



ONTARIO COLLEGE OF TRADES

ORDRE DES MÉTIERS DE L'ONTARIO

Apprenticeship
Training Standard

Marine Engine
Technician

Trade Code: 435B

Development Date: June 2004

Veillez noter que le Ministère de la Formation et des Collèges et Universités (MFCU) a préparé les normes de formation d'apprentissage et les normes de programme. À partir du 8 avril 2013, l'Ordre des métiers de l'Ontario (l'Ordre) sera responsable du développement et de l'entretien de ces normes. L'Ordre reportera les normes actuelles sans modifications.

Puisque les normes de formation d'apprentissage et les normes de programme ont été préparées en vertu de la *Loi sur la qualification professionnelle et l'apprentissage des gens de métiers* (LQPAGM) ou la *Loi de 1998 sur l'apprentissage et la reconnaissance professionnelle* (LARP), il se peut que les définitions qui apparaissent dans ces normes ne soient plus précises et ne reflètent pas la nouvelle *Loi de 2009 sur l'Ordre des métiers de l'Ontario et l'apprentissage* (LOMOA). Ces définitions seront mises à jour prochainement par l'Ordre des métiers.

Pour vous renseigner sur l'Ordre, consultez le site de l'Ordre des métiers (<http://www.ordredesmetiers.ca/>). Pour obtenir plus d'information sur LOMOA et les règlements, visitez : <http://www.ordredesmetiers.ca/qui-sommes-nous/loi-et-reglements> .

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APPRENTICESHIP PROGRAM SUMMARY/GUIDELINES

1. **Program Definition: Marine Engine Technician** is defined as a person who:
 - possesses the skills and knowledge to diagnose, repair, and maintain marine craft and marine craft engine systems, including electrical/electronic systems, gasoline engine fuel management systems, steering systems, hydraulic systems and drive, and propulsion systems.

MARINE ENGINE TECHNICIAN is an approved apprenticeship program for the purposes of the *Apprenticeship and Certification Act, 1998 (ACA)*.

2. **Program Guidelines**

- **On-the-Job Training Duration (*for apprentices*)**
The Industry Committee has identified **4280** hours as the duration generally necessary for any apprentice to become competent in the skills required. There may be individual circumstances in which the duration varies from this guideline.
- **In-School Training Duration**
The Industry Committee has identified **720** hours of in-school training as the duration generally necessary for an apprentice to complete the in-school curriculum for this program, except where an apprentice has been exempted from any level of that curriculum.
- **Journeyman-To-Apprentice Ratio**
The Industry Committee has identified a journeyman-to-apprentice ratio of one journeyman or individuals who are deemed equivalent to a journeyman status to one apprentice as the ratio generally necessary for an apprentice to be properly trained on the job in this program. There may be individual circumstances in which the ratio varies from this guideline.

2. Program Requirements

- **Restricted Skill Sets**

This program does not contain any restricted skill sets as per Ontario Regulation 565/99, Restricted Skill Sets. Therefore, an individual is not required to be registered apprentice or possess certification in order to perform skills contained in the program.

- **Academic Standard**

The Industry Committee has identified the minimum academic standard for entry to this program as completion of Grade 12 or ministry-approved equivalent.

(See ACA Policy 102, Confirming Academic Requirements)

- **Eligibility for Exam Challenge (*for Non-apprentice C of Q Applicants*)**

The challenger must:

- provide proof of competency in all mandatory (unshaded) skills as identified in the Training Standard or Schedule of Training; and
- demonstrate that he/she has acquired 7.222 hours of on-the-job training.

(See ACA Policy 150, Assessing Applicants for the Certificate of Qualification)

- **Eligibility for Program Completion (*for Apprentices*)**

The apprentice must:

- achieve competency in all mandatory (unshaded) skills as identified in the Training Standard or Schedule of Training.
- complete the in-school training as outlined in the industry and ministry-approved Curriculum Standard.

(ACA Policy 309, Completion of an Apprenticeship Program)

- **Other Information**

- **Other Resources**

Complete program requirements, policies, and standards can be obtained by referring to the following resources:

- *Apprenticeship and Certification Act, 1998 (ACA)*;
- ACA General Regulation 573/99;
- ACA Exemption Regulation 566/99;
- Program-specific Apprenticeship Training Standards or Schedules of Training; and
- ACA Program and Policy Manual

- **Other Required Certification**

N/A

- **Academic Background**

Industry has identified relevant secondary school course(s) likely to increase an individual's chances of success if completed prior to program entry. For details, see the document Apprenticeship Subject Pathways.

COMPETENCY ANALYSIS PROFILE
Marine Engine Technician – 435B

(All unshaded skill sets must be demonstrated/completed.)

SKILL SETS**SKILLS**

PROTECT SELF AND OTHERS U6380.0	Identify and take corrective action against potential workplace health and safety hazards U6380.01	Handle, store, and dispose of hazardous workplace materials U6380.02	Wear and maintain personal protective equipment U6380.03	Comply with workplace-related legislation U6380.04	Practise good housekeeping in the workplace U6380.05
	Comply with Workplace Hazardous Materials Information System (WHMIS) guidelines U6380.06	Communicate with supervisors and co-workers U6380.07			

PERFORM GENERAL TRADE PRACTICES U6381.0	Interpret and apply service-related information U6381.01	Demonstrate effective customer relations U6381.02	Perform customer relations activities U6381.03	Perform seasonal storage of marine craft and powered equipment U6381.04	Perform a visual inspection of oxy/fuel heating and cutting equipment U6381.05
	Prepare repair area and set up and operate oxy/fuel heating and cutting equipment U6381.06	Verify condition of heating and cutting area U6381.07	Perform a visual inspection of metal inert gas (MIG) welding equipment U6381.08	Prepare repair area and set up and operate metal inert gas (MIG) welding equipment U6381.09	Verify integrity of the weld U6381.10
	Perform a visual inspection of arc welder U6381.11	Prepare repair area and set up and operate arc welding equipment U6381.12	Verify integrity of the arc weld U6381.13		

REPAIR SHOP AIR SUPPLY AND AUXILIARY AIR SYSTEMS U6382.0	Perform a visual inspection of shop air supply systems and components U6382.01	Diagnose and troubleshoot shop air supply systems and components U6382.02	Repair shop air supply systems and components U6382.03	Verify repair of shop air supply and auxiliary air systems and components U6382.04	
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MARINE ENGINE TECHNICIAN

PERFORM PRE-DELIVERY INSPECTION (PDI)	Check marine craft and powered equipment systems and components	Perform a visual inspection of marine craft and powered equipment	Diagnose and troubleshoot marine craft and powered equipment	Complete a pre-delivery inspection report recording the results of the visual inspection, diagnosis, and troubleshooting activities	Perform marine craft and powered equipment pre-delivery and set-up procedures
U6383.0	U6383.01	U6383.02	U6383.03	U6383.04	U6383.05
	Verify the pre-delivery inspection report's accuracy				
	U6383.06				

REPAIR ELECTRICAL/ELECTRONIC SYSTEMS	Perform a visual inspection of electrical/electronic systems	Diagnose and troubleshoot batteries	Service and boost or charge batteries	Diagnose and troubleshoot starting systems and components	Repair starting systems and components
U6384.0	U6384.01	U6384.02	U6384.03	U6384.04	U6384.05
	Verify repair of starting systems and components	Diagnose and troubleshoot charging systems and components	Repair charging systems and components	Verify repair of charging systems and components	Diagnose and troubleshoot electrical and electronically controlled systems and components
	U6384.06	U6384.07	U6384.08	U6384.09	U6384.10
	Repair electrical and electronically controlled systems and components	Verify repair of electrical, electronically controlled systems and components	Diagnose and troubleshoot electrical/electronic ignition systems and components	Repair electrical/electronic ignition systems and components	Verify repair of electrical/ electronic ignition systems and components
	U6384.11	U6384.12	U6384.13	U6384.14	U6384.15

MARINE ENGINE TECHNICIAN

REPAIR GASOLINE ENGINE FUEL MANAGEMENT SYSTEMS U6385.0	Perform a visual inspection of mechanically and electronically controlled gasoline engine fuel systems and components U6385.01	Diagnose and troubleshoot mechanically and electronically controlled gasoline engine fuel control systems and components U6385.02	Repair mechanically and electronically controlled gasoline engine fuel control systems and components U6385.03	Verify repair of gasoline engine fuel control systems and components U6385.04	Diagnose and troubleshoot diesel engine fuel control systems and components U6385.05
	Repair diesel engine fuel control systems and components U6385.06	Verify repair of diesel fuel control systems and components U6385.07			

PERFORM ENGINE TUNE- UPS U6386.0	Perform gasoline engine tune-ups U6386.01	Perform diesel engine tune-ups U6386.02	Verify engine tune-ups U6386.03		
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REPAIR ENGINE SYSTEMS U6387.0	Perform a visual inspection of engine cooling systems U6387.01	Diagnose and troubleshoot cooling systems and components U6387.02	Repair cooling systems and components U6387.03	Verify repair of cooling systems and components U6387.04	Perform a visual inspection of engine lubrication systems U6387.05
	Diagnose and troubleshoot engine lubricating systems and components U6387.06	Repair engine lubricating systems and components U6387.07	Verify repair of engine lubricating systems and components U6387.08	Perform a visual inspection of engine cylinder heads, block, and components U6387.09	Diagnose and troubleshoot cylinder heads and components U6387.10
	Repair cylinder heads and components U6387.11	Verify repair of cylinder heads and components U6387.12	Diagnose and troubleshoot engine block and components U6387.13	Repair engine block and components U6387.14	Verify repair of engine block and components U6387.15

MARINE ENGINE TECHNICIAN

REPAIR STEERING SYSTEMS	Perform a visual inspection of steering systems and components	Diagnose and troubleshoot steering systems and components	Repair steering systems and components	Verify repair of steering systems and components	
U6388.0	U6388.01	U6388.02	U6388.03	U6388.04	

REPAIR HYDRAULIC SYSTEMS	Perform a visual inspection of mechanically and electrically controlled hydraulic systems and components	Diagnose and troubleshoot mechanically and electrically controlled hydraulic systems and components	Repair mechanically and electrically controlled hydraulic systems and components	Verify repair of mechanically and electrically controlled hydraulic systems and components	
U6389.0	U6389.01	U6389.02	U6389.03	U6389.04	

REPAIR DRIVE AND PROPULSION SYSTEMS	Perform a visual inspection of drive and propulsion systems and components	Diagnose and troubleshoot outboard drive and propulsion systems and components	Repair outboard drive and propulsion systems and components	Verify repair of outboard drive and propulsion systems and components	Diagnose and troubleshoot stern drive and propulsion systems and components
	U6390.01	U6390.02	U6390.03	U6390.04	U6390.05
	Repair stern drive and propulsion systems and components	Verify repair of stern drive and propulsion systems and components	Diagnose and troubleshoot inboard drive and propulsion systems and components	Repair inboard drive and propulsion systems and components	Verify repair of inboard drive and propulsion systems and components
	U6390.06	U6390.07	U6390.08	U6390.09	U6390.10
	Diagnose and troubleshoot jet pump drive and propulsion systems and components	Repair jet pump drive and propulsion systems and components	Verify repair of jet pump drive and propulsion systems and components		
	U6390.11	U6390.12	U6390.13		

<p>REPAIR TRAILER SUSPENSION AND HITCHING SYSTEMS</p> <p>U6391.0</p>	<p>Perform a visual inspection of trailer suspension and hitching system components</p> <p>U6391.01</p>	<p>Diagnose and troubleshoot trailer suspension and hitching system components</p> <p>U6391.02</p>	<p>Verify repair of trailer suspension and hitching system components</p> <p>U6391.03</p>		
<p>INSTALL ENGINE AND PROPULSION SYSTEM</p> <p>U6392.0</p>	<p>Perform a visual inspection of engine and propulsion system installation area</p> <p>U6392.01</p>	<p>Diagnose and troubleshoot engine and propulsion systems and component installation process</p> <p>U6392.02</p>	<p>Install engine and propulsion systems and components</p> <p>U6392.03</p>	<p>Verify installation of engine and propulsion systems and components</p> <p>U6392.04</p>	
<p>DIAGNOSE MARINE CRAFT AND HANDLING EQUIPMENT OPERATION</p> <p>U6393.0</p>	<p>Perform a visual inspection of marine craft, trailers, and handling equipment</p> <p>U6393.01</p>	<p>Diagnose and troubleshoot marine craft handling equipment, operating systems, and components</p> <p>U6393.02</p>	<p>Verify marine craft handling equipment, operating systems, and components</p> <p>U6393.03</p>		
<p>PERFORM MARINE SYSTEMS AND ACCESSORIES INSTALLATION, MAINTENANCE, REPAIR, AND WINTERIZING</p> <p>U6394.0</p>	<p>Perform a visual inspection of marine craft systems and accessories</p> <p>U6394.01</p>	<p>Diagnose and troubleshoot marine craft systems and accessories</p> <p>U6394.02</p>	<p>Install, maintain, repair, and winterize marine craft systems and accessories</p> <p>U6394.03</p>	<p>Verify installation, maintenance, repair, and winterizing of marine craft systems and accessories</p> <p>U6394.04</p>	

PREFACE

This training standard was developed by the Workplace Training Branch of the Ministry of Training, Colleges, and Universities (MTCU), in partnership with the Industry Committees and in consultation with representatives from the industry. This document is intended to be used by the 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.

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

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

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

Competency Analysis Profile

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

Competence Learning

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

General Performance Objective (On-the-Job Skill Set)

Describes a set of skills that includes all performance objectives under that skill set

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 objectives that must be signed off on for the apprentice to complete the program

Optional

Status assigned to shaded individual skills, skills sets, or general performance objectives for which sign-off is not required for the apprentice to complete the program but that may be tested on an examination for certification

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

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

Sponsor/Employer

A person who 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. For sponsors/employers 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 that have been identified by Provincial Advisory Committees (PACs) or Industry Committees (ICs) as being required for the trade.

Supervisor

An individual who oversees the execution of a task or 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 that describe how well an apprentice must perform each skill in order to become competent. By 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 apprenticeship staff at the local Ministry of Training, Colleges and Universities 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 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 Contract of Apprenticeship/Training Agreement.
4. The apprentice completion form with the Completed and Authorized Training Standard must be presented to the local Apprenticeship Client Services Unit.

Sponsors/Employers and Supervisors/Trainers

The Training Standard identifies skills required for this trade/occupation and its related training program.

This Training Standard has been written in concise statements which describe how an apprentice must perform each skill 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
U6380.0	PROTECT SELF AND OTHERS	
U6381.0	PERFORM GENERAL TRADE PRACTICES	
U6382.0	REPAIR SHOP AIR SUPPLY AND AUXILIARY AIR SYSTEMS	
U6383.0	PERFORM PRE-DELIVERY INSPECTION (PDI)	
U6384.0	REPAIR ELECTRICAL/ELECTRONIC SYSTEMS	
U6385.0	REPAIR GASOLINE ENGINE FUEL MANAGEMENT SYSTEMS	
U6386.0	PERFORM ENGINE TUNE-UPS	
U6387.0	REPAIR ENGINE SYSTEMS	
U6388.0	REPAIR STEERING SYSTEMS	
U6389.0	REPAIR HYDRAULIC SYSTEMS	
U6390.0	REPAIR DRIVE AND PROPULSION SYSTEMS	
U6391.0	REPAIR TRAILER SUSPENSION AND HITCHING SYSTEMS	
U6392.0	INSTALL ENGINE AND PROPULSION SYSTEM	
U6393.0	DIAGNOSE MARINE CRAFT AND HANDLING EQUIPMENT OPERATION	
U6394.0	PERFORM MARINE SYSTEMS AND ACCESSORIES INSTALLATION, MAINTENANCE, REPAIR, AND WINTERIZING	

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 in-school curriculum learning outcomes will cover all of the skill sets, both shaded and unshaded.
- The Certificate of Qualification examination will test the whole of the trade and may test both shaded and unshaded performance skill sets.

U6380.0 PROTECT SELF AND OTHERS**GENERAL PERFORMANCE OBJECTIVE**

Comply with occupational health and safety procedures by identifying potential workplace health and safety hazards; handling, storing, and disposing of hazardous materials; wearing and maintaining personal protective equipment; complying with workplace-related legislation; interpreting and applying service-related information; practising good housekeeping in the workplace; and complying with Workplace Hazardous Materials Information System (WHMIS) guidelines; according to the *Occupational Health and Safety Act*, government safety regulations, accepted industry standards, and manufacturers' recommendations.

PERFORMANCE OBJECTIVES**SKILLS**

U6380.01 Identify and take corrective action against potential workplace health and safety hazards, including excessive exhaust and explosive fumes, dust, sound levels, and electrical and mechanical hazards (i.e., damaged or faulty air lines and inadequate ventilation), so that the potential for personal injury, damage to equipment, water craft, and the environment are minimized, according to government safety regulations, accepted industry standards, and manufacturers' recommendations.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

U6380.0 PROTECT SELF AND OTHERS (cont.)

U6380.02 Handle, store, and dispose of hazardous workplace materials, including cleaning solvents, antifreeze, hydraulic fluids, engine oil, gear oil, bilge sewage, battery acid, refrigerants, and gases, by using personal protective equipment and specified handling and storage equipment; so that individuals are protected from injury, the environment is protected from contamination, and safety procedures are followed, according to government safety regulations, accepted industry standards, and manufacturers' recommendations.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date

U6380.03 Wear and maintain personal protective equipment, including eye, ear, hand, respiratory, body, and foot protection, by ensuring that correct fit and optimum protection is provided to the wearer for the specific task performed, according to government safety regulations, accepted industry standards, and manufacturers' recommendations.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date

U6380.0 PROTECT SELF AND OTHERS (cont.)

U6380.04 Comply with workplace-related legislation relating to water and highway traffic safety, parts, warranties, occupational health/safety, environmental protection, and business and trade practices, including the *Occupational Health and Safety Act*, the *Motive Vehicle Repair Act*, the *Highway Traffic Act*, the *Environmental Protection Act*, and the Coast Guard regulations, by identifying the personal and legal liabilities of technicians and water craft owners when performing and conducting safety inspections, emissions tests, and work estimates, and repairing or replacing defective parts, according to government safety regulations, accepted industry standards, and manufacturers' recommendations.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

U6380.05 Practise good housekeeping in the workplace by applying fire hazard prevention methods, including maintaining a clean and orderly work area; identifying, removing and disposing of potential fire hazards; cleaning up grease, oil spills and fluids; ensuring work area is free of obstructions; and safely storing tools and shop equipment, to minimize accident or injury to self and others, according to government safety regulations, accepted industry standards, and manufacturers' recommendations.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

U6381.0 PERFORM GENERAL TRADE PRACTICES

GENERAL PERFORMANCE OBJECTIVE

Perform general trade practice procedures by interpreting and applying service-related information; demonstrating effective customer relations and activities; performing seasonal storage of water craft and powered equipment; performing oxyacetylene heating, cutting, welding, and soldering; and performing metal inert gas (MIG) welding and shielded metal arc welding; according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

PERFORMANCE OBJECTIVES

SKILLS

U6381.01 Interpret and apply service-related information, including service bulletins, manuals, and parts catalogues, by locating and identifying marine craft and powered equipment identification numbers, and accessing microfiche and computerized service information systems so that service/repair is performed, according to accepted industry standards and manufacturers' recommendations.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

U6381.0 PERFORM GENERAL TRADE PRACTICES (cont.)

U6381.02 Demonstrate effective customer relations by using attentive listening skills, communicating clearly and effectively, accurately recording customer service requirements and related information, and describing to the customer the recommended maintenance and operation of marine craft and powered equipment and the manufacturers’ warranty provisions and limitations.

Signatures:

_____ Date

Apprentice

_____ Date

Supervisor/Trainer

U6381.03 Perform customer relations activities, including providing an honest interpretation of the marine craft and powered equipment condition, explaining repairs and costs, providing a written statement of work performed, as well as resolving customers’ complaints, so that customers’ expectations are met and information is communicated in a courteous and friendly manner.

Signatures:

_____ Date

Apprentice

_____ Date

Supervisor/Trainer

U6381.0 PERFORM GENERAL TRADE PRACTICES (cont.)

U6381.04 Perform seasonal storage of marine craft and powered equipment by draining and winterizing cooling system, lubricating and draining carburettor, stabilizing fuel systems, draining and refilling drive units, and protecting intake and exhaust system, interior and exterior, from the elements, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

U6381.05 Perform a visual inspection of oxy/fuel heating and cutting equipment, including tanks, gauges, oxyacetylene valves, hoses, fittings, regulators, lines, and tips, by checking for tank pressure, cracks, leaks, foreign matter, wear, and specific regulator settings, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

U6381.0 PERFORM GENERAL TRADE PRACTICES (cont.)

U6381.06 Prepare repair area and set up and operate oxy/fuel heating and cutting equipment, including opening gas valve, checking regulator for specified pressure, setting the regulators for cutting or heating, selecting tip, setting mixture, igniting gas, fine-tuning and adjusting flame, by heating or cutting seized bolts, nuts, and other metal assemblies as specified by manufacturers' repair procedures; using hand, power, specialized, precision, and electronic service tools, lifting devices and safety stands, personal protective equipment, and fire retardant shielding; and covering or removing exposed parts to prevent injuries and vehicle damage, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

_____	_____
Apprentice	Date
_____	_____
Supervisor/Trainer	Date

U6381.07 Verify condition of heating and cutting area by visually inspecting and checking for damage or distortion to surrounding area and components, according to manufacturers' and industry approved repair procedures and safety requirements.

Signatures:

_____	_____
Apprentice	Date
_____	_____
Supervisor/Trainer	Date

U6381.0 PERFORM GENERAL TRADE PRACTICES (cont.)

U6381.08 Perform a visual inspection of metal inert gas (MIG) welding equipment, including tanks, gases, hoses, fittings, regulators, lines, electrical connectors, cables, ground clamps, tips and nozzles, drive assembly, and ventilation fans, by checking for pressure, cracks, leaks, corrosion, fraying, foreign matter, wear, proper settings, connections, obstructions, and ventilation; according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

U6381.09 Prepare repair area and set up and operate metal inert gas (MIG) welding equipment, including attaching ground clamp to repair area to protect vehicle electronic components, turning on power switch, opening gas valve; checking regulator for specified pressure, adjusting wire speed, selecting required amperage, fine-tuning the welder to the repair area, and applying weld-through primer to repair area, by performing welding on mild steel and aluminum components, and silicon bronze welding for cosmetic repairs only, using personal protective equipment, and fire retardant shielding, and covering or removing exposed parts to prevent injuries and vehicle damage, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

U6381.0 PERFORM GENERAL TRADE PRACTICES (cont.)

U6381.10 Verify integrity of the weld, including correct penetration and the absence of visible cracks, undercuts, melt-through, porosity, craters, excessive spatter, and edge defects, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

U6381.11 Perform a visual inspection of arc welder, including ground clamp and holder, power cables, electrical connectors, electrodes, and ventilation fans, by checking for wear, fraying, burns, corrosion, loose connections, and electrode condition, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

U6381.0 PERFORM GENERAL TRADE PRACTICES (cont.)

U6381.12 Prepare repair area and set up and operate arc welding equipment, including cleaning and preparing work area, selecting specified electrodes, adjusting amperage, attaching ground clamp, turning on power switch, and fine-tuning the welder to the repair area, as specified by manufacturers' repair procedures, by performing welding limited to heavy gauge steel when recommended by manufacturers' repair procedures; and using personal protective equipment, fire retardant shielding, and covering or removing exposed parts to prevent injuries and vehicle damage, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

U6381.13 Verify integrity of the arc weld, including correct penetration, without any slag in the weld, or visible cracks, undercuts, melt-through, porosity, craters, excessive spatter, and edge defects, by visually inspecting and checking for damage to surrounding area and components, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

Sponsor/Employer Name

Sponsor/Employer Signature

U6382.0 REPAIR SHOP AIR SUPPLY AND AUXILIARY AIR SYSTEMS

GENERAL PERFORMANCE OBJECTIVE

Diagnose and repair shop air supply systems and components, by performing a visual inspection, diagnosing and troubleshooting, repairing, and verifying the repair of air supply systems and components, according to; manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

PERFORMANCE OBJECTIVES

SKILLS

U6382.01 Perform a visual inspection of shop air supply systems and components, identifying system type and application, including compressors, drive mechanisms, regulator, cooling, and lubrication systems, air filters, air manifolds, reservoirs, lines, hoses, fittings, seals, valves, gauges, moisture drains, fasteners and mounting devices; and checking for worn, loose, damaged, missing, leaking, restricted, or defective components, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

U6382.0 REPAIR SHOP AIR SUPPLY AND AUXILIARY AIR SYSTEMS (cont.)

U6382.02 Diagnose and troubleshoot shop air supply systems and components, including compressors, drive mechanisms, regulator, cooling and lubrication systems, air filters, air manifolds, reservoirs, lines, hoses, fittings, seals, valves, gauges, moisture drains, fasteners, and mounting devices, by visually inspecting, testing, and analysing performance and function, checking for wear, temperature, lubrication, leaks, contamination, pressure, flow/velocity, routing of lines and hoses, belt tension and condition, vibration or noise, corrosion, erosion, distortion and fractures; and using hand, power, specialized, precision, and electronic service tools, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date

U6382.03 Repair shop air supply systems and components, including compressors, drive mechanisms, regulator, cooling, and lubrication systems, air filters, air manifolds, reservoirs, lines, hoses, fittings, seals, valves, gauges, moisture drains, fasteners, and mounting devices by exchanging, reconditioning, servicing, or calibrating, using hand, power, specialized, precision, and electronic service tools, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date

U6382.0 REPAIR SHOP AIR SUPPLY AND AUXILIARY AIR SYSTEMS (cont.)

U6382.04 Verify repair of shop air supply and auxiliary air systems and components, by visually inspecting, testing, and analysing performance and function, and using hand, power, specialized, precision, and electronic service tools, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

Sponsor/Employer Name

Sponsor/Employer Signature

U6383.0 PERFORM PRE-DELIVERY INSPECTION (PDI)

GENERAL PERFORMANCE OBJECTIVE

Perform marine craft and powered equipment pre-delivery and set-up procedures by performing a visual inspection, diagnosing and troubleshooting, completing a pre-delivery inspection report, and verifying the pre-delivery inspection report's accuracy, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

PERFORMANCE OBJECTIVES

SKILLS

U6383.01 Check marine craft and powered equipment systems and components by visually inspecting, diagnosing, troubleshooting, testing, and verifying performance and function, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

U6383.0 PERFORM PRE-DELIVERY INSPECTION (PDI) (cont.)

U6383.02 Perform a visual inspection of marine craft and powered equipment, including the condition of exterior and interior components, accessories, engine systems, fuel system, electrical and electronic systems, steering systems, drive systems and controls, hydraulic systems and controls, and fastening and mounting devices, and by checking for cleanliness, structural integrity, cracks, distortion, corrosion, leaks, worn, loose, damaged, missing and defective components, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date

U63830.03 Diagnose and troubleshoot marine craft and powered equipment, including the condition of exterior and interior components, accessories, engine systems, fuel system, electrical and electronic systems, steering systems, drive systems and controls, hydraulic systems and controls, and fastening and mounting devices, by visually inspecting, testing, and analysing performance and function; checking for structural integrity, leaks, pressure, venting, flow, temperature, corrosion, vibration, noise, wear, misalignment, fractures, odour, and colour; and by using hand, power, and specialized electronic service tools, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date

U6383.0 PERFORM PRE-DELIVERY INSPECTION (PDI) (cont.)

U6383.04 Complete a pre-delivery inspection report, recording the results of the visual inspection, diagnosis, and troubleshooting activities, including the condition of exterior and interior components, accessories, engine systems, fuel system, electrical and electronic systems, steering systems, drive systems and controls, hydraulic systems and controls, and fastening and mounting devices, according to manufacturers’ recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice	Date
Supervisor/Trainer	Date

U6383.05 Perform marine craft and powered equipment, pre-delivery and set-up procedures, including re-torquing specified fasteners, installing required accessories and attachments, cleaning and applying corrosion protection, adjusting belt tensions and drive control linkage, and topping up fluid levels, according to manufacturers’ recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice	Date
Supervisor/Trainer	Date

U6383.0 PERFORM PRE-DELIVERY INSPECTION (PDI) (cont.)

U6383.06 Verify the pre-delivery inspection report’s accuracy, including the condition of exterior and interior components, accessories, engine systems, fuel system, electrical and electronic systems, steering systems, drive systems and controls, hydraulic systems and controls, and fastening and mounting devices, by visually inspecting, testing, and analysing performance, function, and structural integrity; and using hand, power, and specialized electronic service tools, according to manufacturers’ recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

Sponsor/Employer Name

Sponsor/Employer Signature

U6384.0 REPAIR ELECTRICAL/ELECTRONIC SYSTEMS**GENERAL PERFORMANCE OBJECTIVE**

Diagnose and repair electrical/electronic systems by performing a visual inspection; diagnosing and troubleshooting batteries; servicing and boosting or charging batteries; and diagnosing, troubleshooting, repairing, and verifying the repair of starting, charging, ignition, electrical, and electronic lighting and accessory systems and components, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

PERFORMANCE OBJECTIVES**SKILLS**

U6384.01 Perform a visual inspection of electrical/electronic systems, identifying system types and applications, including batteries, electrolyte levels, mechanical pull starting mechanisms, electric starters, generators, alternators, drive mechanisms, electrical/electronic accessories, cables, connectors, solenoids, relays, sensors, modules, regulators, circuit protection devices, wiring harnesses, gauges, magneto systems, and fastening and mounting devices, by checking for worn, damaged, corroded, loose, or defective components, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date

U6384.0 REPAIR ELECTRICAL/ELECTRONIC SYSTEMS (cont.)

U6384.02 Diagnose and troubleshoot batteries by visually inspecting, testing, and analysing performance and function; checking for damaged, worn, loose, and missing components, electrolyte specific gravity, voltage, fluid level, leaks, cracks, corroded connections, distortion, and cleanliness; and using hand, power, specialized, precision, and electronic service tools, load testers, chargers, and hydrometers, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

U6384.03 Service and boost or charge batteries, including single batteries and multi-battery group, by removing, charging, or replacing using hand and power tools, booster cables, booster packs, chargers, electrolyte, distilled water, pullers, cleaning tools, and hydrometers, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

U6384.0 REPAIR ELECTRICAL/ELECTRONIC SYSTEMS (cont.)

U6384.04 Diagnose and troubleshoot starting systems and components, including mechanical pull starting mechanisms, electrical starting motors and drive mechanisms, batteries, cables, connectors, circuit protection devices, neutral safety devices, switches, solenoids, relays, wiring harnesses, fasteners, and mounting devices, by visually inspecting, testing, and analysing performance and function; checking for wear, opens, shorts, and grounds, high-resistance connections, routing of wires, noise or vibration, odour, distortion, corrosion, fractures, and temperature, and using hand, power, specialized, precision, and electronic service tools, digital volt ohmmeter, ammeter, and load testers, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date

U6384.05 Repair starting systems and components, including mechanical starting mechanisms, electrical starting motors and drive mechanisms, batteries, neutral safety devices, cables, connectors, circuit protection devices, switches, solenoids, relays, wiring harnesses, fasteners, and mounting devices, by exchanging, reconditioning, or servicing using hand, power, specialized, and electronic service tools, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date

U6384.0 REPAIR ELECTRICAL/ELECTRONIC SYSTEMS (cont.)

U6384.06 Verify repair of starting systems and components by visually inspecting, testing, and analysing performance and function using hand, power, specialized, and electronic service tools, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

U6384.07 Diagnose and troubleshoot charging systems and components, including magneto systems, generators, alternators, drive mechanisms, batteries, cables, connectors, circuit protection devices, voltage regulators, switches, relays, sensors, modules, wiring harnesses, fasteners, and mounting devices, by visually inspecting, testing, and analysing performance and function; checking for wear, pins, shorts, grounds, high-resistance connections, parasitic draw, routing of wires, system voltage and amperage, vibration or noise, odour, corrosion, distortion, contamination, and temperature, and using hand, power, specialized, precision, and electronic service tools, digital volt ohmmeter (DVOM), amperage voltage resistance (AVR) testers, and stethoscopes; according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

U6384.0 REPAIR ELECTRICAL/ELECTRONIC SYSTEMS (cont.)

U6384.08 Repair charging systems and components, including magneto systems, generators, alternators, drive mechanisms, batteries, cables, connectors, circuit protection devices, voltage regulators, switches, relays, sensors, modules, wiring harnesses, fasteners and mounting devices, by exchanging, reconditioning, or servicing, and using hand, power, specialized, precision, and electronic service tools, and digital volt ohmmeter (DVOM), according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date

U6384.09 Verify repair of charging systems and components by visually inspecting, testing, and analysing performance and function using hand, power, specialized, precision, and electronic service tools, according to manufacturers' recommendations, and specifications, government safety regulations, and accepted industry standards.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date

U6384.0 REPAIR ELECTRICAL/ELECTRONIC SYSTEMS (cont.)

U6384.10 Diagnose and troubleshoot electrical and electronically controlled systems and components, including batteries, connectors, cables, display panels, gauges, switches, solenoids, relays, sensors, modules, data links, warning devices, lighting/illumination systems, circuit protection devices, theft-deterrent and electrical accessory devices, wiring harnesses, and fasteners and mounting devices, by visually inspecting, testing, and analysing performance and function; checking for wear, opens, shorts, grounds, parasitic draw, diagnostic codes, routing of wires, temperature, corrosion, distortion, vibration or noise, colour, and odour; and using hand, power, specialized, precision, and electronic service tools and digital volt ohmmeter (DVOM); according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

U6384.11 Repair electrical and electronically controlled systems and components, including batteries, connectors, cables, display panels, gauges, switches, solenoids, relays, sensors, modules, data links, warning devices, lighting/illumination, circuit protection, theft-deterrent and electrical accessory devices, wiring harnesses, fasteners, and mounting devices, by exchanging, reconditioning, or servicing; and using hand, power, specialized, precision, and electronic service tools, according to manufacturers' recommendations and specifications, and government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

U6384.0 REPAIR ELECTRICAL/ELECTRONIC SYSTEMS (cont.)

U6384.12 Verify repair of electrical, electronically controlled systems and components, by visually inspecting, testing, and analysing performance and function, using hand, power, specialized, precision, and electronic service tools, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date

U6384.13 Diagnose and troubleshoot electrical/electronic ignition systems and components, including distributor components, coils, resistors, ignition modules, ignition timing components, spark advance mechanisms, high-tension wires, spark plugs, data links, switches, sensors, pick-up assembly, modules, circuit protection devices, wiring harnesses, fasteners, and mounting devices, by visually inspecting, testing, and analysing performance and function; checking for wear, pins, shorts, grounds, diagnostic codes, routing of wires, temperature, colour, system voltage and amperage, electrical leakage, coil oil leakage, corrosion, and vibration or noise; and using hand, power, specialized, precision, and electronic service tools and digital volt ohmmeter (DVOM); according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date

U6384.0 REPAIR ELECTRICAL/ELECTRONIC SYSTEMS (cont.)

U6384.14 Repair electrical/electronic ignition systems and components, including distributor components, coils, resistors, ignition modules, ignition timing components, spark advance mechanisms, high-tension wires, spark plugs, data links, switches, sensors, pick-up assembly, modules, circuit protection devices, wiring harnesses, fasteners and mounting devices, by exchanging, reconditioning, or servicing; and using hand, power, specialized, precision, and electronic service tools, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

U6384.15 Verify repair of electrical/electronic ignition systems and components by visually inspecting, testing, and analysing performance and function using hand, power, specialized, precision, and electronic service tools, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

Sponsor/Employer Name

Sponsor/Employer Signature

U6385.0 REPAIR GASOLINE ENGINE FUEL MANAGEMENT SYSTEMS**GENERAL PERFORMANCE OBJECTIVE**

Diagnose and repair gasoline engine fuel management systems by performing a visual inspection; diagnosing, troubleshooting, repairing, and verifying the repair of fuel control systems and components, ignition systems and components, and computer-controlled systems and components, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

PERFORMANCE OBJECTIVES**SKILLS**

U6385.01 Perform a visual inspection of mechanically and electronically controlled gasoline engine fuel systems and components, identifying system types and applications, including fuel, tanks, valves, filters, pumps, lines, hoses and fittings, carburetors, injectors, fuel rails, pressure regulators, intake manifolds, ventilation systems, diagnostic codes, warning devices, solenoids, relays, sensors, modules, actuators, data links, circuit protection devices, wiring harnesses, and fastening and mounting devices, by checking for worn, loose, damaged, leaking, missing, or defective components, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

U6385.0 REPAIR GASOLINE ENGINE FUEL MANAGEMENT SYSTEMS (cont.)

U6385.02 Diagnose and troubleshoot mechanically and electronically controlled gasoline engine fuel control systems and components, including fuel, tanks, valves, filters, pumps, lines, hoses and fittings, carburetors, injectors, fuel rails, pressure regulators, intake manifolds, ventilation systems, diagnostic codes, warning devices, solenoids, relays, sensors, modules, actuators, data links, circuit protection devices, wiring harnesses, and fastening and mounting devices, by visually inspecting, testing, and analysing performance and function; checking for odour, temperature, corrosion, colour, vibration or noise, leaks, pressure, vacuum, and flow, and using hand, power, specialized, and electronic service tools, and lifting, rigging, and blocking devices, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date

U6385.03 Repair mechanically and electronically controlled gasoline engine fuel control systems and components, including fuel, tanks, valves, filters, pumps, lines, hoses and fittings, carburetors, injectors, fuel rails, pressure regulators, intake manifolds, ventilation systems, diagnostic codes, warning devices, solenoids, relays, sensors, modules, actuators, data links, circuit protection devices, wiring harnesses, and fastening and mounting devices, by exchanging, reconditioning, or servicing using hand, power, specialized, and electronic service tools, and lifting, rigging, and blocking devices, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date

U6385.0 REPAIR GASOLINE ENGINE FUEL MANAGEMENT SYSTEMS (cont.)

U6385.04 Verify repair of gasoline engine fuel control systems and components by visually inspecting, testing, and analysing performance and function using hand, power, specialized, and electronic service tools, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date

U6385.05 Diagnose and troubleshoot diesel engine fuel control systems and components, including fuel, tanks, valves, filters, pumps, lines, hoses and fittings, injectors, fuel rails, intake manifolds, diagnostic codes, warning devices, solenoids, relays, sensors, modules, actuators, data links, circuit protection devices, wiring harnesses, and fastening and mounting devices, by visually inspecting, testing, and analysing performance and function; checking for odour, temperature, corrosion, colour, vibration or noise, leaks, pressure, vacuum, and flow; and using hand, power, specialized, and electronic service tools, and lifting, rigging, and blocking devices, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date

U6385.0 REPAIR GASOLINE ENGINE FUEL MANAGEMENT SYSTEMS (cont.)

U6385.06 Repair diesel engine fuel control systems and components, including fuel, tanks, valves, filters, pumps, lines, hoses and fittings, injectors, fuel rails, intake manifolds, diagnostic codes, warning devices, solenoids, relays, sensors, modules, actuators, data links, circuit protection devices, wiring harnesses, and fastening and mounting devices, by exchanging, reconditioning, or servicing, using hand, power, specialized, and electronic service tools, and lifting, rigging, and blocking devices, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

U6385.07 Verify repair of diesel fuel control systems and components by visually inspecting, testing, and analysing performance and function, using hand, power, specialized, and electronic service tools, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

Sponsor/Employer Name

Sponsor/Employer Signature

U6386.0 PERFORM ENGINE TUNE-UPS**GENERAL PERFORMANCE OBJECTIVE**

Perform engine tune-ups by performing a visual inspection; diagnosing and troubleshooting engine operating systems; checking compression; replacing filters, crankcase oil, sparkplugs, fuel injectors, and ignition components; checking and adjusting ignition and fuel pump timing and fuel pump pressure; and verifying the tune-up, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

PERFORMANCE OBJECTIVES**SKILLS**

U6386.01 Perform gasoline engine tune-ups by checking or replacing spark plugs, performing compression, vacuum, and leak-down tests, checking or replacing air filters, intake system, and flame arresters, checking fuel pressure, lines, and hoses, adjusting, cleaning, or replacing carburetors or injectors, checking or replacing batteries, cables, and connectors, ignition system components, fuel filter, and positive crankcase ventilation (PCV) valve, checking, and adjusting ignition timing, timing control mechanisms, governors, idle speed, and emission control devices, checking, adjusting the level, or replacing engine oil, checking, or repairing exhaust restrictions, using hand, power, specialized, and electronic service tools, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

U6386.0 PERFORM ENGINE TUNE-UPS (cont.)

U6386.02 Perform diesel engine tune-ups by performing compression and leak-down tests, checking or replacing air filters, intake system components, and fuel filters, checking fuel pressure, lines, and hoses, checking or repairing exhaust restriction, checking manifold boost pressure, electrical system, and valve adjustment, including injectors and pumps, checking or adjusting injection timing, governors, idle speed, and emission control devices, and using hand, power, specialized, and electronic service tools, according to manufacturers' recommendations, and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

U6386.03 Verify engine tune-up by visually inspecting, testing, and analysing performance and function using hand, power, specialized, and electronic service tools, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

Sponsor/Employer Name

Sponsor/Employer Signature

U6387.0 REPAIR ENGINE SYSTEMS**GENERAL PERFORMANCE OBJECTIVE**

Diagnose and repair engine systems by performing a visual inspection; diagnosing and troubleshooting; repairing and verifying repairs of cooling system and components, engine lubricating system and components, cylinder head and components, and engine block and components, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

PERFORMANCE OBJECTIVES**SKILLS**

U6387.01 Perform a visual inspection of engine cooling systems by identifying system types and applications, including coolant, reservoirs, cooling fins, surge tanks, coolant pumps, raw water pump, belts, hoses, lines, fittings, heat exchangers, gaskets, o-rings, seals, pipes, valves, sensors, temperature control devices, drive mechanisms, wiring harnesses, fastening and mounting devices; and checking for coolant level, worn, loose, damaged, missing, leaking, or defective components, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

U6387.0 REPAIR ENGINE SYSTEMS (cont.)

U6387.02 Diagnose and troubleshoot cooling systems and components, including coolant, reservoirs, surge tanks, coolant pumps, belts, raw water pump, hoses, lines, fittings, heat exchangers, seals, gaskets, o-rings, pipes, valves, sensors, relays, temperature control devices, drive mechanisms, wiring harnesses, fastening and mounting devices, by visually inspecting, testing, and analysing performance and function; checking for leaks, odour, temperature, corrosion, colour, vibration or noise, coolant type, quantity, and condition; and using hand, power, electronic service, and specialized tools, and lifting, rigging, and blocking devices, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date

U6387.03 Repair cooling systems and components, including coolant, reservoirs, surge tanks, coolant, coolant pumps, raw water pump, belts, hoses, lines, fittings, heat exchangers, seals, gaskets, o-rings, pipes, valves, sensors, relays, temperature control devices, drive mechanisms, wiring harnesses, fasteners, and mounting devices, by exchanging, reconditioning, or servicing using hand, power, electronic service, and specialized tools, and lifting, rigging, and blocking devices, according to manufacturers' recommendations, and specifications, government safety regulations, and accepted industry standards.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date

U6387.0 REPAIR ENGINE SYSTEMS (cont.)

U6387.04 Verify repair of cooling systems and components by testing and analysing performance and function using hand, power, electronic service, and specialized tools, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date

U6387.05 Perform a visual inspection of engine lubrication systems by identifying system types and applications, including pumps, housings, filters, lines, fittings, seals, oil, lubrication jets, gaskets, o-rings, heat exchangers, bypass valves, auxiliary devices, sensors, modules, gauges, warning devices, wiring harnesses, and fastening and mounting devices, by checking for oil levels, worn, loose, damaged, missing, leaking, or defective components, according to manufacturers' recommendations, and specifications, government safety regulations, and accepted industry standards.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date

U6387.0 REPAIR ENGINE SYSTEMS (cont.)

U6387.06 Diagnose and troubleshoot engine lubricating systems and components, including pumps, housings, filters, lines, fittings, seals, oil, lubrication jets, gaskets, o-rings, heat exchangers, bypass valves, auxiliary devices, sensors, modules, gauges, warning devices, wiring harnesses, and fastening and mounting devices, by visually inspecting, testing, and analysing performance and function; checking for leaks, odour, temperature, distortion, corrosion, colour, vibration or noise, pressure, contamination, and oil analysis; and using hand, power, electronic service, and specialized tools, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date

U6387.07 Repair engine lubricating systems and components, including pumps, housings, filters, lines, fittings, seals, oil, lubrication jets, gaskets, o-rings, heat exchangers, bypass valves, auxiliary devices, sensors, modules, gauges, warning devices, wiring harnesses, and fastening and mounting devices, by exchanging, reconditioning, or servicing using hand, power, electronic service, and specialized tools, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date

U6387.0 REPAIR ENGINE SYSTEMS (cont.)

U6387.08 Verify repair of engine lubricating systems and components by testing and analysing performance and function using hand, power, electronic, and specialized tools, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date

U6387.09 Perform a visual inspection of engine cylinder heads, block, and components, identifying system types and applications, including cylinder heads, cover plates, seats, guides, seals, gaskets, o-rings, springs, retainers, rotators, injector tubes, expansion plugs, valves, actuating mechanisms, camshafts, follower assemblies, drive mechanisms, engine blocks, piston assemblies, connecting rods, bearings, liners, counter-balancers, crankshafts, flywheel assemblies, balance shafts, gear trains, harmonic balancers, pulleys, auxiliary drives, oil pans, sensors, modules, gauges, warning devices, wiring harnesses, fastening and mounting devices, and checking for worn, loose, damaged, missing, leaking, or defective components, ventilation, and pressure, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date

U6387.0 REPAIR ENGINE SYSTEMS (cont.)

U6387.10 Diagnose and troubleshoot cylinder heads and components, including cylinder heads, cover plates, seats, guides, seals, gaskets, o-rings, springs, retainers, rotators, injector tubes, expansion plugs, valves, actuating mechanisms, camshafts, follower assemblies, drive mechanisms, sensors, modules, gauges, warning devices, wiring harnesses, and fastening and mounting devices, by visually inspecting, testing, and analysing performance and function; checking for corrosion, erosion, vibration or noise, carbon build-up, fractures, leaks, distortion, temperature, pressure and ventilation; and using hand, power, electronic service, and specialized tools, and lifting, rigging, and blocking devices, according to manufacturers' recommendations and accepted industry standards.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date

U6387.11 Repair cylinder heads and components, including cylinder heads, cover plates, seats, guides, seals, gaskets, o-rings, springs, retainers, rotators, injector tubes, expansion plugs, valves, positive crankcase ventilation systems, actuating mechanisms, camshafts, follower assemblies, drive mechanisms, sensors, modules, gauges, warning devices, wiring harnesses, and fastening and mounting devices, by exchanging, reconditioning, or servicing using hand, power, electronic service, and specialized tools and equipment, and lifting, rigging, and blocking devices, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date

U6387.0 REPAIR ENGINE SYSTEMS (cont.)

U6387.12 **Verify repair of cylinder heads and components** by testing and analysing performance and function using hand, power, electronic service, and specialized tools, and lifting, rigging, and blocking devices, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

U6387.13 **Diagnose and troubleshoot engine block and components**, including engine blocks, expansion plugs, cover plates, positive crankcase ventilation systems, piston assemblies, connecting rods, bearings, seals, gaskets, liners, counter-balancers, crankshafts, flywheel assemblies, balance shafts, gear trains, camshafts, follower assemblies, harmonic balancers, pulleys, auxiliary drives, oil pans, and fastening and mounting devices, by visually inspecting, testing, and analysing performance and function; checking for temperature, corrosion, erosion, vibration or noise, carbon build-up, fractures, distortion, alignment, leaks, ventilation and pressure; and using hand, power, electronic service, and specialized tools, and lifting, rigging, and blocking devices, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

U6387.0 REPAIR ENGINE SYSTEMS (cont.)

U6387.14 Repair engine block and components, including expansion plugs, cover plates, positive crankcase ventilation systems, piston and connecting rod assemblies, bearings, seals, gaskets, sealants, liners, counter-balancers, crankshafts, flywheel assemblies, balance shafts, gear trains, camshafts and follower assemblies, harmonic balancers, pulleys, auxiliary drives, oil pans, and fastening and mounting devices, by exchanging, reconditioning, or servicing using hand, power, electronic service, and specialized tools; heating, cutting, and welding equipment; and lifting, rigging, and blocking devices, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

U6387.15 Verify repair of engine block and components by testing and analysing performance and function using hand, power, electronic service, and specialized tools, and lifting, rigging, and blocking devices, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

Sponsor/Employer Name

Sponsor/Employer Signature

U6388.0 REPAIR STEERING SYSTEMS**GENERAL PERFORMANCE OBJECTIVE**

Repair steering systems by performing a visual inspection; diagnosing and troubleshooting; repairing and verifying repair of steering systems and components, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

PERFORMANCE OBJECTIVES**SKILLS**

U6388.01 Perform a visual inspection of steering systems and components by identifying system types and applications, including lines, hoses, fittings, gauges, valves, controls, actuators, pumps, drive mechanisms, cylinders, reservoirs, seals, bearings, gaskets, steering boxes/racks/motors, struts, rudders, linkages, tie rod ends, cables, bushings, guides, column assemblies, and fastening and mounting devices; and checking for worn, loose, missing, leaking, damaged, or defective components, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

U6388.0 REPAIR STEERING SYSTEMS (cont.)

U6388.02 Diagnose and troubleshoot steering systems and components, including lines, hoses, fittings, gauges, valves, controls, actuators, pumps, drive mechanisms, cylinders, reservoirs, seals, bearings, gaskets, steering boxes/racks/motors, struts, rudders, linkages, tie rod ends, cables, bushings, guides, column assemblies, and fastening and mounting devices, by visually inspecting, testing, and analysing performance and function; checking for vibration or noise, corrosion, fractures, leaks, pressure, colour, alignment, stability, and controls; and using hand, power, and specialized tools, and lifting, rigging, and blocking devices, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date

U6388.03 Repair steering systems and components, including lines, hoses, fittings, gauges, valves, controls, and actuators, pumps, drive mechanisms, cylinders, reservoirs, seals, bearings, gaskets, steering boxes/racks/motors, struts, rudders, linkages, tie rod ends, cables, bushings, guides, column assemblies, and fastening and mounting devices, by exchanging, reconditioning, aligning, or servicing using hand, power, and specialized tools; heating, cutting, and welding equipment; and lifting, rigging, and blocking devices, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date

U6388.0 REPAIR STEERING SYSTEMS (cont.)

U6388.04 Verify repair of steering systems and components by visually inspecting, testing, and analysing performance and function using hand, power, and specialized tools; and lifting, rigging, and blocking devices, according to manufacturers’ recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

Sponsor/Employer Name

Sponsor/Employer Signature

U6389.0 REPAIR HYDRAULIC SYSTEMS**GENERAL PERFORMANCE OBJECTIVE**

Diagnose and repair hydraulic systems by performing a visual inspection; diagnosing, troubleshooting, repairing, and verifying the repair of mechanically controlled hydraulic systems and components; and electrically controlled hydraulic systems and components, according to manufacturers' recommendations and specification, government safety regulations, and accepted industry standards.

PERFORMANCE OBJECTIVES**SKILLS**

U6389.01 Perform a visual inspection of mechanically and electrically controlled hydraulic systems and components identifying system types and applications, including pumps, valves, actuators, motors, cylinders, accumulators, reservoirs, atmospheric ventilating devices, controls, display panels, screens, filters, heat exchangers, drive mechanisms, fittings, lines, hoses, oil, seals, bearings, bushings, gaskets, switches, solenoids, relays, sensors, modules, circuit protection devices, wiring harnesses, fasteners, and mounting devices, and checking for worn, loose, damaged, leaking, missing, or defective components, oil level, and condition, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

U6389.0 REPAIR HYDRAULIC SYSTEM (cont.)

U6389.02 Diagnose and troubleshoot mechanically and electrically controlled hydraulic systems and components, including pumps, valves, actuators, motors, cylinders, accumulators, reservoirs, atmospheric ventilating devices, controls, display panels, screens, filters, heat exchangers, drive mechanisms, fittings, lines, hoses, oil, seals, bearings, bushings, gaskets, switches, solenoids, relays, sensors, modules, circuit protection devices, wiring harnesses, fasteners, and mounting devices, by visually inspecting, testing, and analysing performance and function; checking for wear, opens, shorts, grounds, fluid level, leaks, odour, colour, distortion, corrosion, cavitation, contamination, fractures, pressure, flow, routing of lines and hoses, temperature, and vibration or noise; and using hand, power, specialized, precision, and electronic service tools, and lifting, rigging, and blocking devices, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date

U6389.03 Repair mechanically and electrically controlled hydraulic systems and components, including pumps, valves, actuators, motors, cylinders, accumulators, reservoirs, atmospheric ventilating devices, controls, display panels, screens, filters, heat exchangers, drive mechanisms, fittings, lines, hoses, oil, seals, bearings, bushings, gaskets, switches, solenoids, relays, sensors, modules, circuit protection devices, wiring harnesses, fasteners, and mounting devices, by exchanging, reconditioning, or servicing using hand, power, specialized, precision, and electronic service tools, and lifting, rigging, and blocking devices, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date

U6389.0 REPAIR HYDRAULIC SYSTEM (cont.)

U6389.04 Verify repair of mechanically and electrically controlled hydraulic systems and components by visually inspecting, testing, and analysing performance and function using hand, power, specialized, precision, and electronic service tools, and lifting, rigging, and blocking devices, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

Sponsor/Employer Name

Sponsor/Employer Signature

U6390.0 REPAIR DRIVE AND PROPULSION SYSTEMS**GENERAL PERFORMANCE OBJECTIVE**

Diagnose and repair drive and propulsion systems, including outboard drive assemblies, stern drive assemblies, inboard drive assemblies, and jet pump drive assemblies, by performing a visual inspection, and diagnosing, troubleshooting, repairing, and verifying repair, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

PERFORMANCE OBJECTIVES**SKILLS**

U6390.01 Perform a visual inspection of drive and propulsion systems and components by identifying system types and applications, including bell and gimbal housings, grease fittings, shafts, couplings, tubes, universal joints, packing, gears, bearings, seals, gaskets, shims, linkages, cables, controls, actuators, switches, relays, solenoids, sensors, wiring harnesses, fluids/lubricants, water pump, filters, propellers, struts, rudders, bushings, hydraulic tilt cylinders and motors, and fastening and mounting devices; and checking for worn, loose, damaged, leaking, missing, or defective components, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

U6390.0 REPAIR DRIVE AND PROPULSION SYSTEMS (cont.)

U6390.02 Diagnose and troubleshoot outboard drive and propulsion systems and components, including housings, grease fittings, shafts, couplings, tubes, packing, gears, bearings, seals, gaskets, shims, linkages, cables, controls, actuators, switches, relays, solenoids, sensors, wiring harnesses, fluids/lubricants, water pump, filters, propellers, bushings, hydraulic tilt cylinders and motors, and fastening and mounting devices, by visually inspecting, testing, and analysing performance and function; checking for odour, temperature, corrosion, contamination, vibration or noise, alignment, colour, fluid level, pressure, free play, internal adjustments, slippage, disengagement, and dragging; using hand, power, electronic service, and specialized tools, and lifting, rigging, and blocking devices, according to manufacturers' recommendations, and specifications, government safety regulations, and accepted industry standards.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date

U6390.03 Repair outboard drive and propulsion systems and components, including housings, grease fittings, shafts, couplings, tubes, packing, gears, bearings, seals, gaskets, shims, linkages, cables, controls, actuators, switches, relays, solenoids, sensors, wiring harnesses, fluids/lubricants, water pump, filters, propellers, bushings, hydraulic tilt cylinders and motors, and fastening and mounting devices, by exchanging, reconditioning, or servicing using hand, power, electronic service, and specialized tools, and lifting, rigging, and blocking devices, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date

U6390.0 REPAIR DRIVE AND PROPULSION SYSTEMS (cont.)

U6390.04 **Verify repair of outboard drive and propulsion systems and components** by testing and analysing performance and function using hand, power, electronic service, and specialized tools, and lifting, rigging, and blocking devices, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date

U6390.05 **Diagnose and troubleshoot stern drive and propulsion systems and components**, including drive shafts, universal joints, housings, grease fittings, shafts, couplings, tubes, packing, gears, bearings, seals, gaskets, shims, linkages, cables, controls, actuators, switches, relays, solenoids, sensors, wiring harnesses, fluids/lubricants, water pump, filters, propellers, bushings, hydraulic tilt cylinders and motors, and fastening and mounting devices, by visually inspecting, testing, and analysing performance and function; checking for odour, temperature, corrosion, contamination, vibration or noise, alignment, colour, fluid level, pressure, free play, internal adjustments, slippage, disengagement, and dragging; and using hand, power, electronic service, and specialized tools, and lifting, rigging, and blocking devices, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date

U6390.0 REPAIR DRIVE AND PROPULSION SYSTEMS (cont.)

U6390.06 Repair stern drive and propulsion systems and components, including drive shafts, universal joints, housings, grease fittings, shafts, couplings, tubes, packing, gears, bearings, seals, gaskets, shims, linkages, cables, controls, actuators, switches, relays, solenoids, sensors, wiring harnesses, fluids/lubricants, water pump, filters, propellers, bushings, hydraulic tilt cylinders and motors, and fastening and mounting devices, by exchanging, reconditioning, or servicing using hand, power, electronic service, and specialized tools, and lifting, rigging, and blocking devices, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date

U6390.07 Verify repair of stern drive and propulsion systems and components by testing and analysing performance and function using hand, power, electronic service, and specialized tools, and lifting, rigging, and blocking devices, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date

U6390.0 REPAIR DRIVE AND PROPULSION SYSTEMS (cont.)

U6390.08 Diagnose and troubleshoot inboard drive and propulsion systems and components, including couplers, clutch assemblies, input shafts, housings, gear trains, synchronizers, shift mechanisms, bearings, seals, packing, lubrication systems, oil, switches, relays, sensors, modules, circuit protection devices, wiring harnesses, drive shafts, propellers, struts, rudders, bushings, and fastening and mounting devices, by visually inspecting, testing, and analysing performance and function; checking for: odour, temperature, corrosion, contamination, colour, leaks, vibration or noise, wear, alignment, gear clash; and using hand, power, specialized, and electronic service tools, and lifting, rigging, and blocking devices, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

U6390.09 Repair inboard drive and propulsion systems and components, including couplers, clutch assemblies, input shafts, housings, gear trains, synchronizers, shift mechanisms, bearings, seals, packing, lubrication systems, oil, switches, relays, sensors, modules, circuit protection devices, wiring harnesses, drive shafts, propellers, struts, rudders, bushings, and fastening and mounting devices, by exchanging, reconditioning, or servicing using hand, power, specialized, and electronic service tools, and lifting, rigging, and blocking devices, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

U6390.0 REPAIR DRIVE AND PROPULSION SYSTEMS (cont.)

U6390.10 **Verify repair of inboard drive and propulsion systems and components** by testing and analysing performance and function using hand, power, electronic service, and specialized tools, and lifting, rigging, and blocking devices, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date

U6390.11 **Diagnose and troubleshoot jet pump drive and propulsion systems and components**, including couplers, input shafts, jet pump, nozzles, bearings, seals, packing, impellers, and fastening and mounting devices, by visually inspecting, testing, and analysing performance and function; checking for temperature, corrosion, contamination, colour, leaks, vibration or noise, wear, and alignment using hand, power, and specialized service tools, and lifting, rigging, and blocking devices, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date

U6390.0 REPAIR DRIVE AND PROPULSION SYSTEMS (cont.)

U6390.12 Repair jet pump drive and propulsion systems and components, including couplers, input shafts, jet pump, nozzles, bearings, seals, packing, impellers, and fastening and mounting devices, by exchanging, reconditioning, or servicing using hand, power, specialized, and electronic service tools, and lifting, rigging, and blocking devices, according to manufacturers’ recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice	Date
Supervisor/Trainer	Date

U6390.13 Verify repair of jet pump drive and propulsion systems and components by testing and analysing performance and function using hand, power, and specialized tools, and lifting, rigging, and blocking devices, according to manufacturers’ recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice	Date
Supervisor/Trainer	Date

Sponsor/Employer Name

Sponsor/Employer Signature

U6391.0 REPAIR TRAILER SUSPENSION AND HITCHING SYSTEMS

GENERAL PERFORMANCE OBJECTIVE

Diagnose trailer suspension and hitching systems by performing a visual inspection, diagnosing and troubleshooting, and repairing and verifying the repair according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

PERFORMANCE OBJECTIVES

SKILLS

U6391.01 Perform a visual inspection of trailer suspension and hitching system components, identifying type and application, including tires, tubes, flaps, rims, hubs, bearings, bushings, seals, lugs, guides, valves, caps, spacers, springs, shocks, frame and hitch assemblies, fasteners, and mounting devices; and checking for worn, misaligned, loose, damaged, missing, overheated, or defective components and leaks, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

U6391.0 REPAIR TRAILER SUSPENSION AND HITCHING SYSTEMS (cont.)

U6391.02 Diagnose and troubleshoot trailer suspension and hitching system components, including tires, tubes, flaps, rims, hubs, bearings, bushings, seals, lugs, guides, valves, caps, spacers, tire ballast, springs, shocks, frame and hitch assemblies, fasteners, and mounting devices, by visually inspecting, testing and analysing performance and function; checking for wear, alignment, tire matching, condition, corrosion, fraying, belt separation, contamination, pressure, leaks, temperature, vibration or noise, and distortion; by using hand, power, specialized, precision, and service tools; torquing devices; and lifting, rigging, and blocking devices, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date

U6391.03 Verify repair of trailer suspension and hitching system components by visually inspecting, testing, and analysing performance and function using hand, power, specialized, and precision service tools; torquing devices; lifting, rigging, and blocking devices, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date_____
Sponsor/Employer Name_____
Sponsor/Employer Signature

U6392.0 INSTALL ENGINE AND PROPULSION SYSTEM**GENERAL PERFORMANCE OBJECTIVE**

Install engines and propulsion systems by performing a visual inspection, diagnosing and troubleshooting, installing, and verifying the installation of engine and propulsion systems and components, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

PERFORMANCE OBJECTIVES**SKILLS**

- U6392.01 Perform a visual inspection of engine and propulsion system installation area** identifying type and application, including template locations, jig locations, engine mounts, struts, throttle, shift, steering and cut-off control locations, cable routing, fuel tank location and line routing, wiring, electrical controls and instrumentation locations, hydraulic power trim and trim plate component locations, jack plate location, propeller selection specifications, sealing requirements, fasteners, and mounting devices, and checking for worn, loose, damaged, defective, or missing components, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

U6392.0 INSTALL ENGINE AND PROPULSION SYSTEM (cont.)

U6392.02 Diagnose and troubleshoot engine and propulsion systems and component installation process, including template and jigs, engine mounts and struts, shafts, stuffing boxes, couplings, throttle, shift, steering and cut-off controls, cables, fuel tank and lines, wiring, electrical controls and instrumentation, hydraulic power trim and trim plates, jack plates, propellers, sealing materials, fasteners, and mounting devices, by visually inspecting, testing, and analysing performance and function; checking for wear, lubrication, contamination, clearances, vibration or noise, alignment, corrosion, distortion, fractures, and sealing; and using hand, power, specialized, precision, and electronic service tools; templates and jigs; and lifting, rigging, and blocking devices; and personal protective and environmental control equipment, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date

U6392.0 INSTALL ENGINE AND PROPULSION SYSTEM (cont.)

U6392.03 Install engine and propulsion systems and components, including template and jigs, engine mounts and struts, shafts, stuffing boxes, couplings, throttle, shift, steering and cut-off controls, cables, fuel tank and lines, wiring, electrical controls and instrumentation, hydraulic power trim and trim plates, jack plates, propellers, fasteners, and mounting devices, by installing templates and jigs; laying out, aligning, adjusting, drilling, and cutting mounting holes; lifting and placing engines and propulsion units into position; sealing, fastening, and torquing; and using hand, power, specialized, precision, and electronic service tools, and lifting, rigging, and blocking devices, and personal protective and environmental control equipment, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date

U6392.0 INSTALL ENGINE AND PROPULSION SYSTEM (cont.)

U6392.04 Verify installation of engine and propulsion systems and components by visually inspecting, testing, and analysing performance and function using hand, power, specialized, precision, and electronic service tools; lifting, rigging, and blocking devices; and personal protective and environmental control equipment, according to manufacturers' recommendations, and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

Sponsor/Employer Name

Sponsor/Employer Signature

**U6393.0 DIAGNOSE MARINE CRAFT AND HANDLING EQUIPMENT
OPERATION****GENERAL PERFORMANCE OBJECTIVE**

Inspect, equip, and operate marine craft and handling equipment by performing a visual inspection, diagnosing and troubleshooting operation and verifying the operation, according to Ministry of Transportation (MTO) regulations, manufacturers' recommendations and specifications, Coast Guard regulations, and approved industry standards.

PERFORMANCE OBJECTIVES**SKILLS**

U6393.01 Perform a visual inspection of marine craft, trailers, and handling equipment identifying type and application, including starting procedures, shift controls, throttle controls, lifting controls, gauge configuration, fluid levels, lights, horns, required safety devices, fasteners, and mounting devices, and checking for worn, misaligned, loose, damaged, missing, or defective components, and fluid leaks and gasoline fumes, according to manufacturers' recommendations and specifications, and government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

U6393.0 **DIAGNOSE MARINE CRAFT AND HANDLING EQUIPMENT OPERATION** (cont.)

U6393.02 **Diagnose and troubleshoot, marine craft and handling equipment, operating systems, and components**, including starting procedures, shift controls, throttle controls, lifting controls, gauge configuration, fluid levels, lights, horns, required safety devices, fasteners, and mounting devices, by visually inspecting, testing and analysing performance and function; checking for wear, alignment, condition, corrosion, fraying, belt separation, contamination, pressure, leaks, temperature, vibration or noise, and distortion; and using hand, power, specialized, precision, and service tools, torquing devices, and lifting, rigging, and blocking devices, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date

U6393.03 **Verify marine craft handling equipment, operating systems, and components** by visually inspecting, testing, and analysing performance and function using hand, power, specialized, precision, and electronic service tools, lifting, rigging, and blocking devices, personal protective and environmental control equipment, and appropriate water source, according to manufacturers' recommendations, and specifications, government safety regulations, and accepted industry standards.

Signatures:_____
Apprentice_____
Date_____
Supervisor/Trainer_____
Date_____
Sponsor/Employer Name_____
Sponsor/Employer Signature

U6394.0 PERFORM MARINE SYSTEMS AND ACCESSORIES INSTALLATION, MAINTENANCE, REPAIR, AND WINTERIZING

GENERAL PERFORMANCE OBJECTIVE

Install, maintain, repair and winterize marine craft systems and accessories by performing a visual inspection; diagnosing and troubleshooting, installing, and verifying the installation, maintenance, and repair of boat systems and accessories, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

PERFORMANCE OBJECTIVES

SKILLS

U6394.01 Perform visual inspection of marine craft systems and accessories, identifying type and application, including plumbing systems, ventilation and refrigeration systems, radio and navigation systems, 110/24 volt AC generating systems, cooking and cleaning appliances, heating systems, freeze protection, fire extinguishing systems, specified safety equipment, fibreglass, wood and metal hulls and decks, masts and rigging systems, fasteners, and mounting devices, and checking for worn, loose, damaged, defective, leaking, or missing components, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

U6394.0 PERFORM MARINE SYSTEMS AND ACCESSORIES INSTALLATION, MAINTENANCE, REPAIR, AND WINTERIZING (cont.)

U6394.02 Diagnose and troubleshoot, marine craft systems and accessories, including plumbing systems, ventilation and refrigeration systems, radio and navigation systems, 110/24 volt AC generating systems, cooking and cleaning appliances, heating systems, fire extinguishing systems, specified safety equipment, fibreglass, wood and metal hulls and decks, masts and rigging systems, fasteners and mounting devices, by visually inspecting, testing, and analysing performance and function; checking for leaks, wear, lubrication, contamination, clearances, vibration or noise, alignment, corrosion, discoloration, odours, temperatures, freeze protection, distortion, and fractures; and using hand, power, specialized, precision, and electronic service tools, lifting, rigging, and blocking devices, and personal protective and environmental control equipment, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

U6394.0 PERFORM MARINE SYSTEMS AND ACCESSORIES INSTALLATION, MAINTENANCE, REPAIR, AND WINTERIZING (cont.)

U6394.03 Install, maintain, repair, and winterize marine craft systems and accessories, including plumbing systems, ventilation and refrigeration systems, radio and navigation systems, 110/24 volt AC generating systems, cooking and cleaning appliances, heating systems, fire extinguishing systems, specified safety equipment, fibreglass, wood and metal hulls and decks, masts and rigging systems, fasteners, and mounting devices, by exchanging, repairing, servicing, cleaning, and winterizing using hand, power, specialized, precision, and electronic service tools; lifting, rigging, and blocking devices; and personal protective and environmental control equipment, according to manufacturers' recommendations and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

U6394.0 PERFORM MARINE SYSTEMS AND ACCESSORIES INSTALLATION, MAINTENANCE, REPAIR, AND WINTERIZING (cont.)

U6394.04 Verify installation, maintenance, repair, and winterizing of marine craft systems and accessories by visually inspecting, testing, and analysing performance and function using hand, power, specialized, precision, and electronic service tools; lifting, rigging, and blocking devices; and personal protective and environmental control equipment, according to manufacturers' recommendations, and specifications, government safety regulations, and accepted industry standards.

Signatures:

Apprentice

Date

Supervisor/Trainer

Date

Sponsor/Employer Name

Sponsor/Employer Signature

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):

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

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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 COMPLETION FORM

APPRENTICE INFORMATION	
Name (Print)	
Signature	
Client ID	

Skill Sets 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 (Print)	
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.