



TRADE PROFILE

SERVICE CENTRE TECHNICIAN



DESCRIPTION OF THE SERVICE CENTRE TECHNICIAN TRADE

This standard covers tasks performed by Service Centre Technicians whose occupational title has been identified by some provinces and territories of Canada under the following names:

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
Service Centre Technician		■	■										

Service Centre Technicians possess the full range of knowledge and abilities required to perform preventative maintenance, diagnose problems and repair vehicle systems including engines, steering, braking, tires, wheels, drive shafts and axles, final drive assemblies, suspension, electrical, electronics, restraints, trim and accessories of automotive vehicles and light trucks.

Service Centre Technicians may be employed by automotive repair shops, dealerships, automotive specialty repair shops, large organizations that may own a fleet of vehicles and motor vehicle body repair companies.

While the scope of the Service Centre Technician trade includes many aspects of vehicle service and repair, an increasing number of technicians specialize in specific areas of automotive vehicle repair due to the complexity of today’s motor vehicle systems.

Technicians usually work indoors and can expect a work environment that includes noise, fumes, odours, hazardous compounds, drafts, vibrations, and confined spaces. The work often requires considerable standing, bending, crawling, lifting, pulling and reaching.

Some important attributes of Service Centre Technicians are: good hand-eye coordination, mechanical aptitude, time management skills, logical thinking and decision-making skills, excellent communication skills, computer skills and the ability to continue learning as technology advances. It is also imperative to have a valid driver’s licence.

With additional training and certification, experienced Service Centre Technicians may advance to Automotive Service Technician positions. Also, technicians can transfer their skills and knowledge to related occupations such as automotive instructor, Truck and Transport Mechanic, Agricultural Equipment Technician or Heavy Duty Equipment Technician.

TRENDS IN THE SERVICE CENTRE TECHNICIAN TRADE

There is a push from consumers and governments towards lowering emissions and improving fuel economy. Maintenance service requirements, schedules, history and reminders are becoming more important. Vehicle components are being built with lighter and stronger materials. More complex and powerful vehicle management systems are being used.

Hybrids and electric vehicles are becoming more popular. More efficient gas and cleaner diesel fueled vehicles are becoming the norm. The need for enhanced training continues in the industry.

As a result of the introduction of a range of sophisticated technologies, there is a movement towards specialization in the trade. Online learning is readily available for technicians and is being used for their training and professional development. The Internet is also frequently used as an on-the-job resource for research and information sharing.

There has been a greater emphasis on environmentally-friendly and less hazardous products with better recycling, disposal and handling procedures. Technicians must be conscious of the detrimental effects of hazardous materials on workers and the environment as well as being informed on the relevant regulations.

There is a greater trend towards component replacement rather than repair. Technicians must be aware of the quality and compatibility of replacement or rebuilt components compared to the original equipment manufacturer (OEM) standards. More vehicle options are resulting in more customization of the vehicle based on customer preferences. It is important to listen to customers carefully before trying to repair an issue that may be a characteristic of a vehicle. Reviewing safety protocols of a system before working on it is paramount.

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/services/jobs/training/initiatives/skills-success.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

Service centre technicians must read and comprehend a variety of materials including repair manuals, manufacturers' bulletins and safety documents. They refer to government regulations, vehicle inspection procedures, hazardous material handling and disposal and safety requirements of vehicles.

DOCUMENT USE

Service centre technicians interpret technical drawings and flowcharts. They locate data such as classifications, product and material specifications, identification numbers, quantities and costs. Automotive service technicians often use specification tables. They scan a variety of manufacturers' labels for part numbers, serial numbers, sizes, colours and other information and adhere to hazard and safety icons.

WRITING

Service centre technicians complete workplace documents such as written explanations to the client, work orders, inspection reports and incident reports.

ORAL COMMUNICATION

Service centre technicians gather information from different sources about vehicle faults and needed repairs, explain the results of inspections and repairs, and discuss maintenance procedures. They exchange technical repair and troubleshooting information with others such as service managers, apprentices, co-workers, colleagues and suppliers.

NUMERACY

Service centre technicians take a variety of measurements using digital and analog equipment. They estimate the amount of time required to complete repairs. Service centre technicians compare measurements of energy, dimension, speed, horsepower, temperature and torque to specifications. They analyze pressure, power, torque, compression and electrical readings to assess vehicle performance and troubleshoot faults.

THINKING

Service centre technicians use thinking skills and visual analysis to diagnose and repair problems. They evaluate the severity of vehicle defects and deficiencies and the quality of repairs. Service centre technicians decide the most efficient course of action to complete a job.

WORKING WITH OTHERS

Most service centre technicians work independently on jobs outlined in work orders. They may assist others with jobs that require two people or are within their specific area of expertise. They collaborate effectively with colleagues including salespersons, partspersons and management to resolve concerns, situations and problems.

DIGITAL TECHNOLOGY

Service centre technicians use computerized scanning equipment, onboard vehicle diagnostics and hand-held diagnostic tools to gain operational information about vehicles. They access the Internet and databases to retrieve repair information. Service centre technicians use digital technology to exchange information with other technicians, service managers, colleagues in other locations and manufacturer support specialists. Keyboarding and basic computer skills are an asset.

CONTINUOUS LEARNING

Constant change in the industry makes it vital for service centre technicians to stay current with the latest technology. They learn on the job, in organized information activities and in work discussion groups. Their training is provided by vehicle manufacturers, parts suppliers, employers and associations. They also advance skills by reading work-related magazines, periodicals and automotive websites.

ROLES AND OPPORTUNITIES FOR SKILLED TRADES IN A SUSTAINABLE FUTURE

Climate change affects all of us. Trades play a large role in implementing solutions and adjusting to changes in the world.

Throughout this standard, there may be specific references to tasks, skills and knowledge that clearly show this trade's role in a more sustainable future. Each trade has different roles to play and contributions to make in their own way.

For example:

- Construction tradespeople need to consider the materials they are using, building methods, and improvements to mechanical and electrical installations. There are important changes to codes and standards to help meet the climate change goals and commitments set for 2030 and 2050. Retrofits and new construction of low-energy buildings provide enormous opportunities for workers in this sector. Concepts, such as energy efficiency and regarding buildings as systems are foundational.
- Automotive and mechanical trades are seeing a shift towards the electrification of vehicles and equipment. As a result, new skills and knowledge will be required for tradespeople working in this sector. There are mandates for sales of new light-duty zero-emission vehicles (ZEV) in Canada, with the goal of achieving 100% ZEV sales by 2035. Due to this mandate, the demand for these vehicles is growing quickly among consumers and fleets. With this escalating demand, the need for skilled workers to maintain and repair these vehicles is also increasing.
- In industrial and resource sectors, there is pressure to move towards increased electrification of industrial processes. Many industrial and commercial facilities are also being upgraded to improve energy efficiency in areas such as lighting systems, and new production processes and technologies. There are also opportunities in carbon capture, utilization and storage (CCUS), as well as the production and export of low-carbon hydrogen.
- Trades in the service sector may also need to be aware of responsible sourcing, as well as efficient use of products and materials. New ways of working better are always a part of the job.

There are fast-moving changes in guidelines, codes, regulations and specifications. Many are being implemented for the purpose of energy efficiency and climate change. Those that affect specific trades may be mentioned within the standard. Examples of these guidelines and legislation include:

- The National Energy Code of Canada for Buildings (NECB).
- The Canadian Net-Zero Emissions Accountability Act (CNZEEA).

- Programs that encourage sustainable building design and construction such as Leadership in Energy and Environmental Design (LEED) and the Zero Carbon Building (ZCB) standards.
- The Montreal Protocol for phasing out R22 refrigerants.
- Energy efficiency programs such as ENERGY STAR.
- Principles of the United Nations Declaration for the Rights of Indigenous Peoples pertaining to energy sector development.

Apprentices and tradespeople need to increase their climate literacy and reinforce their own understanding of energy issues and environmental practices. It is important for them to understand why these changes are happening and their effect on trades' work. While individual tradespeople and apprentices may not be able to choose certain elements like; the architectural design of buildings, building material selection, regulatory requirements, use of electric vehicles and technologies, they must understand the impact of using these elements in their work. Impacts include using environmentally friendly products and following requirements related to the disposal and recycling of materials.

In apprenticeship, as well as in ongoing professional development, employers and instructors should encourage learning about these concepts, why they are important, how they are implemented, and the overarching targets they are aiming to achieve.

All in all, it's about doing the work better and building a better world.

INDUSTRY-EXPECTED PERFORMANCE

All tasks must be performed according to the applicable jurisdictional regulations and standards. All health and safety standards must be respected and observed. Work should be done efficiently and at a high quality without material waste or environmental damage. All requirements of the manufacturer specifications must be met. Automotive service technicians should work professionally and strive to meet or exceed client expectations. As they progress in their career there is an expectation they continue to upgrade their skills and knowledge to keep pace with industry and promote continuous learning in their trade including mentoring of apprentices. At a journeyman level of performance, all tasks must be done with minimal direction and supervision.

CERTIFICATION EXAM WEIGHTINGS

MWA A	Performs Common Occupational Skills	9%
MWA B	Diagnoses and Repairs Engine and Engine Support Systems	26%
MWA C	Diagnoses and Repairs Vehicle Module Communications Systems	0%
MWA D	Diagnoses and Repairs Driveline Systems	8%
MWA E	Diagnoses and Repairs Electrical and Comfort Control Systems	23%
MWA F	Diagnoses and Repairs Steering and Suspension, Braking, Control Systems, Tires, Hubs and Wheel Bearings	31%
MWA G	Diagnoses and Repairs Body Components, Accessories and Trim	3%
MWA H	Diagnoses and Repairs Hybrid and Electric Vehicles (EV)	0%

This pie chart represents a breakdown of the Nova Scotia provincial certification examination (based on the 2016 Automotive Service Technician RSOS). The task matrix on the following pages indicates the breakdown of tasks and sub-tasks within each major work activity. Provincial certification examinations typically have between 100 and 150 questions.

SERVICE CENTRE TECHNICIAN TASK MATRIX

(Based on the 2016 Automotive Service Technician RSOS)

- White cards/sub-tasks are part of the Service Centre Technician (SCT) trade.
- Grey cards/sub-tasks are not part of the SCT trade. The grey cards, in combination with the white cards, represent the full scope of the Automotive Service Technician (AST) trade.
- M = Mandatory Trade Skill in Logbook
- O = Optional Trade Skill in Logbook

A – PERFORMS COMMON OCCUPATIONAL SKILLS

9%

Task A-1 Performs safety-related functions	A-1.01 Maintains safe work environment, including general safety awareness of Hybrid and EV vehicles M	A-1.02 Uses personal protective equipment (PPE) and safety equipment M	
Task A-2 Uses tools, equipment and documentation	A-2.01 Uses tools and equipment M	A-2.02 Uses fasteners, tubing, hoses and fittings M	A-2.03 Uses hoisting and lifting equipment M
	A-2.04 Uses technical information M		
Task A-3 Uses communication and mentoring techniques	A-3.01 Uses communication techniques M	A-3.02 Uses mentoring techniques M	

B – DIAGNOSES AND REPAIRS ENGINE AND ENGINE SUPPORT SYSTEMS

26%

Task B-4 Diagnoses engine systems	B-4.01 Diagnoses cooling systems M	B-4.02 Diagnoses lubricating systems	B-4.03 Diagnoses engine assembly
	B-4.04 Diagnoses accessory drive systems M		

Task B-5 Repairs engine systems	B-5.01 Repairs cooling systems M	B-5.02 Repairs lubricating systems	B-5.03 Repairs engine assembly
	B-5.04 Repairs accessory drive systems M		
Task B-6 Diagnoses gasoline engine support systems	B-6.01 Diagnoses gasoline fuel delivery systems M	B-6.02 Diagnoses gasoline ignition systems 0	B-6.03 Diagnoses gasoline intake/exhaust systems 0
	B-6.04 Diagnoses gasoline emission control systems		
Task B-7 Repairs gasoline engine support systems	B-7.01 Repairs gasoline fuel delivery systems M	B-7.02 Repairs gasoline ignition systems 0	B-7.03 Repairs gasoline intake/exhaust systems 0
	B-7.04 Repairs gasoline emission control systems related to exhaust system M		
Task B-8 Diagnoses diesel engine support systems	B-8.01 Diagnoses diesel fuel delivery systems	B-8.02 Diagnoses diesel exhaust systems	B-8.03 Diagnoses diesel emission control systems
Task B-9 Repairs diesel engine support systems	B-9.01 Repairs diesel fuel delivery systems	B-9.02 Repairs diesel exhaust systems	B-9.03 Repairs diesel emission control systems

C – DIAGNOSES AND REPAIRS VEHICLE MODULE COMMUNICATIONS SYSTEMS 0%

Task C-10 Diagnoses vehicle networking systems	C-10.01 Reads diagnostic trouble codes (DTCs)	C-10.02 Monitors data	C-10.03 Interprets test results
	C-10.04 Tests system circuitry and components		
Task C-11 Repairs vehicle networking systems	C-11.01 Updates component software	C-11.02 Replaces components	C-11.03 Verifies vehicle module communications system repair

D – DIAGNOSES AND REPAIRS DRIVELINE SYSTEMS 8%

Task D-12 Diagnoses driveline systems	D-12.01 Diagnoses drive shafts and axles M	D-12.02 Diagnoses manual transmissions/transaxles	D-12.03 Diagnoses automatic transmissions/transaxles
	D-12.04 Diagnoses clutches	D-12.05 Diagnoses transfer cases	D-12.06 Diagnoses final drive assemblies
Task D-13 Repairs driveline systems	D-13.01 Repairs drive shafts and axles M	D-13.02 Repairs manual transmissions/transaxles	D-13.03 Repairs automatic transmissions/transaxles
	D-13.04 Repairs clutches	D-13.05 Repairs transfer cases	D-13.06 Repairs final drive assemblies

E – DIAGNOSES AND REPAIRS ELECTRICAL AND COMFORT CONTROL SYSTEMS

23%

Task E-14 Diagnoses electrical systems and components	E-14.01 Diagnoses basic wiring and electrical systems M	E-14.02 Diagnoses starting/charging systems and batteries M	E-14.03 Diagnoses lighting and wiper systems M
	E-14.04 Diagnoses entertainment systems	E-14.05 Diagnoses electrical options	E-14.06 Diagnoses instrumentation and information displays
	E-14.07 Diagnoses electrical accessories		
Task E-15 Repairs electrical systems and components	E-15.01 Repairs basic wiring and electrical systems M	E-15.02 Repairs starting/charging systems and batteries M	E-15.03 Repairs lighting and wiper systems M
	E-15.04 Repairs entertainment systems	E-15.05 Repairs electrical options	E-15.06 Repairs instrumentation and information displays
	E-15.07 Installs electrical accessories	E-15.08 Repairs electrical accessories	
Task E-16 Diagnoses heating, ventilation and air conditioning (HVAC) and comfort control systems	E-16.01 Diagnoses air flow control systems	E-16.02 Diagnoses refrigerant systems	E-16.03 Diagnoses heating systems
Task E-17 Repairs HVAC and comfort control systems	E-17.01 Repairs air flow control systems	E-17.02 Repairs refrigerant systems	E-17.03 Repairs heating systems

F – DIAGNOSES AND REPAIRS STEERING AND SUSPENSION, BRAKING, CONTROL SYSTEMS, TIRES, HUBS AND WHEEL BEARINGS

31%

<p>Task F-18 Diagnoses steering and suspension, braking, control systems, tires, wheels, hubs and wheel bearings</p>	<p>F-18.01 Diagnoses steering and suspension systems M</p>	<p>F-18.02 Diagnoses braking systems M</p>	<p>F-18.03 Diagnoses tires, wheels, hubs and wheel bearings M</p>
<p>Task F-19 Repairs steering and suspension, braking, control systems, tires, wheels, hubs and wheel bearings</p>	<p>F-19.01 Repairs steering and suspension systems M</p>	<p>F-19.02 Repairs braking systems M</p>	<p>F-19.03 Repairs tires, wheels, hubs and wheel bearings M</p>

G – DIAGNOSES AND REPAIRS BODY COMPONENTS, ACCESSORIES AND TRIM

3%

<p>Task G-20 Diagnoses body components, accessories and trim</p>	<p>G-20.01 Diagnoses restraint systems M</p>	<p>G-20.02 Diagnoses wind noises, rattles and water leaks 0</p>	<p>G-20.03 Diagnoses interior and exterior components, accessories and trim 0</p>
<p>Task G-21 Repairs body components, accessories and trim</p>	<p>G-20.04 Diagnoses latches, locks and movable glass M</p>	<p>G-21.02 Repairs wind noises, rattles and water leaks 0</p>	<p>G-21.03 Repairs interior and exterior components, accessories and trim 0</p>
	<p>G-21.01 Repairs restraint systems M</p>		
	<p>G-21.04 Repairs latches, locks and movable glass M</p>		

H – DIAGNOSES AND REPAIRS HYBRID AND ELECTRIC VEHICLES (EV)

0%

Task H-22 Diagnoses hybrid and EV	H-22.01 Implements specific safety protocols for hybrid and electric vehicles (EV) (safety awareness only, which is covered in Safety, Task A-1)	H-22.02 Diagnoses hybrid and EV systems
Task H-23 Repairs hybrid and EV	H-23.01 Repairs hybrid vehicle systems	H-23.02 Repairs EV systems

APPENDIX A

ACRONYMS

ABS	antilock braking systems
ACC	adaptive cruise control
AVR	alternator voltage regulator
AWD	all-wheel drive
BCM	body control module
CAN	controller area network
CMB	collision monitoring braking systems
CVT	constantly variable transmission
DCT	dual clutch transmission
DIC	driver information centre
DEF	diesel exhaust fluid
DLC	data link connection
DOC	diesel oxidation catalyst
DPF	diesel particulate filter
DSC	dynamic stability control
DTC	diagnostic trouble codes
DVOM	digital volt ohm meter
EGR	exhaust gas recirculation
EV	electric vehicles
EVAP	evaporative emission control systems
GDI	gasoline direct injection
GHS	Globally Harmonized System
GMAW	gas metal arc welding
HID	high intensity discharge
HRAI	heating, refrigeration and air conditioning institute of Canada
HVAC	heating, ventilation and air conditioning
IPC	instrument panel cluster
ISO	International Standards Organization
LIN	local interface network
MIG	metal inert gas welding
NA	naturally aspirated
NVH	noise, vibration and harshness
OCS	occupant classification system
OEM	original equipment manufacturer
OH&S	Occupational Health and Safety
PCM	powertrain control module

PCV	positive crankcase ventilation
PPE	personal protective equipment
SAE	Society of Automotive Engineers
SCR	Selective Catalyst Reduction
SDS	safety data sheets
SMAW	shielded metal arc welding
TCM	transmission control module
TCS	traction control systems
TPMS	tire pressure monitoring system
TSB	technical service bulletins
VCT	variable cam-timing
VIN	vehicle identification number
WHMIS	Workplace Hazardous Materials Information System

APPENDIX B

TOOLS AND EQUIPMENT

Standard Tool Kit

air die grinder
air hammer/chisel
air ratchet
antifreeze tester
axle boot clamp tools
battery post service and reshape tool
belt tension release tool
blow gun
bolt and nut extractor set (easy-outs)
brake service tools (adjusters, spring removal and installation tools, caliper tools)

caulking gun
compression testers

creeper
crowfoot wrenches

dial indicator set
drill and bits
drill gauge
feeler gauges – SAE and metric
fender covers
filter wrenches
flare nut wrenches – SAE and metric
flaring tool (SAE, metric and ISO)
flashlights
fuel injector noid lights
fuel/transmission/air conditioning line disconnect set
hacksaw
hammers – ball peen, dead blow, rubber mallet, softface
hex keys and sockets – SAE and metric
impact driver and bits
impact wrench and impact socket set – SAE and metric

inspection mirror
jumper lead
locking pliers
magnetic pick-up tool
mechanic's pick set
metal files
micrometer – SAE and metric
digital multimeter (DMM)
nut driver set – SAE and metric
pliers – slip joint, needle nose, multipurpose adjustable, side cutter, snap ring, inside pliers
pry bars
pullers – gear, pulley, battery terminal and steering wheel
punches and chisels
ratchet and sockets – SAE and metric, swivel, spark plug, extensions and adapters
refractometer
rivet gun
scraper (gasket and carbon)
screwdriver set
seal drivers and extractors
soldering tools
spark plug gapper
spark tester
standard test leads and probes
stethoscope
straight edge
stud extractor
tap and die set – SAE, metric and pipe thread

tape and ruler
terminal remover tools
test lamp

Standard Tool Kit (continued)

thermometer

thread files

timing light

tin snips – centre, left and right cut

tire pressure gauge

torque angle meter/indicator

torque limited sockets (torque sticks)

torque wrenches – various sizes and ranges

torx bits and sockets

tread depth gauge (for tires and brakes)

trouble light

tube bending tool

tube cutters

upholstery tools – trim panel tools, hog ring pliers

utility knife

vacuum pump

vacuum/pressure gauge

vernier caliper – SAE and metric

wire brush

wire stripper/crimping tool

wrench set – SAE and metric/various designs

Shop Tools and Equipment

acetylene torches

air compressor – hoses, inline filter and water separators

air conditioning flushing equipment

air conditioning leak detection and inspection equipment

air conditioning recovery/recycle/recharge station

air conditioning service and repair tools

airbag removal tools

airbag simulators

anti-static devices

ball joint press and adapters

battery chargers/boosting equipment

battery, alternator and starter tester (AVR)

battery power supply

bearing remover

belt tension gauge

bench grinders

bench vises

black light

borescope

brake cylinder hone

brake drum gauge

brake lathe

brake pressure tester

brake rotor gauge

brake system bleeder

CAT-IV meter (for hybrid vehicles)

camshaft bearing tools (removal and installation)

chassis ears

clutch alignment tools

clutch installers and removers

compression leak-down tester

computer – laptop, PC

coolant drain pans

cooling system pressure tester

cooling system recovery and flushing station

core plug/expansion plug installation tool

cylinder ridge reamer

drill press

electrical short detector

engine and transmission supports

engine cylinder hone

engine hanging supports; engine hoisting equipment

engine stand – portable

EVAP test equipment (smoke generator)

exhaust fan, ventilation hoses

exhaust pipe bender

Shop Tools and Equipment (continued)

floor jack
fuel injector flushing kit
fuel quality tester
fuel recovery and storage station
funnels
gear puller set

grease gun – oil dispensing system, fluid suction pump
hydraulic press
hydraulic transmission jack
insulated tools (for hybrid vehicles)
jack stands and supports
leak detection tank (tires)
lock pick set – lock out tools
manometer
oil drain barrels and disposal system
opacity meter
oscilloscope
parts washers/steam cleaners and blaster
piston ring compressor

piston ring installer
power steering pressure tester
pressure washer
propane enrichment tools

shop vacuum
slide hammer
specialized tools for air conditioning systems
specialized tools for engines and transmission
spreaders
spring compressors – coil spring and strut spring
tire changing machine

tire pressure monitoring systems (TPMS)
tire repair equipment
transmission fixtures
transmission flushing equipment
transmission pressure test kit
vacuum fill tools
valve grinding equipment
valve spring compressor
vehicle hoist
vehicle service information system
water hose
welding equipment – TIG, GMAW, GTAW, MIG welder and oxy-fuel
wheel alignment equipment
wheel balancer
wheel chocks
wheel ramps

Measuring Tools and Equipment

air conditioning pressure gauge
ammeter
AVR (alternator voltage regulator)
back pressure gauge
ball joint dial indicator set
battery load tester
coolant system pressure tester
cylinder bore gauges – small bore gauge, telescoping gauge
electronic vibration analyzer
fuel pressure gauges
headlight aiming equipment
hole gauge

inclinometer
infrared temperature gun
micrometer – SAE and metric
oil pressure gauge set – engine/transmission
opacity meter
plastic precision clearance gauge
power steering pressure tester
pyrometer

refractometer
refractor
scan tools
spring scale

Safety and Personal Protective Equipment

body protection – shop apron/heat resistant arm protectors

CSA approved safety foot wear

eye protection – face shield/goggles/safety glasses/welding goggles

eye wash station

fire extinguisher

first aid kits and station

hand protection – chemical/heat resistant, abrasion/leather, disposable latex gloves, gloves (for hybrid vehicles and EV)

hearing protection – ear muffs, ear plugs

respiratory protection – dust and particle masks, chemical filtered mask

safety hook (for hybrid and electric vehicles)

safety pylons (for hybrid and electric vehicles)

APPENDIX C

GLOSSARY

ammeter	instrument used to measure electrical current flow in a circuit
AVR	alternator voltage regulator; refers to a device that is used to test generators/alternators for electrical output, voltage and amperage
CAN	controller area network; a protocol for communication between electronic/computer modules
DMM	a digital electronic measuring instrument that combines several functions in one unit
accessories	features that are not originally equipped by the manufacturer
options	features that are originally equipped at time of manufacture
inclinometer	device used to measure the incline of an object, measured in degrees
J2534 standard	is an interface standard designed by SAE (Society of Automotive Engineers) for vehicle electronics reprogramming
jounce	the motion of a wheel that compresses its suspension. Full jounce refers to a wheel that is at the upper limits of its travel. Jounce is the opposite of rebound
manometer	a graduated tube containing water which measures pressure/vacuum in units of water column
micrometer	a precision measuring device for small distances
OBD	on board diagnostics are part of a vehicle's engine management software used to monitor system performance
Ohm's Law	the relationship between current, resistance and voltage in any electrical circuit
opacity meter (smoke)	an instrument that measure the optical properties of diesel exhaust
Pascal's Law	fluid pressure exerted in a sealed vessel is equal and undiminished in all directions
pneumatic	operated by compressed air
pyrometer	instrument used to measure temperatures
sensory inspection	using one or more senses to perform an inspection
refractor	test instrument used to measure the strength of antifreeze or specific gravity of electrolyte in a cell of a lead/acid battery
sirometer	test instrument used to measure RPM of an engine or frequency of a vibration with great accuracy
UART	universal asynchronous receive transmit; a protocol for communication between computer modules
Watt's Law	the relationship of power to current, voltage and resistance in any electrical circuit