b> Use power tools	<b>9486.04</b> Maintain power tools	<b>9486.05</b> Use machine-tools
<b>9486</b> <b>Use and Maintain Tools &amp; Equipment</b>	<b>9486.06</b> Maintain machine-tools	<b>9486.07</b> Use cutting tools	<b>9486.08</b> Maintain cutting tools	<b>9486.09</b> Use hoisting, lifting, rigging and supporting equipment	<b>9486.10</b> Maintain hoisting, lifting, rigging and supporting equipment
	<b>9486.11</b> Use layout equipment	<b>9486.12</b> Maintain layout equipment	<b>9486.13</b> Use measuring tools	<b>9486.14</b> Maintain measuring tools	<b>9486.15</b> Use heat treatment equipment
	<b>9486.16</b> Maintain heat treatment equipment	<b>9486.17</b> Use accessories and work holding devices	<b>9486.18</b> Maintain accessories and work holding devices		

<b>9487</b> <b>Communicate, Mentor and Use Documentation</b>	<b>9487.01</b> Communicate with colleagues, tradespeople, vendors and the public	<b>9487.02</b> Mentor apprentices and co-workers	<b>9487.03</b> Perform customer service functions	<b>9487.04</b> Estimate costs of project/service	<b>9487.05</b> Complete job documentation
<b>9488</b> <b>Plan and Prepare for Machining Job</b>	<b>9488.01</b> Interpret drawings, specifications and their applications	<b>9488.02</b> Determine requirements for machining	<b>9488.03</b> Plan project activities	<b>9488.04</b> Perform calculations for machining operations	
<b>9489</b> <b>Perform Benchwork</b>	<b>9489.01</b> Perform layout	<b>9489.02</b> Perform manual operations	<b>9489.03</b> Finish workpiece	<b>9489.04</b> Inspect workpiece	
<b>9490</b> <b>Perform Power Sawing</b>	<b>9490.01</b> Determine power sawing requirements	<b>9490.02</b> Set up power saws	<b>9490.03</b> Saw straight and angle cuts	<b>9490.04</b> Saw irregular shapes	
<b>9491</b> <b>Perform Drilling Using Drill Press/Machine</b>	<b>9491.01</b> Determine drill press requirements	<b>9491.02</b> Set up drill press	<b>9491.03</b> Drill holes using drill presses	<b>9491.04</b> Cut countersink, counterbore, chamfer and spot face using drill presses	<b>9491.05</b> Tap using drill presses
	<b>9491.06</b> Finish holes using drill presses				

<p><b>9492</b> Perform Lathe Work</p>	<p><b>9492.01</b> Determine lathing requirements</p>	<p><b>9492.02</b> Set-up conventional lathes</p>	<p><b>9492.03</b> Face surface using conventional lathes</p>	<p><b>9492.04</b> Turn internal and external surfaces using conventional lathes</p>	<p><b>9492.05</b> Create holes using conventional lathes</p>
<p><b>9493</b> Perform Milling</p>	<p><b>9493.01</b> Determine conventional milling machine requirements</p>	<p><b>9493.02</b> Set up conventional milling machines</p>	<p><b>9493.03</b> Mill surfaces using conventional milling machines</p>	<p><b>9493.04</b> Create holes and hole features</p>	
<p><b>9494</b> Perform Grinding</p>	<p><b>9494.01</b> Determine grinding machines requirements</p>	<p><b>9494.02</b> Set up grinding machines and accessories</p>	<p><b>9494.03</b> Grind flat surfaces using a surface grinder</p>	<p><b>9494.04</b> Grind profiles</p>	<p><b>9494.05</b> Grind internal and external cylindrical and tapered surfaces</p>
	<p><b>9494.06</b> Grind tools and cutters</p>	<p><b>9494.07</b> Finish holes using a honing machine</p>			
<p><b>9495</b> Perform Computer Numerical Control (CNC) Machining</p>	<p><b>9495.01</b> Perform CNC programming</p>	<p><b>9495.02</b> Input program data into control memory</p>	<p><b>9495.03</b> Establish workpiece datum</p>	<p><b>9495.04</b> Verify programs</p>	<p><b>9495.05</b> Monitor machining processes</p>







## Notes


## Completing Your Apprenticeship Program

Once your sponsor agrees you are competent in the required skills, your hours are complete and you have completed all the levels of classroom training required for your trade:

- ✓ Follow the completion instructions on the Completion Form (Appendix A) in the Logbook.
- ✓ Answer any questions that MLITSD staff may have and provide any additional completion documentation that may be required.
- ✓ Once completion is confirmed, MLITSD will issue you a Certificate of Apprenticeship and notify Skilled Trades Ontario.

## After Your Apprenticeship

If you are in a trade with a certification exam, Skilled Trades Ontario will receive notice of your completion.

For compulsory trades, you will be issued a Provisional Certificate of Qualification which will allow you to work legally for up to 12 months until you write and pass your examination.

For a non-compulsory trade, once you pass your examination, you will be issued a Certificate of Qualification for your trade.

## Preparing For Your Exam

- **To pay for a Certificate of Qualification examination, contact Skilled Trades Ontario Client Services Department at: 647-847-3000 or toll free at 1-855-299-0028**
- **To schedule your exam:** Once you have paid, contact your local Service Delivery Office to book your exam.
- **Download Skilled Trades Ontario exam preparation guide at:**  
[Exam Resources – Skilled Trades Ontario](#) and/or view the exam preparation guide for Red Seal trades at: [red-seal.ca](http://red-seal.ca)



[SkilledTradesOntario.ca](http://SkilledTradesOntario.ca)



Tool & Die Maker

