ONTARIO COLLEGE OF TRADES

ORDRE DES MÉTIERS DE L'ONTARIO

Apprenticeship Training Standard

Schedule of Training

Mould or Die Finisher

Trade Code: 277M

Development Date: 2003

Please Note: Apprenticeship Training and Curriculum Standards were developed by the Ministry of Training, Colleges and Universities (MTCU). As of April 8th, 2013, the Ontario College of Trades (College) has become responsible for the development and maintenance of these standards. The College is carrying over existing standards without any changes.

However, because the Apprenticeship Training and Curriculum Standards documents were developed under either the *Trades Qualification and Apprenticeship Act* (TQAA) or the *Apprenticeship and Certification Act, 1998* (ACA), the definitions contained in these documents may no longer be accurate and may not be reflective of the *Ontario College of Trades and Apprenticeship Act, 2009* (OCTAA) as the new trades legislation in the province. The College will update these definitions in the future.

Meanwhile, please refer to the College's website (http://www.collegeoftrades.ca) for the most accurate and up-to-date information about the College. For information on OCTAA and its regulations, please visit: http://www.collegeoftrades.ca/about/legislation-and-regulations

NOTICE OF COLLECTION OF PERSONAL INFORMATION

1. At any time during your apprenticeship training, you may be required to show this training standard to the Ministry of Training, Colleges and Universities (the Ministry). You will be required to disclose the signed Apprenticeship Completion form to the Ministry in order to complete your program. The Ministry 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 Ministry will disclose information about your program completion and your certificate of apprenticeship to the Ontario College of Trades, as it is necessary for the College to carry out its responsibilities.

3. Your personal information is collected, used and disclosed by the Ministry under the authority of the Ontario College of Trades and Apprenticeship Act, 2009.

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 Training, Colleges and Universities
   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.

Ontario

SCHEDULE OF TRAINING
APPRENTICESHIP TRADE

Mould or Die Finisher - 277M

A. Description/Duties:

A **Mould or Die Finisher** performs some or all of the following:

Utilizes a variety of power and hand tools to shape, smooth, finish, and polish moulds or metal working dies.

Is knowledgeable in:

OHSA
Metallurgy
Metrology
Mould Finishing principles
Die Finishing principles
Engineering Drawings

Benchmark/Guideline Total Training Time Frames: (On-the-job and In-school)	**Company/Sector/IC Name:**
4,000 hours (includes 240 hours in-school)	
Originating TC/IC/PDSU	**District Manager/PDSU Manager**
_____	_____
Date: _____	**Date**: _____

Program Standards Approval	**Director's Approval**	**Assigned Trade Code**
By _____	**By** _____	**277M**
Date _____	**Date** _____	

Ontario

SCHEDULE OF TRAINING
APPRENTICESHIP TRADE

Mould or Die Finisher - 277M

B. On-The-Job Training:

Unit No.	PERFORMANCE OBJECTIVES (ON-THE-JOB SKILL SETS)
277M-1.0	**PROTECT SELF AND OTHERS**
277M-1.1	**Identify health and safety hazards** in the workplace, so that the potential for personal injury and damage to equipment or the environment is minimized, corrective action as defined in government legislation or company policies is taken, and hazards are reported. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-1.2	**Wear, adjust, and maintain personal protective equipment** including eye, ear, hand, and foot protectors, to ensure correct fit and optimum protection for the wearer and task being performed in compliance with company procedures and the Occupational Health and Safety Act (OHSA). _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-1.3	**Wear, adjust, and maintain respiratory protectors** to ensure correct fit and optimum protection, in compliance with company procedures and the OHSA. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-1.4	**Practise safe work habits** by staying outside guards and barricades, wearing proper clothing (not loose or torn), confining long hair, and removing jewellery, in accordance with company procedures and the OHSA. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-1.5	**Follow company fire procedures** including locating and assessing the severity of the fire, taking appropriate action such as suppressing minor fire, activating alarm, and reporting. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-1.6	**Operate emergency safety equipment** such as fire extinguishers, respirators, and fire blankets, ensuring that procedures are carried out in a safe and efficient manner, in accordance with health and safety regulations. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date

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SCHEDULE OF TRAINING
APPRENTICESHIP TRADE

Mould or Die Finisher - 277M

B. On-The-Job Training (cont'd):

Unit No.	PERFORMANCE OBJECTIVES (ON-THE-JOB SKILL SETS)
277M-1.0	**PROTECT SELF AND OTHERS** (cont'd)
277M-1.7	**Practise industrial hygiene** by wearing proper clothing, using eye wash, barrier creams, and/or showering, to avoid contamination or injury, in compliance with company procedures and the OHSA. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-1.8	**Practise good housekeeping** in the workplace by cleaning up spills and/or leaks, keeping work area clean and clear of obstructions, and storing tools or equipment so that the potential for accident or injury is minimized and tools and equipment are in place and available, in compliance with company procedures and the OHSA. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-1.9	**Conduct pre-operational check of equipment**, ensuring that guards and safety devices are in place, secured, and not damaged, in compliance with company procedures and the OHSA. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-1.10	**Report injuries** to supervisor or first aid personnel promptly and clearly, ensuring that the injured person is attended to and information is reported precisely and accurately describing how incident occurred so that future recurrence of similar accidents is prevented. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date Sponsor's Name Sponsor's Signature _____ _____

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SCHEDULE OF TRAINING
APPRENTICESHIP TRADE

Mould or Die Finisher - 277M

B. On-The-Job Training (cont'd):

Unit No.	PERFORMANCE OBJECTIVES (ON-THE-JOB SKILL SETS)
277M-2.0	**PLAN AND PREPARE FOR FINISHING PROCESS**
277M-2.1	**Read and interpret engineering drawings** to identify dimensions and tolerances, surface designations and allowances, type of workpiece material, and any other information needed to plan the finishing job, in accordance with company procedures and job specifications. Apprentice's Signature and Date _____ Employer's/Trainer's Signature and Date _____
277M-2.2	**Read and interpret job documentation** to determine application, use, assembly interrelationship, elements, and features of mould or die to be finished. Apprentice's Signature and Date _____ Employer's/Trainer's Signature and Date _____
277M-2.3	**Read and interpret engineering drawings and job documentation** to identify: type of finish; tolerances; profiles; hand graving techniques; hand-finishing/polishing techniques; surface dimensions; and, quality inspection requirements; and any other information needed to plan the finishing job. Apprentice's Signature and Date _____ Employer's/Trainer's Signature and Date _____
277M-2.4	**Perform calculations** for finishing operations to determine: required finishes; contours; geometric shapes; dimensions; angles; sizes; cutting tool positions; workpiece alignments; machinery parameters; and, read-outs for measuring instruments; to ensure that the mould or die is the finished or polished as specified in engineering drawings, job specifications, and dimensional charts. Apprentice's Signature and Date _____ Employer's/Trainer's Signature and Date _____
277M-2.5	**Read and interpret work-process documentation** to identify required machines, job operation, sequencing of job, method of finishing and set-ups, and any other information needed to plan the finishing job. Apprentice's Signature and Date _____ Employer's/Trainer's Signature and Date _____
277M-2.6	**Verify workpiece material** for surface condition, hardening ability, heat-treat response, type, grade, and dimensions, by checking colour codes, lettering, numerical stamps, and stock lists, to ensure that the mould or die is the correct one to be finished or polished as specified in engineering drawings and job specifications. Apprentice's Signature and Date _____ Employer's/Trainer's Signature and Date _____

Ontario

SCHEDULE OF TRAINING
APPRENTICESHIP TRADE

Mould or Die Finisher - 277M

B. On-The-Job Training (cont'd):

Unit No.	PERFORMANCE OBJECTIVES (ON-THE-JOB SKILL SETS)
277M-2.0	**PLAN AND PREPARE FOR FINISHING PROCESS** ... cont'd
277M-2.7	**Identify and select tooling** required to perform finishing procedures by using information in engineering drawings and job instructions, to ensure that tooling selected is the correct size and type for the application and available to perform the job. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-2.8	**Identify and select finishing equipment or materials** including files, lapping compounds, diamond compounds, stones, abrasives, cloths, and diamond or felt bobs, ensuring that equipment or material selected are the correct grade, grits, and hardness to achieve the finish or polish specified in engineering drawings and job specifications. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-2.9	**Identify and select hand-finishing tools** including abrasives, lapping and diamond compounds, stones, files, cloths, and diamond or felt bobs by using information from part drawings and job specifications to ensure that selected tools are the correct ones to size and shape workpiece. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-2.10	**Identify and select measuring instruments and checking devices**, ensuring that instruments and devices selected are capable of obtaining the dimensions and tolerances specified in the engineering drawings and process layout. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-2.11	**Lay out features of engineering drawings** on to the workpiece using precision measuring instruments and layout equipment including scriber, centre punch, vernier height gauge, surface plate, combination set, and layout medium or dyes, so that the completed layout conforms to engineering drawings or job specifications. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date

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SCHEDULE OF TRAINING
APPRENTICESHIP TRADE

Mould or Die Finisher - 277M

B. On-The-Job Training (cont'd):

Unit No.	PERFORMANCE OBJECTIVES (ON-THE-JOB SKILL SETS)
277M-2.0	**PLAN AND PREPARE FOR FINISHING PROCESS** ... cont'd
277M-2.12	**Prepare die blocks and mould halves** by: visually inspecting for surface defects, checking for cracks and defects using dye penetrates, developers, or removers; measuring all dimensions and angles; using micrometers, callipers, height gauges, radius gauges, dial indicators, templates, and feeler gauges; checking and comparing the workpiece shape, size, and dimensions to the specifications in the engineering drawings, job specifications, and job requirements. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-2.13	**Clean surfaces** by: applying bluing to determine surface defects; visually inspecting for surface deviations; and then cleaning with solvents; to ensure that surface is clean, free from dust and particles, and that all cutter or grinding marks are removed; in accordance with job specifications and engineering drawings. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-2.14	**Communicate with co-workers** to identify previous job operations, availability of tools, parts, and machinery, scheduling requirements, and any other information needed to perform work-in-process dimensional and surface verification procedures, ensuring that the information communicated is clear, concise, and accurate. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-2.15	**Complete work documentation** including tracking sheets, sign-off sheets, inspection reports, or procedure sheets, to record the finalization of jobs and to facilitate traceability of work-in-process, ensuring that all data is recorded accurately and clearly in accordance with engineering drawings, job specifications, and company procedures. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date Sponsor's Name Sponsor's Signature _____ _____

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SCHEDULE OF TRAINING
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B. On-The-Job Training (cont'd):

Unit No.	PERFORMANCE OBJECTIVES (ON-THE-JOB SKILL SETS)
277M-3.0	**PERFORM IN-PROCESS DIMENSIONAL AND SURFACE VERIFICATION**
277M-3.1	**Check straight cuts** by using precision measuring instruments including micrometer, verniers, callipers, squares, straight edge, dial indicator, and surface comparator, to ensure that the accurate size, finish, parallelism, and squareness of straight cuts conform with engineering drawings and job specifications. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-3.2	**Check shapes** by using precision measuring instruments and checking devices including radius gauges, surface comparator, and verniers, to ensure that the profile and finish of the cut shape conforms to engineering drawings and job specifications. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-3.3	**Check holes** by using precision measuring instruments and checking devices including dial indicators, bore gauges, plug gauges, telescopic gauges, surface comparators, and verniers, to ensure that the accuracy of the diameter, depth, concentricity, position, and finish of cut holes conform with engineering drawings and job specifications. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-3.4	**Check threads** by using precision measuring instruments, checking devices and various checking methods including 3-wire method, thread micrometer, thread gauge, and plug or ring gauges, to ensure that the accuracy of pitch, thread geometry, and size of cut threads conform to engineering drawings and job specifications. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-3.5	**Check tapers** using precision measuring instruments and checking devices including taper gauge, sine bar, micrometer, and vernier to ensure the accuracy of the angle, taper/foot, and diameter of the cut tapers conform with engineering drawings and job specifications. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date

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B. On-The-Job Training (cont'd):

Unit No.	PERFORMANCE OBJECTIVES (ON-THE-JOB SKILL SETS)
277M-3.0	**PERFORM IN-PROCESS DIMENSIONAL And SURFACE VERIFICATION ... cont'd**
277M-3.6	**Check hardness** using various types of hardness testers and comparison charts, to ensure that the hardness level of workpiece materials are in accordance with engineering drawings and job specifications. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-3.7	**Check surfaces** using surface comparators, to ensure that surface is finished in micro-inches or microns as specified in the engineering drawings and job specifications. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-3.8	**Perform final inspection** using precision measuring instruments including inside and outside micrometers, vernier height gauges or indicators, gauge blocks, and pin gauges, to ensure that the tolerances and dimensions of the completed workpiece conform to the engineering drawings and job specifications. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-3.9	**Communicate with co-workers** to identify previous job operations, availability of tools, parts, and machinery, scheduling requirements, and any other information needed to perform work-in-process dimensional and surface verification procedures, ensuring that the information communicated is clear, concise, and accurate. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-3.10	**Complete work documentation** including tracking sheets, sign-off sheets, inspection reports, or procedure sheets, to record the finalization of jobs and to facilitate traceability of work-in-process, ensuring that all data is recorded accurately and clearly in accordance with engineering drawings, job specifications, and company procedures. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date Sponsor's Name and Date Sponsor's Signature _____ _____

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SCHEDULE OF TRAINING
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Mould or Die Finisher - 277M

B. On-The-Job Training (cont'd):

Unit No.	PERFORMANCE OBJECTIVES (ON-THE-JOB SKILL SETS)
277M-4.0	**GRIND MOULD OR DIE TOOLING AND COMPONENTS**
277M-4.1	**Identify and select grinder** using information from engineering drawings and work process documentation, to ensure that grinder selected is the correct one for the application, and available to perform the job. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-4.2	**Select machine speeds and feeds** using speed and feed charts and in accordance with size, type, and hardness of workpiece materials, so that the machines provide optimum cutting without damage to workpiece, cutting tools, or machines, and ensures personal safety. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-4.3	**Select grinding wheel** using information in engineering drawings, charts, and job specifications, to ensure that the wheel selected is the correct grade and size needed to finish, shape, and size the workface, in accordance with the hardness and finish of material. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-4.4	**Check condition of grinding wheel** for defects, cracks, or chips, and by taking corrective action or replacing if required, to ensure personal safety and to perform optimum cutting. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-4.5	**Install wheel** to specified radii and tangents/angles, using diamond or star-wheel dresser to ensure personal safety and to perform optimum grinding. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-4.6	**Locate and position workpiece in grinder** to required operational clearances, by setting up workholding devices including angle plate, magnetic holders, vises, chucks, centres, jigs, vee-block, and mandrels, so that workpiece is aligned, secured, and stable during grinding operations. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date

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SCHEDULE OF TRAINING
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B. On-The-Job Training (cont'd):

Unit No.	PERFORMANCE OBJECTIVES (ON-THE-JOB SKILL SETS)
277M-4.0	**GRIND MOULD OR DIE TOOLING AND COMPONENTS** (cont'd)
277M-4.6	**Surface workpiece** using surface grinder so that the finish, flatness, and size of ground surface conforms to engineering drawings and job specifications. _____ Apprentice's Signature and Date _____ Employer's/Trainer's Signature and Date
277M-4.7	**Hone holes using a honing machine** or attachments, so that the dimension, tolerance, and finish of holes conforms to engineering drawings and job specifications. _____ Apprentice's Signature and Date _____ Employer's/Trainer's Signature and Date
277M-4.8	**Lap workpiece** by hand grinding or using a power lapping machine so that the finish and flatness of the lapped surface conforms to engineering drawings and job specifications. _____ Apprentice's Signature and Date _____ Employer's/Trainer's Signature and Date
277M-4.9	**Cylindrical grind and polish inside and outside diameters (ID/OD)** using machine grinders so that the dimensions and tolerances of ground ID/OD surfaces conform to engineering drawings and job specifications. _____ Apprentice's Signature and Date _____ Employer's/Trainer's Signature and Date
277M-4.10	**Check surfaces** using surface comparators, to ensure that surface is finished in micro-inches or microns as specified in the engineering drawings and job specifications. _____ Apprentice's Signature and Date _____ Employer's/Trainer's Signature and Date
277M-4.11	**Inspect grinding** using precision measuring instruments and checking devices, including inside and outside micrometers, vernier height gauges or indicators, gauge blocks, and pin gauges, to ensure that the tolerances and dimensions of the completed workpiece conform to the engineering drawings and job specifications. _____ Apprentice's Signature and Date _____ Employer's/Trainer's Signature and Date

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B. On-The-Job Training (cont'd):

Unit No.	PERFORMANCE OBJECTIVES (ON-THE-JOB SKILL SETS)
277M-4.0	**GRIND MOULD OR DIE TOOLING AND COMPONENTS** (cont'd)
277M-4.12	**Perform final inspection** using precision measuring instruments and checking devices, including inside and outside micrometers, fixed gauges, optical comparators, callipers, and surface gauges, to ensure that the tolerances and dimensions of the cutter shape conforms to the engineering drawings and job specifications. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-4.13	**Complete work documentation** including tracking sheets, sign-off sheets, inspection reports, or procedure sheets, to record the finalization of jobs and to facilitate traceability of work-in-process, ensuring that all data is recorded accurately and clearly in accordance with engineering drawings, job specifications, and company procedures. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date Sponsor's Name and Date Sponsor's Signature _____ _____

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SCHEDULE OF TRAINING
APPRENTICESHIP TRADE

Mould or Die Finisher - 277M

B. On-The-Job Training (cont'd):

Unit No.	PERFORMANCE OBJECTIVES (ON-THE-JOB SKILL SETS)
277M-5.0	**HAND FINISH COMPONENT SURFACES**
277M-5.1	**Identify and select hand-finishing tools** including grinders, abrasives, stones, carbide burrs, files, and/or emery cloths, using information from part drawings and job specifications to ensure that hand-finishing tools selected are the correct ones to size, shape, polish, and finish the workpiece. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-5.2	**Clean and deburr mould surface** by following required cleaning techniques, inspecting for surface defects, marking radii, protecting critical areas, and deburring, to facilitate the hand-finishing process in accordance with engineering drawings and company procedures. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-5.3	**Hand-file** using files include flat, die-sink, needle, smooth, bastard, rat-tail, lathe, coarse, and half-round files to remove excessive material so that component surface conforms with engineering drawings and job specifications. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-5.4	**Hand-grind** using pneumatic or electric hand grinders to remove excessive material so that component surface conforms with engineering drawings and job specifications. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-5.5	**Remove tool and cutter marks** from surfaces using hand-grinders, files, stones, and/or abrasive discs, so that contour, uniformity, and radii of surface conforms with engineering drawings and job specifications. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-5.6	**Clean surfaces** by: applying bluing to determine surface defects; visually inspecting for surface deviations; and then cleaning with solvents; to ensure that surface is clean, free from dust and particles, and that all cutter or grinding marks are removed; in accordance with job specifications and engineering drawings. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date

Ontario

SCHEDULE OF TRAINING
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Mould or Die Finisher - 277M

B. On-The-Job Training (cont'd):

Unit No.	PERFORMANCE OBJECTIVES (ON-THE-JOB SKILL SETS)
277M-5.0	**HAND FINISH COMPONENT SURFACES**
277M-5.7	**Perform final inspection** using precision measuring instruments including inside and outside micrometers, vernier height gauges or indicators, gauge blocks, and pin gauges, to ensure that the tolerances and dimensions of the completed workpiece conform to the engineering drawings and job specifications. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-5.8	**Communicate with co-workers** to identify previous job operations, availability of tools, parts, and machinery, scheduling requirements, and any other information needed to perform work-in-process dimensional and surface verification procedures, ensuring that the information communicated is clear, concise, and accurate. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-5.9	**Complete work documentation** including tracking sheets, sign-off sheets, inspection reports, or procedure sheets, to record the finalization of jobs and to facilitate traceability of work-in-process, ensuring that all data is recorded accurately and clearly in accordance with engineering drawings, job specifications, and company procedures. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date Sponsor's Name and Date Sponsor's Signature _____ _____

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SCHEDULE OF TRAINING
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Mould or Die Finisher - 277M

B. On-The-Job Training (cont'd):

Unit No.	PERFORMANCE OBJECTIVES (ON-THE-JOB SKILL SETS)
277M-6.0	**PERFORM FINISHING AND BLENDING TECHNIQUES**
277M-6.1	**Read and interpret engineering drawings and prototype parts** to determine contours, dimensions, tolerances, allowances, surface designations, type of workpiece material, and any other information needed to complete the finishing and blending job. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-6.2	**Identify and select finishing and blending equipment or materials** including files, lapping compounds, compounds, stones, abrasives, cloths, diamond or felt bobs, honing equipment, and glass beads, ensuring that equipment or material selected are the correct ones to achieve the finish or blend as specified in engineering drawings and job specifications. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-6.3	**Check assembled mould or die** using precision measuring instruments including inside and outside micrometers, vernier height gauges or indicators, gauge blocks, and pin gauges, to ensure that the tolerances and dimensions of the assembled component conforms to the engineering drawings and job specifications. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-6.4	**Finish and blend surface of tooling** by removing tool and cutter marks using required equipment including carbide burrs, rotary grinders, stones, and files so that marks are removed and surface is blended to required dimensions and shape, in accordance with engineering drawings and job specifications. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-6.5	**Inspect part produced** by the developed die or mould using information from part drawings and by measuring or checking using shadow-graph, Coordinate Measuring Machine (CMM), verniers, and micro-meters, so that the piece part produced conforms with engineering drawings and job specifications. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date

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B. On-The-Job Training (cont'd):

Unit No.	PERFORMANCE OBJECTIVES (ON-THE-JOB SKILL SETS)
277M-6.0	**PERFORM FINISHING AND BLENDING TECHNIQUES** (cont'd)
277M-6.6	**Inspect die blocks or mould halves** by visually inspecting for surface defects, checking for cracks or defects using dye penetrates, developer, or removers, and measuring all dimensions and angles using micrometers, callipers, height gauges, radius gauges, dial indicators, templates, and feeler gauges; to check and compare the workpiece shape, size, and dimensions to the specifications in the engineering drawings and customer requirements. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-6.7	**Perform final inspection** using precision measuring instruments including inside and outside micrometers, vernier height gauges or indicators, gauge blocks, and pin gauges, to ensure that the tolerances and dimensions of the completed workpiece conform to the engineering drawings and job specifications. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-6.8	**Communicate with co-workers** to identify previous job operations, availability of tools, parts, and machinery, scheduling requirements, and any other information needed to perform work-in-process dimensional and surface verification procedures, ensuring that the information communicated is clear, concise, and accurate. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-6.9	**Complete work documentation** including tracking sheets, sign-off sheets, inspection reports, or procedure sheets, to record the finalization of jobs and to facilitate traceability of work-in-process, ensuring that all data is recorded accurately and clearly in accordance with engineering drawings, job specifications, and company procedures. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date Sponsor's Name and Date Sponsor's Signature _____ _____

Ontario

SCHEDULE OF TRAINING
APPRENTICESHIP TRADE

Mould or Die Finisher - 277M

B. On-The-Job Training (cont'd):

Unit No.	PERFORMANCE OBJECTIVES (ON-THE-JOB SKILL SETS)
277M-7.0	**PERFORM POLISHING TECHNIQUES**
277M-7.1	**Read and interpret engineering drawings and prototype parts** to determine contours, dimensions, tolerances, allowances, surface designations, type of workpiece material, and any other information needed to complete the polishing job. Apprentice's Signature and Date _____ Employer's/Trainer's Signature and Date _____
277M-7.2	**Identify and select polishing equipment or materials** including abrasives, honing equipment, stones, compounds, and glass beads, ensuring that equipment or material selected are the correct ones to achieve the polish specified in engineering drawings and job specifications. Apprentice's Signature and Date _____ Employer's/Trainer's Signature and Date _____
277M-7.3	**Polish the mould or die surface** by following procedures including blasting, lapping, and/or polishing, and using required materials including lapping compounds, diamond compounds, stones, and/or abrasives, so that the final surface finish conforms to the engineering drawings and job specifications. Apprentice's Signature and Date _____ Employer's/Trainer's Signature and Date _____
277M-7.4	**Polish surface of tooling** using required equipment and materials including abrasives, honing equipment, stones, compounds, glass beads, and polishing equipment, so that the surface is polished to the required polish/finish as specified in engineering drawings and job specifications. Apprentice's Signature and Date _____ Employer's/Trainer's Signature and Date _____
277M-7.5	**Inspect die or mould for quality assurance** by analyzing, checking, and making adjustments to ensure that the finalized tooling will function without premature failure and that the tooling operates and functions in accordance with engineering drawings and job specifications. Apprentice's Signature and Date _____ Employer's/Trainer's Signature and Date _____ Sponsor's Name and Date _____ Sponsor's Signature _____

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SCHEDULE OF TRAINING
APPRENTICESHIP TRADE

Mould or Die Finisher - 277M

B. On-The-Job Training (cont'd):

Unit No.	PERFORMANCE OBJECTIVES (ON-THE-JOB SKILL SETS)
277M-8.0	**PERFORM MOULD VERIFICATION AND QUALITY ASSURANCE PROCEDURES**
277M-8.1	**Read and interpret mould-build documentation** including bill of materials, engineering drawings, component prints, assembly, mould, and part drawings, to correctly identify working components, type of material, assembly process, number of parts, job operations and sequencing, drawing revision level, type of parts, and type of mould, ensuring that all required component features are checked and identified in order to verify the features of the mould. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-8.2	**Verify features of mould components** by: checking contours, shapes or profiles; measuring and checking using gauges, templates, micrometers or callipers; performing a visual inspection; performing casting techniques including surface casting of wax, coating with non-dry blue pigment; casting with clay, low-heat metal, or plaster casting; so that the shape, contour, or profile of the components conform to engineering drawings, model, prototype, or job specifications. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-8.3	**Verify the contour of the piece part** using gauges and templates, performing a visual inspection, and/or applying a surface casting of wax, modelling clay and/or low-heat metal, to ensure that the shape of the part conforms to the engineering drawings and/or model. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-8.4	**Inspect the tooling fit and functions** by trying out tooling and checking tool components for failure, wear, or defects, to ensure that the fitting and functions of the tooling conform to engineering drawings and customer specifications. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-8.5	**Inspect and verify part produced** using information from part drawings and by measuring or checking using shadow-graph, Coordinate Measuring Machine (CMM), verniers, and micro-meters, so that produced part conforms to engineering drawings and customer specifications. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date

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SCHEDULE OF TRAINING
APPRENTICESHIP TRADE

Mould or Die Finisher - 277M

B. On-The-Job Training (cont'd):

Unit No.	PERFORMANCE OBJECTIVES (ON-THE-JOB SKILL SETS)
277M-8.0	**PERFORM MOULD VERIFICATION AND QUALITY ASSURANCE PROCEDURES** (cont'd)
277M-8.6	**Final inspect mould** for customer approval by analyzing, checking, and making adjustments to ensure that finalized mould will function without premature failure and conforms with engineering drawings and company procedures. Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-8.7	**Communicate with co-workers** to identify previous job operations, availability of tools, parts, and machinery, scheduling requirements, and any other information needed to perform work-in-process dimensional and surface verification procedures, ensuring that the information communicated is clear, concise, and accurate. Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-8.8	**Complete documentation** including tracking sheets, required sign-offs, inspection reports and procedure sheets to ensure the finalization of the workpiece and traceability of work is in accordance with engineering drawings, customer specifications, and company procedures. Apprentice's Signature and Date Employer's/Trainer's Signature and Date Sponsor's Name and Date Sponsor's Signature

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SCHEDULE OF TRAINING
APPRENTICESHIP TRADE

Mould or Die Finisher - 277M

B. On-The-Job Training (cont'd):

Unit No.	PERFORMANCE OBJECTIVES (ON-THE-JOB SKILL SETS)
277M-9.0	**PERFORM DIE VERIFICATION AND QUALITY ASSURANCE PROCEDURES**
277M-9.1	**Read and interpret die-build documentation** including bill of materials, engineering drawings, components prints, and assembly, die, and part drawings, to correctly identify tolerances, sizes, and diameters, revision level, projection and section views, pick-up datum point, component shapes, number of stations, number of working components, material specifications, thickness and type of steel, assembly process, number of functions, quantity and type of parts, tools, and die, so that all required component features are checked and identified to verify features of tool components _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-9.2	**Verify features of die components** by: checking dimensions, contours, shapes or profiles; measuring and checking using gauges, callipers, inside and outside micrometers, vernier height gauges or indicators, gauge blocks, and pin gauges; performing a visual inspection; and performing spotting techniques; so that the dimensions, shape, contour, or profile of the components conform to engineering drawings, piece part, prototype, or job specifications. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-9.3	**Try out and trouble-shoot the die** by trying out in die press, checking for workpiece failures including worn, dull, or chipped edges, distortion of parts, excessive burrs, and/or inadequate or improper lubrication, and by measuring and checking, making necessary adjustments or modifications, and continuing to re-try until the die passes final quality inspection. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-9.4	**Inspect part produced by developed die** using information from part drawings and by checking using measuring instruments and checking devices including inside and outside micrometers, vernier height gauges or indicators, gauge blocks, and pin gauges, so that the piece part produced by the die conforms to engineering drawings and customer specifications. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-9.5	**Final inspect die** by analyzing, checking, and making adjustments to ensure that the finalized die functions without premature die failures and conforms to engineering drawings, company procedures, customer specifications. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date

Ontario

SCHEDULE OF TRAINING
APPRENTICESHIP TRADE

Mould or Die Finisher - 277M

B. On-The-Job Training (cont'd):

Unit No.	PERFORMANCE OBJECTIVES (ON-THE-JOB SKILL SETS)
277M-9.0	**PERFORM DIE VERIFICATION AND QUALITY ASSURANCE PROCEDURES** (cont'd)
277M-9.6	**Communicate with co-workers** to identify previous job operations, availability of tools, parts, and machinery, scheduling requirements, and any other information needed to perform work-in-process dimensional and surface verification procedures, ensuring that the information communicated is clear, concise, and accurate. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date
277M-9.7	**Complete documentation** including tracking sheets, required sign-offs, inspection reports and procedure sheets to ensure the finalization of the workpiece and traceability of work in accordance with engineering drawings, customer specifications, and company procedures. _____ _____ Apprentice's Signature and Date Employer's/Trainer's Signature and Date Sponsor's Name and Date Sponsor's Signature _____ _____

Ontario

SCHEDULE OF TRAINING
APPRENTICESHIP TRADE

Mould or Die Finisher - 277M

C. Off-The-Job Learning Outcomes:

CONTENT: (To be written in learning and benchmark timeframes). On successful completion of off-the-job/in-school training, the apprentice will demonstrate the ability to:

Applied Safety Procedures - Benchmark Hours - 6.0

MODULE LEARNING OUTCOMES

When successfully completed, the apprentice will be able to:

- identify and describe appropriate safety procedures including:
- safety materials and manuals;
- Occupational Health and Safety Act (OHSA);
- Workplace Hazardous Material Information System (WHMIS);
- machine set-up and operational safety procedures and practices;
- protective clothing and gear.

Applied Trade Calculations, Charts, and Table - Benchmark Hours - 36

MODULE LEARNING OUTCOMES

When successfully completed, the apprentice will be able to:

- perform calculations and functions to determine plane geometric problems;
- use required reference material, conversion charts/tables, and calculators;
- solve trade-specific problems using Pythagorean Theorem
- solve trade-specific problems using algebraic equations and calculating perimeters;
- solve trade-specific problems involving areas and volumes;
- perform mould or die finishing calculations

Engineering Drawings and Documentation - Benchmark Hours - 36 hours

MODULE LEARNING OUTCOMES:

When successfully completed, the apprentice will be able to:

- read and interpret engineering drawings;
- use charts, tables, and reference materials;
- use layout tools and accessories
- sketch sectional views
- perform dimensional check of layouts
- transfer drawing dimensions to workpiece materials
- develop operational plan for finishing

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SCHEDULE OF TRAINING
APPRENTICESHIP TRADE

Mould or Die Finisher - 277M

C. Off-The-Job Learning Outcomes (cont'd)

Content (continued)

Metallurgy - Benchmark Hours - 18 hrs

MODULE LEARNING OUTCOMES:

When successfully completed, the apprentice will be able to:

- use required reference materials, charts, and tables;
- identify metal characteristics and properties;
- identify and describe the physical and mechanical properties of metals.
- identify systems of classification and identification

Metrology - Benchmark Hours - 12 hrs

MODULE LEARNING OUTCOMES:

When successfully completed, the apprentice will be able to:

- describe the principles and fundamentals of dimensional metrology;
- use precision measuring instruments and checking devices;
- demonstrate measuring, checking, and gauging techniques.
- identify and describe measuring techniques using direct/indirect reading angular measuring instruments;
- identify and describe measuring techniques using direct/indirect reading linear measuring instruments.

Grinding Technology - Benchmark Hours - 24 hrs

MODULE LEARNING & CURRICULUM OUTCOMES:

When successfully completed, the apprentice will be able to:

- identify and select grinder
- describe operational procedures
- select and set up grinder, workholding devices, accessories, and attachments
- demonstrate selecting, ringing, mounting, and trueing of grinding wheel
- develop operational plan for honing, grinding, and polishing
- perform grinding techniques

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SCHEDULE OF TRAINING
APPRENTICESHIP TRADE

Mould or Die Finisher - 277M

C. Off-The-Job Learning Outcomes (cont'd)

Content (continued)

Mould or Die Tooling and Components Applications and End Use - 24 hrs

MODULE LEARNING & CURRICULUM OUTCOMES:

When successfully completed, the apprentice will be able to:

- use reference materials, charts, and tables;
- demonstrate knowledge of tool and mould terminology
- identify and evaluate incoming die and mould finishes
- describe in detail the functions and end use of dies and moulds

Hand-Finishing Techniques - 18 hrs

MODULE LEARNING & CURRICULUM OUTCOMES:

When successfully completed, the apprentice will be able to:

- select finishing tools and materials
- identify and describe operating principles of power hand tools
- identify and describe hand-finishing and polishing techniques
- demonstrate cutting, grinding, and finishing of tooling

Reworking, Restoring, and Finishing Techniques - 72 hrs

MODULE LEARNING & CURRICULUM OUTCOMES:

When successfully completed, the apprentice will be able to:

- identify and describe finishes;
- identify and describe tolerances;
- identify and describe profilers;
- identify and describe hand-engraving techniques;
- identify and describe hand-finishing/polishing techniques;
- identify and describe mould surface verification;
- identify and describe die surface verification;
- perform all mould and die final inspection functions;
- identify and complete all appropriate documentation.

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C. Off-The-Job Learning Outcomes:

Source & Type (Specify in detail e.g. block or day release; night school; in-plant; correspondence) :
Benchmark/Guideline Time-frames of Off-The-Job/In-School Learning Outcomes: **240 hours**
Funding
Performance Objectives and Learning Outcomes reached: **Date:** _____ **Sponsor/Trainer/Employer Signature:** _____ **Apprentice Signature:** _____

You will be required to disclose this signed form to the Ministry of Training, Colleges and Universities in order to complete your program. The Ministry will use your personal information to administer and finance Ontario's apprenticeship training system. For further information please see the notice/declaration for collection of personal information that is referenced in the table of contents of this training standard.