Recreation Vehicle Service Technician

Guide to Course Content

2024

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Recognition:
To promote transparency and consistency, this document has been adapted from the 2012 Recreation Vehicle Service Technician National Occupational Analysis (Employment and Social Development Canada).

A complete version of the Occupational Analysis can be found at www.red-seal.ca

STRUCTURE OF THE GUIDE TO COURSE CONTENT

To facilitate understanding of the occupation, this guide to course content contains the following sections:

Description of the Recreation Vehicle Service Technician trade: an overview of the trade's duties and training requirements.

Essential Skills Summary: an overview of how each of the nine essential skills is applied in this trade.

Elements of Harmonization for Apprenticeship Training: includes adoption of Red Seal trade name and number of levels of apprenticeship. Sequencing and hours are not harmonized in this program.

Task Matrix: a chart which outlines graphically the major work activities, tasks and sub-tasks of this standard detailing the essential skills and the level of training where the content is covered.

Major Work Activity (MWA): the largest division within the standard that is comprised of a distinct set of trade activities.

Task: distinct actions that describe the activities within a major work activity.

Sub-task: distinct actions that describe the activities within a task.

Technical Training Course Content for the Recreation Vehicle Service Technician trade: a chart which outlines the model for Alberta's technical training sequencing. For the harmonized level of training, a cross reference to the Harmonized apprenticeship technical training sequencing, at the learning outcome level, is provided.

DESCRIPTION OF THE RECREATION VEHICLE SERVICE TECHNICIAN TRADE

Recreation Vehicle Service Technicians inspect, diagnose, service, repair, replace and overhaul all systems and components of recreation vehicles, including exterior and interior components, electrical components, plumbing, propane gas components, appliances, structural frames and towing on motor homes, travel trailers, van conversions and licensed towables.

Recreation Vehicle Service Technicians work on systems and components of recreation vehicles, including electrical components, plumbing, liquefied petroleum (LP) gas components, appliances, exterior and interior components, structural frames and towing systems. They diagnose, repair, replace, install, adjust, test, maintain and modify these components and systems. They may also perform maintenance and repairs on trailer frames and running gear. They are knowledgeable about each system's function and the interaction among them. However, it is important to note that they do not work on the motor or drive train components.

Recreation vehicles serviced in this trade include: class A, B, B+ and C motorhomes, travel trailers, fifth wheel trailers, park model trailers, truck campers and pop-up camping trailers. RV service technicians also work on toy haulers, utility trailers, flat deck trailers, construction living trailers and an assortment of mobile vehicles.

While Recreation Vehicle Service Technicians are experienced in all facets of the trade, many may develop specialized skills in areas such as electronics, appliances, hitching systems, and interior and exterior finishing.

Recreation Vehicle Service Technicians are typically employed at RV dealerships, independent RV repair shops, RV manufacturers and may also be self-employed. They may work at indoor shops and outdoors at RV sites. Safety is important due to risks and hazards such as working at heights, with electricity, with explosive and volatile materials, and under vehicles.

Some important attributes include service, mechanical and mathematical skills, manual dexterity, an ability to plan and think sequentially and an ability to work as a team member. Customer relations skills are critical when providing on-site services. Sales skills are required when performing maintenance tasks and assisting customers with making decisions related to repair options.

The functions of Recreation Vehicle Service Technicians may overlap with a number of other trades such as Parts Technician, Automotive Service Technician, Construction Electrician, Plumber, Gasfitter, Carpenter, Floorcovering Installer, Sheet Metal Worker, Refrigeration and Air Conditioning Mechanic, Welder, Auto Body and Collision Technician, and Appliance Service Technician.

Experienced Recreation Vehicle Service Technicians may advance to supervisory or training positions. They may also move into positions with manufacturers, wholesalers and sales divisions of RV dealerships.

Training Requirements: To graduate from each level of the apprenticeship program, an apprentice must successfully complete the required technical training and compile enough on-the-job experience to total at least 1600 hours each year. Total trade time required is 4800 hours and at least 3 years in the trade.

There are three levels of technical training delivered by the Southern Alberta Institute of Technology (SAIT) Polytechnic in Calgary Alberta.

Level One:	8 weeks
Level Two:	8 weeks
Level Three:	8 weeks

The information contained in this guide to course content details the technical training delivered for each level of apprenticeship. An apprentice spends approximately 15% of their apprenticeship term in a technical training institute learning the technical and theoretical aspects of the trade. The hours and percentages of technical and practical training may vary according to class needs and progress.

The content of the technical training components is subject to change without notice.

Entrance Requirements for Apprenticeship Training

Your grade twelve transcripts (with no modified classes) or GED 12 is your guarantee that you meet the educational entrance requirements for apprenticeship in Saskatchewan. In fact, employers prefer and recommend apprentices who have completed high school. This ensures the individual has all of the necessary skills required to successfully complete the apprenticeship program and receive journeyperson certification.

Individuals with “modified” or “general” classes in math or science do not meet our entry requirements. These individuals are required to take an entrance assessment prescribed by the SATCC.

English is the language of instruction in all apprenticeship programs and is the common language for business in Saskatchewan. Before admission, all apprentices and/or “upgraders” must be able to understand and communicate in the English language. Applicants whose first language is not English must have a minimum Canadian Language Benchmark Assessment of six (CLB6).

Note: A CLB assessment is valid for a one-year period from date of issue.

Designated Trade Name	**Math Credit** at the Indicated Grade Level❶	**Science Credit** at Grade Level
Recreation Vehicle Service Technician	Grade 10	Grade 10

❶ - (One of the following) WA – Workplace and Apprenticeship; or F – Foundations; or P – Pre-calculus, or a Math at the indicated grade level (Modified and General Math credits are not acceptable.).

*Applicants who have graduated in advance of 2015-2016, or who do not have access to the revised Science curricula will require a Science at the minimum grade level indicated by trade.

For information about high school curriculum, including Math and Science course names, please see: http://www.curriculum.gov.sk.ca/

Individuals not meeting the entrance requirements will be subject to an assessment and any required training.

ESSENTIAL SKILLS SUMMARY

Essential skills are needed for work, learning and life. They provide the foundation for learning all other skills and enable people to evolve with their jobs and adapt to workplace change.

Through extensive research, the Government of Canada and other national and international agencies have identified and validated nine essential skills. These skills are used in nearly every occupation and throughout daily life in different ways.

A series of CCDA-endorsed tools have been developed to support apprentices in their training and to be better prepared for a career in the trades. The tools can be used independently or with the assistance of a tradesperson, trainer, employer, teacher or mentor to:

- understand how essential skills are used in the trades;
- learn about individual essential skills strengths and areas for improvement; and
- improve essential skills and increase success in an apprenticeship program.

Tools are available online or for order at: https://www.canada.ca/en/employment-social-development/programs/essential-skills/tools.html.

The application of these skills may be described throughout this document within the competency statements which support each subtask of the trade. The following are summaries of the requirements in each of the essential skills, taken from the essential skills profile. A link to the complete essential skills profile can be found at: www.red-seal.ca.

READING

Recreation Vehicle Service Technicians read labels on products and decals on equipment for instructions. They read code books, service bulletins, technical update sheets, work orders and recall notices from manufacturers. They also read service memos, warranty information, emails, texts, and notes from customers describing a problem. Recreation Vehicle Service Technicians also read manuals for training purposes for example, when learning how to repair new or unfamiliar systems, or equipment.

DOCUMENT USE

Recreation Vehicle Service Technicians refer to Workplace Hazardous Materials Information System (WHMIS) labels and Safety Data Sheets (SDS) for information on how to handle, dispose of or mix products. They refer to code books, charts, checklists and work schedules. They also refer to these work orders to determine what repairs need to be done. Recreation Vehicle Service Technicians complete work orders, including information about problems encountered, the cause and how the issues were resolved. They also complete time sheets to record or track tasks done from a number of work orders.

Recreation Vehicle Service Technician may draw or read sketches to clarify steps in a procedure, refer to troubleshooting charts to diagnose a problem, or refer to wiring schematics, assembly diagrams and blueprints when installing equipment. They may also be required to take photos of equipment and service work for record keeping purposes.

WRITING

Recreation Vehicle Service Technicians write notes to themselves, other co-workers and service managers about job details, customer requests, deadlines or supplies. They enter information in work orders to keep a record of tasks done for warranty purposes. They also write the reasons for recommending a particular procedure. They may also write warranty reports.

ORAL COMMUNICATION

Recreation Vehicle Service Technicians call suppliers to obtain information about products. They also talk to other staff to clarify orders, to discuss complex repair problems and to provide explanations of service. They communicate with customers to explain features and to demonstrate proper operation of a system. They also explain and present to them repair options. This communication is done with tact and respect for customers. Recreation Vehicle Service Technicians may also instruct and direct the work and learning of apprentices in the shop.

NUMERACY

Recreation Vehicle Service Technicians measure size and location openings such as for appliances and accessories. They also measure weights, voltage, amperage, resistance and pressures using various tools and equipment such as scales, multimeters and gauges. They develop material lists based on this information. They may also estimate how much time it will take to complete various jobs.

THINKING

Recreation Vehicle Service Technicians use problem solving skills to assess problems with the vehicle and its components. They consider information provided to them by the customer to determine causes of a malfunction. They often depend on their experience, knowledge and observations to diagnose and repair problems as service manuals may not cover all possible issues. They may have to design replacement pieces that are no longer available. They also carry out detailed troubleshooting techniques to deal with unexpected problems or unique difficulties, for example when making customized changes to a recreation vehicle, when diagnosing recurring electrical failures or when locating the source of a leak. They research information using service manuals and online resources, contact manufacturers' technical support lines, or consult with co-workers to help resolve problems.

Recreation Vehicle Service Technicians use decision making skills to decide which tools and supplies to use. They also decide what repair or reconstruction to recommend taking into consideration time, cost and safety.

WORKING WITH OTHERS

Recreation Vehicle Service Technicians work as part of a team which includes other technicians, service managers, salespersons, parts technicians, shop foremen and support staff. However, they usually work independently on the particular unit assigned to them. They coordinate tasks with others as necessary and sometimes work with a partner, for example, when installing awnings and construction repair.

DIGITAL TECHNOLOGY

Recreation Vehicle Service Technicians may use computer applications. For example, they may use handheld diagnostic tools. They may have access to service and repair information through online resources. They may also use point of sale software.

CONTINUOUS LEARNING

Recreation Vehicle Service Technicians learn continuously through hands-on experience with a range of repairs. They learn from co-workers as a first resource. They participate in training courses and access materials provided by manufacturers and suppliers. Recreation Vehicle Service Technicians also consult with their customers who can give the history of their recreation vehicle.

ELEMENTS OF HARMONIZATION FOR APPRENTICESHIP TRAINING

At the request of industry, the Harmonization Initiative was launched in 2013 to *substantively align* apprenticeship systems across Canada by making training requirements more consistent in the Red Seal trades. Harmonization aims to improve the mobility of apprentices, support an increase in their completion rates and enable employers to access a larger pool of apprentices.

As part of this work, the Canadian Council of the Directors of Apprenticeship (CCDA) identified four main harmonization priorities in consultation with industry and training stakeholders:

1. Trade name

The official Red Seal name for this trade is Recreation Vehicle Service Technician.

2. Number of Levels of Apprenticeship

The number of levels of technical training recommended for the Recreation Vehicle Service Technician trade is three.

3. Total Training Hours during Apprenticeship Training

The total hours of training, including both on-the-job and in-school training for the Recreation Vehicle Service Technician subtrade is 4800.

4. Consistent sequencing of training content (at each level) using the most recent Occupational Standard

Implementation for harmonizing sequencing has yet to be determined for the trade Recreation Vehicle Service Technician in the province of Alberta.

RECREATION VEHICLE SERVICE TECHNICIAN
TASK MATRIX

This chart outlines the major work activities, tasks and sub-tasks from the 2012 Recreation Vehicle Service National Occupational Analysis. Each sub-task details the corresponding essential skill and level of training where the content is covered. *

* Sub Tasks with numbers in the boxes is where the content will be delivered in training.

A – Common occupational skills — 8%

A-1 Performs safety-related activities	**A-1.01 Uses personal protective equipment (PPE) and safety equipment** 1	**A-1.02 Maintains safe work environment** 1	
A-2 Uses and maintains tools and equipment	**A-2.01 Maintains tools and equipment** 1,3	**A-2.02 Uses lifting, moving and access equipment** 1	
A-3 Performs common work practices and procedures	**A-3.01 Uses blueprints, drawings, schematics and sketches** 2	**A-3.02 Identifies outstanding recalls and service bulletins** 1,2	**A-3.03 Performs pre-delivery inspections (PDI)** 1

B – Plumbing systems — 11%

B-4 Diagnoses plumbing systems	B-4.01 Diagnoses potable water systems 1	B-4.02 Diagnoses waste water systems 1	
B-5 Services potable water systems	B-5.01 Maintains potable water systems 1	B-5.02 Repairs potable water systems 1	B-5.03 Installs potable water systems 1
B-6 Services waste water systems	B-6.01 Maintains waste water systems 1	B-6.02 Repairs waste water systems 1	B-6.03 Installs waste water system components 1

C – Electrical systems — 18%

C-7 Diagnoses electrical systems	C-7.01 Diagnoses AC electrical and power supply systems 2,3	C-7.02 Diagnoses DC electrical and power supply systems 1,2,3	
C-8 Services AC electrical systems	C-8.01 Maintains AC electrical and power supply systems 1,2,3	C-8.02 Repairs AC power supply and distribution system 2,3	C-8.03 Installs AC power supply and distribution system components 2,3
C-9 Services DC electrical systems	C-9.01 Maintains DC electrical and power supply systems 1,2,3	C-9.02 Repairs DC power supply and distribution systems 1,2,3	C-9.03 Installs DC power supply and distribution system components 1,2,3

D – Liquified petroleum (LP) gas systems — 16%

D-10 Diagnoses LP gas systems	D-10.01 Diagnoses LP gas supply systems (high pressure) 1	D-10.02 Diagnoses LP gas distribution systems (low pressure) 1	
D-11 Services LP gas systems	D-11.01 Maintains LP gas systems 1	D-11.02 Repairs LP gas systems and components 1	D-11.03 Installs LP gas systems and components 1

E – Appliances and consumer products — 17%

E-12 Maintains appliances	E-12.01 Maintains water heaters and components 1,2	E-12.02 Maintains furnaces and components 1,2	E-12.03 Maintains ranges and ovens 1,2	E-12.04 Maintains refrigerators and ice makers 1, 3	E-12.05 Maintains air conditioners and heat pump systems 1, 3
E-13 Diagnoses appliances	E-13.01 Diagnoses water heaters 2	E-13.02 Diagnoses furnaces 2	E-13.03 Diagnoses ranges and ovens 2	E-13.04 Diagnoses refrigerators and ice makers 3	E-13.05 Diagnoses air conditioners and heat pumps 2,3
E-14 Repairs appliances and consumer products	E-14.01 Repairs Water Heaters 2	E-14.02 Repairs furnaces 2	E-14.03 Repairs ranges and ovens 2	E-14.04 Repairs refrigerators and ice makers 3	E-14.05 Repairs air conditioners and heat pumps 3
	E-14.06 Replaces consumer products 1,2,3				
E-15 Installs appliances and consumer products	E-15.01 Installs appliances and components 2,3	E-15.02 Installs consumer products and components 1,2,3			

F – Interior and exterior components 10%

F-16 Diagnoses interior and exterior components	F-16.01 Diagnoses interior components 1,2,3	F-16.02 Diagnoses exterior components 1,2	
F-17 Services interior components	F-17.01 Maintains interior components 1,2,3	F-17.02 Repairs interior components 1,2,3	F-17.03 Installs interior components 1,2,3
F-18 Services exterior components	F-18.01 Maintains exterior components 1,2	F-18.02 Repairs exterior components 1,2	F-18.03 Installs exterior components 1,2

G – Chassis and mechanical components 13%

G-19 Maintains chassis and mechanical components	G-19.01 Maintains frames 1,2,3	G-19.02 Maintains running gear 1,3	G-19.03 Maintains levelling systems 1,3	G-19.04 Maintains slide-out and lifting systems 2, 3	G-19.05 Maintains generators 2,3
G-20 Diagnoses chassis and mechanical components	G-20.01 Diagnoses frames 1,2	G-20.02 Diagnoses running gear 1,3	G-20.03 Diagnoses leveling systems 1,3	G-20.04 Diagnoses slide-out and lifting systems 1,2,3	G-20.05 Diagnoses generators 2,3
G-21 Repairs chassis and mechanical systems	G-21.01 Repairs frames and components (Not Common Core) 1,2	G-21.02 Repairs running gear 1	G-21.03 Repairs leveling systems 3	G-21.04 Repairs slide-out and lifting systems 2,3	G-21.05 Repairs generators 2,3

G-22 Installs chassis and mechanical components	G-22.01 Installs levelling systems and components 3	G-22.02 Installs generators 2

H – Towing systems — 7%

H-23 Diagnoses towing systems	H-23.01 Diagnoses tow vehicle systems 2,3	H-23.02 Diagnoses towed vehicle systems 2,3		
H-24 Services towing systems	H-24.01 Maintains tow vehicle systems 1,2,3	H-24.02 Maintains towed vehicle systems 1,2,3	H-24.03 Installs tow vehicle systems and components 2,3	H-24.04 Installs towed vehicle systems and components 2,3

TRAINING PROFILE CHART ALBERTA

At this time, <u>all</u> Saskatchewan's Recreation Vehicle Service Technician apprentices attend technical training in Alberta at Southern Alberta Institute of Technology Polytechnic (SAIT) located in Calgary, AB.

This Training Profile Chart represents Alberta Apprenticeship and Industry Training (AIT) technical training at the topic level.

Southern Alberta Institute of Technology (NAIT, SAIT) Polytechnic Level One	**Hours**
Standard Workplace Safety, Industry Overview, Regulations and Administration	38
Plumbing	24
Liquified Petroleum (LP) Systems	44
Direct Current (DC) Electrical Systems	48
Appliance Operation and Accessories	44
Mechanical and Towing Systems	42
	240

Northern and Southern Alberta Institute of Technology (NAIT, SAIT) Polytechnic Level Two	**Hours**
Standard Practices and Procedures	24
Alternating Current (AC) Electrical Systems	54
Consumer Products	24
Appliances	53
Exterior Structures	61
Mechanical and Suspension Systems	24
	240

Northern and Southern Alberta Institute of Technology (NAIT, SAIT) Polytechnic Level Three	**Hours**
Inverter And Solar Systems	30
Appliances	80
Interior Structures and Components	30
Slide outs and Levelling Systems	50
Auxiliary Fueling Systems and Specialty Haulers	25
Welding, Coaching, Certification and Committees	25
	240

TECHNICAL TRAINING COURSE CONTENT

This chart outlines the model for Alberta Apprenticeship and Trade Certification technical training sequencing. For the harmonized level of training, a cross reference to the National Occupational Analysis (NOA) apprenticeship technical training sequencing, at the learning outcome level, is provided.

Level One — 8 weeks — 240 hours

Section One- Standard Workplace Safety, Industry Overview, Regulations and Administration — 38 hours total

Safety Legislation, Regulations and Industry Policy in the Trades — 4 hours

- Demonstrate the application of the Occupational Health and Safety Act, Regulation and Code.
- Describe the employer's and employee's role with Occupational Health and Safety (OH&S) regulations, Worksite Hazardous Materials Information Systems (WHMIS), fire regulations, Workers Compensation Board regulations and related advisory bodies and agencies.
- Describe industry practices for hazard assessment and control procedures.
- Describe the responsibilities of worker and employers to apply emergency procedures.
- Describe tradesperson attitudes with respect to housekeeping, personal protective equipment and emergency procedures.
- Describe the roles and responsibilities of employers and employees with the selection and use of personal protective equipment (PPE).
- Maintain required PPE for tasks.
- Use required PPE for tasks.

NOA topics covered in this section of training:

Task 1 Performs safety-related activities

A-1.01 Uses personal protective equipment (PPE) and safety equipment

- select and wear PPE such as safety glasses, safety boots, face shields and gloves according to job task and jurisdictional requirements
- locate, select and operate safety equipment such as fire extinguishers and first aid kits according to jurisdictional requirements
- inspect PPE and safety equipment to identify deficiencies such as expired fire extinguishers and exposed metal on steel toe boots
- store PPE and safety equipment according to manufacturers' specifications
- report defective PPE and safety equipment

A-1.02 Maintains safe work environment

- verify safety guards on equipment such as saws, grinders and power tools are in place and in full working condition
  clean up and dispose of hazards such as solvents, debris and waste according to type of hazard
- store hazardous explosive and chemical items such as paints and solvents according to WHMIS and regulations
- recognize and address safety hazards and violations such as condition of power cords, damaged electrical receptacles, hand rails and lifting devices according to regulations
- maintain clean and organized work area
- locate emergency exits and safety related equipment such as eye wash stations, first aid kits and fire extinguishers

Climbing, Lifting, Rigging and Hoisting — 3 hours

- Describe manual lifting procedures.
- Describe rigging hardware and associated safety factors.
- Select equipment for rigging loads.
- Describe hoisting and load moving procedures.
- Maintain personal protective equipment (PPE) for climbing, lifting and load moving equipment.
- Use PPE for climbing, lifting and load moving equipment.

NOA topics covered in this section of training:

Task 2 Uses and maintains tools and equipment

A-2.02 Uses lifting, moving and access equipment

- select lifting, moving and access equipment according to job task
- determine lifting points according to manufacturers' specifications
- operate lifting equipment such as hydraulic jacks and hoists according to manufacturers' specifications and regulations
- operate moving equipment such as dollies, pallet jacks and forklifts
- assemble and disassemble equipment such as scaffolding and ladders according to manufacturers' specifications and regulations

Hazardous Materials and Fire Protection — 3 hours

- Describe roles, responsibilities, features and practices related to the Workplace Hazardous Materials Information System (WHMIS) program.
- Describe three key elements of WHMIS.
- Describe handling, storing and transporting procedures for hazardous material.
- Describe venting procedures when working with hazardous materials.
- Describe hazards, classes, procedures and equipment related to fire protection.

NOA topics covered in this section of training:

Task 1 Performs safety-related activities

A-1.01 Uses personal protective equipment (PPE) and safety equipment

- select and wear PPE such as safety glasses, safety boots, face shields and gloves according to job task and jurisdictional requirements
- locate, select and operate safety equipment such as fire extinguishers and first aid kits according to jurisdictional requirements
- inspect PPE and safety equipment to identify deficiencies such as expired fire extinguishers and exposed metal on steel toe boots
- store PPE and safety equipment according to manufacturers' specifications
- report defective PPE and safety equipment

A-1.02 Maintains safe work environment

- verify safety guards on equipment such as saws, grinders and power tools are in place and in full working condition
- clean up and dispose of hazards such as solvents, debris and waste according to type of hazard
- store hazardous explosive and chemical items such as paints and solvents according to WHMIS and regulations
- recognize and address safety hazards and violations such as condition of power cords, damaged electrical receptacles, hand rails and lifting devices according to regulations
- maintain clean and organized work area
- locate emergency exits and safety related equipment such as eye wash stations, first aid kits and fire extinguishers

Apprenticeship Orientation — 2 hours

- Describe the contractual responsibilities of the apprentice, employer and Apprenticeship and Industry Training.
- Describe the purpose of the apprentice record book.
- Describe the procedure for changing employers during an active apprenticeship.
- Describe the purpose of the course outline.
- Describe the procedure for progressing through an apprenticeship.

NOA topics covered in this section of training:

This section of training exceeds NOA scope of work in Level One and exceeds the minimum sequencing as set out in the Recreation Vehicle Service Technician NOA. Its purpose is to assist in the understanding of an apprentice the steps to earn journeyperson certification.

Tools and Equipment — 4 hours

- Describe the types and application of tools and equipment.
- Describe the procedures for maintaining tools and equipment.
- Maintain tools and equipment.
- Use tools and equipment

NOA topics covered in this section of training:

Task 2 Uses and maintains tools and equipment
A-2.01 Maintains tools and equipment

- recalibrate equipment such as electronic testers, manometers and scales according to manufacturers' specifications
- clean tools and equipment
- organize and store tools and equipment in a designated area according to manufacturers' specifications
- lubricate and add fluids to tools such as jacks, trolley jacks and air tools according to manufacturers' specifications
- identify and report tools to be serviced or replaced

Cleaning Procedures — 2 hours

- Describe methods and products used for spot cleaning recreation vehicles.
- Describe the hazards associated with cleaning products and procedures.

NOA topics covered in this section of training:

Task 1 Performs safety-related activities
A-1.02 Maintains safe work environment

- verify safety guards on equipment such as saws, grinders and power tools are in place and in full working condition
- clean up and dispose of hazards such as solvents, debris and waste according to type of hazard
- store hazardous explosive and chemical items such as paints and solvents according to WHMIS and regulations
- recognize and address safety hazards and violations such as condition of power cords, damaged electrical receptacles, hand rails and lifting devices according to regulations
- maintain clean and organized work area
- locate emergency exits and safety related equipment such as eye wash stations, first aid kits and fire extinguishers

Vehicle Identification Number (VIN) Plates and Labels — 2 hours

- Describe the types and purpose of labels applicable to recreation vehicles.
- Interpret information on VIN plates and labels

NOA topics covered in this section of training:

A-3 Performs common work practices and procedures.
A-3.03 Performs pre-delivery inspections (PDI)

- verify vehicle and component operation according to original equipment manufacturers' (OEM) checklists, dealer requirements and regulations
- record and report findings
- access and record component serial numbers and file for warranty purposes

Cutting and Heating — 10 hours

- Describe cutting and heating operations permitted within the scope of this trade.
- Describe the characteristics and handling of cutting and heating gases.
- Describe the components of cutting and heating equipment.
- Perform a leak check on cutting and heating equipment.
- Describe the procedure for adjusting cutting and heating equipment.
- Demonstrate the procedure for storing and maintaining cutting and heating equipment.
- Perform cutting and heating operations.

NOA topics covered in this section of training:

Task 2 Uses and maintains tools and equipment
A-2.01 Maintains tools and equipment

- recalibrate equipment such as electronic testers, manometers and scales according to manufacturers' specifications
- clean tools and equipment
- organize and store tools and equipment in a designated area according to manufacturers' specifications
- lubricate and add fluids to tools such as jacks, trolley jacks and air tools according to manufacturers' specifications
- identify and report tools to be serviced or replaced

Pre-Delivery Inspection (PDI) — 6 hours

- Describe the purpose of a PDI.
- Describe PDI procedures.
- Describe the purpose of PDI documentation.
- Describe PDI tasks specific to recreation vehicle designs.
- Perform a PDI.

NOA topics covered in this section of training:

Task 3 Performs common work practices and procedures
A-3.03 Performs pre-delivery inspections (PDI)

- verify vehicle and component operation according to original equipment manufacturers' (OEM) checklists, dealer requirements and regulations
- record and report findings
- access and record component serial numbers and file for warranty purposes

Motorhome Controls — 2 hours

- Describe the operation of motorhome control systems.
- Describe the purpose of motorhome safety equipment.
- Describe codes, regulations and liabilities relating to motorhomes.
- Describe diesel engine start-up procedures.
- Describe the operation of air brake systems.

NOA topics covered in this section of training:

Task 20 Diagnoses chassis and mechanical components

G-20.01 Diagnoses frames

- confirm customer's concern to isolate source of problem and determine required diagnostic actions
- measure frame for alignment according to manufacturers' specifications using tools and equipment such as measuring tapes and alignment machines
- visually inspect frame for defects such as peeling undercoat, corrosion cracks, bends and broken bolts
- cause of defect such as poor maintenance, accidents and rough road conditions
- servicing requirements according manufacturers' specifications to repair defects

G-20.02 Diagnoses running gear

- confirm customer's concern to isolate source of problem and determine required diagnostic actions
- interpret tire tread wear such as cupping, and outer and inner wear
- identify worn, loose or broken suspension parts such as bushings, hangers, equalizers, shocks, springs, bolts and shackles
- test braking system using ammeters
- check for brake problems such as scored brake drums, seized parts and delaminated linings, defective magnets, broken springs and out of adjustment
- test voltage drop and amp draw using VOMs and ammeters to locate and isolate electrical problem between trailer and tow vehicle
- visually inspect hydraulic brakes for leaks
- test hydraulic brakes system through manual activation according to manufacturers' specifications
- cause of defect such as poor maintenance, defective parts and rough road conditions
- servicing requirements such as repairing seals, bearings, bushings and springs according manufacturers' specifications

G-20.03 Diagnoses levelling systems

- confirm customer's concern to isolate source of problem and determine required diagnostic actions
- access and visually inspect components such as switches, seals, fittings, cylinders and hoses
- check hydraulic fluid for level and contaminants
- test levelling system as per operating instructions
- check hydraulic system for leaks in components such as hoses, fittings and cylinders using methods such as visual inspection and hydraulic pressure
- check electrical source for specified DC voltage and amperage using tools such as VOMs, ammeters and load testers
- inspect wiring connections, gauge and routing
- inspect levelling system components such as manual and electric jacks for adequate lubrication
- cause of defect such as poor maintenance, defective parts and operator misuse
- determine servicing requirements such as replacing jacks, and repairing fittings and hoses according manufacturers' specifications

G-20.04 Diagnoses slide-out and lifting systems

- confirm customer's concern to isolate source of problem and determine required diagnostic actions
- check electrical source for specified DC voltage and amperage using tools such as VOMs, ammeters and load testers
- inspect wiring connections, gauge and routing
- test electrical/electronic components such as solenoids, relays and control boards for operation using tools such as ammeters and VOMs
- check cables, gears, pulleys, tubes and rollers for lubrication and wear
  check hydraulic system for leaks in components such as hoses, fittings and cylinders using methods such as visual inspection and hydraulic pressure gauges
- visually inspect hydraulic fluid for level and contaminants
- check gaskets and sweeps for conditions such as fit, cracks, tears and adhesion
- inspect slide-out and lifting system components such as drive gears, guide tubes, motors and cables
- cause of defect such as poor maintenance, defective parts and operator misuse
- determine servicing requirements such as replacing cylinders, cables, motors and winches, and repairing fittings and hoses according manufacturers' specifications

Task 21 Repairs chassis and mechanical components

G-21.04 Repairs slide-out and lifting systems

- replace and repair electrical wiring and connections by means such as soldering and crimping
- re-align slide-out and lifting system using tools such as tape measures, wrenches and sockets
- lubricate components such as cables, gears, pulleys, tubes and rollers according to manufacturers' specifications
- fill hydraulic fluid to manufacturers' specifications
- drain and flush hydraulic fluid reservoirs
- repair hydraulic system leaks by replacing seals, hoses, fittings and cylinders
- route and crimp cables using tools such as cable crimper and fish tape
- replace components such as pumps, motors, solenoids and circuit boards
- bleed hydraulic lines to remove air
- verify repair by testing slide-out and lifting system operation

Section Two- Plumbing — 24 hours total

Potable Water Systems — 9 hours

- Describe the components and operation of potable water systems.
- Describe the procedure for installing and servicing potable water systems.
- Identify codes for potable water systems.
- Service potable water systems.

NOA topics covered in this section of training:

Task 4 Diagnoses plumbing systems

B-4.01 Diagnoses potable water systems

- confirm customer's concern to isolate source of problem and determine required diagnostic actions
- visually inspect potable water systems and venting for defects such as leaks, obstructions, low pressure and contaminants
- perform leak test by pressurizing system with water or air
- activate pumps to verify normal operation
- verify connections to system components such as faucets, water heater and toilet
- determine types of servicing required such as replacing or repairing fittings, lines and fixtures

B-4.02 Diagnoses waste water systems

- confirm customer's concern to isolate source of problem and determine required diagnostic actions
- visually inspect waste water systems and venting for defects such as leaks, obstructions and contaminants
- verify connections to system components such as toilets, sewer valves and appliances by performing leak test by filling system with water
- activate pumps to verify normal operation
- cause of defect such as damaged storage tank, blockage and physical leaks
- types of servicing required such as replacing or repairing fittings, pipes, tanks and valves

Task 5 Services potable water systems

B-5.01 Maintains potable water systems

- flush system by filling fresh water tank and flushing water lines and related components
- remove and replace drinking water filters
- clean components such as screens, filters and aerators
- sanitize potable water systems
- winterize and de-winterize potable water systems
- select and use tools and equipment such as filter wrenches, hand tools and cordless drills

B-5.02 Repairs potable water systems

- access repair area by removing items such as tank covers, access panels and cabinets
- select and use tools and equipment such as filter wrenches, hand tools and cordless drills
- replace faulty components such as water pumps, water tanks, accumulator, lines and fittings
- repair components including valves, pumps, tanks and fixtures using methods such as plastic welding and installing rebuild kits
- perform leak test to ensure integrity of system

B-5.03 Installs potable water system

- calculate load, demand and material required to determine installation strategy according to criteria such as component placement, customer needs, codes and manufacturers' specifications
- select and use tools and equipment such as cutters, crimpers and hand tools
- access installation area by removing items such as beds and cabinets
- adjust area to accommodate new components by making modifications such as reinforcing structure, relocation of plumbing and enlarging installation area
- install components such as hoses, tubing, fittings and tanks
- verify potable water system operation and perform leak test to ensure system integrity

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Waste Water Systems — 9 hours

- Describe the components and operation of waste water systems.
- Describe the procedure for installing and servicing waste water systems.
- Identify codes for waste water systems.
- Service waste water systems.

NOA topics covered in this section of training:

Task 6 Services waste water systems

B-6.01 Maintains waste water systems

- clean holding tanks using various methods such as chemical treatments and rinsing systems
- lubricate valves
- winterize and de-winterize waste water system

B-6.02 Repairs waste water systems

- repair area by removing items such as tank covers, access panels and appliances
- select and use tools and equipment such as hand tools and cordless drills
- replace faulty components such as P-traps, gate valves, gaskets and venting systems
- repair components including tanks, connections and valves using methods such as gluing and plastic welding
- perform leak test to ensure system integrity

B-6.03 Installs waste water system components

- calculate capacity and material required to determine installation strategy according to criteria such as component placement, customer needs, codes and manufacturers' specifications
- select and use tools and equipment such as cutters, hand tools and hole saws
- access installation area by removing items such as access panels and cabinets, or lifting RV
- adjust area to accommodate new components by making modifications such as reinforcing structure, relocation of plumbing and enlarging installation area
- install components such as pipes, valves, toilets, tanks, sensors and wires
- verify waste water system operation and perform leak test to ensure system integrity

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Winterizing and De-Winterizing — 2 hours

- Describe the types and applications of plumbing antifreeze.
- Describe winterizing and de-winterizing procedures.

NOA topics covered in this section of training:

Task 5 Services potable water systems

B-5.01 Maintains potable water systems

- flush system by filling fresh water tank and flushing water lines and related components
- remove and replace drinking water filters
- clean components such as screens, filters and aerators
- sanitize potable water systems
- winterize and de-winterize potable water systems
- select and use tools and equipment such as filter wrenches, hand tools and cordless drills

B-5.02 Repairs potable water systems

- access repair area by removing items such as tank covers, access panels and cabinets
- select and use tools and equipment such as filter wrenches, hand tools and cordless drills
- replace faulty components such as water pumps, water tanks, accumulator, lines and fittings
- repair components including valves, pumps, tanks and fixtures using methods such as plastic welding and installing rebuild kits
- perform leak test to ensure integrity of system

B-5.03 Installs potable water system

- calculate load, demand and material required to determine installation strategy according to criteria such as component placement, customer needs, codes and manufacturers' specifications
- select and use tools and equipment such as cutters, crimpers and hand tools
- access installation area by removing items such as beds and cabinets

- adjust area to accommodate new components by making modifications such as reinforcing structure, relocation of plumbing and enlarging installation area
- install components such as hoses, tubing, fittings and tanks
- verify potable water system operation and perform leak test to ensure system integrity

Task 6 Services waste water systems
B-6.01 Maintains waste water systems
- clean holding tanks using various methods such as chemical treatments and rinsing systems
- lubricate valves
- winterize and de-winterize waste water system

Service Monitoring Systems — 4 hours

- Describe the components, principles of operation and owner procedures for monitoring systems.
- Describe servicing of monitor panels and sensors.

NOA topics covered in this section of training:

Task 8 Services AC electrical system
C-8.01 Maintains AC electrical and power supply systems
- visually inspect shore power cords for physical damage such as corrosion, cuts and melting
- visually inspect grounds and connections to identify potential faults
- perform maintenance tests such as hot skin test, AC power supply and distribution system operation verification and GFCI check
- clean inverters and converters to prevent overheating
- isolate potential problems and determine required action

Section Three- Liquified Petroleum Gas (LP) Systems — 44 hours total

Propane Systems — 44 hours

- Describe the properties of propane.
- Describe safety procedures for working with propane.
- Describe the types and applications of propane storage vessels.
- Describe the requirements for inspecting, recertifying and filling propane storage vessels.
- Describe the purpose of propane system components.
- Describe the operation of propane system components.
- Describe the operation of leak detectors.
- Identify codes for propane systems.
- Perform a leak and pressure test.
- Perform operations to make connections in propane systems.
- Adjust a propane regulator.

NOA topics covered in this section of training:

Task 3 Performs common work practices and procedures
A-3.01 Uses blueprints, drawings , schematics and sketches
- uses blueprints, drawings, schematics and sketches
- interpret documents such as diagrams, schematics and flow charts to determine actions to be performed
- interpret symbols, dimensions and specifications
- perform metric/imperial conversions
- measure dimensions to ensure proper installation
- sketch modifications of repairs and installations such as liquefied petroleum (LP) gas and electrical systems, and structure

Task 10 Diagnoses LP gas systems

D-10.01 Diagnoses LP gas supply system (high pressure)

- confirm customer's concern to isolate source of problem and determine required diagnostic actions
- inspect system and components to ensure compliance with codes
- visually inspect system and containers for expiry date and damage such as rust, dents and damaged welds
- select and use tools and equipment such as hand tools, leak detectors and high pressure gauges
- locate leaks
- test operational pressure of propane system to meet code requirements and design specifications
- determine cause of defect such as kinked hose, punctured hose and seized excess flow valve
- types of servicing required such as repair or replacement of faulty components

D-10.02 Diagnoses LP gas distribution system (low pressure)

- confirm customer's concern to isolate source of problem and determine required diagnostic actions
- visually inspect low pressure distribution system to ensure compliance with codes and for damage such as impacts, broken ground and unsecured gas lines
- perform system tests such as drop pressure test, regulator lock-up test and system operating test according to code
- select and use tools and equipment such as hand tools, leak detectors and manometer
- locate leaks
- determine cause of defect such as contaminants, punctured lines and faulty components
- types of servicing required such as repair or replacement of faulty components

Task 11 Services LP gas systems

D-11.01 Maintains LP gas supply systems

- visually inspect components such as hoses, tanks, protective coverings and fasteners for damage and wear
- perform system leak test using manometer
- determine types of servicing required such as repair or replacement of faulty components

D-11.02 Repairs LP gas supply systems and components

- access repair area by removing items such as heat shields and tank covers or by raising RV
- select and use tools and equipment such as manometers, hand tools and flaring tools
- replace or repair faulty components such as regulators, protective coverings, hoses, tanks, tubing, pipes and cylinders
- re-secure cylinders and distribution system according to codes
- remove contaminants to maximize supply of LP gas
- perform drop pressure test and adjust pressure

D-11.03 Installs LP gas supply systems and components

- calculate load, demand and material required to determine installation strategy according to criteria such as component placement, customer needs, codes and manufacturers' specifications
- select and use tools and equipment such as pipe cutters, flaring tools and manometers
- access installation area by removing items such as heat shields and tank covers or by raising RV
- adjust area to accommodate new components by making modifications such as reinforcing structure, relocation of piping and enlarging installation area
- install components such as regulators, tubing, venting, valves, disconnects and hoses
- verify LP system operation and perform leak test to ensure compliance with codes

Section Four- Direct Current (DC) Electrical Systems — 48 hours total

DC electrical systems — 33 hours

- Describe electrical principles.
- Describe the function and operation of dc circuits and circuit components.
- Describe the use of schematics in servicing dc electrical systems.
- Construct dc electrical circuits.
- Identify codes for dc electrical systems.
- Service DC components and circuits.

NOA topics covered in this section of training:

Task 7 Diagnoses electrical systems

C-7.02 Diagnoses DC electrical and power supply systems

- confirm customer's concern to isolate source of problem and determine required diagnostic actions
- access electrical components to perform tests
- visually inspect components such as batteries, breakers, fuses and wires for defects including corrosion, cuts, melting and routing
- select and use tools and equipment such as VOM, test lights and ammeters
- check performance of power sources such as solar panels, inverters and converters to ensure compliance with manufacturers' specifications
- perform checks and tests on battery such as specific gravity, load test and water level to confirm condition of battery
- measure source voltage to ensure compliance with manufacturers' specifications
- check components such as wire gauges and breakers to determine system capacity
- test electrical system to identify possible faults such as shorts, opens and grounds
- 10 determine cause of defect such as shorts, open connections and faulty components
- types of servicing required such as replacing resettable breakers, fuses and wires

Task 9 Services DC electrical system

C-9.01 Maintains DC electrical and power supply systems

- maintain lead acid batteries using procedures such as checking water levels, charging battery, specific gravity test and load test
- visually inspect components such as breakers, fuses and wires for defects including corrosion, cuts, loose connections and routing
- select and use tools and equipment such as battery straps, battery terminal cleaner and wire brush
- clean components and connections such as solar panels, battery terminals and inverters/converters
- verify DC electrical and power supply system operation to ensure compliance with manufacturers' specifications

C-9.02 Repairs DC power supply and distribution systems

- access repair area by removing items such as panels, seats and cabinets
- select and use tools and equipment such as wire strippers, wire crimpers and hand tools
- rewire damaged circuits according to codes
- modify existing electrical system to meet requirements such as codes, customer needs and space limitation
- replace or repair faulty components such as batteries, power converters, switches, pumps and solar panels according to specifications
- verify DC electrical and power supply system operation to ensure compliance with manufacturers' specifications

C-9.03 Installs DC power supply and distribution system components

- calculate load, demand and material required to determine installation strategy according to criteria such as component placement, customer needs, codes and manufacturers' specifications
- select and use tools and equipment such as VOM, cordless drills and wire strippers
- access installation area by removing items such as panels, seats, dishes and cabinets
- adjust area to accommodate new components by making modifications such as enlarging installation area, changing location and adding ventilation
- install components such as plugs, receptacles, inverters, converters, switches and breakers
- verify DC power supply and distribution system operation to ensure compliance with manufacturers' specifications

Batteries — 15 hours

- Identify the types and application of batteries.
- Describe the principles of battery operation.
- Describe the procedure for storing and installing batteries.
- Describe the procedure for testing, recharging and boosting batteries.
- Identify the types of battery disconnect devices and systems.

NOA topics covered in this section of training:

Task 9 Services DC electrical system

C-9.01 Maintains DC electrical and power supply systems

- maintain lead acid batteries using procedures such as checking water levels, charging battery, specific gravity test and load test
- visually inspect components such as breakers, fuses and wires for defects including corrosion, cuts, loose connections and routing
- select and use tools and equipment such as battery straps, battery terminal cleaner and wire brush
- clean components and connections such as solar panels, battery terminals and inverters/converters
- verify DC electrical and power supply system operation to ensure compliance with manufacturers' specifications

Section Five- Appliances and Accessories — 44 hours total

Appliances Operation and Replacement — 12 hours

- Describe the general operation of RV appliances.
- Describe the precautions and procedures for removing and installing RV appliances.

NOA topics covered in this section of training:

Task 12 Maintains appliances

E-12.01 Maintains water heaters and components

- test operation of water heater
- check water supply systems for leaks and blockages
- check LP gas system for leaks and adjust for correct pressure
- check and clean venting and combustion components for sooting and foreign object obstructions
- check and adjust air fuel mixture for proper flame according to manufacturers' specifications
- clean and test connections of circuit board and components
- flush tank and replace anode rod
- identify worn and damaged parts to recommend replacement or repair

E-12.02 Maintains furnaces and components

- test operation of furnace
- turn off and disconnect power and LP gas supply for safety purposes
- access components by removing burner assembly, LP lines and motor cover
- clean components such as motor shafts, blower wheel and micro switches
- clean and test electrical connections such as circuit boards and electrodes
- identify worn and damaged parts to recommend replacement or repair
- check LP gas system for leaks and adjust for correct pressure
- reinstall burner assembly, LP lines and motor cover
- verify furnace operation

E-12.03 Maintains ranges and ovens

- measure and calibrate gas pressure and AC/DC power supply using tools such as high temperature thermometer, VOMs and manometers
- clean and adjust components such as burners, air shutters, pilots and electrodes for proper operation
- perform LP gas system leak test to ensure safe operation
- calibrate oven thermostat
- identify worn and damaged parts to recommend replacement or repair
- verify range and oven operation

E-12.04 Maintains refrigerators and ice makers

- test operation of refrigerators and ice makers
- turn off and disconnect power and LP gas supply
- measure and calibrate gas pressure and AC/DC power supply using tools such as manometers and VOMs
- clean components such as burners, orifices, fridge vents and flue tube
- clean electrical connections such as circuit boards and electrodes
- identify worn and damaged parts to recommend replacement or repair
- check LP gas system for leaks and adjust for correct pressure
- reinstall components such as burners, baffles and caps
- verify refrigerator and ice maker operation

E-12.05 Maintains air conditioners and heat pump systems

- test operation of air conditioners and heat pump systems
- turn off and disconnect power supply
- clean cooling coils and condenser fins of debris and foreign objects
- clean return air filters to ensure adequate air flow
- reconnect and turn on power supply to perform function test
- identify worn and damaged parts to recommend replacement or repair

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Interior Accessories and Safety Components — 12 hours

- Describe the purpose of interior accessories and safety components.
- Describe the operation of interior accessories and safety components.
- Describe the procedure for installing and servicing interior accessories and safety components.

NOA topics covered in this section of training:

Task 16 Diagnoses interior and exterior components

F-16.01 Diagnoses interior components

- confirm customer's concern to isolate source of problem and determine required diagnostic action
- visually inspect components such as sidewalls, ceiling, flooring, soft good and cabinetry to identify defects such as cracks, torn upholstery and delamination

- cause of defect such as leak, binding, environmental conditions and misuse
- access damaged area by removing components to facilitate in-depth inspection
- type of servicing required such as adjustment or replacement of faulty components

Task 17 Services interior components

F-17.01 Maintains interior components

- adjust hardware, door, trims and upholstery using tools such as pliers and screwdrivers
- lubricate hinges, door slides and locks using products such as silicone based lubricants and white lithium grease
- apply protective coatings and fire retardant to soft goods and carpeting to prevent wear and staining damages
- clean interior components using products such as furniture polish, appliance wax and upholstery shampoo
- identify worn and damaged parts to recommend replacement or repair

F-17.02 Repairs interior components

- move, relocate and re-secure components such as studding, furniture and wall trim
- prepare area by measuring, laying out and cutting work surface such as decor panels and flooring by using techniques such as sanding, filling, nailing and applying adhesive
- replace soft goods hardware such as snaps and buttons
- repair wood, fabric and vinyl surfaces using materials such as batten tape, wood putties and seam sealers
- repair plastic components from scratches, cracks and gouges by using materials such as epoxies, paint and resins
- replace interior components such as window coverings, panels, cabinets, laminates, foam, fabrics, closet doors and hardware, trim and mouldings

F-17.03 Installs interior components

- move, relocate and re-secure components such as studding, furniture and wall trim
- measure, lay out and cut wall panels, ceiling panels and flooring using tools such as carpenter squares, jig saws, drills and routers
- position, level and secure interior components using tools such as drills, levels, air nailers and finishing staplers
- touch up finishes after installation by applying stain varnishes, tapes, trims and batten mouldings

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Exterior Accessories — 20 hours

- Describe the procedure for installing and servicing awnings.
- Describe the procedure for installing and servicing screen rooms.
- Describe the procedure for installing aftermarket/optional exterior accessories.
- Describe the procedure for installing and servicing back-up alarms and monitoring devices.
- Describe the procedure for installing and servicing steps.

NOA topics covered in this section of training:

E-14 Repairs appliances and consumer products

E-14.06 Replaces consumer products

- verify required supply sources for proper operation
- replace components such as fuses, breakers and mounting hardware
- remove product using tools such as screwdrivers, cordless drills and wrenches
- modify interior and exterior components for consumer product
- modify and install venting
- exchange and secure product according to manufacturers' specifications
- replace gaskets and seals

- verify operation of consumer product

E-15 Installs appliances and consumer products

E-15.02 Installs consumer products and components

- identify and lay out location of product installation by visually inspecting obstructions and measuring proposed location in relation to power, LP gas, and water supply
- cut out opening using tools and equipment such as tin snips, jigsaws and reciprocating saws according to manufacturers' specifications
- insert, secure and seal product according to manufacturers' specifications
- connect appliance by installing components such as ducting, venting, electrical and gas in RV
- fasten and seal product for safety of occupants
- perform LP gas and water leak tests to verify safe operation
- verify operation of consumer product

E-16 Diagnoses interior and exterior components

F-16.02 Diagnoses exterior components

- confirm customer's concern to isolate source of problem and determine required diagnostic action
- visually inspect components such as sidewalls, roof, sub floor structures, sealants, doors, awnings, mouldings and windows to identify damages such as corrosion, delamination and misalignment of fasteners
- cause of defect such as sealant failure, UV damage and impact
- access damaged area by removing components such as windows, doors and awnings, to facilitate in-depth inspection
- perform moisture and leak test to detect point of entry of water
- type of servicing required such as adjustment or replacement of faulty components

F-18 Services exterior components

F-18.01 Maintains exterior components

- clean exterior components by removing contaminants
- lubricate exterior components such as awnings, steps, locks and hinges
- adjust hardware such as door latches and locks
- check operation of components such as lights, locks, awnings and vents
- apply products such as rubber conditioners, sealants, waxes, cleaners, paint shields and UV protectants to prevent deterioration
- identify worn and damaged parts to recommend replacement or repair

F-18.02 Repairs exterior components

- access damaged area by removing components such as ladders, windows, aluminium sidings, doors, vents and mouldings
- replace joists, studs, rafters, ducting and insulation
- repair damaged area by using techniques such as reapplying sealants, adding structural reinforcements and refinishing FRP panel
- replace exterior components such as windows, doors, hatches, vents, outlets, awnings, wheel wells, aluminium skin and rock guards

F-18.03 Installs exterior components

- measure, lay out and cut material to prepare for installation of components such as roofing, siding, sub floor and underbelly
- remove and relocate existing components to aid in installation of new exterior components such as EPDM rubber, vents, awnings and ladders
- position, level and secure exterior components using fasteners such as adhesives, screws, rivets, staples, nuts and bolts
- apply sealants and finishing products such as paints, silicones, putty and self-levelling sealants
- install decals and striping to enhance cosmetic appearance

Section Six- Mechanical and Towing Systems — 42 hours total

Tow Vehicle — 6 hours

- Describe the requirements and procedure for installing wiring trailer connections on a tow vehicle.
- Describe the operation, application and installation of charging system isolators and relays.

NOA topics covered in this section of training:

Task 24 Services towing systems

H-24.01 Maintains tow vehicle systems

- visually inspect components for wear, corrosion and lack of lubrication
- lubricate and protect components such as electrical connections and hitching components
- verify operation of electrical system by using diagnostic equipment
- replace components such as hitches, brake controls and sway controls
- repair components such as fifth wheel hitch, torsion hitch and electrical components

H-24.02 Maintains towed vehicle systems

- visually inspect components for wear, corrosion and lack of lubrication
- lubricate and protect components such as tow bars and electrical connections
- verify operation of electrical system by using diagnostic equipment
- replace components such as spacers, shims, springs, boots and cables
- repair components such as tow bars, lube pumps, auxiliary braking system and driveline disconnect devices

Hitch Systems — 12 hours

- Describe the types and application of hitch and tow systems.
- Describe the procedure for installing and adjusting hitch and tow systems.
- Describe the types and application of sway control devices.
- Describe the purpose and requirements for safety chains.
- Describe methods, regulations and applications for dinghy towing.

NOA topics covered in this section of training:

Task 24 Services towing systems

H-24.01 Maintains tow vehicle systems

- visually inspect components for wear, corrosion and lack of lubrication
- lubricate and protect components such as electrical connections and hitching components
- verify operation of electrical system by using diagnostic equipment
- replace components such as hitches, brake controls and sway controls
- repair components such as fifth wheel hitch, torsion hitch and electrical components

H-24.02 Maintains towed vehicle systems

- visually inspect components for wear, corrosion and lack of lubrication
- lubricate and protect components such as tow bars and electrical connections
- verify operation of electrical system by using diagnostic equipment
- replace components such as spacers, shims, springs, boots and cables
- repair components such as tow bars, lube pumps, auxiliary braking system and driveline disconnect devices

Brake Systems — 6 hours

- Describe the components and operation of brake systems.
- Describe the procedure for installing a tow vehicle brake control system.
- Service brake systems and components.

NOA topics covered in this section of training:

Task 19 Maintains chassis and mechanical components

G-19.01 Maintains frames

- visually inspect undercoating for defects such as chipping and peeling
- sand, prep, paint and undercoat frame according to manufacturers' specifications
- inspect frame for deficiencies such as rust, cracks, frame to axle misalignment and improper gauge using tools such as calipers and alignment tools
- visually inspect mounting points for frame components such as floor to frame and slide-out mechanism
- clean, adjust and lubricate components such as steps, couplers, bumpers and pin box

G-20 Diagnoses chassis and mechanical components

G-20.02 Diagnoses running gear

- confirm customer's concern to isolate source of problem and determine required diagnostic actions
- interpret tire tread wear such as cupping, and outer and inner wear
- identify worn, loose or broken suspension parts such as bushings, hangers, equalizers, shocks, springs, bolts and shackles
- test braking system using ammeters
- check for brake problems such as scored brake drums, seized parts and delaminated linings, defective magnets, broken springs and out of adjustment
- test voltage drop and amp draw using VOMs and ammeters to locate and isolate electrical problem between trailer and tow vehicle
- visually inspect hydraulic brakes for leaks
- test hydraulic brakes system through manual activation according to manufacturers' specifications
- cause of defect such as poor maintenance, defective parts and rough road conditions
- servicing requirements such as repairing seals, bearings, bushings and springs according manufacturers' specifications

G-21 Repairs chassis and mechanical systems

G-21.02 Repairs running gear

- repair and replace tires according to defect
- replace damaged brake parts using tools such as wrenches, sockets, pliers and spring tools
- bleed and flush hydraulic trailer brakes to remove air in system and contaminants
- clean and lubricate brake components
- repack and replace bearings
- replace bushings and lubricate according to bushing type
- adjust brakes according to specifications
- replace springs using tools such as hammers, wrenches and jacks
- verify brake repair by testing operation
- air pressure using tools such as measuring tools, torque wrenches and pressure gauges

Undercarriage 12 hours

- Describe the purpose of undercarriage components.
- Describe the construction of trailer frames.
- Describe axle types, suspension systems and weight ratings.
- Describe the procedure for aligning an axle.
- Describe wheel and tire types and ratings.
- Describe tire wear patterns and causes.
- Describe types of landing gear and trailer tongue jacks.
- Describe the procedure for servicing landing gear and trailer tongue jacks.
- Perform wheel and tire balance.
- Service wheel bearings and seals

NOA topics covered in this section of training:

Task 19 Maintains chassis and mechanical components
G-19.01 Maintains frames

- visually inspect undercoating for defects such as chipping and peeling
- sand, prep, paint and undercoat frame according to manufacturers' specifications
- inspect frame for deficiencies such as rust, cracks, frame to axle misalignment and improper gauge using tools such as calipers and alignment tools
- visually inspect mounting points for frame components such as floor to frame and slide-out mechanism
- clean, adjust and lubricate components such as steps, couplers, bumpers and pin box

Task 21 Repairs chassis and mechanical systems
G-21.01 Repairs frames and components (NOT COMMON CORE)

- sand, prep, paint and undercoat frame according to manufacturers' specifications
- grind out weld and crack, and re-fasten using tools such as a grinders, welders, presses, jacks and hammers
- reattach existing components such as outriggers, couplers, jacks, floor mounts and steps using tools and materials including welders, wrenches, bolts and fasteners
- align frame components using tools and equipment such as measuring tools, welders, drills and grinders
- lubricate components such as steps, couplers and jacks
- adjust components such as steps, couplers, bumpers and pin box using tools such as socket wrenches and hammers
- clean components such as steps, couplers and metal surfaces
- fabricate frame components such as support, brackets and consumer products according manufacturers' specifications
- modify replacement components for fit and use
- verify frame component repair

Level Two — 8 weeks — 240 hours

Section One- Standard Practices and Procedures — 24 hours total

Work Orders — **4 hours**

- Describe purpose and types of work orders.
- Describe air supply systems.
- Describe procedure for documenting parts, labour and shop supplies.

NOA topics covered in this section of training:

Task 3 Performs common work practices and procedures
A-3.02 Identifies outstanding recalls and service bulletins

- interpret outstanding recalls and service bulletins to determine servicing requirements
- ensure completion of servicing meets compliance requirements
- update maintenance records to reflect compliance with outstanding recalls and service bulletins

Estimating — **10 hours**

- Describe the purpose and types of estimates.
- Describe estimating policies and procedures.
- Perform an estimate.

NOA topics covered in this section of training:

Task 3 Performs common work practices and procedures
A-3.01 Uses blueprints, drawings , schematics and sketches

- interpret documents such as diagrams, schematics and flow charts to determine actions to be performed
- interpret symbols, dimensions and specifications
- perform metric/imperial conversions
- measure dimensions to ensure proper installation
- sketch modifications of repairs and installations such as liquefied petroleum (LP) gas and electrical systems, and structure

A-3.02 Identifies outstanding recalls and service bulletins

- interpret outstanding recalls and service bulletins to determine servicing requirements
- ensure completion of servicing meets compliance requirements
- update maintenance records to reflect compliance with outstanding recalls and service bulletins

Task 14 Repairs appliances and consumer products
E-14.06 Replaces consumer products

- verify required supply sources for proper operation
- replace components such as fuses, breakers and mounting hardware
- remove product using tools such as screwdrivers, cordless drills and wrenches
- modify interior and exterior components for consumer product
- modify and install venting
- exchange and secure product according to manufacturers' specifications
- replace gaskets and seals
- verify operation of consumer product

Task 15 Installs appliances and consumer products

E-15.02 Installs consumer products and components

- identify and lay out location of product installation by visually inspecting obstructions and measuring proposed location in relation to power, LP gas, and water supply
- cut out opening using tools and equipment such as tin snips, jigsaws and reciprocating saws according to manufacturers' specifications
- insert, secure and seal product according to manufacturers' specifications
- connect appliance by installing components such as ducting, venting, electrical and gas in RV
- fasten and seal product for safety of occupants
- perform LP gas and water leak tests to verify safe operation
- verify operation of consumer product

Warranty and Recall Procedures — 2 hours

- Describe warranty policies and procedures.
- Describe the procedure for processing recalls and service bulletins.

NOA topics covered in this section of training:

Task 3 Performs common work practices and procedures
A-3.02 Identifies outstanding recalls and service bulletins

- interpret outstanding recalls and service bulletins to determine servicing requirements
- ensure completion of servicing meets compliance requirements
- update maintenance records to reflect compliance with outstanding recalls and service bulletins

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Parts Catalogues and Related References — 4 hours

- Describe warranty policies and procedures.
- Describe the procedure for processing recalls and service bulletins.

NOA topics covered in this section of training:

Task 3 Performs common work practices and procedures
A-3.02 Identifies outstanding recalls and service bulletins

- interpret outstanding recalls and service bulletins to determine servicing requirements
- ensure completion of servicing meets compliance requirements
- update maintenance records to reflect compliance with outstanding recalls and service bulletins

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Customer Relations — 4 hours

- Describe how to provide courtesy to a customer and project a professional image.
- Identify how to address customer needs and expectations.
- Describe expectations for professional conduct during customer communications.

NOA topics covered in this section of training:

Task 14 Repairs appliances and consumer products
E-14.06 Replaces consumer products

- verify required supply sources for proper operation
- replace components such as fuses, breakers and mounting hardware
- remove product using tools such as screwdrivers, cordless drills and wrenches
- modify interior and exterior components for consumer product
- modify and install venting
- exchange and secure product according to manufacturers' specifications
- replace gaskets and seals

- verify operation of consumer product

Section Two- Alternating Current (AC) Electrical Systems — 54 hours total

AC Electrical System Service — 24 hours

- Describe the difference between ac and dc circuits.
- Describe safety precautions used when servicing ac electrical systems.
- Describe the purpose and operation of ac circuit components.
- Describe the purpose and operation of Energy Management Systems.
- Describe codes for ac electrical systems.

NOA topics covered in this section of training:

Task 7 Diagnoses electrical systems

C-7.01 Diagnoses AC electrical and power supply systems

- confirm customer's concern to isolate source of problem and determine required diagnostic actions
- access electrical components to perform tests
- visually inspect components such as shore cords, transfer switches and breakers for damage including corrosion, cuts and melting
- select and use tools and equipment such as VOM, ground fault circuit interrupter (GFCI) tester and ammeter
- check performance of power sources such as inverters, generators and shore power to ensure components comply with manufacturers' specifications
- check components such as wire gauges and breakers to identify system capacity
- test electrical system to identify possible faults such as shorts, opens and grounds
- determine cause of defect such as shorts, open connections and faulty components
- types of servicing required such as replacing breakers, GFCI and wire

Task 8 Services AC electrical system

C-8.01 Maintains AC electrical and power supply systems

- visually inspect shore power cords for physical damage such as corrosion, cuts and melting
- visually inspect grounds and connections to identify potential faults
- perform maintenance tests such as hot skin test, AC power supply and distribution system operation verification and GFCI check
- clean inverters and converters to prevent overheating
- isolate potential problems and determine required actions

C-8.02 Repairs AC power supply and distribution system

- access repair area by removing items such as panels, seats and cabinets
- replace faulty components such as inverters, converters and transfer switches
- rewire damaged circuits according to codes
- modify existing electrical system to meet requirements such as codes, customer needs and space limitation
- verify AC power supply and distribution system operation to ensure compliance with manufacturers' specifications
- select and use tools and equipment such as meters, fish wires and wire strippers

C-8.03 Installs AC power supply and distribution system components

- calculate load, demand and material required to determine installation strategy according to criteria such as component placement, customer needs, codes and manufacturers' specifications
- select and use tools and equipment such as VOM, cordless drills and wire strippers
- access installation area by removing items such as panels, seats and cabinets
- adjust area to accommodate new components by making modifications such as enlarging installation area, changing location and adding ventilation

- install components such as receptacles, inverters, converters, switches and breakers
- verify AC power supply and distribution system operation to ensure compliance with manufacturers' specifications

Generators — 20 hours

- Describe safety hazards associated with generators.
- Calculate output requirements for generators.
- Describe the procedure for installing generators.
- Describe codes for generator systems.
- Describe the procedure for servicing generators.
- Test generator output.

NOA topics covered in this section of training:

Task 19 Maintains chassis and mechanical components

G-19.05 Maintains generators

- check generator components such as spark plugs and ignition for compliance with specifications such as gap, timing and compression
- change oil and change filters such as fuel, air and oil filters
- visually inspect and test starting system switches and harnesses for functionality
- visually inspect fuel delivery systems for leaks and connections
- visually inspect installation and supporting hardware
- check electrical source for specified DC voltage and amperage using tools such as VOMs, ammeters and load testers
- inspect wiring connections, gauge and routing
- verify generator operation by testing AC output voltage and frequency, and exercising generator

Task 20 Diagnoses chassis and mechanical components

G-20.05 Diagnoses generators

- confirm customer's concern to isolate source of problem and determine required diagnostic actions
- check generator components including spark plugs and ignition, that items such as gap, timing and compression meet specifications
- check filters such as fuel, air and oil for contamination
- inspect and test starting system switches and harnesses for operation
- visually inspect fuel delivery systems for leaks and connections
- visually inspect installation and supporting hardware
- check electrical source for specified DC voltage and amperage using tools such as VOMs, ammeters and load testers
- inspect wiring connections, gauge and routing
- verify generator operation by testing AC output voltage and frequency
- check generator windings for shorts and continuity
- perform tests such as compression and ignition using tools such as compression tester, spark plug gauges and spark testers
- cause of defect such as poor maintenance and defective parts
- servicing requirements such as replacing circuit boards, spark plugs and breakers, and repairing fuel supply, DC electrical, fittings and hoses according manufacturers' specifications

Task 21 Repairs chassis and mechanical systems

G-21.05 Repairs generators

- replace components such as fuel pumps, spark plugs and starter

- tune and adjust generator by adjusting carburetor, fuel mixture and revolutions per minute (rpm)
- clean, re-build and replace carburetors
- change oil and filters such as fuel, air and oil filters
- repair leaks in fuel delivery systems by replacing components such as fuel lines and fittings
- replace or repair electrical wiring and connections by means such as soldering and crimping
- replace generator according to manufactures' installation instructions
- verify generator operation by testing AC output voltage and frequency, and exercising generator

Task 22 Installs chassis and mechanical components

G-22.02 Installs generators

- prepare and modify location for generator such as moving other RV components in order to install generator according to application
- position and secure mounting components as per RV manufacturers' specifications to prepare for generator installation
- position and secure generator according to manufacturers' specifications
- route and connect electrical wiring and fuel lines considering factors such as pinch points, heat and secure mounting
- ensure exhaust system is installed to allow venting according to Canadian Standards Association (CSA) code book
- verify generator operation

Converters and Charging Systems — 10 hours

- Describe types of converters and charging systems.
- Describe the operation of converters and charging systems.
- Describe the operation of power centers.
- Describe the procedure for servicing converters, power centers and charging systems.
- Calculate convertor requirements.

NOA topics covered in this section of training:

Task 7 Diagnoses electrical systems

C-7.01 Diagnoses AC electrical and power supply systems

- confirm customer's concern to isolate source of problem and determine required diagnostic actions
- access electrical components to perform tests
- visually inspect components such as shore cords, transfer switches and breakers for damage including corrosion, cuts and melting
- select and use tools and equipment such as VOM, ground fault circuit interrupter (GFCI) tester and ammeter
- check performance of power sources such as inverters, generators and shore power to ensure components comply with manufacturers' specifications
- check components such as wire gauges and breakers to identify system capacity
- test electrical system to identify possible faults such as shorts, opens and grounds
- determine cause of defect such as shorts, open connections and faulty components
- types of servicing required such as replacing breakers, GFCI and wire

C-7.02 Diagnoses DC electrical and power supply systems

- confirm customer's concern to isolate source of problem and determine required diagnostic actions
- access electrical components to perform tests

- visually inspect components such as batteries, breakers, fuses and wires for defects including corrosion, cuts, melting and routing
- select and use tools and equipment such as VOM, test lights and ammeters
- check performance of power sources such as solar panels, inverters and converters to ensure compliance with manufacturers' specifications
- perform checks and tests on battery such as specific gravity, load test and water level to confirm condition of battery
- measure source voltage to ensure compliance with manufacturers' specifications
- check components such as wire gauges and breakers to determine system capacity
- test electrical system to identify possible faults such as shorts, opens and grounds
- 10 determine cause of defect such as shorts, open connections and faulty components
- types of servicing required such as replacing resettable breakers, fuses and wires

Task 8 Services AC electrical system

C-8.01 Maintains AC electrical and power supply systems

- visually inspect shore power cords for physical damage such as corrosion, cuts and melting
- visually inspect grounds and connections to identify potential faults
- perform maintenance tests such as hot skin test, AC power supply and distribution system operation verification and GFCI check
- clean inverters and converters to prevent overheating
- isolate potential problems and determine required actions

C-8.02 Repairs AC power supply and distribution system

- access repair area by removing items such as panels, seats and cabinets
- replace faulty components such as inverters, converters and transfer switches
- rewire damaged circuits according to codes
- modify existing electrical system to meet requirements such as codes, customer needs and space limitation
- verify AC power supply and distribution system operation to ensure compliance with manufacturers' specifications
- select and use tools and equipment such as meters, fish wires and wire strippers

C-8.03 Installs AC power supply and distribution system components

- calculate load, demand and material required to determine installation strategy according to criteria such as component placement, customer needs, codes and manufacturers' specifications
- select and use tools and equipment such as VOM, cordless drills and wire strippers
- access installation area by removing items such as panels, seats and cabinets
- adjust area to accommodate new components by making modifications such as enlarging installation area, changing location and adding ventilation
- install components such as receptacles, inverters, converters, switches and breakers
- verify AC power supply and distribution system operation to ensure compliance with manufacturers' specifications

Task 9 Services DC electrical system

C-9.01 Maintains DC electrical and power supply systems

- maintain lead acid batteries using procedures such as checking water levels, charging battery, specific gravity test and load test
- visually inspect components such as breakers, fuses and wires for defects including corrosion, cuts, loose connections and routing
- select and use tools and equipment such as battery straps, battery terminal cleaner and wire brush
- clean components and connections such as solar panels, battery terminals and inverters/converters

- verify DC electrical and power supply system operation to ensure compliance with manufacturers' specifications

C-9.02 Repairs DC power supply and distribution systems

- access repair area by removing items such as panels, seats and cabinets
- select and use tools and equipment such as wire strippers, wire crimpers and hand tools
- rewire damaged circuits according to codes
- modify existing electrical system to meet requirements such as codes, customer needs and space limitation
- replace or repair faulty components such as batteries, power converters, switches, pumps and solar panels according to specifications
- verify DC electrical and power supply system operation to ensure compliance with manufacturers' specifications

C-9.03 Installs DC power supply and distribution system components

- calculate load, demand and material required to determine installation strategy according to criteria such as component placement, customer needs, codes and manufacturers' specifications
- select and use tools and equipment such as VOM, cordless drills and wire strippers
- access installation area by removing items such as panels, seats, dishes and cabinets
- adjust area to accommodate new components by making modifications such as enlarging installation area, changing location and adding ventilation
- install components such as plugs, receptacles, inverters, converters, switches and breakers
- verify DC power supply and distribution system operation to ensure compliance with manufacturers' specifications

Section Three- Consumer Products — 24 hours total

Consumer Media Products — 24 hours

- Describe the types of consumer media products.
- Describe the general operation and set up procedures for common consumer products.
- Describe the procedure for installing and servicing entertainment systems.
- Describe the procedure for installing and servicing antennae and satellite systems.

NOA topics covered in this section of training:

Task 14 Repairs appliances and consumer products

E-14.06 Replaces consumer products

- verify required supply sources for proper operation
- replace components such as fuses, breakers and mounting hardware
- remove product using tools such as screwdrivers, cordless drills and wrenches
- modify interior and exterior components for consumer product
- modify and install venting
- exchange and secure product according to manufacturers' specifications
- replace gaskets and seals
- verify operation of consumer product

Task 15 Installs appliances and consumer products

E-15.01 Installs appliances and components

- identify and lay out location of appliance installation by visually inspecting for obstructions and by measuring proposed location in relation to propane, water and power supply
- cut out opening using tools and equipment such as tin snips, jigsaws and reciprocating saws according to manufacturers' specifications
- reinforce structure to support appliances
- insert, secure and seal appliances according to manufacturers' specifications

- connect AC/DC power, LP gas and water supply to appliances
- install ducting and venting to appliances
- install supplementary devices such as cooling fans, duct booster fan and heating strip, according to manufacturers' specifications
- perform gas and water leak tests to verify safe operation
- verify operation by cycling appliance

E-15.02 Installs consumer products and components

- identify and lay out location of product installation by visually inspecting obstructions and measuring proposed location in relation to power, LP gas, and water supply
- cut out opening using tools and equipment such as tin snips, jigsaws and reciprocating saws according to manufacturers' specifications
- insert, secure and seal product according to manufacturers' specifications
- connect appliance by installing components such as ducting, venting, electrical and gas in RV
- fasten and seal product for safety of occupants
- perform LP gas and water leak tests to verify safe operation
- verify operation of consumer product

Section Four- Appliances — 53 hours total

Cooking Equipment — 5 hours

- Describe the types of cooking equipment.
- Describe the purpose and operation of cooking equipment components.
- Describe codes relating to cooking equipment.
- Describe the procedure for servicing cooking equipment.

NOA topics covered in this section of training:

Task 10 Diagnoses LP gas systems

D-10.01 Diagnoses LP gas supply system (high pressure)

- confirm customer's concern to isolate source of problem and determine required diagnostic actions
- inspect system and components to ensure compliance with codes
- visually inspect system and containers for expiry date and damage such as rust, dents and damaged welds
- select and use tools and equipment such as hand tools, leak detectors and high pressure gauges
- locate leaks
- test operational pressure of propane system to meet code requirements and design specifications
- determine cause of defect such as kinked hose, punctured hose and seized excess flow valve
- types of servicing required such as repair or replacement of faulty components

D-10.02 Diagnoses LP gas distribution system (low pressure)

- confirm customer's concern to isolate source of problem and determine required diagnostic actions
- visually inspect low pressure distribution system to ensure compliance with codes and for damage such as impacts, broken ground and unsecured gas lines
- perform system tests such as drop pressure test, regulator lock-up test and system operating test according to code
- select and use tools and equipment such as hand tools, leak detectors and manometer
- locate leaks
- determine cause of defect such as contaminants, punctured lines and faulty components
- types of servicing required such as repair or replacement of faulty components

Task 11 Services LP gas systems

D-11.01 Maintains LP gas supply systems

- visually inspect components such as hoses, tanks, protective coverings and fasteners for damage and wear
- perform system leak test using manometer
- determine types of servicing required such as repair or replacement of faulty components

D-11.02 Repairs LP gas supply systems and components

- access repair area by removing items such as heat shields and tank covers or by raising RV
- select and use tools and equipment such as manometers, hand tools and flaring tools
- replace or repair faulty components such as regulators, protective coverings, hoses, tanks, tubing, pipes and cylinders
- re-secure cylinders and distribution system according to codes
- remove contaminants to maximize supply of LP gas
- perform drop pressure test and adjust pressure

D-11.03 Installs LP gas supply systems and components

- calculate load, demand and material required to determine installation strategy according to criteria such as component placement, customer needs, codes and manufacturers' specifications
- select and use tools and equipment such as pipe cutters, flaring tools and manometers
- access installation area by removing items such as heat shields and tank covers or by raising RV
- adjust area to accommodate new components by making modifications such as reinforcing structure, relocation of piping and enlarging installation area
- install components such as regulators, tubing, venting, valves, disconnects and hoses
- verify LP system operation and perform leak test to ensure compliance with codes

Task 12 Maintains appliances

E-12.03 Maintains ranges and ovens

- measure and calibrate gas pressure and AC/DC power supply using tools such as high temperature thermometer, VOMs and manometers
- clean and adjust components such as burners, air shutters, pilots and electrodes for proper operation
- perform LP gas system leak test to ensure safe operation
- calibrate oven thermostat
- identify worn and damaged parts to recommend replacement or repair
- verify range and oven operation

Task 13 Diagnoses appliances

E-13.03 Diagnoses ranges and ovens

- confirm customer's concern to isolate source of problem and determine required diagnostic action
- measure power and gas supply to ensure voltage and gas pressure meet manufacturers' specifications using tools such as high temperature thermometer, VOMs and manometers
- visually inspect components including burners, pilots, safety valves and electrodes for conditions such as corrosion, burnt wires, poor installation and foreign objects
- perform operational test by cycling unit
- test thermostat to ensure oven is cycling at specified temperature
- type of servicing required such as adjustment or replacement of faulty components

Task 14 Repairs appliances and consumer products

E-14.03 Repairs ranges and ovens

- disconnect AC/DC power and LP gas supply to ranges and ovens to prevent injury
- replace ranges and ovens or components such as burner valves, oven safety valves, thermostats, gaskets, seals, igniters and LP gas regulators
- calibrate thermostat to required temperature settings by using tools such as high temperature thermometers and screwdrivers, and adjust combustion air
- adjust oven door to ensure proper seal
- reconnect AC/DC power and LP gas supply to ranges and ovens
- perform LP pressure and leak tests to ensure safe operation
- perform operational test

Water Heating Systems — 13 hours

- Describe the types of water heating systems.
- Describe the purpose and operation of water heating system components.
- Describe codes for water heating systems.
- Service water heating systems.

NOA topics covered in this section of training:

Task 12 Maintains appliances
E-12.01 Maintains water heaters and components

- test operation of water heater
- check water supply systems for leaks and blockages
- check LP gas system for leaks and adjust for correct pressure
- check and clean venting and combustion components for sooting and foreign object obstructions
- check and adjust air fuel mixture for proper flame according to manufacturers' specifications
- clean and test connections of circuit board and components
- flush tank and replace anode rod
- identify worn and damaged parts to recommend replacement or repair

Task 13 Diagnoses appliances
E-13.01 Diagnoses water heaters

- confirm customer's concern to isolate source of problem and determine required diagnostic action
- measure power and gas supply to ensure voltage and gas pressure comply with manufacturers' specifications
- visually inspect tank and related components for conditions such as corrosion, burnt wires, poor installation and foreign objects
- check operation of components such as thermostats, circuit boards, energy cut off (ECO), gas valves, electrodes/thermocouples and heating elements using measuring tools such as VOMs and ammeters
- verify by-pass, mixing and check valves to determine flow direction according to manufacturers' specifications
- type of servicing required such as adjustment or replacement of faulty components

Task 14 Repairs appliances and consumer products
E-14.01 Repairs water heaters

- shut off and disconnect AC and DC power, LP gas and water to prevent injury drain water heater to prevent damage to RV
- adjust electrodes to ensure spark gap, ground and position
- adjust gas pressure according to manufacturers' specifications to establish optimal flame operation
- adjust air shutter on burner tube to ensure air fuel mixture

- replace defective water heater or components such as gas valves, circuit boards, thermostats, ECO, thermocouples, heating elements, electrode
  switches and inner tanks using tools such as backup wrenches, VOMs and manometers
- perform gas leak test to ensure safe operation
- perform operation tests to verify repairs

Heating Systems — 35 hours

- Describe the types and operation of heating systems.
- Describe the purpose and operation of heating systems components.
- Describe the types and operation of thermostats and climate controls.
- Describe codes for heating systems.
- Describe the procedure for servicing heating systems.

NOA topics covered in this section of training:

Task 12 Maintains appliances
E-12.02 Maintains furnaces and components

- test operation of furnace
- turn off and disconnect power and LP gas supply for safety purposes
- access components by removing burner assembly, LP lines and motor cover
- clean components such as motor shafts, blower wheel and micro switches
- clean and test electrical connections such as circuit boards and electrodes
- identify worn and damaged parts to recommend replacement or repair
- check LP gas system for leaks and adjust for correct pressure
- reinstall burner assembly, LP lines and motor cover
- verify furnace operation

Task 13 Diagnoses appliances
E-13.02 Diagnoses furnaces

- confirm customer's concern to isolate source of problem and determine required diagnostic action
- measure power and gas supply to ensure voltage and gas pressure comply with manufacturers' specifications
- check air flow at registers for possible obstructions
- visually inspect intake and exhaust venting
- visually inspect combustion chambers and related components for conditions such as corrosion, burnt wires, poor installation and foreign objects
- verify burner operation by inspecting flame characteristics
- check operation of components such as thermostats, circuit boards, high limit switches, gas valves, electrodes and thermocouples using measuring tools such as VOMs, manometers and ammeter
- type of servicing required such as adjustment or replacement of faulty components

Task 14 Repairs appliances and consumer products
E-14.02 Repairs furnaces

- calibrate thermostat and anticipator to ensure proper operation
- disconnect AC/DC power and LP gas supply to furnace to prevent injury
- disconnect ducting and venting to remove furnace
- add and modify ducting and venting to ensure proper air flow
- adjust electrodes to ensure spark gap, ground and position
- adjust gas pressure according to manufacturers' specifications to establish optimal flame operation

- replace faulty components such as gas valves, high limit and micro switches, thermostat, and blower motor using tools such as gas line wrenches, Allen keys and screwdrivers
- test operation of furnace using independent power and gas supplies
- reinstall furnace by reconnecting ducting, venting, electrical and gas in RV
- perform LP gas leak test to ensure safe operation
- perform operational test

Section Five- Exterior Structures — 61 hours total

Exterior Surfaces, Components and Structures — 41 hours

- Describe framing and insulating methods, materials and design.
- Describe the types of exterior finishes.
- Describe the procedure for servicing framing.
- Describe the procedure for servicing exterior components.
- Describe the procedure for replacing fiber reinforced plastic (FRP).
- Describe the types of material used in windows.
- Describe the types of roof construction.
- Describe the procedure for servicing roofing systems.
- Describe the procedure for preparing units for cold weather use.
- Describe the design and construction of slide-out rooms.
- Describe the procedure for servicing interior walls, ceiling coverings and panels.
- Identify codes relating to the servicing of exterior structures.
- Replace metal siding.
- Service structural and exterior components.

NOA topics covered in this section of training:

Task 16 Diagnoses interior and exterior components

F-16.01 Diagnoses interior components

- confirm customer's concern to isolate source of problem and determine required diagnostic action
- visually inspect components such as sidewalls, ceiling, flooring, soft good and cabinetry to identify defects such as cracks, torn upholstery and delamination
- cause of defect such as leak, binding, environmental conditions and misuse
- access damaged area by removing components to facilitate in-depth inspection
- type of servicing required such as adjustment or replacement of faulty components

F-16.02 Diagnoses exterior components

- confirm customer's concern to isolate source of problem and determine required diagnostic action
- visually inspect components such as sidewalls, roof, sub floor structures, sealants, doors, awnings, mouldings and windows to identify damages such as corrosion, delamination and misalignment of fasteners
- cause of defect such as sealant failure, UV damage and impact
- access damaged area by removing components such as windows, doors and awnings, to facilitate in-depth inspection
- perform moisture and leak test to detect point of entry of water
- type of servicing required such as adjustment or replacement of faulty components

Task 17 Services interior components

F-17.01 Maintains interior components

- adjust hardware, door, trims and upholstery using tools such as pliers and screwdrivers
- lubricate hinges, door slides and locks using products such as silicone based lubricants and white lithium grease

- apply protective coatings and fire retardant to soft goods and carpeting to prevent wear and staining damages
- clean interior components using products such as furniture polish, appliance wax and upholstery shampoo
- identify worn and damaged parts to recommend replacement or repair

F-17.02 Repairs interior components

- move, relocate and re-secure components such as studding, furniture and wall trim
- prepare area by measuring, laying out and cutting work surface such as decor panels and flooring by using techniques such as sanding, filling, nailing and applying adhesive
- replace soft goods hardware such as snaps and buttons
- repair wood, fabric and vinyl surfaces using materials such as batten tape, wood putties and seam sealers
- repair plastic components from scratches, cracks and gouges by using materials such as epoxies, paint and resins
- replace interior components such as window coverings, panels, cabinets, laminates, foam, fabrics, closet doors and hardware, trim and mouldings

F-17.03 Installs interior components

- move, relocate and re-secure components such as studding, furniture and wall trim
- measure, lay out and cut wall panels, ceiling panels and flooring using tools such as carpenter squares, jig saws, drills and routers
- position, level and secure interior components using tools such as drills, levels, air nailers and finishing staplers
- touch up finishes after installation by applying stain varnishes, tapes, trims and batten mouldings

Task 18 Services exterior components

F-18.01 Maintains exterior components

- clean exterior components by removing contaminants
- lubricate exterior components such as awnings, steps, locks and hinges
- adjust hardware such as door latches and locks
- check operation of components such as lights, locks, awnings and vents
- apply products such as rubber conditioners, sealants, waxes, cleaners, paint shields and UV protectants to prevent deterioration
- identify worn and damaged parts to recommend replacement or repair

F-18.02 Repairs exterior components

- access damaged area by removing components such as ladders, windows, aluminium sidings, doors, vents and mouldings
- replace joists, studs, rafters, ducting and insulation
- repair damaged area by using techniques such as reapplying sealants, adding structural reinforcements and refinishing FRP panel
- replace exterior components such as windows, doors, hatches, vents, outlets, awnings, wheel wells, aluminium skin and rock guards

F-18.03 Installs exterior components

- measure, lay out and cut material to prepare for installation of components such as roofing, siding, sub floor and underbelly
- remove and relocate existing components to aid in installation of new exterior components such as EPDM rubber, vents, awnings and ladders
- position, level and secure exterior components using fasteners such as adhesives, screws, rivets, staples, nuts and bolts
- apply sealants and finishing products such as paints, silicones, putty and selflevelling sealants
- install decals and striping to enhance cosmetic appearance

Body Panels — 15 hours

- Describe the composition of body panels and components.
- Describe the procedure for servicing FRP, fibre glass panels and components.
- Describe the procedure for servicing plastic components.
- Describe the procedure for installing and replacing decals and graphics.

NOA topics covered in this section of training:

F-18.01 Maintains exterior components

- clean exterior components by removing contaminants
- lubricate exterior components such as awnings, steps, locks and hinges
- adjust hardware such as door latches and locks
- check operation of components such as lights, locks, awnings and vents
- apply products such as rubber conditioners, sealants, waxes, cleaners, paint shields and UV protectants to prevent deterioration
- identify worn and damaged parts to recommend replacement or repair

Camper Tie-Down Systems And Jacks — 5 hours

- Describe the types and capacities of tie down systems.
- Describe the types and capacities of camper jacks.
- Describe the procedure for installing and servicing camper jacks.
- Describe the procedure for installing and servicing tie down systems.

NOA topics covered in this section of training:

Task 23 Diagnoses towing systems

H-23.01 Diagnoses tow vehicle systems

- confirm customer's concern to isolate source of problem and determine required diagnostic actions
- inspect systems including hitching, braking systems and lighting for operational faults such as improper setup, damage and malfunctions
- visually inspect components such as fifth wheel hitch, weight distribution system and tie downs for damage including wear, fatigue and loose fasteners
- perform various tests such as electrical circuit testing, to isolate issues between tow and towed vehicle
- determine cause of defect such as shorts, corroded connectors and worn hitching components
- determine types of servicing required such as replacing plugs, hitches and brake controls

H-23.02 Diagnoses towed vehicle systems

- confirm customer's concern to isolate source of problem and determine required diagnostic actions
- inspect systems including hitching, braking and lighting for operational faults such as improper setup, damage and malfunctions
- visually inspect components such as tow bars, base plates and auxiliary brake systems for damage including wear, fatigue, loose fasteners and operation
- perform various tests such as electrical circuit testing and lube systems pressure test, to isolate issues between tow and towed vehicle
- cause of defect such as shorts, corrosion and wear
- types of servicing required such as replacing plugs, hitches and braking system

Task 24 Services towing systems

H-24.01 Maintains tow vehicle systems

- visually inspect components for wear, corrosion and lack of lubrication

- lubricate and protect components such as electrical connections and hitching components
- verify operation of electrical system by using diagnostic equipment
- replace components such as hitches, brake controls and sway controls
- repair components such as fifth wheel hitch, torsion hitch and electrical components

H-24.02 Maintains towed vehicle systems

- visually inspect components for wear, corrosion and lack of lubrication
- lubricate and protect components such as tow bars and electrical connections
- verify operation of electrical system by using diagnostic equipment
- replace components such as spacers, shims, springs, boots and cables
- repair components such as tow bars, lube pumps, auxiliary braking system and driveline disconnect devices

H-24.03 Installs tow vehicle systems and components

- calculate load and material requirements to determine installation strategy such as component selection and placement, and customer needs
- select and use tools and equipment such as air tools, measuring devices and hand tools
- access installation area by removing items such as interior/exterior body parts or by raising tow vehicle
- adjust area to accommodate new components by making manufacturers' recommended modifications
- install components such as hitches, weight distribution hitches and anti-sway devices
- verify tow system operation and setup

H-24.04 Installs towed vehicle systems and components

- calculate load and material requirements to determine installation strategy such as component selection and placement, and customer needs
- select and use tools and equipment such as air tools, measuring devices and hand tools
- access installation area by removing items such as interior/exterior body parts or by raising towed vehicle
- adjust area to accommodate new components by making manufacturers' recommended modifications
- install components such as lubrication systems, hitches, base plates and braking systems
- verify towed system operation and setup

Section Six-Mechanical and Suspension Systems — 24 hours total

Suspension Aids — 16 hours

- Describe trailer frame types and features.
- Describe types of suspension systems.
- Describe the effect of add-on suspension aids.
- Describe the effect of vehicle modifications on suspension operation.
- Describe the procedure for installing suspension aids.
- Describe the procedure for adjusting suspension aids.
- Describe the procedure for servicing suspension aids.

NOA topics covered in this section of training:

Task 19 Maintains chassis and mechanical components

G-19.01 Maintains frames

- visually inspect undercoating for defects such as chipping and peeling
- sand, prep, paint and undercoat frame according to manufacturers' specifications
- inspect frame for deficiencies such as rust, cracks, frame to axle misalignment and improper gauge using tools such as calipers and alignment tools

- visually inspect mounting points for frame components such as floor to frame and slide-out mechanism
- clean, adjust and lubricate components such as steps, couplers, bumpers and pin box

Task 20 Diagnoses chassis and mechanical components

G-20.01 Diagnoses frames

- confirm customer's concern to isolate source of problem and determine required diagnostic actions
- measure frame for alignment according to manufacturers' specifications using tools and equipment such as measuring tapes and alignment machines
- visually inspect frame for defects such as peeling undercoat, corrosion cracks, bends and broken bolts
- cause of defect such as poor maintenance, accidents and rough road conditions
- servicing requirements according manufacturers' specifications to repair defects

Task 21 Repairs chassis and mechanical systems

G-21.01 Repairs frames and components (NOT COMMON CORE)

- sand, prep, paint and undercoat frame according to manufacturers' specifications
- grind out weld and crack, and re-fasten using tools such as a grinders, welders, presses, jacks and hammers
- reattach existing components such as outriggers, couplers, jacks, floor mounts and steps using tools and materials including welders, wrenches, bolts and fasteners
- align frame components using tools and equipment such as measuring tools, welders, drills and grinders
- lubricate components such as steps, couplers and jacks
- adjust components such as steps, couplers, bumpers and pin box using tools such as socket wrenches and hammers
- clean components such as steps, couplers and metal surfaces
- fabricate frame components such as support, brackets and consumer products according manufacturers' specifications
- modify replacement components for fit and use
- verify frame component repair

Lift and Wall Systems — 8 hours

- Describe the types of lift systems.
- Describe the operation of lift systems.
- Describe the servicing of lift systems.
- Describe the procedure for servicing wall systems**.**

NOA topics covered in this section of training:

Task 19 Maintains chassis and mechanical components

G-19.04 Maintains slide-out and lifting systems

- check electrical source for specified DC voltage and amperage using tools such as VOMs and load tester
- inspect wiring connections, gauge and routing
- verify slide-out and lifting system operation for factors such as alignment, gap, and full extension and retraction
- lubricate components such as cables, gears, pulleys, tubes and rollers
- check hydraulic system for leaks in components such as hoses, fittings and cylinders using methods such as visual inspection and hydraulic pressure gauges
- check hydraulic fluid level, fill and visually inspect for debris and contaminants such as dirt and water

- check gaskets and sweeps for conditions such as fit, cracks, tears and adhesion

Task 20 Diagnoses chassis and mechanical components

G-20.04 Diagnoses slide-out and lifting systems

- confirm customer's concern to isolate source of problem and determine required diagnostic actions
- check electrical source for specified DC voltage and amperage using tools such as VOMs, ammeters and load testers
- inspect wiring connections, gauge and routing
- test electrical/electronic components such as solenoids, relays and control boards for operation using tools such as ammeters and VOMs
- check cables, gears, pulleys, tubes and rollers for lubrication and wear
- check hydraulic system for leaks in components such as hoses, fittings and cylinders using methods such as visual inspection and hydraulic pressure gauges
- visually inspect hydraulic fluid for level and contaminants
- check gaskets and sweeps for conditions such as fit, cracks, tears and adhesion
- inspect slide-out and lifting system components such as drive gears, guide tubes, motors and cables
- cause of defect such as poor maintenance, defective parts and operator misuse
- determine servicing requirements such as replacing cylinders, cables, motors and winches, and repairing fittings and hoses according manufacturers' specifications

Task 21 Repairs chassis and mechanical systems

G-21.04 Repairs slide-out and lifting systems

- replace and repair electrical wiring and connections by means such as soldering and crimping
- re-align slide-out and lifting system using tools such as tape measures, wrenches and sockets
- lubricate components such as cables, gears, pulleys, tubes and rollers according to manufacturers' specifications
- fill hydraulic fluid to manufacturers' specifications
- drain and flush hydraulic fluid reservoirs
- repair hydraulic system leaks by replacing seals, hoses, fittings and cylinders
- route and crimp cables using tools such as cable crimper and fish tape
- replace components such as pumps, motors, solenoids and circuit boards
- bleed hydraulic lines to remove air
- verify repair by testing slide-out and lifting system operation

Level Three — 8 weeks — 240 hours

Section One- Inverter and Solar Panels — 30 hours total

Solar Systems — **15 hours**

- Describe the purpose of solar charging system components.
- Describe the operation and application of solar charging systems.
- Describe the procedure for installing solar charging systems.
- Size a solar charging and battery system to meet customer requirements.
- Describe the procedure for expanding a solar charging system to match higher requirements.
- Describe the procedure for servicing a solar charging system.

NOA topics covered in this section of training:

Task 7 Diagnoses electrical systems

C-7.01 Diagnoses AC electrical and power supply systems

- confirm customer's concern to isolate source of problem and determine required diagnostic actions
- access electrical components to perform tests
- visually inspect components such as shore cords, transfer switches and breakers for damage including corrosion, cuts and melting
- select and use tools and equipment such as VOM, ground fault circuit interrupter (GFCI) tester and ammeter
- check performance of power sources such as inverters, generators and shore power to ensure components comply with manufacturers' specifications
- check components such as wire gauges and breakers to identify system capacity
- test electrical system to identify possible faults such as shorts, opens and grounds
- determine cause of defect such as shorts, open connections and faulty components
- types of servicing required such as replacing breakers, GFCI and wire

Task 8 Services AC electrical system

C-8.01 Maintains AC electrical and power supply systems

- visually inspect shore power cords for physical damage such as corrosion, cuts and melting
- visually inspect grounds and connections to identify potential faults
- perform maintenance tests such as hot skin test, AC power supply and distribution system operation verification and GFCI check
- clean inverters and converters to prevent overheating
- isolate potential problems and determine required actions

C-8.02 Repairs AC power supply and distribution system

- access repair area by removing items such as panels, seats and cabinets
- replace faulty components such as inverters, converters and transfer switches
- rewire damaged circuits according to codes
- modify existing electrical system to meet requirements such as codes, customer needs and space limitation
- verify AC power supply and distribution system operation to ensure compliance with manufacturers' specifications
- select and use tools and equipment such as meters, fish wires and wire strippers

C-8.03 Installs AC power supply and distribution system components

- calculate load, demand and material required to determine installation strategy according to criteria such as component placement, customer needs, codes and manufacturers' specifications
- select and use tools and equipment such as VOM, cordless drills and wire strippers

- access installation area by removing items such as panels, seats and cabinets
- adjust area to accommodate new components by making modifications such as enlarging installation area, changing location and adding ventilation
- install components such as receptacles, inverters, converters, switches and breakers
- verify AC power supply and distribution system operation to ensure compliance with manufacturers' specifications

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Inverter Systems — 15 hours

- Describe the purpose and operation of an inverter system.
- Describe types of inverters and remote control panels.
- Describe the procedure for installing an inverter system.
- Calculate power draws, battery requirements, cable sizes and load protection devices.
- Describe the procedure for servicing inverter systems

NOA topics covered in this section of training:

Task 7 Diagnoses electrical systems

C-7.01 Diagnoses AC electrical and power supply systems

- confirm customer's concern to isolate source of problem and determine required diagnostic actions
- access electrical components to perform tests
- visually inspect components such as shore cords, transfer switches and breakers for damage including corrosion, cuts and melting
- select and use tools and equipment such as VOM, ground fault circuit interrupter (GFCI) tester and ammeter
- check performance of power sources such as inverters, generators and shore power to ensure components comply with manufacturers' specifications
- check components such as wire gauges and breakers to identify system capacity
- test electrical system to identify possible faults such as shorts, opens and grounds
- determine cause of defect such as shorts, open connections and faulty components
- types of servicing required such as replacing breakers, GFCI and wire

C-7.02 Diagnoses DC electrical and power supply systems

- confirm customer's concern to isolate source of problem and determine required diagnostic actions
- access electrical components to perform tests
- visually inspect components such as batteries, breakers, fuses and wires for defects including corrosion, cuts, melting and routing
- select and use tools and equipment such as VOM, test lights and ammeters
- check performance of power sources such as solar panels, inverters and converters to ensure compliance with manufacturers' specifications
- perform checks and tests on battery such as specific gravity, load test and water level to confirm condition of battery
- measure source voltage to ensure compliance with manufacturers' specifications
- check components such as wire gauges and breakers to determine system capacity
- test electrical system to identify possible faults such as shorts, opens and grounds
- 10 determine cause of defect such as shorts, open connections and faulty components
- types of servicing required such as replacing resettable breakers, fuses and wires

Task 8 Services AC electrical system

C-8.01 Maintains AC electrical and power supply systems

- visually inspect shore power cords for physical damage such as corrosion, cuts and melting
- visually inspect grounds and connections to identify potential faults
- perform maintenance tests such as hot skin test, AC power supply and distribution system operation verification and GFCI check
- clean inverters and converters to prevent overheating
- isolate potential problems and determine required actions

C-8.02 Repairs AC power supply and distribution system

- access repair area by removing items such as panels, seats and cabinets
- replace faulty components such as inverters, converters and transfer switches
- rewire damaged circuits according to codes
- modify existing electrical system to meet requirements such as codes, customer needs and space limitation
- verify AC power supply and distribution system operation to ensure compliance with manufacturers' specifications
- select and use tools and equipment such as meters, fish wires and wire strippers

C-8.03 Installs AC power supply and distribution system components

- calculate load, demand and material required to determine installation strategy according to criteria such as component placement, customer needs, codes and manufacturers' specifications
- select and use tools and equipment such as VOM, cordless drills and wire strippers
- access installation area by removing items such as panels, seats and cabinets
- adjust area to accommodate new components by making modifications such as enlarging installation area, changing location and adding ventilation
- install components such as receptacles, inverters, converters, switches and breakers
- verify AC power supply and distribution system operation to ensure compliance with manufacturers' specifications

Task 9 Services DC electrical system

C-9.01 Maintains DC electrical and power supply systems

- maintain lead acid batteries using procedures such as checking water levels, charging battery, specific gravity test and load test
- visually inspect components such as breakers, fuses and wires for defects including corrosion, cuts, loose connections and routing
- select and use tools and equipment such as battery straps, battery terminal cleaner and wire brush
- clean components and connections such as solar panels, battery terminals and inverters/converters
- verify DC electrical and power supply system operation to ensure compliance with manufacturers' specifications

C-9.02 Repairs DC power supply and distribution systems

- access repair area by removing items such as panels, seats and cabinets
- select and use tools and equipment such as wire strippers, wire crimpers and hand tools
- rewire damaged circuits according to codes
- modify existing electrical system to meet requirements such as codes, customer needs and space limitation
- replace or repair faulty components such as batteries, power converters, switches, pumps and solar panels according to specifications
- verify DC electrical and power supply system operation to ensure compliance with manufacturers' specifications

C-9.03 Installs DC power supply and distribution system components

- calculate load, demand and material required to determine installation strategy according to criteria such as component placement, customer needs, codes and manufacturers' specifications
- select and use tools and equipment such as VOM, cordless drills and wire strippers
- access installation area by removing items such as panels, seats, dishes and cabinets
- adjust area to accommodate new components by making modifications such as enlarging installation area, changing location and adding ventilation
- install components such as plugs, receptacles, inverters, converters, switches and breakers
- verify DC power supply and distribution system operation to ensure compliance with manufacturers' specifications

Section Two-Appliances — 80 hours total

Air Conditioning and Heat Pumps — 20 hours

- Describe the types of air conditioners and heat pumps.
- Describe the purpose of air conditioner and heat pump components.
- Describe types and operation of thermostats and climate controls.
- Describe the procedure for servicing air conditioners and heat pump systems.
- Describe the procedure for disposing, reclaiming and recycling refrigerants.
- Describe codes for air conditioners and heat pumps.

NOA topics covered in this section of training:

Task 12 Maintains appliances

E-12.05 Maintains air conditioners and heat pump systems

- test operation of air conditioners and heat pump systems
- turn off and disconnect power supply
- clean cooling coils and condenser fins of debris and foreign objects
- clean return air filters to ensure adequate air flow
- reconnect and turn on power supply to perform function test
- identify worn and damaged parts to recommend replacement or repair

Task 13 Diagnoses appliances

E-13.05 Diagnoses air conditioners and heat pumps

- confirm customer's concern to isolate source of problem and determine required diagnostic action
- measure power supply to ensure voltage complies with manufacturers' specifications using tools and equipment such as VOMs and ammeter
- check operation of components such as capacitors, motors, relays and control units by using VOMs, digital and infrared thermometers while conducting performance test
- visually inspect components including motors and condenser fins for conditions such as corrosion, burnt wires, poor installation and foreign objects
- type of servicing required such as adjustment or replacement of faulty components or units

Task 14 Repairs appliances and consumer products

E-14.05 Repairs air conditioners and heat pumps

- disconnect AC/DC power and discharge capacitors
- add and modify venting to ensure adequate air flow
- replace air conditioners or components including motors, relays and capacitors using tools such as analog VOMs, digital ammeters and screwdrivers
- perform operational test

Refrigerators 35 hours

- Describe the types and operation of refrigerators.
- Describe the purpose of refrigerator components.
- Describe the procedure for servicing refrigerators.
- Describe codes related to refrigerators.
- Service refrigerators.

NOA topics covered in this section of training:

Task 12 Maintains appliances

E-12.04 Maintains refrigerators and ice makers

- test operation of refrigerators and ice makers
- turn off and disconnect power and LP gas supply
- measure and calibrate gas pressure and AC/DC power supply using tools such as manometers and VOMs
- clean components such as burners, orifices, fridge vents and flue tube
- clean electrical connections such as circuit boards and electrodes
- identify worn and damaged parts to recommend replacement or repair
- check LP gas system for leaks and adjust for correct pressure
- reinstall components such as burners, baffles and caps
- verify refrigerator and ice maker operation

Task 13 Diagnoses appliances

E-13.04 Diagnoses refrigerators and ice makers

- confirm customer's concern to isolate source of problem and determine required diagnostic action
- measure power and gas supply to ensure voltage and gas pressure comply with manufacturers' specifications using tools such as VOMs and manometers
- check operation of components including thermostats, circuit boards, high limit switches, gas valves, electrodes, water valves, timer switches and thermocouples using measuring tools such as VOMs and manometers
- visually inspect components including burners, pilots, gas valves and electrodes for conditions such as corrosion, burnt wires, poor installation, combustion and foreign objects
- measure temperature of refrigerator and freezer compartments and cooling unit components such as condenser fins and boiler tubes
- identify worn and damaged components to be replaced or repaired
- check venting and levelling to ensure proper conditions for testing
- inspect door gasket to ensure adequate contact
- by-pass control and circuitry to check cooling performance as per manufacturers' specifications
- type of servicing required such as adjustment or replacement of faulty components

E-14.04 Repairs refrigerators and ice makers

- disconnect AC/DC power, LP gas and water supply to refrigerator and ice maker to prevent injury and damage
- add and modify venting to ensure adequate air flow
- adjust electrodes to ensure spark gap and ground
- adjust gas pressure according to manufacturers' specifications to establish optimal flame operation
- replace refrigerators and ice makers or faulty components including gas valves, high limit switches, thermostats and circuit boards using tools such as gas line wrenches, screwdrivers, VOMs and manometers
- test operation of refrigerators and ice makers using independent power and gas supplies
- perform LP gas and water leak test to ensure safe operation

- perform operation tests

Appliance Products — 10 hours

- Describe types of appliance and consumer products.
- Describe the procedure for servicing appliances and consumer products.
- Describe the procedure for installing appliance and consumer products.

NOA topics covered in this section of training:

Task 14 Repairs appliances and consumer products
E-14.06 Replaces consumer products

- verify required supply sources for proper operation
- replace components such as fuses, breakers and mounting hardware
- remove product using tools such as screwdrivers, cordless drills and wrenches
- modify interior and exterior components for consumer product
- modify and install venting
- exchange and secure product according to manufacturers' specifications
- replace gaskets and seals
- verify operation of consumer product

Task 15 Installs appliances and consumer products
E-15.01 Installs appliances and components

- identify and lay out location of appliance installation by visually inspecting for obstructions and by measuring proposed location in relation to propane, water and power supply
- cut out opening using tools and equipment such as tin snips, jigsaws and reciprocating saws according to manufacturers' specifications
- reinforce structure to support appliances
- insert, secure and seal appliances according to manufacturers' specifications
- connect AC/DC power, LP gas and water supply to appliances
- install ducting and venting to appliances
- install supplementary devices such as cooling fans, duct booster fan and heating strip, according to manufacturers' specifications
- perform gas and water leak tests to verify safe operation
- verify operation by cycling appliance

E-15.02 Installs consumer products and components

- identify and lay out location of product installation by visually inspecting obstructions and measuring proposed location in relation to power, LP gas, and water supply
- cut out opening using tools and equipment such as tin snips, jigsaws and reciprocating saws according to manufacturers' specifications
- insert, secure and seal product according to manufacturers' specifications
- connect appliance by installing components such as ducting, venting, electrical and gas in RV
- fasten and seal product for safety of occupants
- perform LP gas and water leak tests to verify safe operation
- verify operation of consumer product

Electronic Control Systems — 15 hours

- Describe the operation of electronic components.
- Describe precautions required for handling electronics.
- Service the wiring connection to an electronic component.
- Describe common faults in electronic components.
- Test electronic components.

NOA topics covered in this section of training:

Task 7 Diagnoses electrical systems

C-7.01 Diagnoses AC electrical and power supply systems

- confirm customer's concern to isolate source of problem and determine required diagnostic actions
- access electrical components to perform tests
- visually inspect components such as shore cords, transfer switches and breakers for damage including corrosion, cuts and melting
- select and use tools and equipment such as VOM, ground fault circuit interrupter (GFCI) tester and ammeter
- check performance of power sources such as inverters, generators and shore power to ensure components comply with manufacturers' specifications
- check components such as wire gauges and breakers to identify system capacity
- test electrical system to identify possible faults such as shorts, opens and grounds
- determine cause of defect such as shorts, open connections and faulty components
- types of servicing required such as replacing breakers, GFCI and wire

Task 8 Services AC electrical system

C-8.01 Maintains AC electrical and power supply systems

- visually inspect shore power cords for physical damage such as corrosion, cuts and melting
- visually inspect grounds and connections to identify potential faults
- perform maintenance tests such as hot skin test, AC power supply and distribution system operation verification and GFCI check
- clean inverters and converters to prevent overheating
- isolate potential problems and determine required actions

C-8.02 Repairs AC power supply and distribution system

- access repair area by removing items such as panels, seats and cabinets
- replace faulty components such as inverters, converters and transfer switches
- rewire damaged circuits according to codes
- modify existing electrical system to meet requirements such as codes, customer needs and space limitation
- verify AC power supply and distribution system operation to ensure compliance with manufacturers' specifications
- select and use tools and equipment such as meters, fish wires and wire strippers

C-8.03 Installs AC power supply and distribution system components

- calculate load, demand and material required to determine installation strategy according to criteria such as component placement, customer needs, codes and manufacturers' specifications
- select and use tools and equipment such as VOM, cordless drills and wire strippers
- access installation area by removing items such as panels, seats and cabinets
- adjust area to accommodate new components by making modifications such as enlarging installation area, changing location and adding ventilation
- install components such as receptacles, inverters, converters, switches and breakers
- verify AC power supply and distribution system operation to ensure compliance with manufacturers' specifications

Section Three- Interior Structures and Components — 30 hours total

Cabinets, Furnishings, and Flooring — 30 hours

- Describe the types of material used in counter top construction.
- Describe the procedure for servicing countertops.
- Describe the types of materials used in cabinet construction.
- Describe the procedure for servicing cabinet structures.
- Describe the procedure for servicing cabinet trim, doors and hardware.
- Describe the procedure for servicing drawers and hardware.
- Describe the procedure for servicing upholstery components.
- Describe the procedure for servicing window coverings, blinds and valances.
- Describe the procedure for servicing floor coverings.
- Service interior components.

NOA topics covered in this section of training:

This section of training exceeds NOA scope of work in Level Three and exceeds the minimum sequencing as set out in the Recreation Vehicle Service Technician NOA. Its purpose is to assist in the understanding of an apprentice the steps to earn journeyperson certification with understanding of the Red Seal Program.

Section Four- Slide Outs and Levelling Systems — 50 hours total

Hydraulic Systems — 15 hours

- Describe the function of hydraulic system components.
- Describe hydraulic system operation, applications and testing.
- Describe the procedure for servicing hydraulic system components.
- Describe the procedure for adjusting hydraulic systems.
- Describe safety procedures relating to hydraulic systems.
- Test a hydraulic system.

NOA topics covered in this section of training:

Task 19 Maintains chassis and mechanical components

G-19.03 Maintains levelling systems

- check electrical source for specified DC voltage and amperage using tools such as VOMs and load testers
- inspect wiring connections, gauge and routing
- check hydraulic fluid level, fill and visually inspect for debris and contaminants such as dirt and water
- lubricate levelling system components such as manual and electric jacks
- verify levelling system operation
- calibrate automatic levelling controls according to manufacturers' instructions
- check hydraulic system for leaks in components such as hoses, fittings and cylinders using methods including visual inspection and hydraulic pressure gauges

G-19.04 Maintains slide-out and lifting systems

- check electrical source for specified DC voltage and amperage using tools such as VOMs and load tester
- inspect wiring connections, gauge and routing
- verify slide-out and lifting system operation for factors such as alignment, gap, and full extension and retraction
- lubricate components such as cables, gears, pulleys, tubes and rollers

- check hydraulic system for leaks in components such as hoses, fittings and cylinders using methods such as visual inspection and hydraulic pressure gauges
- check hydraulic fluid level, fill and visually inspect for debris and contaminants such as dirt and water
- check gaskets and sweeps for conditions such as fit, cracks, tears and adhesion

Task 20 Diagnoses chassis and mechanical components

G-20.03 Diagnoses levelling systems

- confirm customer's concern to isolate source of problem and determine required diagnostic actions
- access and visually inspect components such as switches, seals, fittings, cylinders and hoses
- check hydraulic fluid for level and contaminants
- test levelling system as per operating instructions
- check hydraulic system for leaks in components such as hoses, fittings and cylinders using methods such as visual inspection and hydraulic pressure
- check electrical source for specified DC voltage and amperage using tools such as VOMs, ammeters and load testers
- inspect wiring connections, gauge and routing
- inspect levelling system components such as manual and electric jacks for adequate lubrication
- cause of defect such as poor maintenance, defective parts and operator misuse
- determine servicing requirements such as replacing jacks, and repairing fittings and hoses according manufacturers' specifications

G-20.04 Diagnoses slide-out and lifting systems

- confirm customer's concern to isolate source of problem and determine required diagnostic actions
- check electrical source for specified DC voltage and amperage using tools such as VOMs, ammeters and load testers
- inspect wiring connections, gauge and routing
- test electrical/electronic components such as solenoids, relays and control boards for operation using tools such as ammeters and VOMs
- check cables, gears, pulleys, tubes and rollers for lubrication and wear
- check hydraulic system for leaks in components such as hoses, fittings and cylinders using methods such as visual inspection and hydraulic pressure gauges
- visually inspect hydraulic fluid for level and contaminants
- check gaskets and sweeps for conditions such as fit, cracks, tears and adhesion
- inspect slide-out and lifting system components such as drive gears, guide tubes, motors and cables
- cause of defect such as poor maintenance, defective parts and operator misuse
- determine servicing requirements such as replacing cylinders, cables, motors and winches, and repairing fittings and hoses according manufacturers' specifications

Task 21 Repairs chassis and mechanical systems

G-21.03 Repairs levelling systems

- replace or repair electrical wiring and connections by means such as soldering and crimping
- fill hydraulic fluid to manufacturers' specifications
- drain and flush hydraulic fluid reservoirs
- replace and repair levelling system components such as manual and electric jacks
- calibrate automatic levelling controls according to manufacturers' guidelines
- repair hydraulic system leaks by replacing seals, hoses, fittings and cylinders
- replace components such as cylinders, motors and pumps
- bleed hydraulic lines to remove air

- verify repair by testing levelling system operation

G-21.04 Repairs slide-out and lifting systems

- replace and repair electrical wiring and connections by means such as soldering and crimping
- re-align slide-out and lifting system using tools such as tape measures, wrenches and sockets
- lubricate components such as cables, gears, pulleys, tubes and rollers according to manufacturers' specifications
- fill hydraulic fluid to manufacturers' specifications
- drain and flush hydraulic fluid reservoirs
- repair hydraulic system leaks by replacing seals, hoses, fittings and cylinders
- route and crimp cables using tools such as cable crimper and fish tape
- replace components such as pumps, motors, solenoids and circuit boards
- bleed hydraulic lines to remove air
- verify repair by testing slide-out and lifting system operation

Task 22 Installs chassis and mechanical components

G-22.01 Installs levelling systems and components

- ensure levelling system is compatible with vehicle according to factors such as weight, size and customer preference
- prepare and modify location for components by moving other RV components or building or installing mounts
- position and secure components according to manufactures' specifications
- route and connect electrical wiring and hydraulic hoses considering factors such as pinch points, heat and secure mounting
- verify levelling system operation

Slide Out Systems — 20 hours

- Describe the purpose of slide out system components.
- Describe the operation of slide out systems.
- Describe the procedure for servicing slide out systems.
- Describe procedure for adjusting, removing and replacing slide out rooms.

NOA topics covered in this section of training:

Task 19 Maintains chassis and mechanical components

G-19.04 Maintains slide-out and lifting systems

- check electrical source for specified DC voltage and amperage using tools such as VOMs and load tester
- inspect wiring connections, gauge and routing
- verify slide-out and lifting system operation for factors such as alignment, gap, and full extension and retraction
- lubricate components such as cables, gears, pulleys, tubes and rollers
- check hydraulic system for leaks in components such as hoses, fittings and cylinders using methods such as visual inspection and hydraulic pressure gauges
- check hydraulic fluid level, fill and visually inspect for debris and contaminants such as dirt and water
- check gaskets and sweeps for conditions such as fit, cracks, tears and adhesion

G-20.04 Diagnoses slide-out and lifting systems

- confirm customer's concern to isolate source of problem and determine required diagnostic actions
- check electrical source for specified DC voltage and amperage using tools such as VOMs, ammeters and load testers
- inspect wiring connections, gauge and routing

- test electrical/electronic components such as solenoids, relays and control boards for operation using tools such as ammeters and VOMs
- check cables, gears, pulleys, tubes and rollers for lubrication and wear
- check hydraulic system for leaks in components such as hoses, fittings and cylinders using methods such as visual inspection and hydraulic pressure gauges
- visually inspect hydraulic fluid for level and contaminants
- check gaskets and sweeps for conditions such as fit, cracks, tears and adhesion
- inspect slide-out and lifting system components such as drive gears, guide tubes, motors and cables
- cause of defect such as poor maintenance, defective parts and operator misuse
- determine servicing requirements such as replacing cylinders, cables, motors and winches, and repairing fittings and hoses according manufacturers' specifications

Task 21 Repairs chassis and mechanical systems
G-21.04 Repairs slide-out and lifting systems

- replace and repair electrical wiring and connections by means such as soldering and crimping
- re-align slide-out and lifting system using tools such as tape measures, wrenches and sockets
- lubricate components such as cables, gears, pulleys, tubes and rollers according to manufacturers' specifications
- fill hydraulic fluid to manufacturers' specifications
- drain and flush hydraulic fluid reservoirs
- repair hydraulic system leaks by replacing seals, hoses, fittings and cylinders
- route and crimp cables using tools such as cable crimper and fish tape
- replace components such as pumps, motors, solenoids and circuit boards
- bleed hydraulic lines to remove air
- verify repair by testing slide-out and lifting system operation

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Levelling Systems — 15 hours

- Describe the purpose of levelling systems.
- Describe types of levelling systems.
- Describe the purpose of levelling system components.
- Describe the operation of levelling systems.
- Describe the procedure for installing levelling systems.
- Describe the procedure for servicing levelling systems.

NOA topics covered in this section of training:

Task 19 Maintains chassis and mechanical components
G-19.03 Maintains levelling systems

- check electrical source for specified DC voltage and amperage using tools such as VOMs and load testers
- inspect wiring connections, gauge and routing
- check hydraulic fluid level, fill and visually inspect for debris and contaminants such as dirt and water
- lubricate levelling system components such as manual and electric jacks
- verify levelling system operation
- calibrate automatic levelling controls according to manufacturers' instructions
- check hydraulic system for leaks in components such as hoses, fittings and cylinders using methods including visual inspection and hydraulic pressure gauges

Task 20 Diagnoses chassis and mechanical components
G-20.03 Diagnoses levelling systems

- confirm customer's concern to isolate source of problem and determine required diagnostic actions
- access and visually inspect components such as switches, seals, fittings, cylinders and hoses
- check hydraulic fluid for level and contaminants
- test levelling system as per operating instructions
- check hydraulic system for leaks in components such as hoses, fittings and cylinders using methods such as visual inspection and hydraulic pressure
- check electrical source for specified DC voltage and amperage using tools such as VOMs, ammeters and load testers
- inspect wiring connections, gauge and routing
- inspect levelling system components such as manual and electric jacks for adequate lubrication
- cause of defect such as poor maintenance, defective parts and operator misuse
- determine servicing requirements such as replacing jacks, and repairing fittings and hoses according manufacturers' specifications

Task 21 Repairs chassis and mechanical systems
G-21.03 Repairs levelling systems

- replace or repair electrical wiring and connections by means such as soldering and crimping
- fill hydraulic fluid to manufacturers' specifications
- drain and flush hydraulic fluid reservoirs
- replace and repair levelling system components such as manual and electric jacks
- calibrate automatic levelling controls according to manufacturers' guidelines
- repair hydraulic system leaks by replacing seals, hoses, fittings and cylinders
- replace components such as cylinders, motors and pumps
- bleed hydraulic lines to remove air
- verify repair by testing levelling system operation

Task 22 Installs chassis and mechanical components
G-22.01 Installs levelling systems and components

- ensure levelling system is compatible with vehicle according to factors such as weight, size and customer preference
- prepare and modify location for components by moving other RV components or building or installing mounts
- position and secure components according to manufactures' specifications
- route and connect electrical wiring and hydraulic hoses considering factors such as pinch points, heat and secure mounting
- verify levelling system operation

Section Five- Auxiliary Fueling Systems and Specialty Haulers — 25 hours total

Auxiliary Fueling Systems — 15 hours

- Describe the properties of gasoline and diesel fuel.
- Describe auxiliary fuel system components.
- Describe the procedure for handling fuel.
- Describe the procedure for dispensing fuel.
- Identify codes for auxiliary fuel systems.

NOA topics covered in this section of training:

Task 20 Diagnoses chassis and mechanical components
G-20.05 Diagnoses generators

- confirm customer's concern to isolate source of problem and determine required diagnostic actions
- check generator components including spark plugs and ignition, that items such as gap, timing and compression meet specifications

- check filters such as fuel, air and oil for contamination
- inspect and test starting system switches and harnesses for operation
- visually inspect fuel delivery systems for leaks and connections
- visually inspect installation and supporting hardware
- check electrical source for specified DC voltage and amperage using tools such as VOMs, ammeters and load testers
- inspect wiring connections, gauge and routing
- verify generator operation by testing AC output voltage and frequency
- check generator windings for shorts and continuity
- perform tests such as compression and ignition using tools such as compression tester, spark plug gauges and spark testers
- cause of defect such as poor maintenance and defective parts
- servicing requirements such as replacing circuit boards, spark plugs and breakers, and repairing fuel supply, DC electrical, fittings and hoses according manufacturers' specifications

Task 21 Repairs chassis and mechanical systems

G-21.05 Repairs generators

- replace components such as fuel pumps, spark plugs and starter
- tune and adjust generator by adjusting carburetor, fuel mixture and revolutions per minute (rpm)
- clean, re-build and replace carburetors
- change oil and filters such as fuel, air and oil filters
- repair leaks in fuel delivery systems by replacing components such as fuel lines and fittings
- replace or repair electrical wiring and connections by means such as soldering and crimping
- replace generator according to manufactures' installation instructions
- verify generator operation by testing AC output voltage and frequency, and exercising generator

Task 22 Installs chassis and mechanical components

G-22.02 Installs generators

- prepare and modify location for generator such as moving other RV components in order to install generator according to application
- position and secure mounting components as per RV manufacturers' specifications to prepare for generator installation
- position and secure generator according to manufacturers' specifications
- route and connect electrical wiring and fuel lines considering factors such as pinch points, heat and secure mounting
- ensure exhaust system is installed to allow venting according to Canadian Standards Association (CSA) code book
- verify generator operation

Specialty Haulers — 10 hours

- Describe the purpose of speciality hauler components.
- Describe the operation of specialty hauler components
- Describe the types of materials used in constructing speciality haulers.
- Describe the design and ventilation requirements.
- Describe codes and safety procedures relating to the servicing of speciality haulers.

NOA topics covered in this section of training:

Task 23 Diagnoses towing systems

H-23.01 Diagnoses tow vehicle systems

- confirm customer's concern to isolate source of problem and determine required diagnostic actions
- inspect systems including hitching, braking systems and lighting for operational faults such as improper setup, damage and malfunctions
- visually inspect components such as fifth wheel hitch, weight distribution system and tie downs for damage including wear, fatigue and loose fasteners
- perform various tests such as electrical circuit testing, to isolate issues between tow and towed vehicle
- determine cause of defect such as shorts, corroded connectors and worn hitching components
- determine types of servicing required such as replacing plugs, hitches and brake controls

H-23.02 Diagnoses towed vehicle systems

- confirm customer's concern to isolate source of problem and determine required diagnostic actions
- inspect systems including hitching, braking and lighting for operational faults such as improper setup, damage and malfunctions
- visually inspect components such as tow bars, base plates and auxiliary brake systems for damage including wear, fatigue, loose fasteners and operation
- perform various tests such as electrical circuit testing and lube systems pressure test, to isolate issues between tow and towed vehicle
- cause of defect such as shorts, corrosion and wear
- types of servicing required such as replacing plugs, hitches and braking system

Task 24 Services towing systems

H-24.01 Maintains tow vehicle systems

- visually inspect components for wear, corrosion and lack of lubrication
- lubricate and protect components such as electrical connections and hitching components
- verify operation of electrical system by using diagnostic equipment
- replace components such as hitches, brake controls and sway controls
- repair components such as fifth wheel hitch, torsion hitch and electrical components

H-24.02 Maintains towed vehicle systems

- visually inspect components for wear, corrosion and lack of lubrication
- lubricate and protect components such as tow bars and electrical connections
- verify operation of electrical system by using diagnostic equipment
- replace components such as spacers, shims, springs, boots and cables
- repair components such as tow bars, lube pumps, auxiliary braking system and driveline disconnect devices

H-24.03 Installs tow vehicle systems and components

- calculate load and material requirements to determine installation strategy such as component selection and placement, and customer needs
- select and use tools and equipment such as air tools, measuring devices and hand tools
- access installation area by removing items such as interior/exterior body parts or by raising tow vehicle
- adjust area to accommodate new components by making manufacturers' recommended modifications
- install components such as hitches, weight distribution hitches and anti-sway devices
- verify tow system operation and setup

H-24.04 Installs towed vehicle systems and components

- calculate load and material requirements to determine installation strategy such as component selection and placement, and customer needs
- select and use tools and equipment such as air tools, measuring devices and hand tools
- access installation area by removing items such as interior/exterior body parts or by raising towed vehicle
- adjust area to accommodate new components by making manufacturers' recommended modifications
- install components such as lubrication systems, hitches, base plates and braking systems
- verify towed system operation and setup

Section Six- Welding, Coaching, Certification and Committees — 25 hours total

Gas Metal Arc Welding (GMAW) — 15 hours

- Describe the welding operations permitted within the scope of this trade.
- Describe the function of GMAW components of GMAW equipment.
- Describe the operation of GMAW equipment.
- Describe troubleshooting of GMAW equipment.
- Demonstrate material preparation.
- Perform the sequence of start-up and shut down of GMAW equipment.
- Perform tack welds using GMAW.

NOA topics covered in this section of training:

Task 2 Uses and maintains tools and equipment
A-2.01 Maintains tools and equipment

- recalibrate equipment such as electronic testers, manometers and scales according to manufacturers' specifications
- clean tools and equipment
- organize and store tools and equipment in a designated area according to manufacturers' specifications
- lubricate and add fluids to tools such as jacks, trolley jacks and air tools according to manufacturers' specifications
- identify and report tools to be serviced or replaced

Workplace Coaching Skills — 4 hours

- Describe the process for coaching an apprentice

NOA topics covered in this section of training:

This section of training exceeds NOA scope of work in Level Three and exceeds the minimum sequencing as set out in the Recreation Vehicle Service Technician NOA. Its purpose is to assist in the understanding of Alberta's Apprenticeship and Industry Training system.

Alberta's Industry Network — 2 hours

- Describe Alberta's Apprenticeship and Industry Training system.
- Describe roles and responsibilities of the Alberta Apprenticeship and Industry Training Board, the Government of Alberta and post-secondary institutions.
- Describe roles and responsibilities of the Provincial Apprenticeship Committees (PACs), Local Apprenticeship Committees (LACs) and Occupational Committees (OCs).

NOA topics covered in this section of training:

This section of training exceeds NOA scope of work in Level Three and exceeds the minimum sequencing as set out in the Recreation Vehicle Service Technician NOA. Its purpose is to assist in the understanding of Alberta's Apprenticeship and Industry Training system.

Interprovincial Standards Red Seal Program — 4 hours

- Identify Red Seal products used to develop Interprovincial examinations.
- Use Red Seal products to prepare for an Interprovincial examination.

NOA topics covered in this section of training:

This section of training exceeds NOA scope of work in Level Three and exceeds the minimum sequencing as set out in the Recreation Vehicle Service Technician NOA. Its purpose is to assist in the understanding of an apprentice the steps to earn journeyperson certification with understanding of the Red Seal Program.