



**Skilled  
Trades**  
Ontario

**Métiers  
spécialisés**  
Ontario

Apprenticeship  
Curriculum Standard

Cement (Concrete) Finisher

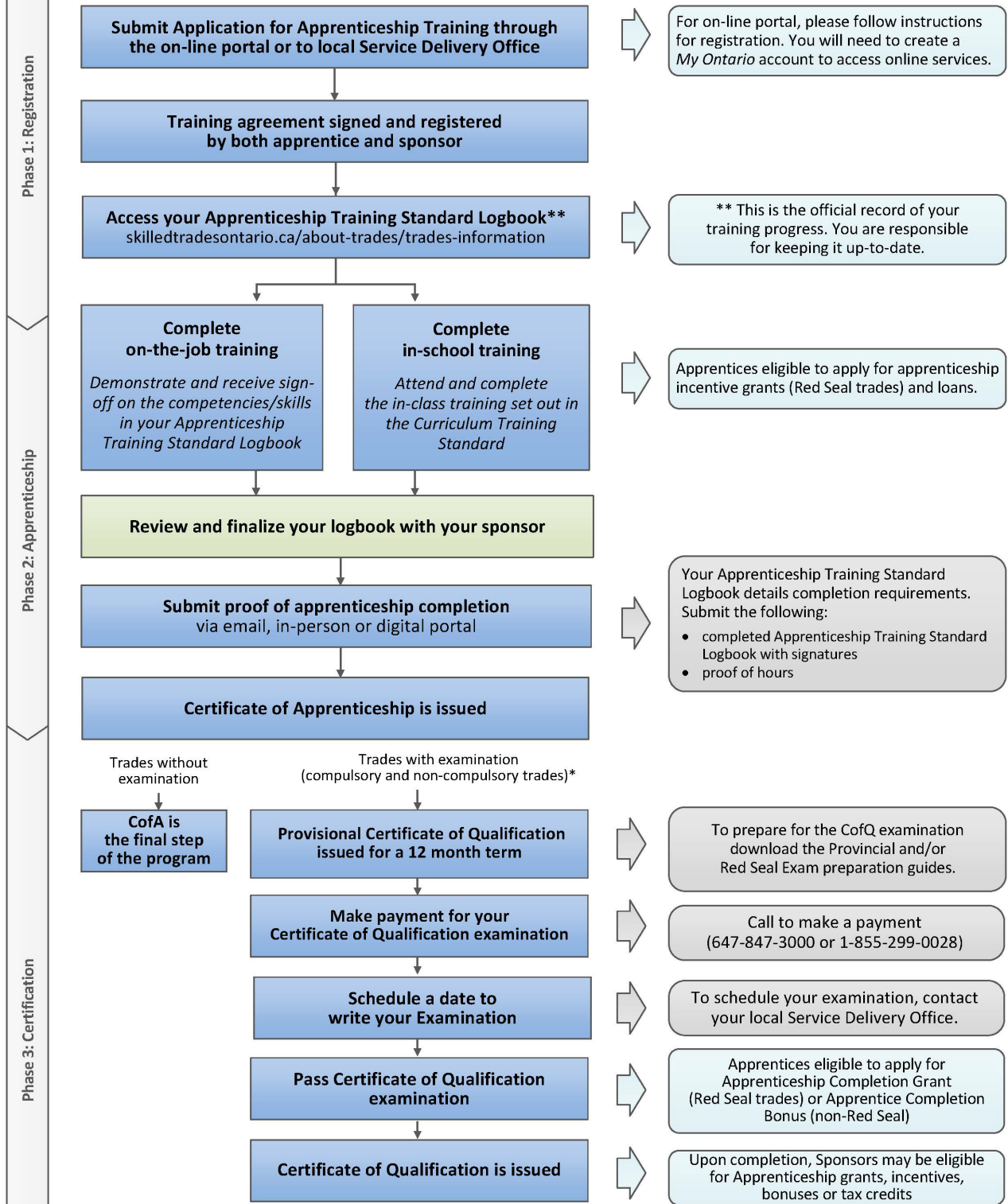
Levels 1 & 2

244G

2012



# Apprenticeship Pathway to a Certificate of Qualification



\* For a list of trades subject to a certification examination, visit: [skilledtradesontario.ca](http://skilledtradesontario.ca)

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**Please Note:** This Standard has been revised to reflect the visual identity of Skilled Trades Ontario (STO) which replaced the Ontario College of Trades on January 1, 2022. The content of this Standard may refer to the former organization; however, all trade specific information or content remains relevant and accurate based on the original date of publishing.

Please refer to STO's website: [skilledtradesontario.ca](https://skilledtradesontario.ca) for the most accurate and up to date information. For information about BOSTA and its regulations, please visit [Building Opportunities in the Skilled Trades Act, 2021 \(BOSTA\)](#).

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

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*Maintained with transfer to Skilled Trades Ontario 2012 (V100)*

## **Preface**

This curriculum standard for the Cement (Concrete) Finisher trade program is based upon the on-the-job performance objectives, located in the industry-approved training standard.

The curriculum is organized into 2 levels of training. The Reportable Subjects Summary chart (located on page 5) summarizes the training hours for each reportable subject.

The curriculum identifies the learning that takes place in-school. The in-school program focuses primarily on the theoretical knowledge and the essential skills required to support the performance objectives of the Apprenticeship Training Standards.

Employers/Sponsors are expected to extend the apprentice's knowledge and skills through practical training on a work site. Regular evaluations of the apprentice's knowledge and skills are conducted throughout training to verify that all apprentices have achieved the learning outcomes identified in the curriculum standard.

It is not the intent of the in-school curriculum to perfect on-the-job skills. The practical portion of the in-school program is used to reinforce theoretical knowledge. Skill training is provided on the job.

Please refer to Skilled Trades Ontario website ([www.skilledtradesontario.ca](http://www.skilledtradesontario.ca)) for the most accurate and up-to-date information about Skilled Trades Ontario. For information on *Building Opportunities in the Skilled Trades Act, 2021 (BOSTA)* and its regulations, please visit [Building Opportunities in the Skilled Trades Act, 2021, S.O. 2021, c. 28 - Bill 288 \(ontario.ca\)](http://www.skilledtradesontario.ca/building-opportunities-in-the-skilled-trades-act-2021-s.o.-2021-c.-28-bill-288)

## **Pre-requisites**

In order to advance to Level 2 of the apprenticeship program, an individual must have completed all of the units outlined in Level 1.

## **Hours Disclaimer** (if applicable)

It is agreed that Training Delivery Agents (TDAs) may need to make slight adjustments (with cause) according to particular apprentice needs and may deviate from the unit sequencing and the prescribed practical and theoretical hours shown within the standard. However, all TDAs will comply with the hours at the reportable subject level.

## **Suggested Equipment for Training Delivery Agencies**

The listing of tools on page 51 and page 52 does not list minimum quantities based on the understanding that the delivering TDA is in the best position to determine the need based on its delivery methodology.

Personal and Safety Equipment: Personal protective equipment is at the discretion of the TDA who must conform to Ontario Provincial Health and Safety Regulations.

## Introduction

The Curriculum Standards for the Cement (Concrete) Finisher trade were developed in 1999 and have been updated in 2002 in keeping with the criteria of the Ministry of Labour, Immigration, Training and Skills Development (MLITSD). This curriculum provides the Ministry with performance standards for training to the competencies identified for this trade by qualified representatives of industry and training providers.

As a general guideline, a time allocation has been included for each Curriculum Module, along with the theory/application breakdown for the delivery of the Unit Learning Outcomes.

There are 17 Curriculum Modules that will be delivered over 16 weeks, or 480 hours of instruction.

Level One training will cover all of Modules 1 to 9 and introductory components of Units 10 to 17. Level Two training will complete the delivery of Units 10 to 17.

The in-school delivery focuses primarily on the knowledge required to master the respective performance objectives outlined in the training standards. Employers, therefore, are expected to complete the delivery of these respective objectives by applying the prescribed in-school knowledge to the required practical learning experiences in the work setting. It is also recommended that apprentices obtain basic health and safety accreditation, which includes, but is not limited to, WHMIS, First Aid certification, and Rigging and Hoisting training. This accreditation is not provided by the current Curriculum Standards.

The Curriculum Standards have been designed to give the instructor every opportunity for flexibility and innovation without deviating to any significant degree from the requirements of the apprenticeship training standards.

The Curriculum Standards have been updated by the Universal Workers Union, Local 183 Life Long Learning Centre and Georgian College in close consultation with industry representatives. The generous contributions made by the Project Steering Committee (Jack Oliveira, Henry Pereira and Victor Soncin) are gratefully acknowledged. The draft updated standards were distributed to all approved Training Delivery Agents prior to final submission to MLITSD.

Implementation: 2012

## **Evaluation and Testing**

The Cement (Concrete) Finisher curriculum standards stipulate that potential apprentices shall be frequently evaluated, primarily in the form of weekly multiple choice tests and on-site assignments.

The design of both the tests and the assignments shall be left to the discretion of the instructor, although the curriculum standards indicate roughly how the marks for each reportable subject should be apportioned.

Level 1 students will be expected to complete approximately eight multiple choice tests, as well as approximately eight on-site assignments of varying complexion.

Level 2 students will be expected to complete approximately nine multiple choice tests and nine on-site assignments.



**Program Summary**

<b>Level</b>	<b>Hours Total</b>	<b>Hours Theory</b>	<b>Hours Practical</b>
Level 1	154	109	45
Level 2	326	72	254
Level 3	480	181	299

Note: There are no assigned co-requisites in this program.

**Program Summary by Level**

Number	Reportable Subjects	Hours Total	Hours Theory	Hours Practical	Prerequisites
<b>Level 1</b>					
S1321	History and Scope of Cement (Concrete) Finisher Trade	6	0	6	None
S1322	Communications and Presentation	6	0	6	None
S1323	Trade Calculations and Quantities	10	2	12	S1321
S1324	Pictorial Drawings and Layout Tools	3	15	18	S1321 & S1323
S1325	Construction Safety	42	0	42	S1321 & S1323
S1326	Hand Tools	12	4	16	S1325
S1327	Power Tools and Equipment	8	16	24	S1325 & S1326
S1328	Concrete Technology	20	4	24	S1324, S1326 & S1327
S1329	Site Preparation	2	4	6	S1324 & S1328
<b>Level 2</b>					
S1330	Place and Level Concrete	8	40	48	S1323, S1324, S1326, S1327 & S1328
S1331	Finish Concrete	10	70	80	S1323, S1327, S1329 & S1330
S1332	Concrete Curing and Protection	8	22	30	S1326, S1327, S1328
S1333	Cut Concrete	6	20	26	S1326, S1327 & S1328
S1334	Repair and Resurface Concrete	8	32	40	S1326, S1327, S1331 & S1333
S1335	Specialty Concrete	8	30	38	S1326, S1327 & S1331
S1336	Architectural Finishes	20	28	48	S1326, S1327 & S1331
S1337	Introduction to Epoxy Systems	4	12	16	S1326, S1327 & S1331

# Level 1

**Reportable Subject Summary – Level 1**

<b>Number</b>	<b>Reportable Subjects</b>	<b>Hours Total</b>	<b>Hours Theory</b>	<b>Hours Practical</b>
S1321	History and Scope of Cement (Concrete) Finisher Trade	6	0	6
S1322	Communications and Presentation	6	0	6
S1323	Trade Calculations and Quantities	10	2	12
S1324	Pictorial Drawings and Layout Tools	3	15	18
S1325	Construction Safety	42	0	42
S1326	Hand Tools	12	4	16
S1327	Power Tools and Equipment	8	16	24
S1328	Concrete Technology	20	4	24
S1329	Site Preparation	2	4	6

Number:	S1321		
Title:	<b>History And Scope of Cement (Concrete) Finisher Trade</b>		
Duration:	Total Hours: 6	Theory: 6	Practical: 0
Prerequisites:	None		

### General Learning Outcome

Upon successful completion, the apprentice is able to explain the history and development of the cement (concrete) finishing trade.

### Learning Outcomes and Content

- 1.0.1 Describe the history and development of the cement (concrete) finishing trade.
- Describe the history of the cement (concrete) finishing trade from its origins to the present time in Ontario and Canada.
  - Identify current trends in the trade today and list the reasons for life-long training and updating of cement (concrete) finishers.
- 1.0.2 Explain the purpose and scope of the Trades Qualification and Apprenticeship Act, and to identify the proposed changes in the Act and the impact on apprentices.
- Summarize/paraphrase the Trades Qualification and Apprenticeship Act, Regulation 1055, and state the apprentice=s rights and responsibilities found therein.
  - State the hours required to progress from entry level to journey person.
  - State registration fees.
  - Describe the cost of in-school training.
  - Describe the process to follow for prior learning assessment and exemptions.
- 1.0.3 Identify national, provincial and local cement (concrete) finishing agencies and associations.
- List national, provincial and local Construction Associations, such as Canadian Portland Cement Association, Concrete Floor Contractors Association, Ottawa Construction Association and Toronto Construction Association.
  - List local firms and suppliers specializing in cement (concrete) finishing.

- 1.0.4 Explain the functions of organized and non-organized sectors of employment.
- List employee-employer obligations and liabilities.
  - Identify organized and non-organized employment opportunities.
- 1.0.5 Maintain financial and personal records, in order to verify hours for certification.
- Maintain a record of in-school training, including dates and name of institution.
  - Maintain a record of employment, including the name of the employer, dates worked, pay stubs and deductions, and hours of employment.

**Evaluation Structure:** Theory test or assignment will comprise 100% of evaluation.

Number:	S1322		
Title:	<b>Communications and Presentation</b>		
Duration:	Total Hours: 6	Theory: 6	Practical: 0
Prerequisites:	None		

### General Learning Outcome

Upon successful completion, the apprentice is able to demonstrate the ability to communicate effectively on a construction site.

### Learning Outcomes and Content

- 2.0.1      Communicate orally, in written form, and graphically on a construction site
- Explain the scope and limits of the cement (concrete) finisher=s job and its relation to allied and non-allied trades on the job.
  - Identify the reporting structure on a project, including the people with whom the apprentice will be communicating, which could include the owner, architect, engineers, general contractors, site manager, safety supervisor, foreperson, and journey persons, and forepersons and journey persons from other allied and non-allied trades on the job site.
  - Identify the choice of means of communication according to the situation, either oral, written (including fax) or graphical (visual).
  - Prepare sketches and drawings of work to be executed or completed.
- 2.0.2      Use terminology of the cement (concrete) finishing trade and related areas of construction.
- Identify tools and equipment used in cement (concrete) finishing, using trade terminology.
  - Identify procedures and specialty aspects of cement (concrete) finishing.
  - List and define trade terminology used in cement (concrete) finishing.

- 2.0.3 Identify and explain safety legislation (Ontario Health and Safety Act) and company policy.
- List the titles of Construction Safety Association (CSAO) publications which specifically address the cement (concrete) finishing (or cement mason) trade.
  - List CSAO training packages relevant to the cement (concrete) finishing trade.
  - Explain the Construction Regulations of OHSA.
  - Explain company (owner or general contractor) safety procedures.
  - Explain fire prevention and fire evacuation procedures.
  - Identify and demonstrate hand signals as per OHSA.
  - Identify hazards associated with hoisting and rigging.
  - Identify the types of cranes normally used on job sites.
  - Outline procedures to follow (if required) to set up a daily log or diary to record site. inspections, visitors, weather, materials deliveries and other significant achievements and events.
  - Explain the significance of exercising Adue diligence@.

- 2.0.4 Demonstrate the ability to research skills related to documenting cement (concrete) finishing procedures.
- List the titles of current trade magazines.
  - Research and document new procedures, tools, equipment and methods applicable to cement (concrete) finishing.

**Evaluation Structure:** Theory test or assignments will comprise 100% of the evaluation.



Number:	S1323		
<b>Title:</b>	<b>Trade Calculations and Quantities</b>		
Duration:	Total Hours: 12	Theory: 10	Practical: 2
Prerequisites:	S1321		

### General Learning Outcome

Upon successful completion, the apprentice is able to perform mathematical calculations required in the cement (concrete) finisher trade.

### Learning Outcomes and Content

3.0.1 Complete arithmetical computations.

- Add, subtract, multiply and divide whole numbers and fractions.
- Perform calculations with decimals.
- Perform percentage calculations.
- Perform ratio and proportion calculations.

3.0.2 Use imperial and metric systems of measurement.

- Perform measurements and computations in both metric (millimeters and meters) and the imperial system (feet, inches and sixteenths of an inch).
- Perform soft conversions from metric to imperial and the reverse.

**Evaluation Structure:** Theory test or assignments will comprise 80% of the evaluation.

Demonstration of manipulative skills will be assessed by marking specific projects (20%).

Number:	S1324		
Title:	<b>Pictorial Drawings and Layout Tools</b>		
Duration:	Total Hours: 18	Theory: 3	Practical: 15
Prerequisites:	S1321, S1323		

### General Learning Outcome

Upon successful completion, the apprentice is able to read and interpret construction drawings for an overview of layout, and apply measuring, layout and levelling tools.

### Learning Outcomes and Content

- 4.0.1 Identify and interpret the three pictorial drawing types as they relate to the work to be completed.
- perspective drawings,
  - isometric drawings,
  - oblique drawings.
- 4.0.2 Define and describe the characteristics, types and purpose of the measurement, layout and levelling tools used in the cement (concrete) finisher trade.
- tape measures and rules,
  - hand levels,
  - chalk lines and string lines,
  - transit and level,
  - dumpy level,
  - laser beam level and explain how it is used for establishing elevation and line.
- 4.0.3 Use measurement, layout and levelling tools for cement (concrete) finishing projects.
- tape measures and rules,
  - transit and level,
  - dumpy level,
  - laser beam level,
  - hand level,
  - chalk lines and string lines.

**Evaluation Structure:** Theory test or assignment will comprise 50% of evaluation.

Marking specific projects (50%) will assess demonstration of manipulative skills, based on accurate use of measurement, layout and levelling tools.

Number:	S1325		
Title:	<b>Construction Safety</b>		
Duration:	Total Hours: 42	Theory: 42	Practical: 0
Prerequisites:	S1321 & S1323		

### General Learning Outcome

Upon successful completion, the apprentice is able to identify hazards in the workplace and to protect him/herself and others in accordance with the Regulations for Construction Projects of the Occupational Health and Safety Act (OHSA).

### Learning Outcomes and Content

- 5.0.1 Interpret and apply trade related health and safety regulations to work site practices.
- Identify and interpret the regulations of OHSA.
  - Identify the Aright to know@ sections in OHSA.
  - Identify the Awork refusal@ sections in OHSA.
  - Describe the Workplace Safety and Insurance Act from the perspective of the worker.
  - Describe the Environmental Protection Act and its impact on the worker and the employer.
  - Read and interpret trade-related Material Safety Data System (MSDS) sheets.
  - Read and interpret Workplace Hazardous Material Information System (WHMIS) regulations.
- 5.0.2 Select, wear and maintain personal protective equipment (PPE) to protect self on a construction site.
- Identify and interpret the sections of the OHSA regulations pertaining to PPE.
  - Read and interpret CSAO literature on personal protection with reference to eye, fall, foot, head, hearing, hand/skin and respiratory protection.
  - Identify tasks to be performed and select PPE, including fall arrest systems for those tasks.
  - Wear special protective equipment as directed by MSDS .
  - Explain the need to maintain and store PPE to protect the integrity of the equipment.

- 5.0.3 Explain how to maintain a safe workplace as per OHS regulations.
- List the procedures for site housekeeping.
  - Identify potential or actual hazards on the job site which would be identified through daily job inspection and reported to site authorities.
  - Describe safety procedures and/or precautions to be taken when working on the job site, including the identification of toxic materials, working in inclement weather and working at heights.
  - Describe the procedures for contacting qualified personnel to treat minor and major injuries and health conditions.
- 5.0.4 Describe fire prevention policies on a construction project and explain how to implement fire safety procedures in the event of an on-site fire.
- Identify owner and/or general contractor emergency procedures .
  - Describe site emergency evacuation procedures.
  - State location of fire alarm pulls and site telephones.
- 5.0.5 Explain how to use and maintain ladders on a construction site as per OHS regulations.
- Identify and interpret the sections of OHS which apply to ladders, including design, construction and use.
  - Identify tasks and job site applications that incorporate ladders.
  - Explain how to select and/or build a ladder for the tasks as per OHS.
  - List rules for the safe use of ladders as described in the CSAO literature.
  - Describe how to inspect and repair ladders.
- 5.0.6 Operate and maintain work platforms and related equipment on a construction site as per OHS regulations.
- Identify and interpret the sections of OHS, which apply to scaffolds, work platforms (including swing stages) and related equipment.
  - Describe and demonstrate how a fall arrest system (life line) is used.
  - Identify the different types of scaffolds and work platforms and their component parts.
  - Read CSAO literature on scaffolds and work platforms and list safety rules.
  - Explain how the different types of scaffolds and work platforms are used.
  - Describe the inspection procedures for dismantling and storing scaffolding components and work platforms.
  - List the functions of work platform suppliers and sub-contractors.

- 5.0.7 Identify preventative back care and ergonomic procedures followed to prevent back and repetitive strain injuries.
- Identify the risk of repetitive strain injury in hands and wrists while using trowels.
  - Explain the procedures for preventing carpal tunnel syndrome.
  - Identify the potential of back injury-the most frequent on-the-job injury.
  - Read CSAO literature on lifting and back care and list safety procedures.
  - Outline procedures for performing warm-up exercises recommended by CSAO.
  - Describe the measures for lifting and handling material onsite.
- 5.0.8 Explain and demonstrate the safe use of tools and equipment.
- Identify and interpret the sections of OHSA which apply to the use of tools and equipment.
  - Identify and select tools and equipment for specific tasks for cement (concrete) finishing.
  - Explain and demonstrate how to ensure safety devices and guards are in place on tools and equipment and the ground for electrical tools, and cut-off plug if defective.
  - Explain the reasons to lock out and tag defective equipment.
  - Read and interpret the OHSA regulations for ground fault circuit interrupters (GFCI) pertaining to the use of portable power tools outdoors or in wet locations.
  - Identify the hazards of using gas-powered machines inside buildings (e.g. carbon monoxide poisoning).
- 5.0.9 Use propane heaters and tanks as per the Occupational Health and Safety Act.
- Identify and interpret the sections in OHSA on the use of propane and propane heaters.
  - Read and interpret CSAO literature on propane and propane heaters and outline safety procedures.
  - List safety features of propane cylinders.
  - Describe the procedures for the storage, care and handling of propane.
  - Distinguish between propane connection and natural gas connection.

**Evaluation Structure:** Theory test or assignment will comprise 100% of evaluation.

Number:	S1326		
<b>Title:</b>	<b>Hand Tools</b>		
Duration:	Total Hours: 16	Theory: 12	Practical: 4
Prerequisites:	S1325		

## General Learning Outcome

Upon successful completion the apprentice is able to identify, describe, select and use hand tools for cement (concrete) finishing according to manufacturer instructions and the regulations of the Occupational Health and Safety Act.

## Learning Outcomes and Content

- 6.0.1 Identify types of hand tools used for cement (concrete) finishing.
- Identify the hand tools used in cement (concrete) finishing such as trowels, floats, shovels, levels, brooms, concrete rakes, concrete edgers, brushes, burlap, cement groover, magnesium screed, rollers and sprayers.
  - Describe the hand tools using the trade and manufacturer terminology.
  - Identify the tools which are not available commercially and must be manufactured by hand.
- 6.0.2 Identify potential hazards associated with using hand tools in cement (concrete) finishing.
- Identify and record the safety procedures for hand tools.
  - Identify the procedures for inspecting hand tools for defects.
  - Outline the procedures for using hand tools according to manufacturer instructions and OHS regulation.
- 6.0.3 Use and maintain hand tools used for cement (concrete) finishing according to manufacturer instructions and the Occupational Health and Safety Act regulations.
- Identify safety and inspection procedures for hand tools.
  - Identify OHS requirements for the use and maintenance of cement (concrete) finishing hand tools.
  - Select hand tools for a specific cement (concrete) finishing task.
  - Outline procedures for using hand tools in accordance with manufacturer instructions.
  - Describe procedures for maintaining and storing hand tools.

**Evaluation Structure:** Theory test and assignment, based on hand tool use and identification, will comprise 60% of the evaluation.

Demonstration of manipulative skills, using hand tools, will be assessed by marking specific projects (40%).



Number:	S1327		
Title:	<b>Power Tools and Equipment</b>		
Duration:	Total Hours: 24	Theory: 8	Practical: 16
Prerequisites:	S1325, S1326		

## General Learning Outcome

Upon successful completion, the apprentice is able to identify, describe, select and use power tools and equipment according to manufacturer instructions and the regulations of the Occupational Health and Safety Act.

## Learning Outcomes and Content

- 7.0.1 Identify and describe power tools and equipment to be selected and used for cement (concrete) finishing.
- Identify power tools and equipment used for cement (concrete) finishing such as concrete cutting saws, chipping guns, power grinders, sandblasting equipment, shotblast machine, power trowels and vibrators.
  - Describe power tools and equipment, using trade and manufacturer terminology.
  - Identify the use or functions of each power tool.
  - Explain the electrical ground requirement for each electric power tool.
  - Identify, select and use personal protective equipment (PPE) required when using power tools and equipment.
- 7.0.2 Identify the hazards associated with power tools used in the cement (concrete) finisher trade, making reference to the Construction Safety Association of Ontario manual for the masonry trade.
- Identify safety procedures for each power tool.
  - Inspect power tools for defects and malfunction.
  - Read owner manuals to identify the safe method for using power tools.
  - List the requirements of OHS in the use of power tools.
  - Select the power tool for a specific task.
  - List the procedures for maintaining power tools in good working order.

- 7.0.3 Operate and maintain power tools and equipment according to the manufacturer instructions and the Occupational Health and Safety Act regulations for the cement (concrete) finisher trade.
- Identify the task to be performed.
  - Identify, select and use the power tool for the task.
  - Identify and record the safety procedures for the power tool.
  - Identify procedures for inspecting power tools for defects.
  - List the maintenance procedures.
  - Identify the maintenance to be performed (e.g. maintain or be aware of maintenance procedures for mortar mixers).
  - Describe the procedures for checking the ground of electrical tools.
  - Explain the importance of checking oil before starting gas-powered equipment.
- 7.0.4 Operate and maintain concrete and mortar mixers, normally operated by a labourer, as per manufacturer instructions.
- List the safety precautions and operating procedures for each mixer and list.
  - Describe procedures for daily inspection of mixers.
  - Describe procedures for performing maintenance checks.
  - Describe and demonstrate procedures for using electric-powered mixers.
  - Describe and demonstrate procedures for cleaning mixer after use.
- 7.0.5 Operate and maintain electric and gas-powered saws as per manufacturer instructions and according to the Construction Safety Association of Ontario guidelines.
- Identify item to be cut.
  - Identify type of saw and blade to be used.
  - Explain the procedures for measuring and marking the item to be cut.
  - List procedures for selecting and using saw effectively.
  - List safety precautions and operating procedures for each tool.
  - Describe the processes for maintaining specific types of saws.
  - Describe the procedures for inspecting saws and blades.
  - Identify the power requirements of electric saws (i.e. 110 or 220 volts).
  - Describe how to verify the ground of electrically-powered saws.
  - Describe how to use a safety jig for hand-held power saws (quickcut).
  - Describe how to use water, as required, when cutting concrete.

7.0.6 Set up, operate and maintain sandblasting equipment according to operator instructions and the Occupational Health and Safety Act regulations.

- Identify and describe sandblasting components, including compressor, hoses, abrasive pot, nozzles, deadman control, air-purifying steam and water attachment.
- Identify, operate and maintain components of the air-purifying system, including the air-fed safety helmet, air purification unit and air supply hoses.
- Select and wear personal protective equipment (PPE) required when sandblasting.
- Identify the grade of silica sand abrasive to be used for specific applications.
- Describe the duties of the nozzleman, pot tender and job supervisor.
- Describe the procedures for connecting sandblasting equipment components and performing pre-operational checks.
- Identify and demonstrate the hand signals used to communicate directions between the nozzleman and pot tender.
- Perform sandblasting operations.
- Describe the procedures for clearing blockages caused by foreign objects.
- Describe the procedures for refilling the pot.
- Perform shutdown procedures, including shutting off compressor.
- Clean, maintain and store equipment, components and materials

7.0.7 Operate gas-powered trowels to float and finish concrete according to the operator instructions and the Occupational Health and Safety Act regulations.

- Describe the operation and maintenance procedures for each power trowel.
- Describe and demonstrate safety precautions for operation of power trowels.
- List procedures for performing pre-operation checks.
- Explain how to adjust trowel blade pitch (angle) as per concrete hardening stage.
- Explain how to use a gas-powered trowel to float and finish concrete.
- Describe the procedures for troubleshooting power trowel problems.
- Clean, maintain and store power trowel after use.

**Evaluation Structure:** Theory test or assignment, based on use of power tools and equipment, will comprise 40% of the evaluation.

Demonstration of manipulative skills, using power tools and equipment, will be assessed by marking specific projects (60%).

Number:	S1328		
Title:	<b>Concrete Technology</b>		
Duration:	Total Hours: 24	Theory: 20	Practical: 4
Prerequisites:	S1324, S1326, S1327		

## General Learning Outcome

Upon successful completion, the apprentice is able to describe the fundamentals of concrete technology, and the transportation, placing and curing of quality concrete.

## Learning Outcomes and Content

- 8.0.1 Describe the procedures for concrete placement, such as preparation prior to placement, and the conveying and placing of concrete.
- Describe the methods for placement of concrete.
  - List the preparation procedures prior to placement of concrete.
  - Describe the methods of conveying (transporting) concrete.
  - Describe procedures for handling concrete and concrete materials (e.g. safety precautions regarding chemicals and safe lifting).
  - Describe procedures for consolidating concrete (e.g. types, uses of vibrators).
- 8.0.2 Describe the tools and procedures for finishing concrete.
- Identify task to be performed.
  - Identify cement (concrete) finishing tools, such as hand trowels, power trowels, darby, power screed and straight edge.
  - Identify the use or functions of each tool.
  - Select the tool for each task.
  - Describe the techniques used to finish concrete, such as consolidating concrete, striking off, edging and jointing, and floating.
- 8.0.3 Describe the procedures for curing concrete.
- Describe methods for curing concrete and list general curing requirements.
  - Describe effects of curing of concrete to requirements.
  - Describe effects of not curing of concrete to requirements.
  - Describe procedures for hot weather concreting, such as methods for preventing rapid evaporation and the use of admixtures.
  - Describe procedures for cold weather concreting, such as procedures for preventing concrete from freezing and the use of accelerators.

- 8.0.4 Describe procedures for providing joints used in flat concrete work.
- List and describe types of concrete joints, such as isolation, construction and control joints.
  - Explain the purpose of providing joints in flat concrete work.
  - Describe methods used for providing joints in flat concrete work.
  - State recommended maximum joint spacing for saw cut contraction joints (wet and dry cutting).
- 8.0.5 Explain why reinforcement is used and how it is placed in concrete.
- List the characteristics, types and performance of reinforcement.
  - Explain the purpose of reinforcement of concrete.
  - Describe the procedures for the placement of reinforcement.
  - Describe the procedures for splicing reinforcement.
  - Describe procedures for consolidating concrete around reinforcement.
  - Describe primary reinforcements, including deformed reinforcing steel bars, post-tensioned cables and steel fibre reinforcing.
  - Describe secondary reinforcements, including welded wire mesh reinforcing and synthetic fibre reinforcing.
  - List advantages and disadvantages of welded wire mesh and steel fibre reinforcing.
- 8.0.6 Describe recommended practices for concreting during hot weather.
- Read and interpret architectural specifications on hot weather concreting.
  - Describe the effects of temperature, relative humidity and wind on concreting in hot weather.
  - Describe recommended practices to follow before placing and finishing concrete in hot weather.
  - List precautions to follow during and after concrete placement in hot weather.
  - Explain importance of recording weather conditions as they apply to hot weather concreting.
  - Explain purpose of testing specimens as it applies to hot weather concreting.
  - Describe the uses and purpose of admixtures with respect to hot weather concreting.

- 8.0.7 Describe recommended practices for concreting during cold weather.
- Review architectural specifications on cold weather concreting.
  - Describe the effects of cold temperatures on concrete.
  - Describe the uses and purpose of chemical accelerators with respect to cold weather concreting.
  - Describe the uses and purpose of no-freeze chemicals with respect to cold weather concreting.
  - List precautions to follow before placing concrete in cold weather.
  - List precautions to follow after placement of concrete in cold weather.
  - Describe curing methods for cold weather concreting.
  - Describe methods for removing forms as they apply to cold weather concreting.

**Evaluation Structure:** Theory test or assignment will comprise 100% of the evaluation.

Number:	S1329		
Title:	<b>Site Preparation</b>		
Duration:	Total Hours: 6	Theory: 2	Practical: 4
Prerequisites:	S1324, S1328		

### General Learning Outcome

Upon successful completion, the apprentice is able to demonstrate the ability to prepare a project site prior to concrete placement.

### Learning Outcomes and Content

- 9.0.1      Layout a site according to specifications.
- Define Benchmark@ and describe its purpose.
  - Explain procedures for establishing a finished floor elevation according to specifications, using a laser or dumpy level.
  - Establish final elevation according to specifications.
  - List characteristics of sub-base materials and requirements.
  - Describe procedures for preparing a sub-base according to specifications.

**Evaluation Structure:**      Theory test or assignment will comprise 50% of evaluation.

Demonstration of manipulative skills, involving site preparation activities, will be assessed by marking specific projects (50%).



# Level 2

**Reportable Subject Summary – Level 2**

<b>Number</b>	<b>Reportable Subjects</b>	<b>Hours Total</b>	<b>Hours Theory</b>	<b>Hours Practical</b>
S1330	Place and Level Concrete	8	40	48
S1331	Finish Concrete	10	70	80
S1332	Concrete Curing and Protection	8	22	30
S1333	Cut Concrete	6	20	26
S1334	Repair and Resurface Concrete	8	32	40
S1335	Specialty Concrete	8	30	38
S1336	Architectural Finishes	20	28	48
S1337	Introduction to Epoxy Systems	4	12	16

Number:	S1330		
Title:	<b>Place and Level Concrete</b>		
Duration:	Total Hours: 48	Theory: 8	Practical: 40
Prerequisites:	S1323, S1324, S1326, S1327, S1328		

### General Learning Outcome

Upon successful completion, the apprentice is able to describe and demonstrate the placement, consolidation and levelling of concrete as per job specifications and the OHS/A regulations.

### Learning Outcomes and Content

- 10.0.1 Identify grades in preparation for concrete placement.
- Identify grades using laser level, dumpy level and tape measure.
  - Explain procedures for orienting placement crew to perform job requirements.
- 10.0.2 Verify that concrete meets project specifications.
- Explain how to verify concrete order from delivery documentation and by observation according to project specifications.
- 10.0.3 Place concrete according to specifications and the Occupational Health and Safety Act regulations.
- Identify and describe equipment used to place concrete, such as pumps, conveyor belts, buggies, wheelbarrows, chutes and buckets.
  - Use hand signals used to communicate to crane and pump operators for placement of concrete.
  - Describe and demonstrate how to use pumps, conveyors, buckets, cranes and buggies to place concrete.
  - Describe and demonstrate procedures for rough-levelling concrete with square-nose shovel and rake.
  - Explain procedures for maintaining location of reinforcing mesh and reinforcing bars while concrete is being placed, using lifting hook.

- 10.0.4 Consolidate concrete using an external and internal vibrator.
- Describe vibrator selection, uses and techniques.
  - Identify defects associated with vibrators, such as separation of concrete or forms giving way.
  - Demonstrate how to insert vibrator to consolidate concrete.
  - Demonstrate how to remove vibrator when consolidation is completed (i.e. when surface of concrete is smooth).
  - Describe and demonstrate procedure for consolidating concrete using an external vibrator.
- 10.0.5 Strike-off concrete using a straightedge or power screed.
- Describe and demonstrate how to screed concrete to finish level using hand, power or laser screed.
  - Describe and demonstrate procedures for bull-floating concrete immediately after strike-off using wood bull-float and magnesium bull-float.
  - Describe and demonstrate procedures for hand floating edges to finish elevation using magnesium and wood hand floats.
  - Describe and demonstrate how to place inserts such as anchor bolts as per specifications.
  - Explain procedures for assessing risk of plastic shrinkage and taking protective action, such as covering concrete with plastic or applying a chemical.

**Evaluation Structure:** Theory test or assignment will comprise 30% of the evaluation.

Demonstration of manipulative skills, involving the placement, levelling and consolidating of concrete, will be assessed by marking specific projects (70%).

Number:	S1331		
Title:	<b>Finish Concrete</b>		
Duration:	Total Hours: 80	Theory: 10	Practical: 70
Prerequisites:	S1326, S1327, S1329, S1330		

## General Learning Outcome

Upon successful completion, the apprentice is able to demonstrate the ability to finish concrete according to specifications and the Occupational Health and Safety Act regulations.

## Learning Outcomes and Content

- 11.0.1 Establish, by visual and physical inspection, when concrete is ready for initial floating.
- Describe procedures for using the rule of thumb methods for determining initial set of concrete, such as foot print test or bleed water test.
  - Read and interpret finish specifications to determine required texture, such as float finish, swirl finish or broom finish.
- 11.0.2 Hand - and power-floating concrete.
- List the four reasons for floating concrete.
  - Describe hand and power tools used for floating concrete.
  - Demonstrate how to use wood and magnesium hand floats to produce an even surface on the concrete.
  - Describe and demonstrate the use of hand floats to produce a rough or textured finish on concrete.
  - Describe and demonstrate the techniques for power-floating concrete.
  - Describe how to add surface hardeners and colour pigments, if specified, using power trowels, buckets and mechanical spreaders.
  - Describe and demonstrate how to perform swirl finishes, if specified, using magnesium float.
  - Clean tools and equipment.
- 11.0.3 Finish edges and joints on concrete.
- Explain purpose of edging or rounding edges and joints in concrete.
  - Select and apply a pointing trowel is applied to separate concrete from forms.
  - Select and apply an edger is applied to finish edge concrete.
  - Select and apply an edger is applied to finish joint concrete.

11.0.4 Hand and power trowel concrete to produce a smooth, dense, hard and durable surface.

- Explain the purpose of trowelling concrete.
- Identify and select hand trowels for concrete finishing operations.
- Describe and demonstrate hand-trowelling techniques.
- Describe and demonstrate power-trowelling techniques.

**Evaluation Structure:** Theory test or assignment will comprise 20% of the evaluation.

Demonstration of manipulative skills will be assessed by marking specific projects related to finishing concrete to specifications (80%).

Number:	S1332		
Title:	<b>Concrete Curing and Protection</b>		
Duration:	Total Hours: 30	Theory: 8	Practical: 22
Prerequisites:	S1326, S1327, S1328		

### General Learning Outcome

Upon successful completion, the apprentice is able to demonstrate the ability to cure and protect concrete as per job specifications and OHS regulations.

### Learning Outcomes and Content

- 12.0.1 Cure concrete as per manufacturer specifications and OHS regulations.
- Describe and demonstrate the traditional methods of curing concrete, such as ponding, fogging, wetting and wet-covering (i.e. burlap, plastic sheeting or membrane paper).
  - Explain the advantages and disadvantages of the traditional methods of curing concrete.
  - Describe the hazards and list the precautions associated with the application of chemical curing compounds.
  - Identify, select and apply curing chemicals to concrete surface according to the manufacturer instructions or as directed by employer.
  - Describe and demonstrate procedures for wet-curing concrete, such as spraying water continuously on concrete surface as specified or as required by site conditions.
  - Describe and demonstrate procedures for moist-curing concrete, such as applying wet burlap and plastic sheeting over the surface as specified or as required by site conditions.

12.0.2 Care for and protect concrete as per specifications.

- State purpose for providing concrete protection.
- Describe the application of heat and protection, such as vented heaters (CO2 free), to maintain optimum temperature and conditions in cold weather.
- Describe the use of barriers, such as wind deflectors and sun protection devices, to maintain optimum temperature and conditions in hot weather.
- Describe the procedures for erecting barriers to keep loads off concrete.
- Explain how to protect concrete from damage by the use of physical protection, such as covering concrete with tarpaulins.
- Explain the procedures for advising client on care and protection of concrete, including concrete after-care and maintenance practices.

**Evaluation Structure:** Theory test or assignment will comprise 50% of the evaluation.

Demonstration of manipulative skills will be assessed by marking specific projects related to curing and protecting concrete according to specifications (50%).



Number:	S1333		
Title:	<b>Cut Concrete</b>		
Duration:	Total Hours: 26	Theory: 6	Practical: 20
Prerequisites:	S1326, 1327, S1328		

### General Learning Outcome

Upon successful completion, the apprentice is able to demonstrate the ability to cut, clean and fill joints on a cement (concrete) finishing project as per job specifications and OHS regulations.

### Learning Outcomes and Content

- 13.0.1 Cut joints manually.
- 13.0.2 Power -cut control joints according to specifications.
- 13.0.3 Clean, prepare and fill joints according to job specifications, manufacturer instructions and OHS regulations.

### Learning Content

- 13.0.1 Cut joints manually.
  - Identify and describe typical control, expansion, isolation and construction joints.
  - Demonstrate how to create control, expansion, isolation and construction joints.
  - Explain the purpose of providing control, expansion, isolation and construction joints.
  - Identify and describe hand tools for jointing, such as edgers and groovers.
  - Determine joint depth and spacing according to specifications.
  - Describe and demonstrate the use of groovers to cut joints.
- 13.0.2 Power -Cut Control Joints according to specifications.
  - Determine joint depth and spacing as per job specifications.
  - Determine when concrete surface is firm enough for power-cutting joints.
  - Describe and demonstrate the use of a power concrete saw with diamond or carborundum blades to cut control joints.
  - Describe the methods for maintaining dust control.

- 13.0.3 Clean, prepare and fill joints according to job specifications, manufacturer instructions and OSHA regulations.
- Describe and demonstrate how to clean out cuts according to specifications, using a power washer, air compressor or high pressure washer.
  - Identify and refer to MSDS for cleaning agents.
  - Identify, select and wear required personal protective equipment (PPE).
  - Describe types and purpose of pre-filling materials, such as backer rod, wax and polysulphide.
  - Identify and select tools for filling cuts, such as caulking guns, power drill mixer, hot-pour applicator and pizza cutter.
  - Identify the types and sizes of backer rod.
  - Identify where and when to use backer rod.
  - Select and install backer rod as per job specifications.
  - Describe types and purpose of caulking compounds.
  - List and identify caulking tools used by cement (concrete) finishers.
  - Identify and refer to MSDS for caulking.
  - Apply caulk to joints using caulking gun, according to job specifications.

**Evaluation Structure:** Theory test or assignment will comprise 60% of the evaluation.

Demonstration of manipulative skills will be assessed by marking specific projects related to the manual cutting and power cutting of concrete joints (40%).

Number:	S1334		
Title:	<b>Repair and Resurface Concrete</b>		
Duration:	Total Hours: 40	Theory: 8	Practical: 32
Prerequisites:	S1326, S1327, S1331, S1333		

### General Learning Outcome

Upon successful completion, the apprentice is able to demonstrate the ability to repair and resurface concrete as per job specifications and OHS regulations.

### Learning Outcomes and Content

- 14.0.1 Perform a visual and tactile inspection of concrete to identify defects.
- List and describe the major causes of defects in vertical and horizontal concrete, such as honeycombing, air pockets, tie holes, rock pockets, gravel streaks, sand streaking, laitance, staining, dusting and surface scaling.
  - Determine specifications deficiencies.
  - Read and interpret deficiencies list.
- 14.0.2 Determine the procedures for repairing concrete surfaces.
- Describe factors affecting concrete repair, including size and location of damaged area, temperature conditions and surface texture.
  - Describe procedures for vertical and horizontal concrete surface repairs.
  - Identify and select tools required for concrete repairs, such as bush hammer, hand grinder and Styrofoam float.
  - Identify and select materials required for concrete repairs, such as Portland cement (white and grey), fine sand and bonding agents.
  - Determine aesthetic requirements, such as matching colour and texture to an existing finish.
  - Determine strengths requirements.
  - Describe how to schedule repairs.
  - List safety precautions for using bonding agents.

- 14.0.3 Repair concrete according to job specifications and the Occupational Health and Safety Act regulations.
- Describe how to remove excess materials, such as bumps using a power saw, chipping hammer or power grinder.
  - Identify and refer to MSDS for cleaning agents and curing compounds.
  - Describe and demonstrate how to prepare surface for repair, by cleaning concrete with water, solvents or power scrubbers.
  - Describe and demonstrate procedures for placing (bonding) new materials to old materials according to job specifications, using agents such as epoxies, latex or cement slurry coat.
  - Remove excess repair materials, using tools such as a power grinder.
  - Protect and cure repaired surfaces according to job specifications, with materials such as burlap and polyethylene, or curing compounds.

**Evaluation Structure:** Theory test or assignment will comprise 50% of the evaluation.

Demonstration of manipulative skills related to concrete repair procedures will be assessed by marking specific projects (50%).

Number:	S1335		
Title:	<b>Specialty Concrete</b>		
Duration:	Total Hours: 38	Theory: 8	Practical: 30
Prerequisites:	S1326, S1327, S1331		

### General Learning Outcome

Upon successful completion, the apprentice is able to demonstrate the ability to install specialty concrete according to job specifications and OHS regulations.

### Learning Outcomes and Content

- 15.0.1 Select and install Specialty Concrete according to specifications.
- Define Specialty concrete.
  - Select specialty concrete according to specifications.
  - Describe and demonstrate the placement of specialty concrete according to specifications, with tools such as plaster mixer, wheelbarrow, hopper or pump.
  - Describe and demonstrate procedures for curing specialty concrete according to specifications.
- 15.0.2 Form, finish and cure super-flat floors, as per job specifications.
- State purpose for super-flat floor construction and give industry-related examples.
  - Explain procedures for ensuring the consistency of concrete throughout pour meets specifications.
  - Describe and demonstrate how to pour concrete to desired specifications.
  - Identify, select and use specialized levelling equipment, such as highway straight edge, power trowels and power screed.
  - Power-trowel surface when concrete reaches specified hardness.
  - Describe and demonstrate how to cure concrete surface as per job specifications.
  - Identify and refer to MSDS on sealers.
  - Describe and demonstrate how to apply a sealer.
  - Saw cut, clean and fill construction joints as per job specifications.

15.0.3 Grout concrete as per job specifications.

- Identify, use and maintain grouting tools and equipment such as point trowel, bush hammer and mortar mixer.
- Describe types, purpose and characteristics of common grouting materials, such as portland cement, concrete and bentonite.
- Identify and refer to MSDS for grouts.
- Describe and demonstrate how to clean and prepare work area to be grouted as per specifications.
- Demonstrate procedures for preparing surface for grouting, including roughening surface with a bush hammers or power chisel.
- Demonstrate and demonstrate the procedures for installing non-shrinkable grout, by forming area to be grouted and applying grout by hand.
- Describe and demonstrate how to install dry pack cementitious grout, by packing in grout with a hammer and ramming board, while ensuring that the material is packed solidly.
- Describe and demonstrate how to apply pressure grouts, using pressure grout machine according to specifications.
- Describe the use of covering materials, curing agents or temperature control methods to cure grout.

**Evaluation Structure:** Theory test or assignment will comprise 50% of the evaluation.

Demonstration of manipulative skills will be assessed by marking specific projects (50%).

Number:	S1336		
Title:	<b>Architectural Finishes</b>		
Duration:	Total Hours: 48	Theory: 20	Practical: 28
Prerequisites:	S1326, S1327, S1331		

## General Learning Outcome

Upon successful completion, the apprentice is able to demonstrate the ability to create architectural finishes as per job specifications and OHS regulations.

## Learning Outcomes and Content

- 16.0.1 Select and install colour and type of aggregate and matrix.
- Specify pigment for ready-mix concrete delivery as per specifications.
  - Describe how to broadcast pigmented hardener manually on concrete surface according to specifications.
  - Describe how to spread pigment evenly using required tools.
  - Describe how to hand- or power-float concrete surface.
  - Describe how to hand- or power-trowel concrete surface.
  - Describe how to cure concrete surface using required curing compound.
  - Describe how to protect surface colour by applying specified sealers.
  - Identify and refer to MSDS for sealers.
- 16.0.2 Set accent strips according to job specifications.
- Describe the purpose of accent strips.
  - Read and interpret specifications for placement of accent strips.
  - Describe how to set accent strips as per job specifications, using pointing trowel, snap line, string line and straight edge.
- 16.0.3 Expose aggregate by removing and/or applying materials to concrete as per job specifications.
- Describe how to level freshly poured concrete, allowing room at top of frame to accommodate the extra aggregate, as per specifications.
  - Sprinkle aggregate uniformly over concrete surface by hand or with a shovel.
  - Describe and demonstrate the procedures for imbedding material into concrete.

- Describe the procedures for removing excess mortar with nylon bristle broom.
- Describe the procedures for washing concrete surface to remove cement film, using exposed aggregate broom attached to a hose.
- Identify and refer to MSDS for retarders and sealers.
- Explain how to spray retarder on exposed aggregate surface.
- Explain how to apply sealer as per specifications.

16.0.4 Bush-hammer concrete surfaces to create an architectural finish as per job specifications, OHS and CSAO regulations.

- Follow specifications and on-site sample surface approved by architect.
- Describe and demonstrate how to bush-hammer a concrete surface to a rough-textured surface, using a portable chipping gun with a bush head.
- Explain procedures for applying a sealant, as per specifications.

16.0.5 Apply sandblasting techniques to create an architectural finish as per job specifications, OHS and CSAO regulations.

- Read operator manual for sandblasting operations.
- List the requirements of OHS and CSAO regarding the safe use of sandblasting equipment and materials.
- Identify and record the safety procedures for sandblasting operations.
- Identify the procedures for inspecting sandblasting apparatus for defects.
- Identify and describe types and uses of sandblasting components.
- Identify and describe the components of the air purifying system.
- Identify, select and wear PPE for sandblasting operations.
- Identify and select the type and grade of abrasive to be used.
- Describe the duties of the nozzleman, pot tender and job supervisor.
- Identify and demonstrate hand signals for communicating directions between the nozzleman and the pot tender.
- Describe and demonstrate the set-up of sandblasting equipment components.
- Direct a blast of wet or dry abrasive-laden stream on a specified surface.
- Describe how to shut down sandblasting equipment at completion of task.
- Describe procedures for cleaning concrete surface and equipment, and how to dispose of spent materials as per OHS regulations.
- Describe how to apply a sealant when concrete surface is dry.



- 16.0.6 Apply acid-etch wash finishing techniques to create an architectural finish as per specifications, OHS and CSAO regulations.
- Follow plans and specifications for finishing application.
  - Explain purpose of acid-etch wash finishing.
  - Identify and refer to MSDS for acids.
  - Identify, select and wear PPE as per OHS and CSAO regulations.
  - Describe and demonstrate how to etch concrete to create a textured surface.
  - Identify and refer to MSDS for sealants.
  - Describe and demonstrate how to apply a sealant when surface is dry.
  - Describe and demonstrate the procedure for disposing of spent material as per OHS.
- 16.0.7 Rub-up finish to concrete walls as per specifications.
- Describe how to remove concrete fins and other imperfections from surface.
  - Explain purpose of pre-wetting concrete surface.
  - Patch major holes and depressions and wait 24 hours for curing.
  - Pre-wet concrete surface.
  - Apply mortar to concrete surface.
  - Rub in mortar using Styrofoam sponge float and/or rubbing stone.
  - Rub off excess mortar with burlap.
- 16.0.8 Texture and stamp concrete according to specifications.
- Ensure concrete is smooth and plastic by trowelling pigmented (integrated mix) concrete.
  - Define a release agent and list reasons for its application.
  - Describe how to broadcast a release agent on concrete surface by hand.
  - Describe and demonstrate how to stamp concrete from the beginning of a concrete pour, following stamp number system, and ensuring consistent imprint on surface by applying either foot pressure or pressure from a hand tamper plate.
  - Use flexible pattern mat and chisel to stamp corners or areas adjacent to walls.
  - Pressure-wash concrete surface after twenty-four hours.
  - Saw cut control joints as per specifications.
  - Re-wash concrete surface.
  - Apply specified sealant after concrete surface has dried.
  - Identify and refer to MSDS for sealants.
  - Fill saw cuts with specified pigmented filler after concrete has cured.

- 16.0.9 Apply sealants to concrete surfaces as per job.
- Describe types, purpose and characteristics of sealants.
  - Identify and refer to MSDS for sealants.
  - Identify, select and wear PPE, such as a half-face respirator, neoprene gloves, safety goggles and long-sleeved shirt.
  - Describe how to apply sealant to concrete surface according to specifications, using a power sprayer, roller and lambs wool applicator.
  - Ensure work area is protected from foot traffic by using barriers.

**Evaluation Structure:** Theory test or assignment will comprise 40% of the evaluation.

Demonstration of manipulative skills will be assessed by marking specific projects (60%).

Number:	S1337		
Title:	<b>Introduction To Epoxy Systems*</b>		
Duration:	Total Hours: 16	Theory: 4	Practical: 12
Prerequisites:	6.0, 7.0, 11.0		

### General Learning Outcome

Upon successful completion, the apprentice is able to demonstrate the ability to prepare, apply and finish epoxy floor systems according to process manufacturer and/or operator instructions.

**\*Basic Instruction only. Training standards have not been developed for this unit.**

### Learning Outcomes and Content

- 17.0.1 Handle epoxy-finishing materials by applying safety directives and manufacturer and/or operator instructions.
- Apply safety directives and procedures for general material handling.
  - Apply safety directives for use of access equipment such as ladders and scaffolds.
  - Describe types, purpose and characteristics of materials used for epoxy finishing, such as resins, catalysts and aggregates.
  - Identify the hazards of using epoxy materials such as fumes, ingestion and skin irritation.
  - Apply safety directives provided in legislation and MSDS for use of epoxy materials.
  - Describe purpose for applying epoxy finishes.
  - Describe how to dispose of spent materials as per OHS regulations.
- 17.0.2 Identify and describe the tools and equipment used for epoxy floor finishing.
- Identify and describe hand tools for epoxy finishing such as hand trowels (point, parting, flexible, cove-based, notched), squeegees, rollers, brushes, shovels, craft paper, hammers, chisels, knee pads, rags, masking tape, polyethylene, level, straight edge, brooms and lambs wool applicator.
  - Identify and describe power tools and accessories such as pail mixer, mortar mixer, heavy duty drills and paddles, power trowel, ventilation fan, extension cords, floor sander, disks, stones, emery screens, floor grinder and stones, hand grinder and stones, cove base machine and stones, and vacuum.

- Identify the uses or function of each tool and piece of equipment.
- Identify and record the safety procedures for hand tools and equipment.
- Describe the process for maintaining each specific tool.
- Identify and select personal protective equipment (PPE) required when operating/applying epoxy finishing tools, equipment and materials, such as half-face respirator, goggles, barrier cream, neoprene gloves and long-sleeved shirts.

17.0.3 Operate and maintain tools and equipment as per manufacturer and/or operator instructions and OHS regulations.

- Identify the task to be performed.
- Identify, select and illustrate how to use the tool and equipment for the task.
- Identify and record the safety procedures for the tools and equipment.
- Identify the procedures for inspecting tools and equipment for defects.
- Check the ground of electrical tools.
- Read and interpret the operator manual for maintenance procedures.
- Identify the maintenance to be performed (e.g. maintain or be aware of maintenance procedures for mortar mixer, power drills, power trowel, floor sander, floor grinder or cove base machine).

17.0.4 Prepare the surface to be finished and apply primer according to the manufacturer and/or operator instructions and OHS regulations.

- Describe how to remove bumps from concrete surface using a chipping gun, hammer, chisel, scraper or grinder.
- Describe how to remove soft laitance, using a power grinder, hand stone, sander, shot blast or sandblast machine.
- Describe how to repair or patch bolt and form tie holes, honeycombing, rock pockets or other indentations or cavities on concrete surfaces.
- Describe how to clean surface by sweeping and/or vacuuming.
- Clean surface using water, solvents or power scrubbers to expose a stable surface for epoxy application.
- Use a moisture meter to check surface for moisture content.
- Locate metal strips according to architectural requirements (blueprints).
- Install base and floor strips with epoxy.
- Apply primer to a prepared and clean floor.
- Explain purpose of priming concrete surfaces.
- Interpret MSDS for primers.
- Apply primer using trowels, squeegee and rollers according to manufacturer instructions.
- Ensure required lighting, accessibility, ventilation and temperature (70°F/21°C).

17.0.5 Demonstrate the ability to install base and floor strips on concrete floors and walls according to specifications.

- Explain the purpose of providing base and floor strips on concrete floors and walls.
- Measure and cut strips as per specifications.
- Install strips on floor by coating strip on bottom with epoxy as per specifications.

**Evaluation Structure:** Theory test or assignment will comprise 80% of the evaluation.

Demonstration of manipulative skills will be assessed by marking specific projects (20%).

### APPENDIX A: Acronyms List

ACI	American Concrete Institute
ASTM	American Society for Testing Materials
EPA	Environment Protection Act
CFCAO	Concrete Floor Contractors Association of Ontario
CPCA	Canadian Portland Cement Association
CSAO	Construction Safety Association of Ontario
HRDC	Human Resources Development Canada
OBC	Ontario Building Code
OHSA	Ontario Health and Safety Act
MTCU	Ministry of Training, Colleges and Universities (Ontario)
MSDS	Material Safety Data Sheet
NOA	National Occupational Analysis
PCA	Portland Cement Association
PPE	Personal Protective Equipment
NMS	National Master Specification
TCA	Toronto Construction Association
WHMIS	Workplace Hazardous Material Information System
WSIA	Workplace Safety and Insurance Act

## APPENDIX B: Tools and Equipment List

The following is a list of the most common tools and equipment of the concrete finishing trade, which includes:

### Hand Tools

brooms	pizza cutters
brushes	pry bars
chisels	rakes (various kinds)
cove base tools	rubbing bricks
crow bars	saws (various kinds)
darbies (various kinds)	scrapers
edgers (various kinds)	shovels (various kinds)
floats (various kinds)	stamps
hammers (various kinds)	straightedges (various kinds)
jointers	string/cord
lifting hooks	trowels (various kinds)
pails/buckets	

### Measuring Equipment

chalk line	straightedges (various kinds)
flow cones	string line
levels (various kinds)	tape measures
squares	transit snap line

### Personal Protective Equipment

barrier creams	knee boards and pads
breathing apparatus	PPE (required by regulations or job specifications)
ear muffs	rain suit
ear plugs	rubber boots
fluorescent vest	safety boots
gloves	safety goggles
hard hats	

**Power Tools**

air compressors	power scrubbers
chipping guns	power sprayers
concrete cutting saws (various kinds)	power trowels
concrete mixers	power washers
cove base machines	pumps
drills (various kinds)	sandblasters
floodlights	shotblast machines
generators (various kinds)	tampers
jackhammers	vacuums
power drill mixers	ventilation fans
power grinders	vibrators (various kinds)
power screeds	





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Concrete Finisher