



ONTARIO COLLEGE OF TRADES

ORDRE DES MÉTIERS DE L'ONTARIO

Apprenticeship
Training Standard

Schedule of Training

Refractory Mason

Trade Code: 401R

Development Date: August 2009

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PREFACE

This Schedule of Training was developed by the Workplace Training Branch of the Ministry of Training, Colleges, and Universities (MTCU), in partnership with the Industry Advisory Committee and in consultation with representatives from the industry. This document is intended to be used by apprentice, supervisor/trainer and sponsor/employer as a "blueprint" for training and as a prerequisite for completion and certification.

This training document becomes the apprentice's only record of workplace training performance.

Supervisor/trainer and apprentice are required to sign off and date the skill following each successful acquisition, unless a skill is marked shaded (optional performances).

The care and maintenance of this training document are the joint responsibility of the apprentice and the sponsor/employer. By signing off the skill, the supervisor/trainer and the apprentice are indicating that the apprentice has demonstrated competence of the skill. This training standard has been developed specifically for documenting the apprentices' acquisition of skills of the trade.

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>

DEFINITIONS

ACA

Apprenticeship and Certification Act, 1998

Certificate of Apprenticeship (C of A)

Certification issued to individuals who have demonstrated that they have completed an apprenticeship in Ontario.

Certificate of Qualification (C of Q)

Certification issued to C of Q applicants who have achieved a passing grade on the certification exam for their trade.

Competence

The ability of an individual to perform a skill repeatedly and without assistance in the workplace to the standard set out in the Training Standard or Schedule of Training.

Competency Analysis Profile

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

Industry Committee (IC) - under the ACA and Provincial Advisory Committee (PAC) under the TQAA

Under the ACA and TQAA, the Minister may appoint a provincial committee in any trade or group of trades to advise the Minister in matters relating to the establishment and operation of apprenticeship training programs and trades qualifications.

Journeyman or Equivalent

A person who has acquired the knowledge and skills in a trade, occupation or craft as attested to by a provincial or territorial authority.

Mandatory

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

Optional

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

Schedule of Training

An apprenticeship training standard which includes the on-the-job performance objectives and off-the-job learning outcomes

Sign-off

Signature of the sponsor/employer of record or an individual, to whom that sponsor or employer has delegated signing authority, indicating an apprentice's achievement of competence.

Skill

Individual skill described in the Training Standard (note: does not mean the larger skill groups referred to in the Training Standard as Skill Sets, Training Units, or General Performance Objective, but the individual skills that make up those groups).

Skill Sets

Group of individual skills found in the Training Standard (may also be called Training Unit or General Performance Objective)

Skill Set Completion Form (and Learning Outcome Completion Form)

Lists all skill sets and includes space for sign-off by sponsor/employer of record.

Sponsor/Employer

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, other occupation or skill set as part of an apprenticeship program approved by the Director.

Sponsor/Employer of Record

Refers to the sponsor or employer documented as the signatory to the current training agreement or contract. In order for an sponsor/employer to be considered for the training of apprentices, they must identify that the workplace has qualified journeypersons or equivalent on site and can identify that the workplace has the tools, equipment, materials, and processes which have been identified by Provincial Advisory Committees (PACs) or Industry Committees (ICs) to be required for the trade.

Supervisor

An individual, who oversees the execution of a task, oversees the actions or work of others.

Trainer

A qualified trainer in a compulsory trade is a journeyperson with a Certificate of Qualification or in a voluntary trade is an individual who is considered equivalent to a journeyperson with a Certificate of Qualification.

TQAA

Trades Qualification and Apprenticeship Act.

Training Standard

A document that has been written in concise statements, which describe how well an apprentice must perform each skill in order to become competent. In using the document, trainers will be able to ensure that the apprentice is developing skills detailed for the occupation.

IMPORTANT DIRECTIONS

Apprentice

1. All complete skills or skill sets must be signed and dated by both the apprentice and sponsor/employer when either all terms of the contract have been completed or the apprentice leaves the employ of the employer.
2. It is the responsibility of the apprentice to inform the local Apprenticeship Client Services Office regarding the following changes:
 - change of sponsor/employer address;
 - change of apprentice name or address;
 - transfer to a new sponsor/employer.
3. The Skill Set Completion Form and Learning Outcome Completion Form must be completed and signed by the current sponsor/employer and presented to the local Apprenticeship Client Services Office at the fulfillment of all terms of a Training Agreement.
4. The apprentice completion form with the Completed and Authorized Schedule of Training must be presented to the local Apprenticeship Client Services Unit.

Sponsors/Employers and Supervisors/Trainers

The Schedule of Training identifies skills and supporting learning outcomes required for this trade/occupation and its related training program.

This Schedule of Training has been written in concise statements which describe how an apprentice must perform each skill/outcome in order to become competent. Competence means being able to perform the task to the required standard.

In using this training standard, supervisors/trainers will be able to ensure that the apprentice is developing the skills detailed for the trade/occupation.

Supervisors/Trainers and apprentices are required to sign off and date the skills following each successful acquisition.

Sponsors/Employers 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.

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.

ROLES & RESPONSIBILITIES OF APPRENTICE, SPONSOR/EMPLOYER AND SUPERVISOR/TRAINER

Apprentice “Apprenticeship is Learning On-the-job”

- Practice safe work habits.
- Use your apprenticeship training standard as a journal to keep track of which skills you have achieved.
- Talk over your training plan with your Training Consultant, Employer, Union, or Sponsor.
- Know what tools are required for your trade and how to use them.
- Ask questions and keep asking.
- Talk to your employer about your training needs.
- Demonstrate enthusiasm and good work habits.
- Ensure that you and your supervisor/trainer sign off skill/skill sets upon demonstration of competency.

Sponsor/Employer “Training is an Investment”

- Demonstrate safe work habits.
- Attest to successful achievement by signing the skill/skills sets.
- Provide opportunities and time for the apprentice to learn the trade.
- Offer practical trade training experiences that cover all of the skill sets.
- Foster work ethics that support training while minimizing productivity losses.
- Set out clear expectations, then recognize or reward performance excellence.
- Involve both the apprentice and supervisor/trainer in developing the training plan.
- Use the Training Standard as a monitoring tool and part of regular performance evaluations.
- Select supervisors/trainers with good communication skills and who work well with others.
- Encourage supervisors/trainers to take upgrading courses - (e.g. Train the Trainer, Mentor Coach, etc).
- Complete the Skill Set Completion Form once the apprentice has demonstrated competency in the training.
- Ensure that the apprentice always works under the direction of or has access to a qualified supervisor/trainer.
- Vary the apprentice’s exposure to all the skills set out in the training standard.

Supervisor/Trainer

- Demonstrate safe work habits.
- Treat apprentices fairly and with respect.
- Use the Training Standard as a guide to evaluating competence in each skill area. In using the Training Standard, supervisors/trainers will be able to ensure that the apprentice is developing skills detailed for the trade/occupation.
- Review the Training Standard with the apprentice and develop a training plan.
- Respond fully to all questions.
- Be patient. Explain what is to be done then, show how it is done, and then let the apprentice demonstrate the task.
- Provide continuous feedback.
- Sign off individual skills/skill sets once the apprentice demonstrates competence in the skill.

Suggestions for Assessing the Progress of the Apprentice in the Workplace

- Use informal daily observation.
- Provide constructive feedback to build confidence.
- Allow the supervisor/trainer time to teach and demonstrate the skills.
- Take prompt action wherever problems occur.
- Conduct regular performance reviews involving the apprentice, supervisor/trainer and sponsor/employer.
- Use the Training Standard as the reference for establishing the competency of the apprentice.

SKILL SET COMPLETION FORM

SKILLS SETS	TITLE	SIGNING AUTHORITY
U6641.0	DEMONSTRATE SAFE WORKING PRACTICES AND PROCEDURES	
U6642.0	ADAPT JOB SITE ENVIRONMENT	
U6643.0	TEAR OUT REFRACTORY MASONRY	
U6644.0	USE AND MAINTAIN REFRACTORY TOOLS AND EQUIPMENT	
U6645.0	LAY REFRACTORY BRICK	
U6646.0	INSTALL POURED CASTABLES	
U6647.0	INSTALL GUNNABLE CASTABLES	
U6648.0	INSTALL LINING WITH CERAMIC WELDING	
U6649.0	INSTALL SHOTCRETE	
U6650.0	INSTALL REFRACTORY MATERIAL BY PLASTIC RAMMING	
U6651.0	INSTALL CERAMIC FIBRE BLANKET AND MODULES	

NOTE ON SHADED PERFORMANCE OBJECTIVES AND SKILLS:

- Shaded performance objectives and skill sets are optional. The shaded skills do not have to be demonstrated or signed-off for completion of the on-the-job component of the apprenticeship
- The learning outcomes will cover all of the skill sets, both shaded and unshaded.

LEARNING OUTCOMES COMPLETION FORM

Date of Completion	Organization Name(s)	SIGNING AUTHORITY

APPRENTICE COMPLETION FORM

APPRENTICE NAME	
Print	
Signature	
Social Insurance Number	

Skill Sets and Learning Outcomes when completed should be signed by the Supervisor/Trainer and presented with this completion form to your local Apprenticeship Client Services Office. Any supporting documentation should also be attached.

In-school Completed Yes () No () Not applicable ()
(Proof to be provided)

Hours completed as Yes () No () Not applicable ()
Per Contract:

SPONSOR/EMPLOYER INFORMATION	
Name	
Address	
Telephone	
E-mail Address	
Signature of Signing Authority	

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.

A. DESCRIPTION/DUTIES

A **Refractory Mason** builds and repairs heat and corrosion resistant structures and vessels such as furnaces, tanks, and containers. These structures are an integral part of the production process for industrial and commercial sites including steel mills, pulp and paper mills, foundries, refineries, auto plants, incinerators, glass plants, and hospitals.

A **Refractory Mason** must be able to work in confined spaces and extreme (hot, dusty) environmental conditions.

A **Refractory Mason** performs some or all of the following:

- Demonstration of safe working practices and procedures
- Adaptation of job site environment
- Tearing out of refractory masonry
- Using and maintaining refractory tools and equipment
- Laying of refractory brick
- Installation of poured castables
- Installation of gunnable castables
- Installation of lining with ceramic welding
- Installation of shotcrete
- Installation of refractory materials by plastic ramming
- Installation of ceramic fibre blankets and modules

A **Refractory Mason** demonstrates knowledge of:

- Safe working practices and procedures
- Adapting job site environment
- Using and maintaining refractory tools and equipment
- Tearing out refractory masonry
- Laying refractory brick
- Installing poured castables
- Installing gunnable castables
- Describing how to install lining with ceramic material
- Describing how to install shotcrete
- Installing refractory material by plastic ramming
- Installing ceramic fibre blanket and modules

BENCHMARK/GUIDELINE TOTAL TRAINING TIMEFRAMES: (ON-THE-JOB AND OFF-THE-JOB):

Recommended number of on-the-job hours 4000 hours (2 years) Includes 240 hours (8 weeks) of in-school training.

B. ON-THE-JOB PERFORMANCE OBJECTIVES**U6641.0 DEMONSTRATE SAFE WORKING PRACTICES AND PROCEDURES****GENERAL PERFORMANCE OBJECTIVE**

Demonstrate safe working practices and procedures by complying with safety acts, regulations, codes, standards and directives; performing housekeeping duties; implementing worksite emergency procedures; performing equipment condition assessments; utilizing and maintaining personal protective equipment and apparel; reporting injuries and accidents; employing simple first aid; manually moving equipment, supplies and components and performing lockout, tagging, and barricading procedures so that these procedures are carried out in accordance with directives identified in legislation and regulations, manufacturers' specifications and company directives.

U6641.1 Comply with acts, regulations, codes, standards, and directives including Occupational Health and Safety Act (OHSA), and Workplace Hazardous Materials Information System (WHMIS), and confined space procedures, by reading, interpreting and following directions; according to legislation, and company policy and procedures.

 Date Completed

 Apprentice

 Supervisor/Trainer

U6641.2 Perform housekeeping duties by identifying health and safety hazards in the workplace, so that the potential for personal injury, damage to equipment, vehicles and the environment are minimized; positioning equipment; erecting protective barriers and signs; recycling, removing and disposing of excess or unwanted materials; ensuring work area is free of obstructions, tools and equipment; and storing tools and equipment so that the potential for accident or injury is minimized and tools and equipment are in place and available for the next job, in accordance with legislation, job requirements, site procedures, safety requirements, and company policy and procedures.

 Date Completed

 Apprentice

 Supervisor/Trainer

U6641.0 DEMONSTRATE SAFE WORKING PRACTICES AND PROCEDURES – cont'd

U6641.3 Implement worksite emergency procedures including assessing the type and severity of the emergency; taking action to address the situation; activating the alarm system; reporting the emergency and evacuating the premises, in accordance with regulatory requirements, codes, site procedures, manufacturers' recommendations and specifications, safety requirements, and company policy and procedures.

Date Completed_____
Apprentice_____
Supervisor/Trainer

U6641.4 Perform equipment condition assessments including ladders, manual and powered lifting devices, and motorized chain hoists; by inspecting, and assessing performance and function, positioning, moving and adjusting the equipment; exchanging or removing equipment from service; checking for capacity, wear, crimps, fraying, fractures, cracks, corrosion, alignment, damage, lubrication, stability, noise, loose or missing components, tire condition, fluid levels and defective components; using measuring, leveling and fastening devices according to legislation, job requirements, manufacturers' recommendations and specifications, safety requirements, and company policy procedures.

Date Completed_____
Apprentice_____
Supervisor/Trainer

U6641.5 Utilize personal protective apparel and equipment, including gloves, glasses, goggles, masks and respirators, face shields, ear protectors/plugs, safety footwear, head protection, heat and fire proof clothing, barrier cream, and fall arrest equipment, by inspecting, selecting, wearing and adjusting to ensure the safety of self and others, in accordance with regulatory requirements, manufacturers' recommendations and specifications, safety requirements, and company policy and procedures.

Date Completed_____
Apprentice_____
Supervisor/Trainer_____
Sponsor/Employer Name_____
Sponsor/Employer Signature

U6641.0 DEMONSTRATE SAFE WORKING PRACTICES AND PROCEDURES – cont'd

U6641.6 Maintain personal protective apparel and equipment, including gloves, glasses, goggles, masks and respirators, face shields, ear protectors/plugs, safety footwear, and fall arrest equipment by checking for wear, breaks, tears, cracks, leakage, loose and defective components; inspecting and analysing performance and functions; and storing or removing devices and components from service to ensure the safety of self and others, in accordance with regulatory requirements, manufacturers' recommendations and specifications, safety requirements, and company policy and procedures.

Date Completed_____
Apprentice_____
Supervisor/Trainer

U6641.7 Report injuries and accidents to immediate supervisor and health and safety representative or committee, ensuring that details are provided, and forms and reports are completed and submitted, in accordance with regulatory requirements, safety requirements, and company policy and procedures.

Date Completed_____
Apprentice_____
Supervisor/Trainer

U6641.8 Employ simple first aid relating to illness and occupational injury, including sudden illness, burns, cuts, sprains, chemical and smoke inhalations, heat stress, and contaminants in eyes, so that the condition of the victim is stabilized and prepared for further treatment; identifying the location of first aid supplies and equipment; obtaining the required emergency medical assistance, in accordance with the victims condition, first aid practices, regulatory requirements, manufacturers' recommendations and specifications, safety requirements, and company policy and procedures.

Date Completed_____
Apprentice_____
Supervisor/Trainer

U6641.0 DEMONSTRATE SAFE WORKING PRACTICES AND PROCEDURES – cont'd

U6641.9 Move equipment, supplies and components manually by utilizing safe lifting, lowering, carrying, pushing and pulling techniques, to protect self and others, in accordance with regulatory requirements, safety requirements, and company policy and procedures.

Date Completed

Apprentice

Supervisor/Trainer

U6641.10 Perform lockout, tagging, and barricading procedures to isolate hazardous or defective equipment by advising the appropriate authorities holding jurisdiction; installing a lockout device and retaining the key; attaching tags; releasing stored energy; performing a bump test; performing the required work; and removing the lockout device on completion of work; using hand and power tools and personal protective equipment, in accordance regulatory requirements, codes, manufacturers' recommendations and specifications, company policies and procedures, and safety requirements.

Date Completed

Apprentice

Supervisor/Trainer

Sponsor/Employer Name

Sponsor/Employer Signature

U6642.0 ADAPT JOB SITE ENVIRONMENT**GENERAL PERFORMANCE OBJECTIVE**

Adapt job site environment by assessing worksite conditions; controlling worksite hazards; adapting work environment and work procedures for extreme conditions and identifying work stoppage issues in accordance with job specifications, manufacturers' recommendations, company policy and procedures, and government regulations.

U6642.1 Assess worksite conditions by visually inspecting unit and surrounding area; checking for worksite organization, material logistics, accessibility, staging, and first aid and emergency equipment; identifying worksite hazards, such as poor air quality, contaminates, overhead hazards, obstructions, extreme temperatures, lighting conditions, and potentials for fall and/or collapse; ensuring that all work materials, equipment, monitoring systems, and emergency systems are in place and functionally effective, in accordance with job specifications, manufacturers' recommendations, company policy and procedures, and government regulations.

Date Completed

Apprentice

Supervisor/Trainer

U6642.2 Control worksite hazards by identifying potential hazards, notifying the supervisor to take corrective action; arranging for and assisting with the removal or control of hazards such as silica and asbestos; and installing environmental equipment and systems, such as air blowers, pumps, lighting and negative air systems, so that the potential for personal injury and damage to equipment and the environment are minimized, in accordance with manufacturers' specifications, company policies and procedures, and government regulations.

Date Completed

Apprentice

Supervisor/Trainer

U6642.3 Adapts work environment and work procedures for extreme conditions by determining how the work areas and materials can be protected; protecting materials from the elements by covering, sheltering or insulating as required; ensuring that the work site and materials are safe and functionally effective for future use, in accordance with job requirements, manufacturers' specifications, company policies and procedures, and government regulations.

Date Completed

Apprentice

Supervisor/Trainer

U6642.0 ADAPT JOB SITE ENVIRONMENT - cont'd

U6642.4 Identify work stoppage issues, such as moisture, unstable substrate, lack of security, and insufficient light, water, ventilation, or power, by recording and reporting deficiencies or work barriers to supervisors, so that the potential for personal injury and damage to equipment and the environment is minimised, in accordance with site conditions, manufacturers' recommendations, and government regulations.

Date Completed

Apprentice

Supervisor/Trainer

Sponsor/Employer Name

Sponsor/Employer Signature

U6643.0 USE AND MAINTAIN REFRACTORY TOOLS AND EQUIPMENT**GENERAL PERFORMANCE OBJECTIVE**

Use and maintain refractory tools and equipment including trade hand tools, power tools and equipment in accordance with job requirements, manufacturers' recommendations and specifications, company policies and procedures, and safety requirements.

U6643.1 Use hand and power tools, including hammers, saws, arch centres, knives, ratchets and trowels, by determining the correct tool for the job; selecting the tool and required components; documenting use in a tool inventory control system; testing it and applying it to the job; and ensuring that tools are used for their intended purpose and functionally effective, in accordance with job requirements, manufacturers' recommendations and specifications, company policies and procedures, and safety requirements.

Date Completed

Apprentice

Supervisor/Trainer

U6643.2 Maintain hand and power tools, including hammers, arch centres, knives, ratchets, trowels, drills and saws by selecting, inspecting, testing, and analyzing performance and function; by using, exchanging, connecting, cleaning, lubricating, reconditioning, and storing or removing tools and accessories from service; and ensuring tools are maintained at a standard of repair that is safe and functionally effective, in accordance with job requirements, manufacturers' recommendations and specifications, company policies and procedures, and safety requirements.

Date Completed

Apprentice

Supervisor/Trainer

U6643.3 Use equipment, including stud welders, bricking machines (e.g. 'pogo sticks'), vibrators, jack hammers, gunning machines, shotcrete machines, pumps, vent rods, pneumatic rings, kiln rings and pneumatic rammers by determining the correct equipment for the job; selecting the equipment and required components; documenting use in an equipment inventory control system; testing it and applying it to the job; and ensuring that they are used for their intended purpose and functionally effective, in accordance with job requirements, manufacturers' recommendations and specifications, company policies and procedures, and safety requirements.

Date Completed

Apprentice

Supervisor/Trainer

U6643.0 USE AND MAINTAIN REFRACTORY TOOLS AND EQUIPMENT – cont’d

U6643.4 Maintain equipment, including bricking machines (e.g. ‘pogo sticks’), stud welders, vibrators, jack hammers, gunning machines, shotcrete machines, pumps, pneumatic rings, kiln rings and pneumatic rammers, by selecting, inspecting, testing, and analyzing performance and function; by using, exchanging, connecting, cleaning, lubricating, reconditioning, and storing or removing tools and accessories from service; and ensuring tools are maintained at a standard of repair that is safe and functionally effective, in accordance with job requirements, manufacturers' recommendations and specifications, company policies and procedures, and safety requirements.

Date Completed

Apprentice

Supervisor/Trainer

Sponsor/Employer Name

Sponsor/Employer Signature

U6644.0 TEAR OUT REFRACTORY MASONRY**GENERAL PERFORMANCE OBJECTIVE**

Tear out refractory masonry by identifying areas and materials to be torn out; identifying sequence of removal; building and installing temporary supports; protecting the existing surrounding structures and other workers; removing refractory masonry and removing temporary support structures in accordance with job requirements, company policies and procedures, manufacturers' specifications, and government regulations.

- U6644.1 Identify areas and materials to be torn out** by consulting with the client; performing visual inspection with a supervisor; checking for excessive wear, hot spots, cracking, deterioration, and deformities; and using electronic devices, hand and power tools, and gauges, in accordance with job requirements, company policies and procedures, and government regulations.

Date Completed

Apprentice

Supervisor/Trainer

- U6644.2 Identify sequence of removal** by determining a start and end point; assessing the need for temporary supports; identifying protection needs of existing structures; selecting the tools, equipment and supplies for the job; and determining and arranging the method of removal and disposal, in accordance with job requirements, company policies and procedures, manufacturers' specifications, and government regulations.

Date Completed

Apprentice

Supervisor/Trainer

- U6644.3 Build and install temporary supports** such as angle irons, braces, wedges, jacks, plates, gussets, and shelf supports by determining the type of support required, determining the minimum strength and load bearing requirements, building or acquiring the appropriate supports, ensuring that the masonry material is supported in the correct position, securing supports in place until the masonry material is self-supporting or permanent structural supports are installed, and using appropriate tools and equipment in accordance with job requirements, company policies and procedures, and government regulations.

Date Completed

Apprentice

Supervisor/Trainer

U6644.0 TEAR OUT REFRACTORY MASONRY – cont’d

U6644.4 Protect the existing surrounding structures and other workers by using wood, steel, tarps or sand barriers to cover and shield adjacent linings and structures, in order to minimize damage and injury while tearing out refractory material, in accordance with job requirements, company policies and procedures, and government regulations.

Date Completed

Apprentice

Supervisor/Trainer

U6644.5 Remove refractory masonry by working in conjunction with other trades people, to cut, break, chip and crush damaged and worn material; containing, removing and disposing of the waste materials; reassessing and gauging work progress; tooting, trimming and keying the surrounding surface; using demolition equipment and related masonry tools; ensuring that the work environment is clean and ready for repair or installation processes, in accordance with job requirements, company policies and procedures, and government regulations.

Date Completed

Apprentice

Supervisor/Trainer

U6644.6 Remove temporary support structures as required after reinstallation of refractory materials, by disassembling the structures and related equipment; storing and/or disposing of structures, using hand and power tools, and cutting torches; ensuring there is minimal disruption of the masonry installation site, in accordance with job requirements, company policies and procedures, and government regulations.

Date Completed

Apprentice

Supervisor/Trainer

Sponsor/Employer Name

Sponsor/Employer Signature

U6645.0 LAY REFRACTORY BRICK**GENERAL PERFORMANCE OBJECTIVE**

Lay refractory brick by designating lay down area; organizing bricks and corrosion resistant lining; identifying type and consistency of mortar; installing bricks and corrosion resistant linings in accordance with job specifications, manufacturers' specifications, company policies and procedures, and government legislation.

U6645.1 Designate lay down area, by selecting a dry area protected from the elements; marking and identifying area; preparing for tools and materials set-up; and ensuring area is safe and accessible, in accordance with job requirements and company policies and procedures.

Date Completed

Apprentice

Supervisor/Trainer

U6645.2 Organize bricks and corrosion resistant lining by sorting according to shape, size, sequence, and quantity; checking for cracks, chips, size, deformation, tolerance and tailoring; setting aside damaged and unusable bricks; reporting excessive damaged materials to supervisor; re-palletizing in proper order and size sequence; and marking and identify the individual pallets, in accordance with job requirements, company policies and procedures and manufacturers' specifications.

Date Completed

Apprentice

Supervisor/Trainer

U6645.3 Identify type and consistency of mortar required for the job including any additives or admixtures from the job specification so that the mortar has the correct consistency, plasticity, workability and setting time and is properly prepared for the application in accordance with manufacturers' recommendations and job specifications.

Date Completed

Apprentice

Supervisor/Trainer

U6645.0 LAY REFRACTORY BRICK – cont’d

U6645.4 **Install bricks and corrosion resistant linings** by assembling the required materials; determining brick placement sequence based on shape and orientation of the structure, cutting the shape of the brick to conform to the wall of the structure, applying trowel techniques and unit masonry placement methods; carrying out construction in the required sequence; placing reinforcement and accessories in the masonry system; finishing the refractory brick lining; checking and controlling for quality on a continuous basis so that time and resources are not wasted in the use of materials, and applying installation skills in a timely and orderly manner, in accordance with job specifications, manufacturers’ specifications, company policies and procedures, and government legislation.

Date Completed

Apprentice

Supervisor/Trainer

Sponsor/Employer Name

Sponsor/Employer Signature

U6646.0 INSTALL POURED CASTABLES**GENERAL PERFORMANCE OBJECTIVE**

Install poured castables by installing anchors, insulation, and vapour barriers; setting forms; placing casting materials and removing the forms in accordance with job specifications, manufacturers' specifications, company policies and procedures, and government legislation.

- U6646.1 Install anchors, insulation, and vapour barriers for poured castables** by marking and laying out anchor pattern on the shell; preparing the shell by grinding the anchor locations to remove oxidization and build up; and welding the anchor in place; ensuring the required anchor orientation and quality of the weld; and affixing the fire proof insulation and required vapour barriers; using tools and fasteners, in accordance with job specifications, manufacturers' specifications, company policies and procedures, and government legislation.

Date Completed

Apprentice

Supervisor/Trainer

- U6646.2 Set forms**, by establishing panel sizes and shapes; applying the releasing agent with a brush or sprayer; securing panels to the wall with false anchors, studs or walers, checking for alignment, uniformity and correct seal; ensuring adequate bracing and support for load and applied forces, in accordance with job specifications, manufacturers' specifications, company policies and procedures, and government legislation.

Date Completed

Apprentice

Supervisor/Trainer

- U6646.3 Place casting materials** by setting up a mixing station; mixing the materials; checking for required consistency; transporting the materials to the form; pouring the casting material into the forms; and vibrating the material to consolidate the mix, ensuring the forms are secure and stable, and allowed the proper time to cure, in accordance with job specifications, manufacturers' specifications, company policies and procedures, and government legislation.

Date Completed

Apprentice

Supervisor/Trainer

U6646.0 INSTALL POURED CASTABLES – cont'd

U6646.4 Remove the forms by dismantling all bracing, fasteners, walers and panels; inspecting, repairing and storing forms; identifying and repairing any defects and deficiencies to the refractory installation and surrounding area, in accordance with job specifications, manufacturers' specifications, company policies and procedures, and government regulations.

Date Completed

Apprentice

Supervisor/Trainer

Sponsor/Employer Name

Sponsor/Employer Signature

U6647.0 INSTALL GUNNABLE CASTABLES**GENERAL PERFORMANCE OBJECTIVE**

Install gunnable castables by installing anchors, insulation and vapour barriers; setting up gunning equipment; installing shot boards; gunning the lining; trimming the hot face; applying a curing agent and cleaning the equipment in accordance with job specifications, manufacturers' specifications, company policies and procedures, and government regulations.

U6647.1 Install anchors, insulation, and vapour barriers for gunnable castables by marking and laying out anchor pattern on the shell; preparing the shell by grinding the anchor locations to remove oxidization and build up; welding the anchor in place; ensuring the required anchor orientation and quality of the weld; and affixing the fire proof insulation and required vapour barriers; using tools and equipment in accordance with job specifications, manufacturers' specifications, company policies and procedures, and government regulations.

 Date Completed

 Apprentice

 Supervisor/Trainer

U6647.2 Set up gunning equipment, by selecting the correct size of gunning machine; connecting the gun to the air supply; running the hose from gun to installation; threading water body to the material hose and nozzle; checking for adequate air and water supply; checking for and ensuring a secure fit for connections, water ring, and nozzle; removing and replacing any defective parts; and connecting unit to clean water supply, in accordance with job specifications, manufacturers' specifications and company policies and procedures.

 Date Completed

 Apprentice

 Supervisor/Trainer

U6647.3 Install shot boards for gunnable castables by establishing panel sizes and shapes; applying the releasing agent with brush or spray instrument; securing shot boards to wall with tie wire; and cross bracing in alternate panels; ensuring adequate bracing and support for load and applied forces; checking for alignment and uniformity; using hand and power tools, in accordance with job specifications, manufacturers' specifications, and company policies and procedures.

 Date Completed

 Apprentice

 Supervisor/Trainer

U6647.0 INSTALL GUNNABLE CASTABLES – cont’d

U6647.4 Gun lining by establishing clear communication with the machine operator using hand signals or radio; adjusting the air and water supply, turning on the rotary bowl to start flow of material through the nozzle; and adjusting water flow to reduce potential rebound, projecting material in a circular motion onto the wall; installing material to full thickness of shotboard as a frame around the panel; and then working toward centre of panel; working on alternate panels; removing shot boards and shutting the machine down; ensuring a completely uniform product mix on the structure and avoiding any laminations in accordance with job specifications, manufacturers’ specifications, and company policies and procedures.

Date Completed_____
Apprentice_____
Supervisor/Trainer

U6647.5 Trim the hot face by screeding excess material to the thickness of the shot boards; using a straight edge that exceeds the width of the panel; ensuring that material is not pulled from anchors; checking that material is of a uniform thickness; in accordance with accepted trade practices, job specifications, manufacturers’ specifications, and company policies and procedures.

Date Completed_____
Apprentice_____
Supervisor/Trainer

U6647.6 Apply a curing agent to prevent excessively rapid drying by means of brush or sprayer in accordance with accepted trade practices, job specifications, manufacturers’ specifications, and company policies and procedures.

Date Completed_____
Apprentice_____
Supervisor/Trainer

U6647.7 Clean the equipment by blowing water and residual material out of the lines with compressed air and ensuring that nothing remains which will obstruct the lines when it dries, in accordance with accepted trade practices, job specifications, manufacturers’ specifications, and company policies and procedures.

Date Completed_____
Apprentice_____
Supervisor/Trainer_____
Sponsor/Employer Name_____
Sponsor/Employer Signature

U6648.0 INSTALL LINING USING CERAMIC WELDING**GENERAL PERFORMANCE OBJECTIVE**

Install lining with ceramic material by preparing the work site; installing ceramic material through a welding process and closing the welding procedure

U6648.1 Prepare the work site by assembling the required materials; securing a safe staging area free of uncontrolled sources of oxygen not less than fifteen (15) feet from the repair location; selecting the appropriate size of ceramic welding equipment based on the size of the repair and the volume of material to be placed; positioning the machine in such a manner as to ensure the material output is not directed toward any person; manually removing scale /slag or sandblasting the surface of the existing lining to ensure an effective bond; so that time and resources are not wasted in the use of materials and installation skills are applied in a timely and orderly manner in accordance with job specifications, manufacturers' specifications, and company policies and procedures.

Date Completed

Apprentice

Supervisor/Trainer

U6648.2 Install ceramic material through a welding procedure by using the lance to build the refractory material out to the required thickness ensuring that it is evenly distributed to prevent as much as possible having to grind it level later so that time and resources are not wasted in the use of materials and installation skills are applied in a timely and orderly manner in accordance with job accepted trade practices, job specifications, manufacturers' specifications, and company policies and procedures.

Date Completed

Apprentice

Supervisor/Trainer

U6648.0 INSTALL LINING USING CERAMIC WELDING – cont’d

U6648.3 **Close the welding procedure** by first shutting off the material feed then shutting off the oxygen source after all material has stopped flowing at the lance; purging all lines/hoses of oxygen and capping to prevent foreign material from entering; and emptying the welding machine hopper of material and storing it in a cool, dry place; so that the process is safely completed and excess ceramic material is cleaned from all equipment in accordance with job accepted trade practices, manufacturers’ specifications, and company policies and procedures.

Date Completed

Apprentice

Supervisor/Trainer

Sponsor/Employer Name

Sponsor/Employer Signature

U6649.0 INSTALL SHOTCRETE**GENERAL PERFORMANCE OBJECTIVE**

Install shotcrete by installing anchors, insulation and vapour barriers; installing shot boards for shotcrete; setting up equipment for shotcreting; pumping shotcrete; trimming the hot face and cleaning equipment in accordance with job specifications, manufacturers' specifications, company policies and procedures, and government regulations.

U6649.1 Install anchors, insulation, and vapour barriers for shotcrete by marking and laying out anchor pattern on the shell; preparing the shell by grinding the anchor locations to remove oxidization and build up; welding the anchor in place; ensuring the required anchor orientation and quality of the weld; and affixing the fire proof insulation and required vapour barriers; using hand and power tools and fasteners, in accordance with job specifications, manufacturers' specifications, company policies and procedures, and government regulations.

Date Completed

Apprentice

Supervisor/Trainer

U6649.2 Install shot boards for shotcrete by establishing panel sizes and shapes; applying the releasing agent with brush or spray instrument; securing shot boards to wall with tie wire; and cross bracing in alternate panels; ensuring adequate bracing and support for load and applied forces; checking for alignment and uniformity; using hand and power tools, in accordance with job specifications, manufacturers' specifications, company policies and procedures, and government regulations.

Date Completed

Apprentice

Supervisor/Trainer

U6649.0 INSTALL SHOTCRETE – cont'd

U6649.3 Set up equipment for shotcreting by selecting the correct size of shotcrete machine; running the hose from shotcrete setup to installation; connecting nozzle assembly to the material hose and to the source of accelerant; checking for adequate air and water supply; checking for and ensuring a secure fit for connections; removing and replacing any defective parts; and connecting unit to clean water supply, in accordance with job specifications, manufacturers' specifications, company policies and procedures, and government regulations.

Date Completed_____
Apprentice_____
Supervisor/Trainer

U6649.4 Pump shotcrete by establishing clear communication with the machine operator; introducing lubricant and mixed shotcrete material mix to the pump; filling the hose to the installation site until lubricant is expelled and material appears at nozzle; checking for and removing any obstructions and blockages, shooting material and accelerant onto the wall in a circular motion; installing material to full thickness of the shot boards as a frame around the panel and then working toward centre of panel; working on alternate panels; removing shot boards and completing remaining panels; and shutting the machine down; ensuring a completely uniform product mix on the structure and avoiding any laminations or voids, in accordance with accepted trade practices, job specifications, manufacturers' specifications, and company policies and procedures.

Date Completed_____
Apprentice_____
Supervisor/Trainer

U6649.5 Trim the hot face by screeding excess material to the thickness of the shot boards; using a straight edge that exceeds the width of the panel; ensuring that material is not pulled from anchors; checking that material is of a uniform thickness; and applying a curing agent, in accordance with accepted trade practices, job specifications, manufacturers' specifications, company policies and procedures, and government regulations.

Date Completed_____
Apprentice_____
Supervisor/Trainer

U6649.0 INSTALL SHOTCRET E – cont’d

U6649.6 **Clean equipment** by blowing water and residual material out of the lines with compressed air and ensuring that nothing remains which will obstruct the lines when it dries, in accordance with accepted trade practices, job specifications, manufacturers’ specifications, and company policies and procedures.

Date Completed

Apprentice

Supervisor/Trainer

Sponsor/Employer Name

Sponsor/Employer Signature

U6650.0 INSTALL REFRACTORY MATERIAL BY PLASTIC RAMMING**GENERAL PERFORMANCE OBJECTIVE**

Install refractory material by plastic ramming by installing anchors and insulation; ramming plastic refractory material and trimming to the face of the wall in accordance with accepted trade practices, job specifications, manufacturers' specifications, and company policies and procedures.

- U6650.1 Install anchors and insulation for plastic ramming** by marking and laying out anchor pattern on the shell; preparing the shell by grinding the anchor locations to remove oxidization and build up; welding the anchor in place; ensuring the required anchor orientation and quality of the weld; and affixing the fire proof insulation and required vapour barriers; using hand and power tools and fasteners, in accordance with accepted trade practices, job specifications, manufacturers' specifications, and company policies and procedures.

Date Completed

Apprentice

Supervisor/Trainer

- U6650.2 Ram plastic refractory material** by placing plastic slabs side by side across the area being repaired; knitting the slabs together using a pneumatic hammer; carrying out construction in the required sequence; installing the anchor tile in the designated area using clips or brackets; and ensuring the anchor tile is securely embedded in the plastic, in accordance with accepted trade practices, job specifications, manufacturers' specifications, and company policies and procedures.

Date Completed

Apprentice

Supervisor/Trainer

- U6650.3 Trim to the face of the wall** by removing excess material using a trowel, spade, and curry comb, ensuring an even, uniform surface; installing aerating holes at approximately 6" centres to allow moisture release; and cutting in control joints to limit cracking in accordance with accepted trade practices, job specifications, manufacturers' specifications, and company policies and procedures.

Date Completed

Apprentice

Supervisor/Trainer

Sponsor/Employer Name

Sponsor/Employer Signature

U6651.0 INSTALL CERAMIC FIBRE BLANKET AND MODULES**GENERAL PERFORMANCE OBJECTIVE**

Install ceramic fibre blanket and modules by installing studs and pins; installing blankets and installing modules in accordance with accepted trade practices, job specifications, manufacturers' specifications, and company policies and procedures.

- U6651.1** **Install studs and pins** by marking and laying out anchor pattern on the shell; preparing the shell by grinding the anchor locations to remove oxidization and build up; welding the anchor in place; ensuring the required anchor orientation and quality of the weld; and affixing the fire proof insulation and required vapour barriers; using hand and power tools and fasteners, in accordance with accepted trade practices, job specifications, manufacturers' specifications, and company policies and procedures.

Date Completed

Apprentice

Supervisor/Trainer

- U6651.2** **Install blankets** by determining size and dimension of installation area; cutting material to required length; impaling the blanket on the pins; working in a continuous process across the width of the repair area; checking for tight fit; staggering of the joints of subsequent rows and layers, and allowing for an overlap of the blanket at the joints on the hot face layer to account for gas flow; affixing washers, insulated washers and/or cuplocks to the pins; ensuring blanket construction is secured to the structure; and spraying rigidizing coating on the surface, in accordance with accepted trade practices, job specifications, manufacturers' specifications, company policies and procedures, and government regulations.

Date Completed

Apprentice

Supervisor/Trainer

U6651.0 INSTALL CERAMIC FIBRE BLANKET AND MODULES – cont’d

U6651.3 **Install modules** by placing modules side by side; working from the bottom up in a continuous process across the width of the repair area; fastening each module to the stud; placing batten strips on each course as required; removing compression straps on modules to allow for expansion of module; tamping hot face surface to create a uniform surface; ensuring a tight fit; and spraying a rigidizing coating on the surface, in accordance with accepted trade practices, job specifications, manufacturers’ specifications, company policies and procedures, and government regulations.

Date Completed

Apprentice

Supervisor/Trainer

Sponsor/Employer Name

Sponsor/Employer Signature

C. LEARNING OUTCOMES – One level - 240 hours

- S1301 Apply safe working practices and procedures (24 hours)
- Comply with safety directives
 - Describe work requirements for confined spaces
 - Perform housekeeping duties
 - Describe worksite emergency procedures
 - Perform equipment condition assessments
 - Utilize and maintain personal protective equipment and apparel
 - Describe injuries and accidents reporting procedures
 - Describe the process of simple first aid deployment
 - Manually move equipment, supplies and components
 - Describe lockout, tag, and barricading procedures
- S1302 Adapt job site environment (16 hours)
- Identify relevant worksite conditions
 - Describe the control of worksite hazards including silica and asbestos
 - Describe how to adapt work environment and work procedures for extreme conditions
 - Identify work stoppage issues
- S1303 Use and maintain refractory tools and equipment (24 hours)
- Use trade hand tools
 - Maintain hand tools
 - Use power tools and equipment
 - Maintain power tools and equipment.
- S1304 Tear out refractory masonry (24 hours)
- Identify areas and materials to be torn out
 - Identify sequence of removal
 - Build and install temporary supports
 - Describe how to protect the existing surrounding structures and other workers
 - Identify the process for removing refractory masonry
 - Describe how to remove temporary support structures
- S1305 Lay refractory brick (40 hours)
- Identify types of refractory bricks
 - Identify a designated lay down area
 - Organize bricks and corrosion resistant lining
 - Identify type and consistency of mortar
 - Install bricks and corrosion resistant linings

- S1306 Install poured castables (24 hours)
- Describe characteristics of poured castables
 - Install anchors, insulation, and vapour barriers
 - Set forms
 - Place casting materials
 - Remove the forms
- S1307 Install gunnable castables (24 hours)
- Describe characteristics of gunnable castables
 - Install. Anchors, insulation and vapour barriers
 - Set up gunning equipment
 - Install shot boards
 - Gun the lining
 - Trim the hot face
 - Apply a curing agent
 - Clean the equipment
- S1308 Describe how to install lining with ceramic material (8 hours)
- Describe the uses and characteristics of ceramic materials
 - Explain how to prepare the work site
 - Describe the procedure for installing ceramic material through a welding process
 - Describe how the welding procedure is closed
- S1309 Describe how to install shotcrete (8 hours)
- Describe the characteristics of shotcrete materials
 - Describe the procedure for installing anchors, insulation and vapour barriers
 - Describe the installation procedure for shot boards
 - Identify equipment set-up for shotcreting
 - Describe shotcrete application and finishing techniques
 - Describe how shotcrete equipment is cleaned
- S1310 Install refractory material by plastic ramming (24 hours)
- Describe the procedure for plastic ramming
 - Install anchors and insulation
 - Ram plastic refractory material
 - Trim to the face of the wall
- S1311 Install ceramic fibre blanket and modules (24 hours)
- describe applications of fibre blankets
 - install studs and pins
 - install blankets
 - install modules

Total Time: 240 hours

APPRENTICE RECORD

APPRENTICE NAME (Print):

SPONSOR/EMPLOYER INFORMATION	
Training Agreement #	
Name	
Address	
Telephone	
E-mail Address	

SUMMARY OF TRAINING	
Employment Start Date	
Employment End Date	
Total hours of training & instruction between dates of employment.	

Date Completed

Apprentice

Supervisor/Trainer

APPRENTICE RECORD

APPRENTICE NAME (Print):

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SUMMARY OF TRAINING

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Date Completed

Apprentice

Supervisor/Trainer

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Employment Start Date	
Employment End Date	
Total hours of training & instruction between dates of employment.	

Date Completed

Apprentice

Supervisor/Trainer

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.