PROGRAM PROGRAMME
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Red Seal Occupational Standard

Auto Body and Collision Technician

INTERPROVINCIAL STANDARD
CANADA
NORME INTERPROVINCIALE

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AUTO BODY AND COLLISION TECHNICIAN

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Title: Auto Body and Collision Technician

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FOREWORD

The Canadian Council of Directors of Apprenticeship (CCDA) recognizes this Red Seal Occupational Standard (RSOS) as the Red Seal standard for the Auto Body and Collision Technician trade.

Background

The first National Conference on Apprenticeship in Trades and Industries, held in Ottawa in 1952, recommended that the federal government be requested to cooperate with provincial and territorial apprenticeship committees and officials in preparing analyses of a number of skilled occupations. Employment and Social Development Canada (ESDC) sponsors the Red Seal Program, which, under the guidance of the CCDA, develops a national occupational standard for each of the Red Seal trades.

Standards have the following objectives:

- to describe and group the tasks performed by skilled workers;
- to identify which tasks are performed in every province and territory;
- to develop instruments for use in the preparation of Interprovincial Red Seal Examinations and assessment tools for apprenticeship and certification authorities;
- to develop common tools for apprenticeship on-the-job and technical training in Canada;
- to facilitate the mobility of apprentices and skilled workers in Canada;
- to supply employers, employees, associations, industries, training institutions and governments with occupational standards.

Any questions, comments, or suggestions for changes, corrections, or revisions to this standard or any of its related products may be forwarded to:

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This standard was prepared by the Apprenticeship and Sectoral Initiatives Directorate of ESDC. The coordinating, facilitating and processing of this standard were undertaken by employees of the standards development team of the Trades and Apprenticeship Division and of the Government of British Columbia, the host jurisdiction for this trade.

STRUCTURE OF THE OCCUPATIONAL STANDARD

To facilitate understanding of the occupation, this standard contains the following sections:

Methodology: an overview of the process for development, review, validation and weighting of the standard

Description of the Auto Body and Collision Technician trade: An overview of the trade's duties, work environment, job requirements, similar occupations and career progression

Trends in the Auto Body and Collision Technician trade: Some of the trends identified by industry as being the most important for workers in this trade

Essential Skills Summary: An overview of how each of the 9 essential skills is applied in this trade

Industry Expected Performance: description of the expectations regarding the level of performance of the tasks, including information related to specific codes, regulations and standards that must be observed

Language Requirements: description of the language requirements for working and studying in this trade in Canada

Pie Chart of Red Seal Examination Weightings: a graph which depicts the national percentages of exam questions assigned to the major work activities

Task Matrix: a chart which outlines graphically the major work activities, tasks and sub-tasks of this standard

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

Task Descriptor: a general description of the task

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

Essential Skills: The most relevant essential skills for this sub-task

Skills:

Performance Criteria: description of the activities that are done as the sub-task is performed

Evidence of Attainment: proof that the activities of the sub-task meet the expected performance of a tradesperson who has reached journeyperson level

Knowledge:

Learning Outcomes: describes what should be learned relating to a sub-task while participating in technical or in-school training

Learning Objectives: topics to be covered during technical or in-school training in order to meet the learning outcomes for the sub-task

Range Variables: elements that provide a more in-depth description of a term used in the performance criteria, evidence of attainment, learning outcomes, or learning objectives

Appendix A – Acronyms: a list of acronyms used in the standard with their full name

Appendix B – Tools and Equipment / Outils et équipement: a non-exhaustive list of tools and equipment used in this trade

Appendix C – Glossary / Glossaire: definitions or explanations of selected technical terms used in the standard

METHODOLOGY

Development of the Standard

A draft standard is developed by a broad group of trade representatives, including tradespeople, instructors and employers at a National Workshop led by a team of facilitators. This draft standard breaks down all the tasks performed in the occupation and describes the knowledge and abilities required for a tradesperson to demonstrate competence in the trade.

Draft Review

The RSOS development team forwards a copy of the standard and its translation to provincial and territorial authorities who consult with industry representatives to review it. Their recommendations are assessed and incorporated into the standard.

Validation and Weighting

Participating provinces and territories also consult with industry to validate and weight the document for the purpose of planning the makeup of the Red Seal Interprovincial Examination for the trade. They validate and weight the major work activities (MWA), tasks and sub-tasks, of the standard as follows:

MWA	Each jurisdiction assigns a percentage of questions to each MWA for an examination that would cover the entire trade.
TASKS	Each jurisdiction assigns a percentage of exam questions to each task within a MWA.
SUB-TASKS	Each jurisdiction indicates, with a YES or NO, whether or not each sub-task is performed by skilled workers within the occupation in its jurisdiction.

The results of this exercise are submitted to the RSOS development team who then analyzes the data and incorporates it into the document. The RSOS provides the individual jurisdictional validation results as well as the national averages of all responses. The national averages for MWA and task weighting guide the Interprovincial Red Seal Examination plan for the trade.

The validation of the RSOS is used to identify common core sub-tasks across Canada for the occupation. If at least 70% of the responding jurisdictions' industry performs a sub-task, it shall be considered common core. Interprovincial Red Seal Examination questions are limited to the common core sub-tasks identified through this validation process.

Definitions for Validation and Weighting

YES	sub-task performed by qualified workers in the occupation in that province or territory
NO	sub-task not performed by qualified workers in the occupation in that province or territory
NV	standard Not Validated by that province or territory
ND	trade Not Designated in a province or territory
NOT COMMON CORE (NCC)	sub-task, task or MWA performed less than 70% of responding jurisdictions; these will not be tested by the Interprovincial Red Seal Examination for the trade
NATIONAL AVERAGE %	average percentage of questions assigned to each MWA and task in Interprovincial Red Seal Examination for the trade

Provincial/Territorial Abbreviations

NL	Newfoundland and Labrador
NS	Nova Scotia
PE	Prince Edward Island
NB	New Brunswick
QC	Quebec
ON	Ontario
MB	Manitoba
SK	Saskatchewan
AB	Alberta
BC	British Columbia
NT	Northwest Territories
YT	Yukon Territory
NU	Nunavut

DESCRIPTION OF THE AUTO BODY AND COLLISION TECHNICIAN TRADE

“Auto Body and Collision Technician” is this trade’s official Red Seal occupational title approved by the CCDA. Prior to October 2018, the trade name was Motor Vehicle Body Repairer (Metal and Paint). This standard covers tasks performed by auto body and collision technicians whose occupational title may vary across provinces and territories of Canada. For official provincial or territorial names, please refer to the Ellis Chart.

Auto body and collision technicians repair and restore damaged motor vehicles. They assess body damage and develop repair estimates and repair plans. Their repair work may range from correcting minor structural damage and cosmetic scratches and dents to fixing extensive structural damage to motor vehicles. Some parts may need to be removed for access or during repairs. Vehicle parts that are damaged beyond repair are replaced. The alignment and replacement of suspension and steering components is also performed in this trade. Restoring interior components of vehicles falls within the scope of the trade. Auto body and collision technicians may work with mechanical and electronic components such as air conditioning (A/C) systems, exhaust systems, drivetrain, engine cooling systems, advanced electronic components (adaptive cruise control and lane departure features), and passenger restraint systems (seat belts and air bags).

In this sector, most auto body and collision technicians work in private enterprises or are self-employed. They may be employed by body repair facilities, auto and truck dealerships, custom repair facilities, and trucking and bus companies. In larger repair facilities or dealerships, there may be a division of responsibilities among the team of repair professionals. Some may work exclusively on collision specialization such as damage repair, frame straightening, refinishing, suspension, detailing, or auto glass installation. Generally in smaller repair facilities, auto body and collision technicians tend to be responsible for a wider range of these duties. While they may work as part of the repair team, which includes other auto body and collision technicians, automotive refinishing technicians, automotive service technicians, and others in the automotive sector, journeypersons tend to work independently.

Auto body and collision technicians require proficiency with a variety of tools and equipment, some of which are technologically advanced. Diagnostic scanning equipment is used for diagnosis and programming electronic and electrical systems. Hand and power tools are used in the repair and replacement of motor vehicle parts. Welding and cutting equipment is also used. Auto body and collision technicians work with a number of materials such as metal, glass, plastic and composites. Surface repairs may require the application of repair materials. In addition, they may prepare surfaces for refinishing and apply a variety of appropriate refinishing products. They have refinishing application and detailing skills.

Working environments vary in this trade. Typically, auto body and collision technicians work indoors in an environment that may be noisy and dusty. However, many repair facilities are well ventilated to reduce health risks from dust and fumes. Health and safety are important issues as these workers are frequently in contact with chemicals (e.g. paints, solvents and fillers) and physical hazards (e.g. lifting heavy objects, frame equipment and sharp metal). Ongoing safety training and safe work practices are important.

Key attributes for people entering this trade are good communication skills, mechanical aptitude, problem solving skills, an eye for detail, computer literacy and a commitment to ongoing training. The work often requires considerable standing, kneeling, lifting, climbing, pulling and reaching.

With experience, auto body and collision technicians may move into supervisory positions, start their own business, or become auto damage appraisers. Some of the skills of this trade may be transferred to other occupations such as sheet metal worker, industrial painter, welder, automotive refinishing technician, truck and transport mechanic, recreation vehicle service technician, glazier or automotive service technician and to other sectors such as manufacturing, aviation and marine.

TRENDS IN THE AUTO BODY AND COLLISION TECHNICIAN TRADE

Removal and repair procedure information is becoming more readily available to the technician as a result of digital technology. This is critical as vehicle design, construction and materials have become more proprietary and complex and changes rapidly to adapt to new government-mandated safety and emission standards. Relevant and up-to-date documentation and training from original equipment manufacturers (OEMs) ensures quality and safe repairs, in a timely manner and according to the OEM and manufacturers' specifications.

Advanced driver-assistance systems (ADAS) (e.g. autonomous vehicles, driver assist technologies, lane departure warning systems) are being introduced. These new systems have increased the need for auto body and collision technicians to continue to update their skills in using advanced diagnostic equipment to diagnose codes and interpret faults. Increased coordination with manufacturers and dealerships may be required due to the use of proprietary technology, including the need for proper manufacturers' reset for electronics.

Repair facilities are streamlining their operations for easier maintenance, better production and cost efficiency. Lean practices are becoming prevalent and affecting the repair process from start to finish by eliminating waste and work duplication.

Health, safety and environmental practices have greatly improved to reduce the risk of workplace health and safety hazards and to comply with legislated environmental practices. More women and people from other equity-seeking groups are being encouraged to enter the trade.

Hybrid, electric vehicles and alternative-fuel vehicles have become, and will continue to be, more prevalent in the marketplace. OEMs have specific recommendations and may have certifications for working on these types of vehicles to prevent vehicle damage and ensure worker safety. This new technology requires auto body and collision technicians to upgrade their skills. The high voltage produced by hybrid and electric vehicles requires increased safety measures. Curing and baking procedures of those vehicles are altered for component longevity and safety.

There is an increase in the use of carbon fibre, plastic and composite type materials, largely because of weight reduction and the resulting fuel economy. Fibre-reinforced plastics and carbon fibre materials are becoming structural components because they are lighter and stronger.

The use of new vehicle construction materials such as magnesium, aluminum and advanced high-strength steels require special training and equipment to perform repairs. Specialized welding equipment and methods are continually being introduced to repair these materials. Aluminum parts and components and all equipment used to repair them must be isolated to avoid cross contamination with ferrous metals.

Auto manufacturers are producing special effect and custom paint finishes such as 3 and 4 stage paint colours, matte finishes and specialty micro flake metallic with specialized preparation and application procedures. Some OEMs are working with paint manufacturers to develop and patent proprietary finishes. New materials and processes for automotive finishing are constantly being researched, developed and introduced.

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

Auto body and collision technicians read labels, technical service bulletins and manuals to learn about installation and repair procedures. They read estimates, work orders and memos about damages and details of customers' requests. Auto body and collision technicians read safety-related information and a variety of Acts, bylaws and regulations. They also read trade publications to learn about new technologies, products and materials.

DOCUMENT USE

Auto body and collision technicians observe hazard symbols on product labels. They locate and interpret data on forms, work orders and documents to identify product identification numbers, parts and colours. Auto body and collision technicians read documents to determine product specifications such as vehicle dimensions, and interpret OEM, industry service and repair procedures. They also identify devices and circuits in schematics and technical drawings to identify connectors, switches, and the position and orientation of vehicle parts and assemblies.

WRITING

Auto body and collision technicians write notes and supplements on work orders and forms to describe what work was performed. They may write reports describing workplace incidents.

ORAL COMMUNICATION

Auto body and collision technicians communicate with co-workers, vendors and customers about the scope of work and work completed. They may explain procedures to apprentices. Auto body and collision technicians may exchange technical information with co-workers and technicians when seeking advice on procedures for carrying out tasks.

NUMERACY

Auto body and collision technicians take a variety of measurements, and analyze and compare them to manufacturers' specifications. They may estimate times and materials for projects.

THINKING

Auto body and collision technicians use problem-solving skills to determine severity of damage prior to beginning repairs and to identify hidden damages when dismantling vehicles. They judge the quality of repairs by considering shape, length, depths of bodylines, fit of doors and parts. Auto body and collision technicians decide order and priority of tasks taking into consideration availability of equipment and priority of unfinished work.

DIGITAL TECHNOLOGY

Auto body and collision technicians may use mobile devices to complete numeracy-related tasks. They may use digital cameras to inspect hard to access vehicle components for damages. They use diagnostic equipment. Auto body and collision technicians may use specialized auto body service databases to access job assignments, retrieve and review past service information, and complete estimates and work orders. They may use the internet to access OEM specifications and procedures and training courses or forums to provide advice and learn how to complete repairs.

WORKING WITH OTHERS

Auto body and collision technicians spend most of their time working independently but they may be required to coordinate activities with workers from other departments to ensure vehicle availability when repairing damaged vehicles. They may also work directly with co-workers when moving vehicles and lifting large and heavy parts into place.

CONTINUOUS LEARNING

Auto body and collision technicians are continuously learning to keep up with the changes in the industry. They attend on-site, on-line or classroom training provided by industry associations or manufacturers and suppliers.

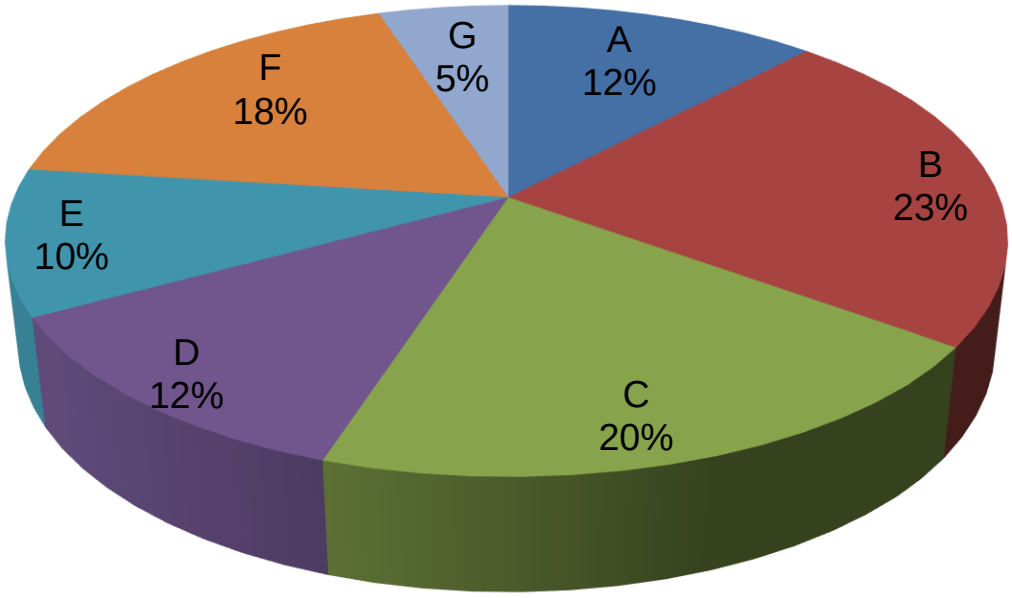
INDUSTRY EXPECTED PERFORMANCE

All tasks must be performed according to the applicable jurisdictional codes and standards. All health and safety standards must be respected and observed. Work should be done efficiently and to a high quality without material waste or environmental damage. All requirements of the manufacturer, client specifications, the Occupational Health and Safety (OH&S) Acts, and Workplace Hazardous Materials Information System (WHMIS) regulations must be met. Auto body and collision technicians should work professionally to meet OEM and industry service specifications, structural integrity and client expectations. At a journeyperson level of performance, all tasks must be done with minimal direction and supervision. As a journeyperson progresses in their career there is an expectation they continue to upgrade their skills and knowledge to maintain pace with industry and promote continuous learning in their trade through mentoring of apprentices.

LANGUAGE REQUIREMENTS

It is expected that journeypersons are able to understand and communicate in either English or French, which are Canada's official languages. English or French are the common languages of business as well as languages of instruction in apprenticeship programs.

PIE CHART
OF RED SEAL EXAMINATION WEIGHTINGS



MWA A	Performs common occupational skills	12%
MWA B	Repairs frame and structural components	23%
MWA C	Repairs non-structural outer body panels and related components	20%
MWA D	Repairs mechanical, electrical and alternative-fuel system components	12%
MWA E	Repairs interior components and services restraint systems	10%
MWA F	Performs refinishing procedures	18%
MWA G	Performs detailing and cleaning	5%

This pie chart represents a breakdown of the interprovincial Red Seal examination. Percentages are based on the collective input from workers from the trade from across Canada. The Task Matrix on the next pages indicates the breakdown of tasks and sub-tasks within each Major Work Activity and the breakdown of questions assigned to the Tasks. The Interprovincial examination for this trade has 120 questions.

AUTO BODY AND COLLISION TECHNICIAN

TASK MATRIX

A – Performs common occupational skills — 12%

Task A-1 **Performs safety-related functions** **11%**	**A-1.01 Maintains safe work environment**	**A-1.02 Uses personal protective equipment (PPE) and safety equipment**	
Task A-2 **Uses and maintains tools and equipment** **17%**	**A-2.01 Maintains hand and power tools**	**A-2.02 Maintains frame and unibody repair and measuring equipment**	**A-2.03 Uses lifting equipment**
	A-2.04 Uses diagnostic equipment	**A-2.05 Maintains refinishing tools and equipment**	
Task A-3 **Uses and maintains welding equipment** **17%**	**A-3.01 Uses welding equipment**	**A-3.02 Maintains welding equipment**	
Task A-4 **Organizes work and uses documentation** **12%**	**A-4.01 Prepares estimates and supplements**	**A-4.02 Prepares repair plan**	**A-4.03 Organizes parts, materials and work area**
	A-4.04 Uses documentation		
Task A-5 **Uses communication and mentoring techniques** **8%**	**A-5.01 Uses communication techniques**	**A-5.02 Uses mentoring techniques**	
Task A-6 **Removes and installs trim and hardware** **13%**	**A-6.01 Removes trim and hardware**	**A-6.02 Installs trim and hardware**	

Task A-7 **Performs final inspections** **10%**	**A-7.01 Performs final operational check**	**A-7.02 Performs final quality control inspection**
Task A-8 **Applies corrosion protection and sound deadening materials** **12%**	**A-8.01 Applies corrosion inhibitors and undercoats**	**A-8.02 Applies seam sealers and sound deadeners**

B – Repairs frame and structural components — 23%

Task B-9 **Prepares for repair and replacement of structural components** **38%**	**B-9.01 Identifies extent of damage**	**B-9.02 Removes components for access**	**B-9.03 Performs vehicle setup**
Task B-10 **Repairs, removes and installs structural components** **44%**	**B-10.01 Repairs structural components**	**B-10.02 Removes structural components**	**B-10.03 Installs structural components**
Task B-11 **Removes, installs and repairs structural and laminated glass** **18%**	**B-11.01 Removes structural glass**	**B-11.02 Installs structural glass**	**B-11.03 Repairs laminated glass**

C – Repairs non-structural outer body panels and related components

20%

Task C-12 **Removes, repairs and installs metal panels and components** **46%**	**C-12.01 Prepares metal panels and components for repair**	**C-12.02 Removes metal panels and components**	**C-12.03 Repairs metal panels and components**
	C-12.04 Installs metal panels and components		
Task C-13 **Removes, repairs and installs plastic and composite panels and components** **37%**	**C-13.01 Prepares plastic and composite panels and components for repair**	**C-13.02 Removes plastic and composite panels and components**	**C-13.03 Repairs plastic and composite panels and components**
	C-13.04 Installs plastic and composite panels and components		
Task-C 14 **Removes and installs non-structural glass** **17%**	**C-14.01 Removes non-structural glass**	**C-14.02 Installs non-structural glass**	

D – Repairs mechanical, electrical and alternative-fuel system components

12%

Task D-15 **Deactivates and reactivates alternative-fuel systems** **20%**	**D-15.01 Deactivates alternative-fuel systems**	**D-15.02 Reactivates alternative-fuel systems**	
Task D-16 **Removes and installs mechanical components** **48%**	**D-16.01 Removes mechanical components**	**D-16.02 Installs mechanical components**	
Task D-17 **Removes, repairs and installs electrical and electronic components** **32%**	**D-17.01 Removes electrical components**	**D-17.02 Repairs damaged wires and protective coverings**	**D-17.03 Installs electrical components**
	D-17.04 Services advanced electronic components		

E – Repairs interior components and services restraint systems

10%

Task E-18 **Repairs and replaces interior components** **39%**	**E-18.01 Repairs interior components**	**E-18.02 Replaces interior components**
Task E-19 **Services supplemental restraint systems (SRS)** **61%**	**E-19.01 Services seat belt restraint systems**	**E-19.02 Services air bags and related components**

F – Performs refinishing procedures

18%

Task F-20 **Prepares surface** **25%**	**F-20.01 Performs initial preparation**	**F-20.02 Masks surface**	**F-20.03 Strips surface**
	F-20.04 Sands surface		
Task F-21 **Uses repair materials** **13%**	**F-21.01 Mixes repair materials**	**F-21.02 Applies repair materials**	
Task F-22 **Prepares refinishing equipment** **13%**	**F-22.01 Prepares spray booth**	**F-22.02 Performs spray gun setup**	
Task F-23 **Prepares refinishing materials** **17%**	**F-23.01 Mixes refinishing materials**	**F-23.02 Performs colour adjustments**	
Task F-24 **Applies refinishing materials** **23%**	**F-24.01 Applies sealers**	**F-24.02 Applies base coat**	**F-24.03 Applies single-stage paint**
	F-24.04 Applies clear coat		
Task F-25 **Performs post-refinishing functions** **9%**	**F-25.01 Removes masking materials**	**F-25.02 Corrects surface imperfections**	

G – Performs detailing and cleaning

5%

Task G-26 **Details exterior** **61%**	**G-26.01 Removes minor imperfections**	**G-26.02 Polishes vehicle**	**G-26.03 Touches up stone chips**
Task G-27 **Cleans vehicle** **39%**	**G-27.01 Cleans exterior**	**G-27.02 Cleans interior**	

MAJOR WORK ACTIVITY A

Performs common occupational skills

TASK A-1 Performs safety-related functions

TASK DESCRIPTOR

Auto body and collision technicians are responsible for using personal protective equipment (PPE) and maintaining a safe work environment to protect themselves, others and the environment.

A-1.01 Maintains safe work environment

Essential Skills	Working with Others, Document Use, Thinking

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
A-1.01.01P	maintain clean and organized work station and repair facility	work station and repair facility are clean and organized according to company policies and jurisdictional regulations
A-1.01.02P	recognize and eliminate potential ***fire hazards***	***fire hazards*** are recognized and eliminated according to ***workplace safety, health*** and fire ***regulations***
A-1.01.03P	perform job hazard assessment (JHA)	potential ***hazardous conditions*** are recognized and eliminated by applying safe work practices according to jurisdictional safety regulations
A-1.01.04P	handle, remove, dispose of and recycle ***hazardous products and waste***	***hazardous products and waste*** are handled, removed, disposed of and recycled according to jurisdictional ***workplace safety, health*** and environmental ***regulations***
A-1.01.05P	apply jurisdictional ***workplace safety and health regulations***	jurisdictional ***workplace safety and health regulations*** are located, identified and executed
A-1.01.06P	recognize and eliminate ***personal injury welding hazards***	***personal injury welding hazards*** are recognized and eliminated by following safety practices

A-1.01.07P	tag and lock out damaged tools, equipment and vehicles	damaged tools, equipment and vehicles are tagged and locked out according to company policies and jurisdictional regulations, if applicable
A-1.01.08P	maintain clear path to emergency exits and designated emergency meeting area	clear path to emergency exits and designated emergency meeting area is maintained
A-1.01.09P	document, complete and maintain ***safety-related documentation***	***safety-related documentation*** is completed according to workplace policies and jurisdictional regulations

RANGE OF VARIABLES

fire hazards include: contaminated rags, build-up of vapours, flammable materials, sparks, open flames

workplace safety and health regulations include: Workplace Hazardous Materials Information System (WHMIS), Occupational Health and Safety (OH&S)

hazardous conditions include: fumes, lack of grounding, static electricity

hazardous products and waste include: solvents, paint products, oils

personal injury welding hazards include: sparks, heat, protruding objects, wet floors, ultraviolet (UV) rays, sharp objects, electrical connections, defective equipment

safety-related documentation includes: spill procedure sheets, product labelling, incident reports, safety data sheets (SDS), equipment maintenance schedules

KNOWLEDGE

	Learning Outcomes	Learning Objectives
A-1.01.01L	demonstrate knowledge of safe work practices	identify ***hazardous conditions*** and describe safe work practices
		identify ***fire hazards*** and describe safe work practices
		describe procedures used to store, use, dispose of and recycle ***hazardous products and waste***
		identify ***personal injury welding hazards*** and describe safe work practices
		identify potential hazards and describe safe work practices for hybrid/alternative fuel vehicles
		identify potential hazards from ***metal debris*** and describe safe work practices
A-1.01.02L	demonstrate knowledge of regulatory requirements pertaining to safety	identify and describe ***workplace safety and health regulations***

		describe regulatory requirements used for the disposal of ***hazardous products and waste***
A-1.01.03L	demonstrate knowledge of ***safety-related documentation*** and its use	identify types and location of ***safety-related documentation*** and describe their purpose, applications and procedures for use

RANGE OF VARIABLES

hazardous conditions include: fumes, lack of grounding, static electricity

fire hazards include: contaminated rags, build-up of vapours, flammable materials, sparks, open flames

hazardous products and waste include: solvents, paint products, oils

personal injury welding hazards include: sparks, heat, protruding objects, wet floors, ultraviolet (UV) rays, sharp objects, electrical connections, defective equipment

metal debris includes: aluminum, magnesium dust

workplace safety and health regulations include: Workplace Hazardous Materials Information System (WHMIS), Occupational Health and Safety (OH&S)

safety-related documentation includes: spill procedure sheets, product labelling, incident reports, safety data sheets (SDS), equipment maintenance schedules

A-1.02 Uses personal protective equipment (PPE) and safety equipment

Essential Skills	Document Use, Thinking, Reading

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
A-1.02.02P	select and wear personal protective equipment (***PPE***)	***PPE*** is selected and worn according to task, job requirements and OH&S regulations
A-1.02.02P	select and use ***safety equipment***	***safety equipment*** is selected and used according to OH&S regulations and company policies
A-1.02.03P	inspect and maintain ***PPE*** and ***safety equipment***	***PPE*** and ***safety equipment*** are inspected and maintained to ensure proper fit and operation prior to use
A-1.02.04P	store ***PPE*** and ***safety equipment***	***PPE*** and ***safety equipment*** are stored in designated locations and packaging
A-1.02.05P	dispose of expired, damaged and used ***PPE*** and ***safety equipment***	expired, damaged and used ***PPE*** and ***safety equipment*** are disposed of according to manufacturers' specifications and jurisdictional regulations

RANGE OF VARIABLES

PPE includes: hearing protection, task-specific respirators, safety gloves, welding jackets, eye and face protection, coveralls, safety footwear, automotive paint suit

safety equipment includes: welding curtains and blankets, smoke and dust extractors, eye wash stations, fire extinguishers, first aid kits, defibrillators, safety stands

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
A-1.02.01L	demonstrate knowledge of ***PPE*** and ***safety equipment***, their applications, maintenance, storage and procedures for use	identify types of ***PPE*** and ***safety equipment*** and describe their applications and limitations
		describe ***PPE*** and ***safety equipment*** operations
		describe the procedures used to inspect, maintain, care for, store and fit ***PPE*** and ***safety equipment***
		identify ***PPE*** and ***safety equipment*** and describe ***safe work practices for hybrid/alternative fuel vehicles***
A-1.02.02L	demonstrate knowledge of regulatory requirements pertaining to ***PPE*** and ***safety equipment***	identify and interpret the regulatory requirements and responsibilities
		identify and describe workplace safety and health regulations pertaining to the use of ***PPE*** and ***safety equipment***

RANGE OF VARIABLES

PPE includes: hearing protection, task-specific respirators, safety gloves, welding jackets, eye and face protection, coveralls, safety footwear, automotive paint suit

safety equipment includes: welding curtains and blankets, smoke and dust extractors, eye wash stations, fire extinguishers, first aid kits, defibrillators, safety stands

safe work practices for hybrid/alternative fuel vehicles include using: insulated gloves, insulated tools, pylons, digital volt-ohm meter (DVOM); removing components

TASK A-2 Uses and maintains tools and equipment

TASK DESCRIPTOR

The proper use and maintenance of tools and equipment is important for safety and efficiency.

A-2.01 Maintains hand and power tools

Essential Skills Thinking, Document Use, Reading

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
A-2.01.01P	clean ***hand*** and ***power tools***	***hand*** and ***power tools*** are cleaned to ensure proper operation and to prevent transfer of contaminants to vehicle
A-2.01.02P	lubricate ***hand*** and ***power tools***	***hand*** and ***power tools*** are lubricated according to manufacturers' specifications
A-2.01.03P	identify, remove, repair or replace defective or unsafe ***hand*** and ***power tools***	defective or unsafe ***hand*** and ***power tools*** are identified, tagged and removed from use, repaired or replaced according to condition of tool
A-2.01.04P	drain compressed air system of water	compressed air system is drained of water daily to prevent premature failure of tools and contamination of work surface
A-2.01.05P	organize and store ***hand*** and ***power tools***	***hand*** and ***power tools*** are organized and stored according to company policies and safety considerations

RANGE OF VARIABLES

hand tools include: see Appendix B
power tools include: see Appendix B

KNOWLEDGE

	Learning Outcomes	Learning Objectives
A-2.01.01L	demonstrate knowledge of ***hand*** and ***power tools***, their applications and procedures for use	identify types of ***hand*** and ***power tools,*** their applications, limitations and procedures for use
		describe the procedures used to inspect ***hand*** and ***power tools***
		identify potential hazards related to ***hand*** and ***power tools***

A-2.01.02L	demonstrate knowledge of the maintenance and storage of ***hand*** and ***power tools***	describe the procedures used to store and maintain ***hand*** and ***power tools***
		describe the procedures used to repair defective ***hand*** and ***power tools***
A-2.01.03L	demonstrate knowledge of ***cutting tools and equipment***, their applications and procedures for use	identify ***cutting tools and equipment*** used to cut components
		identify hazards and describe safe work practices pertaining to cutting
		identify cutting processes and describe their applications
		describe the procedures to set up and shut down plasma arc cutting equipment
		describe the procedures used to cut with plasma arc cutting equipment
		describe the procedures to maintain plasma arc cutting equipment
		describe the procedures to set up and shut down oxy-fuel equipment
		describe the procedures used to cut with oxy-fuel equipment
		describe the procedures to maintain oxy-fuel equipment

RANGE OF VARIABLES

hand tools include: see Appendix B

power tools include: see Appendix B

cutting tools and equipment include: cut-off wheels, plasma cutters, saws (manual, air, electric), oxy-fuel

A-2.02 Maintains frame and unibody repair and measuring equipment

Essential Skills	Numeracy, Document Use, Working with Others

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
A-2.02.01P	check ***frame and unibody repair equipment components***	***frame and unibody repair equipment components*** are checked for damage, wear and missing parts
A-2.02.02P	check level of hydraulic fluids in ***frame and unibody repair equipment***	level of hydraulic fluids is checked according to manufacturers' specifications to ensure full extension and capability
A-2.02.03P	confirm air pressure in ***frame and unibody repair equipment***	air pressure is confirmed according to manufacturers' specifications to avoid premature damage to equipment
A-2.02.04P	clean ***frame and unibody repair equipment***	***frame and unibody repair equipment*** is cleaned according to manufacturers' procedures to ensure smooth operation
A-2.02.05P	lubricate ***frame and unibody repair equipment***	***frame and unibody repair equipment*** is lubricated according to manufacturers' specifications
A-2.02.06P	calibrate ***measuring equipment***	***measuring equipment*** is calibrated according to manufacturers' specifications to ensure accurate measurements
A-2.02.07P	identify, remove, repair or replace defective ***measuring equipment***	defective ***measuring equipment*** is identified and removed, repaired or replaced to ensure accurate measurements
A-2.02.08P	update ***measuring equipment*** software	***measuring equipment*** software is updated to current specifications on electronic measuring systems
A-2.02.09P	clean and store ***measuring equipment***	***measuring equipment*** is cleaned and stored to prevent damage while not in use

RANGE OF VARIABLES

frame and unibody repair equipment components include: See Appendix B
frame and unibody repair equipment includes: See Appendix B
measuring equipment includes: See Appendix B

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
A-2.02.01L	demonstrate knowledge of ***frame and unibody repair equipment*** and ***components***, their applications and procedures for use	identify types of ***frame and unibody repair equipment*** and ***components***, their applications, limitations and procedures for use
		identify correct air pressures and level of hydraulic fluids
		describe the procedures used to inspect ***frame and unibody repair equipment*** and ***components***
A-2.02.02L	demonstrate knowledge of the maintenance and storage of ***frame and unibody repair equipment***	describe the procedures used to store and maintain ***frame and unibody repair equipment***
A-2.02.03L	demonstrate knowledge of ***measuring equipment***, their applications and procedures for use	identify types of ***measuring equipment***, their applications, limitations and procedures for use
		describe the procedures used to inspect ***measuring equipment***
A-2.02.04L	demonstrate knowledge of the maintenance and storage of ***measuring equipment***	describe the procedures used to store and maintain ***measuring equipment***

RANGE OF VARIABLES

frame and unibody repair equipment includes: See Appendix B
frame and unibody repair equipment components include: See Appendix B
measuring equipment includes: See Appendix B

A-2.03 Uses lifting equipment

Essential Skills	Document Use, Working with Others, Thinking

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
A-2.03.01P	identify lifting points of vehicle	lifting points of vehicle are identified to avoid damage to hoist, vehicle and surroundings
A-2.03.02P	select ***lifting equipment***	***lifting equipment*** is selected according to vehicle and required repair

A-2.03.03P	operate ***lifting equipment*** within operating limitations	***lifting equipment*** is operated within operating limitations according to manufacturers' specifications
A-2.03.04P	check ***lifting equipment***	***lifting equipment*** is checked to ensure that certification and servicing are kept current and documented according to jurisdictional regulations
A-2.03.05P	check ***lifting equipment components*** and ***safety backups***	***lifting equipment components*** and ***safety backups*** are checked for proper operation

RANGE OF VARIABLES

lifting equipment includes: hoists, floor jacks, door jacks, engine lifts, frame racks
lifting equipment components include: pads, levers, cables, arm locks
safety backups include: hoist locks, safety tabs, height limiter switches, safety stands

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
A-2.03.01L	demonstrate knowledge of vehicle lifting points	identify vehicle lifting points
A-2.03.02L	demonstrate knowledge of ***lifting equipment***, their applications and procedures for use	identify types of ***lifting equipment,*** their applications, limitations and procedures for use
		describe the procedures used to inspect ***lifting equipment***, including checking ***safety backups*** and ***lifting equipment components***
A-2.03.03L	demonstrate knowledge of ***jurisdictional regulatory requirements*** pertaining to ***lifting equipment***	identify and interpret the ***jurisdictional regulatory requirements*** pertaining to ***lifting equipment***

RANGE OF VARIABLES

lifting equipment includes: hoists, floor jacks, door jacks, engine lifts, frame racks
safety backups include: hoist locks, safety tabs, height limiter switches, safety stands
lifting equipment components include: pads, levers, cables, arm locks
jurisdictional regulatory requirements include: inspection frequency, documentation, maintenance

A-2.04 Uses diagnostic equipment

Essential Skills	Digital Technology, Continuous Learning, Document Use

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
A-2.04.01P	check function of ***diagnostic equipment***	functional errors are identified
A-2.04.02P	calibrate ***diagnostic equipment***	***diagnostic equipment*** is calibrated according to manufacturers' specifications to ensure accurate diagnosis
A-2.04.03P	clean and store ***diagnostic equipment***	***diagnostic equipment*** is cleaned and stored in its case to prevent damage
A-2.04.04P	update ***diagnostic equipment*** software	***diagnostic equipment*** software is updated to current manufacturers' specifications
A-2.04.05P	perform pre-scan of vehicle to identify faults	pre-scan of vehicle is performed to identify faults using ***diagnostic equipment*** according to OEM or industry service specifications and manufacturers' procedures
A-2.04.06P	perform post-scan of vehicle to confirm repairs	post-scan of vehicle is performed to confirm repairs using ***diagnostic equipment*** according to OEM or industry service specifications and manufacturers' procedures

RANGE OF VARIABLES

diagnostic equipment include: scan tools, DVOM, laptop, tablets

KNOWLEDGE

	Learning Outcomes	Learning Objectives
A-2.04.01L	demonstrate knowledge of ***diagnostic equipment***, their applications and procedures for use	identify types of ***diagnostic equipment***, their applications, limitations and procedures for use
		describe the procedures used to inspect ***diagnostic equipment***
		describe the procedures used to calibrate ***diagnostic equipment***

		describe the procedures used to diagnose advanced safety system and advanced driver-assistance system (ADAS) codes
A-2.04.02L	demonstrate knowledge of the maintenance and storage of ***diagnostic equipment***	describe the procedures used to store and maintain ***diagnostic equipment***

RANGE OF VARIABLES

diagnostic equipment include: scan tools, DVOM, laptop, tablets

A-2.05 Maintains refinishing tools and equipment

Essential Skills Thinking, Document Use, Continuous Learning

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
A-2.05.01P	clean and maintain spray booths and preparation stations	spray booths and preparation stations are cleaned and maintained according to manufacturers' specifications
A-2.05.02P	clean spray guns	spray guns are cleaned after every application according to manufacturers' procedures
A-2.05.03P	lubricate spray gun components	spray gun components are lubricated with paint-compatible lubricant according to manufacturers' procedures
A-2.05.04P	maintain air dryers and filters	air dryers and filters are maintained to remove contamination and moisture
A-2.05.05P	calibrate refinishing material mixing scales	refinishing material mixing scales are calibrated according to manufacturers' specifications
A-2.05.06P	maintain mixing equipment and paint mixing room	mixing equipment and paint mixing room are maintained according to health and safety regulations and company policies
A-2.05.07P	maintain spray gun cleaners and recycling equipment	spray gun cleaners and recycling equipment are maintained according to manufacturers' specifications

A-2.05.08P	check spray gun equipment for malfunctions	spray gun equipment is checked for malfunctions and corrected
A-2.05.09P	maintain service and maintenance records	service and maintenance records are maintained according to manufacturers' recommendations and jurisdictional regulations

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
A-2.05.01L	demonstrate knowledge of types of ***refinishing tools and equipment***, their components and applications	identify types of ***refinishing tools and equipment***, their components and applications
		describe the procedures used to inspect and make adjustments to ***refinishing tools and equipment*** and their components
A-2.05.02L	demonstrate knowledge of ***refinishing tools and equipment*** maintenance and storage	describe the procedures used to maintain and store ***refinishing tools and equipment*** and their components
		identify types of cleaning products and equipment used to clean spray guns
		describe procedures used to clean and store spray equipment
		identify types of lubricants and their purpose and application

RANGE OF VARIABLES

refinishing tools and equipment include: spray booths, spray guns, drying equipment, mixing tools, paint scales, paint application equipment, paint mixing machines, gun wash stations, solvent recyclers, preparation stations

TASK A-3 Uses and maintains welding equipment

TASK DESCRIPTOR

The ability to weld competently is an important skill for auto body and collision technicians as it is used in many aspects of the trade.

A-3.01 Uses welding equipment

Essential Skills	Thinking, Digital Technology, Continuous Learning

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
A-3.01.01P	determine base material to be welded	base material is determined according to OEM documentation and ***physical test*** results
A-3.01.02P	select and use ***welding equipment***	***welding equipment*** is selected and used according to base material to be welded and OEM procedures
A-3.01.03P	protect vehicle	vehicle is protected with welding blankets, disconnecting battery, and ensuring any electronic components are isolated
A-3.01.04P	select position for continuity clamp (work clamp)	position of continuity clamp (work clamp) is selected as close as possible to repair area
A-3.01.05P	ensure a ***safe*** working environment	a ***safe*** working environment is ensured
A-3.01.06P	prepare and clean work piece	work piece is prepared and cleaned using ***methods***
A-3.01.07P	secure, clamp and brace work piece	work piece is secured, clamped and braced according to OEM specifications and procedures
A-3.01.08P	set ***welding equipment*** and shielding gas	***welding equipment*** and shielding gas are adjusted according to job requirements, OEM and manufacturers' specifications, and performing test welds on the same material
A-3.01.09P	perform destructive test	destructive test is performed to ensure proper and safe weld according to OEM specifications and procedures
A-3.01.10P	control heat while welding	heat is controlled while welding using heat-sink materials to prevent warping

A-3.01.11P	maintain appropriate angle, speed of travel and distance from work piece	appropriate angle, speed of travel and distance from work piece are maintained to ensure a proper and safe weld
A-3.01.12P	maintain appropriate position of electrode tips on work piece	appropriate position of electrode tips on squeeze type welders are controlled according to OEM and manufacturers' specifications
A-3.01.13P	install ***components***	***components*** are installed with number and types of welds according to OEM specifications and procedures
A-3.01.14P	return vehicle integrity	vehicle integrity is returned by using sectioning procedures according to available OEM specifications and procedures

RANGE OF VARIABLES

physical tests include: ferrous metal test, grinding test, magnet test

welding equipment includes: GMAW (metal active gas MAG, metal inert gas MIG), STRSW, GTAW (tungsten inert gas TIG)

safe includes: dry, ventilated, clean, well-lit, isolated

methods include: grinding, media blasting, using a pre-cleaner, drilling, punching, applying corrosion resistant materials, sanding

components include: sheet metal, structural components, repair panels

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
A-3.01.01L	demonstrate knowledge of base materials	identify types of base materials and describe their characteristics
A-3.01.02L	demonstrate knowledge of ***welding equipment***	identify types of ***welding equipment*** and describe their applications and procedures for use
		identify types of ***welding equipment accessories*** and describe their applications and procedures for use
		describe the procedures to set up and shut down different types of ***welding equipment***
		describe the procedures used to perform troubleshooting of ***welding equipment***
A-3.01.03L	demonstrate knowledge of welding procedures	define terminology associated with welding
		identify ***hazards*** and describe safe work practices pertaining to welding
		describe the procedures to use ***welding equipment***
		describe squeeze-type resistance spot welding (STRSW) and its applications

	describe gas metal arc welding (GMAW) and its applications
	describe gas tungsten arc welding (GTAW) and its applications
	identify types of welds, their characteristics and applications
	describe the procedures to perform destructive test
	describe the procedures to perform test welds
	identify types of ***joint assembly*** and describe their characteristics and applications
	identify types of ***weld defects***, their causes and the procedures to prevent and correct them

RANGE OF VARIABLES

welding equipment includes: GMAW (metal active gas MAG, metal inert gas MIG), STRSW, GTAW (tungsten inert gas TIG)

welding equipment accessories include: gauges, tips, coolants, nozzles, regulators, welding wires, shielding gases, hoses

hazards include: personal, equipment, vehicle, repair facility

joint assembly include: lap joint, butt joint, backing, open butt joint, plug welding

weld defects include: porosity, burn through, overlap, excess weld spatter, cracking, undercut

A-3.02 Maintains welding equipment

Essential Skills	Thinking, Continuous Learning, Reading

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
A-3.02.01P	check ***welding equipment***	***welding equipment*** is checked for calibration, damage, wear and missing parts
A-3.02.02P	ensure cylinders are secured	cylinders are secured to prevent them from damage according to jurisdictional regulations
A-3.02.03P	check tension on drive rollers	tension on drive rollers is checked to ensure that wire is fed correctly according to manufacturers' procedures

A-3.02.04P	check wire liner	wire liner is checked for wear and contamination according to manufacturers' procedures
A-3.02.05P	clean out interior of GMAW equipment	interior of GMAW equipment is cleaned out according to manufacturers' procedures
A-3.02.06P	conduct systems check of STRSW equipment	STRSW equipment is checked to ensure tips are dressed, coolant level, cables, casings and cords are maintained according to manufacturers' specifications
A-3.02.07P	perform leak test	leaks are identified using leak test solution

RANGE OF VARIABLES

welding equipment includes: GMAW (metal active gas MAG, metal inert gas MIG), STRSW, GTAW (tungsten inert gas TIG)

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
A-3.02.01L	demonstrate knowledge of procedures to maintain ***welding equipment***	identify types of ***welding equipment*** and describe their maintenance procedures
		identify types of ***welding equipment accessories*** used for different types of repairs and describe their maintenance procedures
		describe inspection procedures
		identify documentation associated with ***welding equipment*** maintenance
		list safety and ***hazards*** associated with the maintenance of ***welding equipment***

RANGE OF VARIABLES

welding equipment includes: GMAW (metal active gas MAG, metal inert gas MIG), STRSW, GTAW (tungsten inert gas TIG)

welding equipment accessories include: gauges, tips, coolants, nozzles, regulators, flowmeters, welding wire, shielding gases, hoses

hazards include: unsecured and leaking cylinders, fire, explosion, electrical shock, contamination

TASK A-4 Organizes work and uses documentation

TASK DESCRIPTOR

Upon the receipt of vehicle, auto body and collision technicians prepare estimates and supplements to establish their repair plans and procedures. In some jurisdictions, technicians contribute to the preparation of estimates and supplements but are not solely responsible for preparing them.

In order for the work to be more efficient, they organize parts, materials and work areas. They use a variety of documents to plan and document their work.

A-4.01 Prepares estimates and supplements

Essential Skills	Document Use, Digital Technology, Writing

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
A-4.01.01P	discuss ***collision details*** with customer	***collision details*** are gathered from customer
A-4.01.02P	document ***information*** on estimate	***information*** is documented on estimate
A-4.01.03P	interpret vehicle identification number ***(VIN) and vehicle build labels information***	***VIN and vehicle build labels information*** are interpreted
A-4.01.04P	visually assess damage to vehicle	damage to vehicle is visually assessed to document repair required
A-4.01.05P	perform and document pre-scan of vehicle	pre-scan of vehicle is performed and documented to identify diagnostic trouble codes (DTC)
A-4.01.06P	perform initial measurements	initial measurements are performed according to OEM and manufacturers' specifications to determine structural damage
A-4.01.07P	photograph vehicle	vehicle is photographed to document damage
A-4.01.08P	dismantle vehicle to access and assess hidden damage	vehicle is dismantled to access and assess hidden damage after obtaining permission from ***customer***
A-4.01.09P	document any previous or pre-existing damage on vehicle	previous or pre-existing damage on vehicle is documented
A-4.01.10P	document estimate of damage	estimate of damage is documented by listing parts, materials and labour required for repair

A-4.01.11P	review estimate with ***customer***	estimate is reviewed with ***customer*** and authorization is obtained
A-4.01.12P	prepare supplement, if required	supplement is prepared, if required

RANGE OF VARIABLES

collision details include: vehicle stopped or moving, speed of vehicle during collision, number of passengers in vehicle, traffic accident report, difference in driveability of car since the incident, direction of impact

information includes: mileage, customer information, VIN, make and model, production date, paint codes, plate number, OEM specifications

VIN and vehicle build labels information include: paint codes, trim levels and colours, OEM-relevant information, production date, make and model

customers include: vehicle owner, insurance company, leasing company

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
A-4.01.01L	demonstrate knowledge of trade-related documentation and its use	describe the importance of effective communication with ***people*** relating to preparing estimates
		define ***terminology associated with damage analysis and estimate documentation***
A-4.01.02L	demonstrate knowledge of vehicle construction	define terminology associated with vehicle construction
		identify ***types of vehicle construction*** and describe their characteristics
		identify types of ***complex materials*** and describe their characteristics
		identify body sections and describe their components
		identify body construction methods
A-4.01.03L	demonstrate knowledge of the procedures used to prepare estimate and supplement documentation	identify the sources of ***information*** used in the preparation of estimates and supplements
		describe the procedures used to prepare estimate and supplement documentation
		identify software used to prepare estimates and supplements
		identify ***sections of an estimate***
A-4.01.04L	demonstrate knowledge of the procedures used to perform a visual inspection	identify the procedures used to perform a visual inspection of the vehicle
A-4.01.05L	demonstrate knowledge of vehicle component operation	describe the procedures used to perform vehicle component operational checks
A-4.01.06L	demonstrate knowledge of the procedures used to perform damage analysis	describe the procedures used to perform damage analysis

RANGE OF VARIABLES

people include: customers, co-workers, appraisers, estimators, insurance adjusters

terminology associated with damage analysis and estimate documentation includes: depreciation, sublet, supplement, included and not-included operations, betterment

types of vehicle construction include: conventional frames, unitized bodies, semi-unitized bodies, space frame, monocoque

complex materials include: aluminum, carbon fibre, magnesium, high-strength steels (HSS), ultra-high-strength steels (UHSS)

information includes: mileage, customer information, VIN, make and model, production date, paint codes, plate number, OEM specifications

sections of an estimate include: customer information, vehicle information, estimate detail lines (damage assessment), estimate sub-totals, final totals, customer responsibility (betterment, deductible)

A-4.02 Prepares repair plan

Essential Skills	Thinking, Document Use, Working with Others

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
A-4.02.01P	review work order and estimate	work order and estimate are reviewed to identify repairs required
A-4.02.02P	perform and document pre-scan of vehicle, if required	pre-scan of vehicle is performed and documented to identify DTCs, if required
A-4.02.03P	review OEM repair procedures and specifications	OEM repair procedures and specifications are reviewed
A-4.02.04P	verify ***parts*** are available	***parts*** are available with supplier
A-4.02.05P	inspect ordered ***parts***	ordered ***parts*** are inspected to confirm quality and suitability for vehicle repair
A-4.02.06P	determine sequence of repair procedure	sequence of repair procedure is determined according to repair facility schedule
A-4.02.07P	determine ***tasks*** to be completed	***tasks*** to be completed are determined

RANGE OF VARIABLES

parts include: OEM, after-market, recycled

tasks include: diagnostic, frame, body, refinishing, electrical, mechanical, glass

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
A-4.02.01L	demonstrate knowledge of vehicle construction	define terminology associated with vehicle construction
		identify ***types of vehicle construction*** and describe their characteristics and applications
		identify body sections and describe their components
		identify types of ***materials used in vehicle construction*** and describe their characteristics and applications
		identify body construction methods
A-4.02.02L	demonstrate knowledge of vehicle components	identify ***structural*** and ***non-structural components*** and describe their characteristics and applications
A-4.02.03L	demonstrate knowledge of work orders (repair orders) and estimates	identify types of repair-related ***documentation*** and describe their purpose, applications and procedures for use
		describe procedures for verifying ordered ***parts***
		describe components of work orders (repair orders) and estimates
A-4.02.04L	demonstrate knowledge of preparing and interpreting repair plans	describe the procedures to prepare repair plan
		describe procedures used to determine repair sequence

RANGE OF VARIABLES

types of vehicle construction include: conventional frames, unitized bodies, semi-unitized bodies, space frame, monocoque

materials used in vehicle construction include: mild steel, composites, plastics, aluminum, carbon fibre, magnesium, HSS, UHSS

structural components include: frame rails, strut tower/apron, rocker panels, reinforcements, pillars, rad supports, stationary glass, bumper reinforcements, intrusion beams

non-structural components include: moveable glass, doors, bolt-on body panels

documentation includes: pre-scan print-out, vehicle dimension print-out, items to be sublet, wheel alignment check

parts include: OEM, after-market, recycled

A-4.03 Organizes parts, materials and work area

Essential Skills	Oral Communication, Working with Others, Thinking

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
A-4.03.01P	verify that necessary parts and consumables are available for task	necessary parts and consumables are available according to job requirements
A-4.03.02P	notify supervisor of missing, damaged and incorrect parts	supervisor is notified of missing, damaged and incorrect parts
A-4.03.03P	store parts	parts are stored to ensure they are not lost or damaged
A-4.03.04P	inspect and prepare parts	parts are inspected and prepared prior to installation
A-4.03.05P	store ***electronic components*** in sealed packaging	***electronic components*** are stored in sealed packaging to protect from dust, moisture and static electricity
A-4.03.06P	label parts and ***electronic components***	parts and ***electronic components*** are labelled for traceability
A-4.03.07P	arrange and sort work area	work area is arranged and sorted in order to facilitate and complete job requirements

RANGE OF VARIABLES

electronic components include: sensors, modules, computers, entertainment systems, on-board cameras

KNOWLEDGE

	Learning Outcomes	Learning Objectives
A-4.03.01L	demonstrate knowledge of organizing parts, materials and work area	describe procedures for organizing and storing replacement parts and materials
		describe procedures to verify that parts and materials are available for task
		describe procedures to inspect and prepare parts prior to installation
		describe procedures for labelling parts and components
		describe procedures to keep work area organized

A-4.04 Uses documentation

Essential Skills	Digital Technology, Document Use, Writing

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
A-4.04.01P	interpret ***information in technical manuals/data sheets and bulletins***	***information in technical manuals/data sheets and bulletins*** is interpreted to aid in repair operations
A-4.04.02P	interpret trade terminology and information on work orders (repair orders) and estimates	trade terminology and information on work orders (repair orders) and estimates are interpreted to carry out repair procedures
A-4.04.03P	maintain service records and maintenance logs	service records and maintenance logs are maintained according to manufacturers' scheduled maintenance
A-4.04.04P	document payable and actual hours	payable and actual hours are documented to measure accuracy and efficiency
A-4.04.05P	interpret and complete ***safety documentation***	***safety documentation*** is interpreted and completed

RANGE OF VARIABLES

information in technical manuals/data sheets and bulletins includes: paint codes, product information, OEM-relevant information

safety documentation includes: SDS, incident reports, spill logs, workplace labels

KNOWLEDGE

	Learning Outcomes	Learning Objectives
A-4.04.01L	demonstrate knowledge of ***trade-related documentation*** and its use	identify and interpret sources of vehicle-related information
		identify types of ***trade-related documentation*** and describe their purpose, applications and procedures for use
		identify and interpret types of ***technical manuals/data sheets and bulletins***
		identify, interpret and complete types of ***safety documentation***

	identify information required for service records and maintenance logs
	identify types of ***written reports*** and describe their purpose and applications

RANGE OF VARIABLES

trade-related documentation includes: OEM and manufacturers' specifications, work orders (repair orders), equipment maintenance schedules, equipment maintenance records, safety manuals and bulletins

information in technical manuals/data sheets and bulletins includes: paint codes, product information, OEM-relevant information

safety documentation includes: SDS, incident reports, spill logs, workplace labels

written reports include: time and material records, apprentice training logs, estimates

TASK A-5 Uses communication and mentoring techniques

TASK DESCRIPTOR

Learning in the trades is done primarily in the workplace with tradespeople passing on their skills and knowledge to apprentices, as well as sharing knowledge among themselves. Apprenticeship is, and always has been about mentoring – learning workplace skills and passing them on. Because of the importance of this to the trade, this task covers the activities related to communication in the workplace and mentoring skills.

A-5.01 Uses communication techniques

Essential Skills	Working with Others, Oral Communication, Thinking

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
A-5.01.01P	demonstrate communication practices with individuals or in a group	instructions and messages are understood by all parties involved in communication
A-5.01.02P	listen using ***active listening*** practices	***active listening*** practices are utilized
A-5.01.03P	receive and respond to feedback on work	response to feedback indicates understanding and corrective measures are taken
A-5.01.04P	explain and provide feedback	explanation and feedback is provided and task is carried out as directed

A-5.01.05P	use questioning to improve communication	questions enhance understanding, on-the-job training and goal setting
A-5.01.06P	participate in safety and information meetings	meetings are attended, information is relayed to the workforce, and is understood and applied

RANGE OF VARIABLES

active listening includes: hearing, interpreting, reflecting, responding, paraphrasing

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
A-5.01.01L	demonstrate knowledge of trade terminology	define terminology used in the trade
A-5.01.02L	demonstrate knowledge of effective communication practices	describe the importance of using effective verbal and non-verbal communication with ***people in the workplace***
		identify ***sources of information*** to effectively communicate
		identify communication and ***learning styles***
		describe effective listening and speaking skills
		identify ***personal responsibilities and attitudes*** that contribute to on-the-job success
		identify the value of diversity in the workplace
		identify communication that constitutes ***harassment*** and ***discrimination***

RANGE OF VARIABLES

people in the workplace include: other tradespeople, co-workers, apprentices, supervisors, clients, authorities having jurisdiction (AHJ), manufacturers

sources of information include: regulations, codes, occupational health and safety requirements, AHJ requirements, prints, drawings, specifications, company and client documentation

learning styles include: seeing it, hearing it, applying it

personal responsibilities and attitudes include: asking questions, working safely, accepting constructive feedback, time management and punctuality, respect for authority, good stewardship of materials, tools and property, efficient work practice

harassment includes: objectionable conduct, comment or display made either on a one-time or continuous basis that demeans, belittles, or causes personal humiliation or embarrassment to the recipient

discrimination is prohibited based on: race, national or ethnic origin, colour, religion, age, sex, sexual orientation, gender identity or expression, marital status, family status, disability, genetic characteristics, pardoned conviction

A-5.02 Uses mentoring techniques

Essential Skills	Working with Others, Oral Communication, Thinking

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
A-5.02.01P	identify and communicate learning objective and point of lesson	apprentice or learner can explain the objective and point of the lesson
A-5.02.02P	link lesson to other lessons and the job	lesson order and unplanned learning opportunities are defined
A-5.02.03P	demonstrate performance of a skill to an apprentice or learner	***steps required to demonstrate a skill*** are performed
A-5.02.04P	set up conditions required for an apprentice or learner to practice a skill	***practice conditions*** are set up so that the skill can be practiced safely by the apprentice or learner
A-5.02.05P	assess apprentice or learner's ability to perform tasks with increasing independence	performance of apprentice or learner improves with practice to a point where skill can be done with little supervision
A-5.02.06P	give supportive and corrective feedback	apprentice or learner adopts best practice after having been given supportive or corrective feedback
A-5.02.07P	support apprentice or learner in pursuing technical training opportunities	technical training is completed within timeframe prescribed by apprenticeship authority
A-5.02.08P	support anti-harassment in the workplace	workplace is harassment and discrimination-free
A-5.02.09P	assess apprentice or learner suitability to the trade	apprentice or learner is given feedback that helps them identify their own strengths and weaknesses and suitability for the trade

RANGE OF VARIABLES

steps required to demonstrate a skill include: understanding the who, what, where, when, why, and how, explaining, showing, giving encouragement, following up to ensure skill is performed correctly

practice conditions means: guided, limited independence, full independence

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
A-5.02.01L	demonstrate knowledge of strategies for learning skills in the workplace	describe the importance of individual experience
		describe the shared responsibilities for workplace learning
		determine one's own learning preferences and explain how these relate to learning new skills
		describe the importance of different types of skills in the workplace
		describe the importance of ***essential skills*** in the workplace
		identify different ***learning styles***
		identify different ***learning needs*** and strategies to meet them
		identify ***strategies to assist in learning a skill***
A-5.02.02L	demonstrate knowledge of ***strategies for teaching*** workplace skills	identify different roles played by a workplace mentor
		describe ***teaching skills***
		explain the importance of identifying the point of a lesson
		identify how to choose a good time to present a lesson
		explain the importance of linking the lessons
		identify the components of the skill (the context)
		describe considerations in setting up opportunities for skill practice
		explain the importance of providing feedback
		identify techniques for giving effective feedback
		describe a skills assessment
		identify methods of assessing progress
		explain how to adjust a lesson to different situations

RANGE OF VARIABLES

essential skills are: reading, document use, writing, oral communication, numeracy, thinking, working with others, digital technology, continuous learning

learning styles include: seeing it, hearing it, applying it

learning needs include: learning disabilities, learning preferences, language proficiency

strategies to assist in learning a skill include: understanding the basic principles of instruction, developing coaching skills, being mature and patient, providing feedback

strategies for teaching include: different methods for teaching skills

teaching skills include: identifying the point of the lesson, linking the lesson, demonstrating the skill, providing practice, giving feedback, assessing skills and progress

TASK A-6 Removes and installs trim and hardware

TASK DESCRIPTOR

Auto body and collision technicians remove trim and hardware to facilitate repairs and refinish on panels. They install trim and hardware on vehicles to obtain proper fit and finish.

A-6.01 Removes trim and hardware

Essential Skills	Thinking, Working with Others, Document Use

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
A-6.01.01P	determine material composition of ***trim***, ***hardware*** and substrate	material composition is determined to avoid damage during removal process
A-6.01.02P	identify how ***trim*** and ***hardware*** is attached	attachment method for ***trim*** and ***hardware*** is identified in order to determine removal method according to available OEM procedures
A-6.01.03P	select and use ***tools and equipment***	***tools and equipment*** are selected and used according to job requirements
A-6.01.04P	document position of ***trim*** for reinstallation	position of ***trim*** is documented for reinstallation
A-6.01.05P	remove ***trim*** and ***hardware*** and identify one-time use parts	***trim*** and ***hardware*** are removed and one-time use parts are identified
A-6.01.06P	remove adhesive tapes and residue	adhesive tapes and residue are removed using eraser wheels, plastic scrapers, heat and solvents

RANGE OF VARIABLES

trim includes: mouldings, roof rack, weatherstrip, interior trim, decals, pin stripes, stone chip protective film, emblems, information labels

hardware includes: window regulators, door handles, side mirrors, door latches

tools and equipment include: plastic blades, utility knives, clip removers, heat guns, eraser wheels, razor blades, stripe cutters, metal picks

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
A-6.01.01L	demonstrate knowledge of types of ***trim*** and ***hardware***, their applications and characteristics	define terminology associated with ***trim*** and ***hardware***
		identify interior ***trim*** and ***hardware*** and describe their characteristics
		identify exterior ***trim*** and ***hardware*** and describe their characteristics
		describe fasteners and adhesives relating to ***trim*** and ***hardware***
		identify hazards and describe safe work practices pertaining to ***trim*** and ***hardware***
A-6.01.02L	demonstrate knowledge of procedures to repair and replace ***trim*** and ***hardware***	describe the procedures used to repair or replace interior ***trim*** and ***hardware***

RANGE OF VARIABLES

trim includes: mouldings, roof rack, weatherstrip, interior trim, decals, pin stripes, stone chip protective film, emblems, information labels

hardware includes: window regulators, door handles, side mirrors, door latches

A-6.02 Installs trim and hardware

Essential Skills Thinking, Working with Others, Document Use

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
A-6.02.01P	clean panel and verify that substrate has proper temperature for adhesion	panel is cleaned and substrate temperature is verified for proper temperature to ensure adhesion
A-6.02.02P	determine ***application method***	***application method*** is determined according to job requirements

A-6.02.03P	select and use tools	tools are selected and used according to job requirements
A-6.02.04P	install ***mechanical fasteners***	***mechanical fasteners*** are installed according to OEM procedures
A-6.02.05P	select and apply ***adhesion promoters*** and ***adhesives*** to ***trim***	***adhesion promoters*** and ***adhesives*** are applied to ***trim***
A-6.02.06P	align and install ***trim*** and ***hardware***	***trim*** and ***hardware*** are aligned and installed to ensure correct placement and proper seal
A-6.02.07P	verify for fit and finish and take corrective action	fit and finish are verified and corrective action is taken if necessary
A-6.02.08P	inspect for leaks and noises and take corrective action	leaks and noises are inspected and corrective action is taken if necessary

RANGE OF VARIABLES

application methods include: soapy water, heat, self-adhesive

mechanical fasteners include: retainers, screws, clips, rivets

adhesion promoters include: wipes, brush-on, spray-on

adhesives include: double-sided tape, sprays, emblem adhesive

trim includes: mouldings, roof rack, weatherstrips, interior trim, decals, pin stripes, stone chip protective film, emblems, information labels

hardware includes: window regulators, door handles, side mirrors, door latches

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
A-6.02.01L	demonstrate knowledge of types of ***trim*** and ***hardware***, their applications and characteristics	define terminology associated with ***trim*** and ***hardware***
		identify interior ***trim*** and ***hardware*** and describe their characteristics
		identify exterior ***trim*** and ***hardware*** and describe their characteristics
A-6.02.02L	demonstrate knowledge of procedures to install ***trim*** and ***hardware***	describe fasteners and adhesives relating to ***trim*** and ***hardware***
		identify hazards and describe safe work practices pertaining to ***trim*** and ***hardware***
A-6.02.03L	demonstrate knowledge of procedures to detect and repair noises and leaks attributed to ***trim*** and ***hardware***	describe the procedures used to inspect interior ***trim*** and ***hardware*** for noises and leaks

RANGE OF VARIABLES

trim includes: mouldings, roof rack, weatherstrips, interior trim, decals, pin stripes, stone chip protective film, emblems, information labels

hardware includes: window regulators, door handles, side mirrors, door latches

TASK A-7 Performs final inspections

TASK DESCRIPTOR

Auto body and collision technicians perform final operational checks and quality control inspections prior to delivery of vehicle to the customer.

A-7.01 Performs final operational check

Essential Skills	Document Use, Digital Technology, Writing

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
A-7.01.01P	check affected fluid levels	fluid levels are checked to ensure that they are at correct operational capacity according to OEM specifications
A-7.01.02P	check operation of components that were repaired, replaced and calibrated	components that were repaired, replaced and calibrated are operational according to OEM specifications
A-7.01.03P	perform post-scan of vehicle	post-scan of vehicle is performed and documented, DTCs are cleared, and components are reprogrammed and calibrated according to OEM procedures and specifications
A-7.01.04P	check tire pressure and wheel torque	tire pressure and wheel torque is checked prior to road test according to OEM specifications
A-7.01.05P	perform road test	road test is performed to ensure that vehicle is returned to pre-incident condition
A-7.01.06P	reset clocks and radio codes	clocks and radio codes are reset

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
A-7.01.01L	demonstrate knowledge of procedures to perform final quality operational checks	identify work order (repair order) details to determine completeness of work
		describe ***final operational checklist*** to verify quality of work
		describe the procedures used to perform vehicle component operational checks
		identify the purpose and procedures for conducting a vehicle road test

RANGE OF VARIABLES

final operational checklist includes: fluid levels, operation of components, post-scan of vehicle, tire pressure, road test, re-enter pre-sets, wheel torque specifications

A-7.02 Performs final quality control inspection

Essential Skills	Document Use, Writing, Thinking

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
A-7.02.01P	inspect vehicle	vehicle is inspected according to ***pre-delivery checklist***
A-7.02.02P	check panel gaps, panel alignment and functionality of latches, catches and locks	panel gaps, panel alignment and functionality of latches, catches and locks are checked for operation according to OEM specifications
A-7.02.03P	check alignment of trims, headlights, grilles and bumpers	alignment of trims, headlights, grilles and bumpers are checked for operation according to OEM specifications

RANGE OF VARIABLES

pre-delivery checklist includes: colour match, blend areas, polish residue, overspray, paint imperfections, tape residue, vehicle cleanliness, lights, mirrors, customer courtesies, sublets, brake pedal hold

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
A-7.02.01L	demonstrate knowledge of procedures to perform quality control inspections	describe procedures to determine completeness of work based on repair order (work order)
		describe procedure to verify quality of work following ***pre-delivery checklist***
		describe procedures used to visually inspect repaired vehicle or component

RANGE OF VARIABLES

pre-delivery checklist includes: colour match, blend areas, polish residue, overspray, paint imperfections, tape residue, vehicle cleanliness, lights, mirrors, customer courtesies, sublets, brake pedal hold

TASK A-8 Applies corrosion protection and sound deadening materials

TASK DESCRIPTOR

Auto body and collision technicians apply corrosion protection to impede corrosion infiltration and ensure structural soundness of vehicle. They also apply sound deadening materials to minimize noise and panel vibration.

A-8.01 Applies corrosion inhibitors and undercoats

Essential Skills	Thinking, Document Use, Reading

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
A-8.01.01P	identify ***areas subject to corrosion***	***areas subject to corrosion*** are identified
A-8.01.02P	protect surrounding areas and components from inhibitors	surrounding areas and components are protected from inhibitors
A-8.01.03P	apply inhibitors to required areas and components	inhibitors are applied to required areas and components to return them to a pre-accident or OEM condition
A-8.01.04P	remove excess inhibitors from surrounding area	excess inhibitors are removed from surrounding area after application

A-8.01.05P	identify usage and location of replacement product	usage and location of replacement product is identified by checking OEM and manufacturers' specifications if available
A-8.01.06P	prepare surface	surface is prepared before applying weld-through primer between adjoining surfaces
A-8.01.07P	apply weld-through primer	weld-through primer is applied according to OEM specifications before panels are welded together

RANGE OF VARIABLES

areas subject to corrosion include: limited access panels, rocker panels, frame rails, repair areas, wheel wells

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
A-8.01.01L	demonstrate knowledge of corrosion, its causes and effects	define terminology associated with corrosion
		identify the ***types of corrosion*** and describe their causes
		identify the ***areas subject to corrosion***
		identify environmental and atmospheric conditions that influence the rate of corrosion
		identify hazards and describe safe work practices pertaining to corrosion and corrosion protection
A-8.01.02L	demonstrate knowledge of ***types of corrosion protection***, their characteristics and applications	identify ***types of corrosion protection*** and describe their characteristics and applications
		interpret ***documentation*** pertaining to corrosion protection
		describe the procedures used to inspect for corrosion related damage
		identify the tools and equipment relating to corrosion protection and describe their applications and procedures for use
A-8.01.03L	demonstrate knowledge of the procedures to restore corrosion protection	describe the procedures used to restore corrosion protection to OEM specifications
A-8.01.04L	demonstrate knowledge of undercoats, their applications, and procedures for use	define terminology associated with undercoats
		identify hazards and describe safe work practices pertaining to undercoats
		interpret jurisdictional regulations pertaining to the use of undercoats

		identify types of undercoats, and describe their characteristics and applications
		identify tools and equipment relating to undercoats and describe their applications and procedures for use
		identify undercoat application techniques
		describe the procedures used to apply undercoats
		identify undercoat defects and describe their causes and the procedures used to prevent or correct them
		describe the procedures used to prepare undercoats for topcoat
A-8.01.05L	demonstrate knowledge of undercoat materials, their characteristics and mixing procedures	describe the procedures used to prepare substrate prior to applying undercoats
		describe the procedures used for mixing undercoats

RANGE OF VARIABLES

types of corrosion include: oxidation, galvanic

areas subject to corrosion include: limited access panels, rocker panels, frame rails, repair areas, wheel wells

types of corrosion protection include: OEM applications, undercoats (primers), topcoats, anti-corrosion compounds, cavity waxes

documentation includes: OEM specifications, manufacturers' specifications

A-8.02 Applies seam sealers and sound deadeners

Essential Skills Thinking, Document Use, Reading

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
A-8.02.01P	identify and replace original ***seam sealers*** and ***sound deadening materials***	original ***seam sealers*** and ***sound deadening materials*** are identified and replaced
A-8.02.02P	protect surrounding areas and components from excess material	surrounding areas and components are protected from excess material
A-8.02.03P	prepare surface prior to application of ***seam sealers*** and ***sound deadening materials***	surface is prepared by priming or scuffing, according to manufacturers' specifications

A-8.02.04P	apply ***seam sealers***	***seam sealers*** are applied according to manufacturers' specifications using ***methods*** to replicate original appearance
A-8.02.05P	apply ***sound deadening materials***	***sound deadening materials*** are applied according to manufacturers' specifications to replicate original appearance
A-8.02.06P	apply sound deadening and structural foam	sound deadening and structural foam is applied according to manufacturers' specifications
A-8.02.07P	remove residual material from surrounding area after application of ***seam sealers*** and ***sound deadening materials***	residual material from surrounding area is removed after application

RANGE OF VARIABLES

seam sealers include: sprayables, brushables, self-leveling, direct-to-metal, solid (seam sealer tape)
sound deadening materials include: pads, foams, sprayables
methods include: masking, spraying, brushing

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
A-8.02.01L	demonstrate knowledge of ***seam sealers*** and ***sound deadening materials***	identify types of ***seam sealers*** and ***sound deadening materials*** and describe their characteristics and applications
		identify hazards and describe safe work practices pertaining to ***seam sealers*** and ***sound deadening materials***
A-8.02.02L	demonstrate knowledge of procedures to apply ***seam sealers*** and ***sound deadening materials***	identify procedures to apply ***seam sealers*** and ***sound deadening materials***

RANGE OF VARIABLES

seam sealers include: sprayables, brushables, self-leveling, direct-to-metal, solid (seam sealer tape)
sound deadening materials include: pads, foams, sprayables

MAJOR WORK ACTIVITY B

Repairs frame and structural components

TASK B-9 Prepares for repair and replacement of structural components

TASK DESCRIPTOR

The frame and structural components, on which all other components of the vehicle are installed, provide vehicles with strength and structural integrity. The vehicle must be anchored securely and dimensions restored. In order to repair or replace these components to OEM tolerances and specifications, some parts may need to be removed for access.

B-9.01 Identifies extent of damage

Essential Skills	Thinking, Document Use, Continuous Learning

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
B-9.01.01P	visually inspect components	components are visually inspected to identify signs of ***damage***
B-9.01.02P	identify hidden ***damage***	hidden ***damage*** is identified by using ***methods***
B-9.01.03P	compare measurements against OEM or industry service specifications	measurements are compared against OEM or industry service specifications to determine extent of damage and to help develop a repair plan using ***methods***

RANGE OF VARIABLES

damage includes: fender gaps, cracked paint, stressed spot welds, broken seam sealers, striker misalignment, cab to body misalignment (full-frame), sway, sag, mash, diamond, twist

methods include: comparison measuring, cross measuring of structural components, 3-D measuring systems, dedicated fixture measuring system

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
B-9.01.01L	demonstrate knowledge of ***vehicle construction*** and structural components	define terminology relating to ***vehicle construction***
		identify types of ***vehicle construction*** and structural components, and describe their characteristics
		identify energy management zones in ***vehicle construction***
B-9.01.02L	demonstrate knowledge of procedures to analyze damage	define terminology associated with damage analysis
		identify visual inspection techniques
		identify types of ***damage*** and determine the appropriate repair procedures
		identify hazards and describe safe work practices pertaining to damage analysis
		describe the ***methods*** used for analyzing damage to vehicles
		describe the procedures and ***considerations*** used for analyzing damage to vehicles
		describe measuring theory
		identify types of measuring equipment and describe their applications and procedures for use
		describe mechanical universal measuring systems
		describe 3-D computerized measuring systems
		describe dedicated fixture measuring systems

RANGE OF VARIABLES

vehicle construction includes: unibody, conventional, space frame, monocoque

damage includes: fender gaps, cracked paint, stressed spot welds, broken seam sealers, striker misalignment, cab to body misalignment (full-frame), sway, sag, mash, diamond, twist

methods include: comparison measuring, cross measuring of structural components, 3-D measuring systems, dedicated fixture measuring system

considerations include: OEM procedures, industry service specifications, repair vs. replace, part availability

B-9.02 Removes components for access

Essential Skills Thinking, Writing, Document Use

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
B-9.02.01P	identify ***components*** that need to be removed	***components*** that need to be removed are identified
B-9.02.02P	remove body, mechanical and electrical ***components***	body, mechanical and electrical ***components*** are removed using hand and power tools according to OEM procedures if available
B-9.02.03P	inspect removed ***components***	***components*** are inspected for physical and operational ***damage***
B-9.02.04P	store, clean and dispose of ***components***	***components*** are stored, cleaned and disposed of according to environmental and jurisdictional regulations
B-9.02.05P	label, organize and store removed ***components***	removed ***components*** are labelled, organized and stored for reassembly according to job requirements

RANGE OF VARIABLES

components include: outer body panels, suspension components, wiring harnesses, refrigerant, cooling system, electronic modules

damage includes: cracks, deformations, kinks, bends, flaking, missing parts, wear and tear

KNOWLEDGE

	Learning Outcomes	Learning Objectives
B-9.02.01L	demonstrate knowledge of procedures to remove ***components***	describe the procedures to remove ***components***
		identify tools and equipment used for removing ***components***
		identify procedures to disarm and disable ***components***
B-9.02.02L	demonstrate knowledge of procedures to inspect for physical ***damage***	assess physical appearance and operation of ***components*** for ***damage*** using inspection methods
B-9.02.03L	demonstrate knowledge of labelling, organizing and storage of removed ***components***	identify labelling, organizing and storing procedures

	identify storage, clean-up and disposal methods
	identify protection and isolation procedures for related ***components***

RANGE OF VARIABLES

components include: outer body panels, suspension components, wiring harnesses, refrigerant, cooling system, electronic modules

damage includes: cracks, deformations, kinks, bends, flaking, missing parts, wear and tear

B-9.03 Performs vehicle setup

Essential Skills	Reading, Document Use, Digital Technology

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
B-9.03.01P	identify anchoring points for clamps and fixtures	anchoring points are identified for clamps and fixtures to secure vehicle prior to repair, according to ***vehicle type***, damage condition and OEM or industry repair specifications
B-9.03.02P	***prepare*** anchoring locations	anchoring locations are ***prepared***
B-9.03.03P	anchor vehicle to structural repair system	vehicle is anchored to structural repair system to secure vehicle for realignment according to OEM-approved anchoring methods or industry repair specifications

RANGE OF VARIABLES

vehicle types include: unibody, full-frame, space frame, monocoque

prepare includes: remove undercoating, remove vehicle components, remove paint, anchoring equipment maintenance

KNOWLEDGE

	Learning Outcomes	Learning Objectives
B-9.03.01L	demonstrate knowledge of procedures to set up vehicle	identify anchoring and pulling techniques used for vehicle structural repair and describe their applications and procedures for use
		identify anchoring location

TASK B-10 Repairs, removes and installs structural components

TASK DESCRIPTOR

Auto body and collision technicians return the frame and structural components of a vehicle to original tolerances and specifications. Repairing involves straightening and stress relieving with or without the application of controlled heat. Damaged components may need to be removed using drilling, cutting and grinding procedures. Replacement components are then installed using welding, fastening and adhesive bonding techniques.

B-10.01 Repairs structural components

Essential Skills	Document Use, Thinking, Continuous Learning

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
B-10.01.01P	identify ***composition of structural components*** using ***methods***	***composition of structural components*** is identified using ***methods***
B-10.01.02P	fasten ***straightening equipment*** to the vehicle	***straightening equipment*** is fastened to the vehicle
B-10.01.03P	isolate damaged area	damaged area is isolated according to measurements
B-10.01.04P	apply corrective force to damaged areas	corrective force is applied to damaged areas to realign frame and structural components
B-10.01.05P	adjust repair plan	repair plan is adjusted by evaluating corrective forces and measurements while ensuring a ***safe work environment***
B-10.01.06P	use stress relief techniques while pulling	stress relief techniques are used while pulling to achieve OEM or industry repair specifications
B-10.01.07P	take three-dimensional measurements and test fit related components	three-dimensional measurements are taken to monitor repair and related components are test fitted

RANGE OF VARIABLES

composition of structural components includes: aluminum, magnesium, fibre-reinforced composite, HSS, UHSS

methods include: OEM specifications, magnetism, scratch testing, electronic mil gauge

straightening equipment includes: clamps, pullers, hooks, dedicated bench systems, chains

safe work environment includes: safety straps, monitoring forces, checking chains

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
B-10.01.01L	demonstrate knowledge of metals and their characteristics	define terminology associated with metallurgy
		identify types of metals and describe their characteristics
B-10.01.02L	demonstrate knowledge of metallurgic principles and their applications to control expansion, contraction and distortion	identify ***procedures associated with working metals*** and describe their applications
		describe the ***effects metal working has on metallurgic properties***
		describe the procedures to prevent or correct problems that occur when working metals
		identify hazards and describe safe work practices pertaining to working metals
		describe ***methods*** for identifying construction material
B-10.01.03L	demonstrate knowledge of structural components	define terminology associated with structural components
		identify structural components and describe their characteristics
B-10.01.04L	demonstrate knowledge of procedures and techniques used to repair structural components	identify ***damaged frame conditions***
		describe ***repair procedures***
		identify ***measuring techniques***
		identify ***measuring equipment*** and describe their applications and procedures for use
		describe the procedures to test fit components
		explain technician liability and responsibility for repair
B-10.01.05L	demonstrate knowledge of procedures and techniques used to adjust and align structural components	identify hazards and describe safe work practices pertaining to straightening, repairing and aligning structural components

	identify ***straightening equipment*** and describe their applications and procedures for use
	describe ***anchoring equipment*** and describe their applications and procedures for use

RANGE OF VARIABLES

procedures associated with working metals include: forming, shearing, punching, drilling, cutting, welding, heating, shrinking, stretching

effects metal working has on metallurgic properties include: stress, contraction, expansion, distortion, work hardening, shrinking, stretching

methods include: OEM specifications, magnetism, scratch testing, electronic mil gauge

damaged frame conditions include: sway, sag, mash, diamond, twist

repair procedures include: pulling, stress relieving (hammer on/hammer off dolly), applying controlled heat

measuring techniques include: cross, length, datum line, width

measuring equipment includes: tram gauge, centering gauge, 3-D measuring systems

straightening equipment includes: clamps, pullers, hooks, dedicated bench systems, chains

anchoring equipment includes: clamps, fixtures, jigs, chains, hooks, cables, straps

B-10.02 Removes structural components

Essential Skills	Document Use, Thinking, Continuous Learning

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
B-10.02.01P	identify areas for sectioning	areas for sectioning are identified according to OEM or industry repair specifications
B-10.02.02P	remove ***fasteners***	***fasteners*** are removed by using hand and power tools, and applying heat
B-10.02.03P	remove spot welds in pre-determined areas	spot welds in pre-determined areas are removed by drilling or grinding
B-10.02.04P	cut and remove components using ***cutting tools and equipment***	components are cut and removed using ***cutting tools and equipment***
B-10.02.05P	remove noise, vibration and harshness (NVH) materials and structural foams	NVH materials and structural foams are removed according to type and location

RANGE OF VARIABLES

fasteners include: self-piercing rivets (SPR), blind rivets, adhesive bonding, laser welds, one-time fasteners, bolts

cutting tools and equipment include: cut-off wheels, plasma cutters, saws (manual, air, electric), oxy-fuel

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
B-10.02.01L	demonstrate knowledge of procedures to remove structural components	describe the procedures used to section ***vehicle*** structural components
		identify the procedures to remove ***fasteners***
		identify ***techniques for removing welds***
		identify ***structural component removal procedures***
B-10.02.02L	demonstrate knowledge of ***cutting tools and equipment***, their applications and procedures for use	identify ***cutting tools and equipment*** used to cut components
		identify hazards and describe safe work practices pertaining to cutting
		identify cutting processes and describe their applications
		describe the procedures to set up and shut down plasma arc cutting equipment
		describe the procedures used to cut with plasma arc cutting equipment
		describe the procedures to maintain plasma arc cutting equipment
		describe the procedures to set up and shut down oxy-fuel equipment
		describe the procedures used to cut with oxy-fuel equipment
		describe the procedures to maintain oxy-fuel equipment

RANGE OF VARIABLES

vehicle includes: unibody, full-frame, space frame, monocoque

fasteners include: self-piercing rivets (SPR), blind rivets, adhesive bonding, laser welds, one-time fasteners, bolts

techniques for removing welds include: drilling, grinding, cutting

structural component removal procedures include: grinding, drilling, cutting, releasing of mechanical fasteners

cutting tools and equipment include: cut-off wheels, plasma cutters, saws (manual, air, electric), oxy-fuel

B-10.03 Installs structural components

Essential Skills	Document Use, Thinking, Continuous Learning

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
B-10.03.01P	prepare structural components	structural components are prepared according to OEM or industry repair procedures
B-10.03.02P	perform initial fastening of components	initial fastening of components is performed to verify alignment and fit using ***methods***
B-10.03.03P	take ongoing measurements and test fit related components	related components are test fitted and measurements are confirmed according to OEM or industry repair procedures
B-10.03.04P	perform final fastening of components	final fastening of components is performed using ***fastening methods***
B-10.03.05P	clean and dress ***repair areas***	***repair areas*** are cleaned and dressed according to job requirements and OEM or industry repair procedures
B-10.03.06P	install NVH materials and structural foams	NVH materials and structural foams are installed according to OEM or industry repair procedures
B-10.03.07P	inspect ***fastening methods***	***fastening methods*** are confirmed according to OEM or industry repair procedures

RANGE OF VARIABLES

methods include: tack welding, bolting, screwing, clamping, dedicated fixtures and jigs

fastening methods include: welding, bolting, using adhesive bonding, riveting, following OEM procedures

repair areas include: welded, bonded, riveted, rivet-bonding, resistance spot welding

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
B-10.03.01L	demonstrate knowledge of procedures to install structural components	describe the ***procedures used to prepare structural components for installation***
		describe the procedures and techniques used to protect electrical and electronic systems and components during installation
		identify ***measuring techniques***
		identify the procedures to test fit components to ensure structural alignment
		describe ***fastening methods*** used to install structural components

RANGE OF VARIABLES

procedures used to prepare structural components for installation include: cleaning, grinding, drilling holes for plug welds

measuring techniques include: cross, length, datum line, width

fastening methods include: welding, bolting, using adhesive bonding, riveting, following OEM procedures

TASK B-11 Removes, installs and repairs structural and laminated glass

TASK DESCRIPTOR

Auto body and collision technicians remove structural glass such as windshields and back glass in order to facilitate access to spot welds and repair areas on structural body panels, or for replacement of damaged glass. They also repair stone chips on laminated structural glass.

B-11.01 Removes structural glass

Essential Skills	Document Use, Working with Others, Continuous Learning

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
B-11.01.01P	remove trim, moulding, non-structural and electrical components	trim, moulding, non-structural and electrical components are removed to access bonding material
B-11.01.02P	release urethane seal	urethane seal is released using cutting tools or induction heaters to facilitate removal of structural glass without causing damage to surrounding body, glass or paint
B-11.01.03P	remove glass from opening	glass is removed from opening manually or by using ***lifting devices***

RANGE OF VARIABLES

lifting devices include: suction cups, ergonomic lift assists

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
B-11.01.01L	demonstrate knowledge of structural glass, its characteristics and importance to vehicle structure	define terminology associated with structural glass
		identify hazards and describe safe work practices pertaining to structural glass and removal tools
		explain the importance of structural glass to the vehicle structural integrity
		identify types of structural glass and describe their characteristics

		identify structural glass components and accessories and describe their purpose and applications
		identify structural glass electrical components and procedures
		describe the procedures used to determine if structural glass can be repaired or if replacement is necessary
B-11.01.02L	demonstrate knowledge of the procedures to remove structural glass	describe the procedures used to remove structural glass and its related components
		identify ***lifting devices*** used to remove glass

RANGE OF VARIABLES

lifting devices include: suction cups, ergonomic lift assists

B-11.02 Installs structural glass

Essential Skills	Document Use, Working with Others, Continuous Learning

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
B-11.02.01P	test fit glass in opening and check for defects in glass and ***mounting surfaces***	glass is test fitted in opening and ***mounting surfaces*** are checked for defects
B-11.02.02P	prepare ***mounting surfaces***	***mounting surfaces*** are prepared by trimming old urethane and cleaning
B-11.02.03P	prepare mating areas using ***primers***	mating areas are prepared according to OEM specifications and manufacturers' procedures using ***primers*** to promote adhesion and prevent corrosion
B-11.02.04P	apply recommended urethane to opening and replace spacer blocks	recommended urethane is applied to opening and spacer blocks are replaced to achieve required glass height
B-11.02.05P	set glass in opening manually or using ***lifting devices***, and verify uniformity of gaps	glass is set in opening manually or by using ***lifting devices***, and uniformity of gaps are verified

B-11.02.06P	secure glass in place to avoid movement until urethane is set	glass is secured in place to avoid movement until urethane is set according to OEM specifications and manufacturers' procedures
B-11.02.07P	perform leak test	leak test is performed according to manufacturers' procedures
B-11.02.08P	install electrical and non-structural components and trim	electrical and non-structural components and trim are installed
B-11.02.09P	calibrate electrical components	electrical components are calibrated according to OEM procedures
B-11.02.10P	complete post-repair documentation	post-repair documentation is completed according to job requirements

RANGE OF VARIABLES

mounting surfaces include: pinch welds, cowls, package trays
primers include: bonding, pinch weld, windshield, corrosion
lifting devices include: suction cups, ergonomic lift assists

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
B-11.02.01L	demonstrate knowledge of the procedures to install structural glass	identify tools and equipment used to install structural glass and describe their applications and procedures for use
		identify procedures to test fit glass
		identify materials used for structural glass replacement and describe their characteristics and procedures for use
		identify the ***types of leaks*** associated with structural glass and describe the procedures used to detect and repair them
		describe procedures to install structural glass
		identify ***fastening methods*** for structural glass and their associated components
		identify ***lifting devices*** used to install glass
		identify electrical components and their calibration requirements

RANGE OF VARIABLES

types of leaks include: wind, water
fastening methods include: mechanical, bonded
lifting devices include: suction cups, ergonomic lift assists

B-11.03 Repairs laminated glass

Essential Skills Reading, Document Use, Thinking

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
B-11.03.01P	inspect glass to determine repair process	glass is inspected to determine repair process according to jurisdictional regulations and OEM specifications
B-11.03.02P	clean glass to remove ***contaminants***	glass is cleaned to remove ***contaminants***
B-11.03.03P	check that glass is dry and at required temperature for resin flow	glass is checked for dryness and is at required temperature for resin flow according to manufacturers' procedures
B-11.03.04P	clean out chipped area of laminated glass	chipped area of laminated glass is cleaned out by drilling outer layer with rotary cutting tools and air pressure
B-11.03.05P	mount resin injection tool onto repair area	resin injection tool is mounted onto repair area
B-11.03.06P	inject resin into damaged area	resin is injected into damaged area with or without vacuum pressure according to manufacturers' specifications
B-11.03.07P	cure resin	resin is cured according to manufacturers' specifications
B-11.03.08P	remove excess resin	excess resin is removed with razor blade
B-11.03.09P	polish glass	glass is polished to remove scratches and minimize the appearance of resin

RANGE OF VARIABLES

contaminants include: water repellents, dirt, broken glass, bugs

KNOWLEDGE

	Learning Outcomes	Learning Objectives
B-11.03.01L	demonstrate knowledge of procedures to repair laminated glass	describe the procedures used to determine if laminated glass can be repaired or if replacement is necessary
		describe procedures used to repair laminated glass

MAJOR WORK ACTIVITY C

Repairs non-structural outer body panels and related components

TASK C-12 Removes, repairs and installs metal panels and components

TASK DESCRIPTOR

Non-structural outer body panels are cosmetic panels that contribute very little to the structural integrity of the vehicle and are generally mechanically affixed to the vehicle structure. Auto body and collision technicians are required to repair or replace damaged panels and components to pre-damaged condition. This task covers the removal, repair and installation of non-structural outer body panels and components made from metals such as aluminum and steel.

C-12.01 Prepares metal panels and components for repair

Essential Skills	Reading, Thinking, Digital Technology

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
C-12.01.01P	identify procedures for removal, repair and installation	procedures are identified by researching available OEM procedures
C-12.01.02P	clean metal ***panel*** with ***products and cleaners***	metal ***panel*** is cleaned with ***products and cleaners*** according to manufacturers' specifications to remove contamination
C-12.01.03P	inspect ***panel***	***panel*** is inspected visually and by touch to identify extent of ***damage***
C-12.01.04P	protect surrounding area and unrelated ***components*** from ***further damage***	surrounding area and unrelated ***components*** are protected from ***further damage***
C-12.01.05P	remove ***components*** attached or adjacent to ***panel*** to access damaged area	***components*** are removed using ***tools and equipment*** to access damaged area

RANGE OF VARIABLES

panels include: door skins, repair panels, doors, fenders, side panels, deck lid

products and cleaners include: soapy water, degreasers, solvents

damage includes: paint damage, metal damage, stretches, buckles, tears

components include: door handles, mirrors, body side mouldings, trims, emblems, brackets and door stays

further damage includes: sparks, grinding marks, overspray

tools and equipment include: clip tools, wrenches, hook tools, blades

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
C-12.01.01L	demonstrate knowledge of metal ***panels*** and ***components***, and their characteristics	define terminology associated with metal ***panels*** and ***components***
		identify types of metal ***panels***, their characteristics, application and handling procedures
		identify types of ***components***
		identify types of ***metals***, their properties, application and handling procedures
C-12.01.02L	demonstrate knowledge of procedures to prepare metal ***panel*** for repair	describe the procedures used to prepare metal ***panel*** for repair
		identify ***products and cleaners*** used to clean ***panel***
		identify procedures to identify extent of ***damage***
		identify types of ***tools and equipment*** used to remove ***components***

RANGE OF VARIABLES

panels include: door skins, repair panels, doors, fenders, side panels, deck lid

components include: door handles, mirrors, body side mouldings, trims, emblems, brackets and door stays

metals include: steel, aluminum alloys

products and cleaners include: soapy water, degreasers, solvents

damage includes: paint damage, metal damage, stretches, buckles, tears

tools and equipment include: clip tools, wrenches, hook tools, blades

C-12.02 Removes metal panels and components

Essential Skills	Working with Others, Thinking, Document Use

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
C-12.02.01P	identify ***fasteners***	***fasteners*** are identified to determine method of removal
C-12.02.02P	remove and label ***fasteners***	***fasteners*** are removed and labeled to identify original location
C-12.02.03P	disconnect electrical components	electrical components are disconnected
C-12.02.04P	protect surrounding area from incidental contact and damage during removal of metal ***panels*** and ***components***	surrounding area is protected from incidental contact and damage during removal of metal ***panels*** and ***components***
C-12.02.05P	select and use ***tools and equipment***	***tools and equipment*** are selected and used according to job requirements

RANGE OF VARIABLES

fasteners include: clips, bolts, adhesives, spot welds, rivets

panels include: door skins, repair panels, doors, fenders, side panels, deck lid

components include: door handles, mirrors, body side mouldings, trims, emblems, brackets and door stays

tools and equipment include: lifting equipment, hand tools

KNOWLEDGE

	Learning Outcomes	Learning Objectives
C-12.02.01L	demonstrate knowledge of procedures to remove metal ***panels*** and ***components***	describe the procedures used to remove metal ***panels*** and ***components***
		identify ***fasteners*** used to attach ***panels*** and ***components***
		identify procedures used to disconnect electrical systems, electronic systems and accessories
		identify ***tools and equipment*** used to remove large and heavy ***panels***

RANGE OF VARIABLES

panels include: door skins, repair panels, doors, fenders, side panels, deck lid

components include: door handles, mirrors, body side mouldings, trims, emblems, brackets and door stays

fasteners include: clips, bolts, adhesives, spot welds, rivets

tools and equipment include: lifting equipment, hand tools

C-12.03 Repairs metal panels and components

Essential Skills	Thinking, Continuous Learning, Document Use

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
C-12.03.01P	identify ***metal***	***metal*** is identified to determine ***repair procedure***
C-12.03.02P	obtain perimeter alignment	perimeter alignment is obtained using ***strategies*** and ***tools and equipment***
C-12.03.03P	remove ***existing coatings*** from damaged area	***existing coatings*** are removed from damaged area with grinders and sanders
C-12.03.04P	rough out damaged area	damaged area is roughed out using ***tools and equipment***
C-12.03.05P	return ***metal*** to shape	***metal*** is returned to shape within tolerances using ***methods***
C-12.03.06P	featheredge repaired area	repaired area is featheredged according to job requirements
C-12.03.07P	apply filler to repair area	filler is applied to repair area using ***repair tools*** according to application
C-12.03.08P	sand filler to contour	filler is sanded to contour by guide coating and block sanding using the cross hatch method
C-12.03.09P	identify surface ***imperfections***	***imperfections*** are identified visually and by touch
C-12.03.10P	determine ***corrective actions***	***corrective actions*** are determined according to ***imperfection***

RANGE OF VARIABLES

metal includes: aluminum, steel

repair procedures include: quarantining, using dedicated tools and materials for aluminum to avoid contamination from steel

strategies include: pulling, pushing, stress relieving

tools and equipment include: hammers, dollies, friction jacks, pry bars, stud welder, suction cups, glue pulling equipment

existing coatings include: paints, primers, undercoats, fillers

methods include: shrinking, jacking, hammer on and off dolly

repair tools include: spreaders, squeegees, fill boards

imperfections include: pin holes, sand scratches, low/high spots

corrective actions include: re-application, block sanding

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
C-12.03.01L	demonstrate knowledge of procedures to repair ***metal panels*** and ***components***	describe procedures used to repair ***metal panels*** and ***components***
		identify types of ***metals*** and describe their associated ***repair procedures***
		identify ***vehicle construction considerations*** and requirements for performing ***metal*** work on ***panels***
		describe the procedures used to shrink ***metal***
		describe the ***procedures used to reshape metal***
		identify hazards and describe safe work practices pertaining to repairing ***metal panels***
		identify ***tools and equipment*** relating to ***metal panels*** and describe their applications
		describe ***metallurgic principles***
		describe the procedures and techniques used to protect electrical and electronic systems and components during repair
		identify types of ***repair materials***
		describe procedures used to apply ***repair materials***
C-12.03.02L	demonstrate knowledge of procedures used to align and adjust ***metal panels***	identify the alignment sequence and describe its importance in the repair of ***metal panels*** and ***components***
		describe the procedures used to rough out and align damaged ***metal panels***

C-12.03.03L	demonstrate knowledge of procedures to prepare ***panels*** for refinishing	describe the procedures used to prepare ***panels*** for refinishing
		identify types of ***imperfections***
		identify the ***corrective action*** to remedy various surface ***imperfections***

RANGE OF VARIABLES

metal includes: aluminum, steel

panels include: door skins, repair panels, doors, fenders, side panels, deck lid

components include: door handles, mirrors, body side mouldings, trims, emblems, brackets and door stays

repair procedures include: quarantining, using dedicated tools and materials for aluminum to avoid contamination from steel

vehicle construction considerations include: metal types, structures

procedures used to reshape metal include: heating, cold repair, pushing, pulling

tools and equipment include: hammers, dollies, friction jacks, pry bars, stud welder, suction cups, glue pulling equipment

metallurgic principles include: tempering, annealing, shrinking, stretching, work hardening

repair materials include: fibre reinforced filler, body fillers, advanced repair compounds, panel bond, aluminum filler

C-12.04 Installs metal panels and components

Essential Skills	Working with Others, Thinking, Document Use

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
C-12.04.01P	protect surrounding area from incidental contact and damage during installation	surrounding area is protected from incidental contact and damage during installation
C-12.04.02P	select and use ***lifting equipment***	***lifting equipment*** is selected and used according to job requirements
C-12.04.03P	reconnect electrical components	electrical components are reconnected
C-12.04.04P	align ***panel***	***panel*** is aligned visually and by touch to achieve uniform spacing and positioning relative to adjacent ***panels*** using gap gauges according to OEM specifications

C-12.04.05P	secure ***panel***	***panel*** is secured using ***fasteners*** at their original location according to OEM specifications if available
C-12.04.06P	verify fit and operation	fit and operation are verified

RANGE OF VARIABLES

lifting equipment includes: hoists, jack stands, floor jacks, door jacks
panels include: door skins, repair panels, doors, fenders, side panels, deck lid
fasteners include: clips, bolts, adhesives, spot welds, rivets, GMAW welds

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
C-12.04.01L	demonstrate knowledge of procedures to install metal ***panels*** and ***components***	identify types of ***lifting equipment*** used to reposition large or heavy ***panels***
		identify procedures used to connect electrical systems, electronic systems and accessories
		identify types of ***fasteners*** and describe their applications
C-12.04.02L	demonstrate knowledge of procedures used to align and adjust metal ***panels***	identify the alignment sequence and describe its importance in the installation
		describe the procedures used to adjust and align metal ***panels*** and ***components***

RANGE OF VARIABLES

lifting equipment includes: hoists, jack stands, floor jacks, door jacks
panels include: door skins, repair panels, doors, fenders, side panels, deck lid
fasteners include: clips, bolts, adhesives, spot welds, rivets, GMAW welds
components include: door handles, regulators, latches, mirrors, body side mouldings, trims, emblems, brackets and door stays

TASK C-13 Removes, repairs and installs plastic and composite panels and components

TASK DESCRIPTOR

This task covers the removal, repair and installation of non-structural outer body panels and components made from plastics and composites. Plastic and composite materials are popular because they are often lighter, more durable and safer for vehicle occupants and pedestrians than traditional base materials.

C-13.01 Prepares plastic and composite panels and components for repair

Essential Skills	Reading, Working with Others, Document Use

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
C-13.01.01P	clean ***plastic and composite panel***	***plastic and composite panel*** is cleaned according to manufacturers' specifications to remove contaminants using ***products and cleaners***
C-13.01.02P	inspect panel	panel is inspected visually and by touch to identify the extent of ***damage***
C-13.01.03P	protect surrounding area and unrelated components from ***damage***	surrounding area and unrelated components are protected from ***damage***
C-13.01.04P	remove ***plastic and composite components*** attached or adjacent to panel to access damaged area	***plastic and composite components*** are removed using ***tools and equipment*** to access damaged area

RANGE OF VARIABLES

plastic and composite panels include: doors, hoods, fenders, deck lids

products and cleaners include: soap and water, alcohol-based cleaners, anti-static degreasers

damage (to panels) includes: paint damage, damage to base material

damage (to surrounding areas) includes: grinding marks, overspray

plastic and composite components include: door handles, mirrors, body side mouldings, trims, emblems, brackets, door stays, radiator supports, bumpers

tools and equipment include: clip tools, wrenches, hook tools, blades

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
C-13.01.01L	demonstrate knowledge of ***plastic and composite panels*** and ***components***, and their characteristics	define terminology associated with ***plastic and composite panels*** and ***components***
		identify types of ***plastics and composites***, their characteristics, application and handling procedures
		identify types of ***plastic and composite panels***
		identify types of ***plastic and composite components***
C-13.01.02L	demonstrate knowledge of procedures to prepare ***plastic and composite panels*** and ***components*** for repair	describe the procedures used to prepare ***plastic and composite panels*** and ***components*** for repair
		identify ***products and cleaners*** used to clean panels
		identify procedures to identify extent of ***damage***
		identify types of ***tools and equipment*** used to remove ***components***

RANGE OF VARIABLES

plastic and composite panels include: doors, hoods, fenders, deck lids
plastic and composite components include: door handles, mirrors, body side mouldings, trims, emblems, brackets, door stays, radiator supports, bumpers
plastics and composites include: poly-olefins, fibre-reinforced polymers, urethane
products and cleaners include: soap and water, alcohol-based cleaners, anti-static degreasers
damage (to panels) includes: paint damage, damage to base material
damage (to surrounding areas) includes: grinding marks, overspray
tools and equipment include: clip tools, wrenches, hook tools, blades

C-13.02 Removes plastic and composite panels and components

Essential Skills	Document Use, Working with Others, Thinking

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
C-13.02.01P	identify ***fasteners***	***fasteners*** are identified to determine method of removal
C-13.02.02P	disconnect electrical components	electrical components are disconnected
C-13.02.03P	select and use ***tools and equipment***	***tools and equipment*** are selected and used according to job requirements
C-13.02.04P	protect surrounding area from incidental contact and damage during removal	surrounding area is protected from incidental contact and damage during removal
C-13.02.05P	remove and label ***fasteners***	***fasteners*** are removed and labelled to identify original location

RANGE OF VARIABLES

fasteners include: clips, bolts, adhesives

tools and equipment include: lifting equipment, hand tools, power tools

KNOWLEDGE

	Learning Outcomes	Learning Objectives
C-13.02.01L	demonstrate knowledge of procedures to remove ***plastic and composite panels*** and ***components***	describe the procedures used to remove ***plastic and composite panels*** and ***components***
		identify ***fasteners*** used to attach ***plastic and composite panels*** and ***components***
		identify procedures used to disconnect electrical systems, electronic systems and accessories
		identify ***tools and equipment*** used to remove ***plastic and composite panels*** and ***components***

RANGE OF VARIABLES

plastic and composite panels include: doors, hoods, fenders, deck lids

plastic and composite components include: door handles, mirrors, body side mouldings, trims, emblems, brackets, door stays, radiator supports, bumpers

fasteners include: clips, bolts, adhesives

tools and equipment include: lifting equipment, hand tools, power tools

C-13.03 Repairs plastic and composite panels and components

Essential Skills Document Use, Thinking, Reading

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
C-13.03.01P	identify ***material***	***material*** is identified to determine if it can be repaired or should be replaced according to OEM specifications if available
C-13.03.02P	obtain perimeter alignment	perimeter alignment is obtained using ***strategies*** and ***tools and equipment*** to return material to its pre-damage condition
C-13.03.03P	remove ***coatings*** from damaged area	***coatings*** are removed from damaged area using grinders and sanders
C-13.03.04P	remove ***imperfections*** from damaged area	***imperfections*** are removed according to job requirements
C-13.03.05P	perform repair	repair is performed by welding, bonding and heating according to manufacturers' and OEM specifications
C-13.03.06P	featheredge repaired area	repaired area is featheredged according to job requirements, manufacturers' and OEM specifications to achieve a smooth transition from repaired area to existing finish
C-13.03.07P	apply adhesion promoters	adhesion promoters are applied according to manufacturers' specifications
C-13.03.08P	apply repair material to repair area	repair material is applied to repair area using ***repair tools*** according to job requirements
C-13.03.09P	sand repair material	repair material is block sanded to achieve its original contour

C-13.03.10P	identify surface ***imperfections***	***imperfections*** are identified visually and by touch
C-13.03.11P	determine ***corrective actions***	***corrective actions*** are determined according to ***imperfection***

RANGE OF VARIABLES

materials include: poly-olefins, fibre-reinforced polymers, urethane, carbon fibres
strategies include: heating, reshaping
tools and equipment include: ovens, heat lamps, heat guns, plastic welders
coatings include: paints, primers
imperfections include: cracks, deep scratches, low/high spots, dents, deformations
repair tools include: spreaders, squeegees, mixing board, static mixer
corrective actions include: re-application, sanding

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
C-13.03.01L	demonstrate knowledge of procedures to repair ***plastic and composite panels*** and ***components***	describe procedures used to repair ***plastic and composite panels*** and ***components***
		identify the alignment sequence and describe its importance in the repair of ***plastic and composite panels*** and ***components***
		describe the procedures used to rough out and align damaged ***plastic and composite panels***
		describe ISO code used for identifying types of plastic
		identify types of ***material*** and describe their associated repair procedures
		identify ***products and materials*** used in repair of ***plastic and composite panels*** and ***components***
		identify hazards and describe safe work practices pertaining to repair of ***plastic and composite panels*** and ***components***
C-13.03.02L	demonstrate knowledge of procedures to prepare panels for refinishing	describe the procedures used to prepare panels for refinishing
		identify types of ***imperfections***
		identify the ***corrective action*** to remedy surface ***imperfections***

RANGE OF VARIABLES

plastic and composite panels include: doors, hoods, fenders, deck lids

plastic and composite components include: door handles, mirrors, body side mouldings, trims, emblems, brackets, door stays, radiator supports, bumpers

materials include: poly-olefins, fibre-reinforced polymers, urethane, carbon fibres

products and materials include: adhesives, reinforcement mesh, back pad, plastic adhesion promoters

imperfections include: cracks, deep scratches, low/high spots, dents, deformations

corrective actions include: re-application, sanding

C-13.04 Installs plastic and composite panels and components

Essential Skills Working with Others, Thinking, Document Use

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
C-13.04.01P	select and use ***lifting equipment***	***lifting equipment*** is selected and used according to job requirements
C-13.04.02P	protect surrounding area from incidental contact and damage during installation	surrounding area is protected from incidental contact and damage during installation
C-13.04.03P	connect electrical components	electrical components are connected
C-13.04.04P	align panel	panel is aligned visually and by touch to achieve uniform spacing and positioning relative to adjacent panels using gap gauges according to OEM specifications
C-13.04.05P	secure panel	panel is secured using ***fasteners*** at their original location and according to OEM specifications
C-13.04.06P	verify fit and operation	fit and operation are verified using ***methods***

RANGE OF VARIABLES

lifting equipment includes: hoists, floor jacks, door jacks

fasteners include: clips, bolts, adhesives, rivets

methods include: visual, mechanical, digital calibration

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
C-13.04.01L	demonstrate knowledge of procedures to install ***plastic and composite panels*** and ***components***	identify types of ***lifting equipment*** used to reposition large or heavy panels
		identify procedures used to connect electrical systems, electronic systems and accessories
		identify the alignment sequence and describe its importance in the installation
		identify types of ***fasteners*** and describe their applications

RANGE OF VARIABLES

plastic and composite panels include: doors, hoods, fenders, deck lids

plastic and composite components include: door handles, mirrors, body side mouldings, trims, emblems, brackets, door stays, radiator supports, bumpers

lifting equipment includes: hoists, floor jacks, door jacks

fasteners include: clips, bolts, adhesives, rivets

TASK C-14 Removes and installs non-structural glass

TASK DESCRIPTOR

Non-structural glass is usually located in doors and side panels. It may be movable or fixed. Cracked, chipped or broken non-structural glass usually needs to be replaced. In some applications, glass needs to be removed and reinstalled to facilitate repair of surrounding components.

C-14.01 Removes non-structural glass

Essential Skills	Document Use, Thinking, Working with Others

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
C-14.01.01P	remove ***trim***	***trim*** is removed to expose ***fasteners***
C-14.01.02P	position glass	glass is positioned to access ***fasteners***
C-14.01.03P	identify and remove ***fasteners***	***fasteners*** are identified and removed

C-14.01.04P	extract glass from vehicle	glass is extracted from vehicle using ***glass removal tools***
C-14.01.05P	label, store or dispose of glass	glass is labeled, stored or disposed of according to job requirements
C-14.01.06P	remove broken glass	broken glass is removed by vacuuming and cleaning ***areas***
C-14.01.07P	inspect vehicle for damage	vehicle is inspected for damage

RANGE OF VARIABLES

trim includes: interior panels, reveal mouldings

fasteners include: pressure clips, mechanical clips, rivets, bolts, urethane, butyl

glass removal tools include: suction cups, cutting tools, heating tools, hand tools, power tools

areas include: seats, seat belt retractors, window regulators, run channels, heating and cooling vents, door panels

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
C-14.01.01L	demonstrate knowledge of ***non-structural glass*** and ***hardware components***, and their characteristics	identify types of ***non-structural glass*** and describe their characteristics
		identify types of ***hardware components*** and describe their applications
		define terminology associated with ***non-structural glass***
		identify types of ***fasteners*** used with ***non-structural glass***
		identify hazards and safe work practices pertaining to ***non-structural glass***
C-14.01.02L	demonstrate knowledge of procedures to remove ***non-structural glass***, and its associated ***hardware components*** and attachments	describe procedures used to remove ***non-structural glass***
		describe procedures used to remove broken glass

RANGE OF VARIABLES

non-structural glass includes: door glass, sun roofs, quarter glass, vent glass, T-tops

hardware components include: regulators, window guides, channel guides, latches

fasteners include: pressure clips, mechanical clips, rivets, bolts, urethane, butyl

C-14.02 Installs non-structural glass

Essential Skills Document Use, Thinking, Working with Others

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
C-14.02.01P	select and use tools, equipment, hardware and ***fasteners***	tools, equipment, hardware and ***fasteners*** are selected and used according to manufacturers' specifications
C-14.02.02P	inspect glass for ***defects***	glass is inspected for ***defects***
C-14.02.03P	insert glass in opening and attach with hardware and ***fasteners***	glass is inserted and attached with hardware and ***fasteners***
C-14.02.04P	verify fit and operation of glass	fit and operation of glass is verified using ***tests***
C-14.02.05P	install and reprogram ***components***	***components*** are installed and reprogrammed according to OEM specifications and procedures

RANGE OF VARIABLES

fasteners include: pressure clips, mechanical clips, rivets, bolts, urethane, butyl
defects include: scratches, chipped edges, pitting, warps
tests include: air, water, operational
components include: trim, modules, vapour barriers, wiring, latches, regulators

KNOWLEDGE

	Learning Outcomes	Learning Objectives
C-14.02.01L	demonstrate knowledge of procedures to install non-structural glass, and its associated hardware and attachments	identify types of tools and equipment used to install non-structural glass and its associated hardware and attachments
		describe the procedures for inspecting non-structural glass and its associated hardware
		identify types of ***defects*** in non-structural glass
		describe the procedures used to install non-structural glass and its associated hardware

	describe the procedures used to install and reprogram ***components***
	identify ***glass classifications and grades*** and describe their characteristics and applications

RANGE OF VARIABLES

defects include: scratches, chipped edges, pitting, warps
components include: trim, modules, vapour barriers, wiring, latches, regulators
glass classifications and grades include: AS1, AS2, AS3, tints

MAJOR WORK ACTIVITY D

Repairs mechanical, electrical and alternative-fuel system components

TASK D-15 Deactivates and reactivates alternative-fuel systems

TASK DESCRIPTOR

The deactivation and reactivation of alternative-fuel system power sources is critical for the safety of auto body and collision technicians and protection of the vehicle. As well, safety must be considered when handling and storing these units and components.

D-15.01 Deactivates alternative-fuel systems

Essential Skills	Document Use, Numeracy, Thinking

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
D-15.01.01P	identify type of ***alternative-fuel system***	***alternative-fuel system*** is identified according to OEM and manufacturers' specifications
D-15.01.02P	inspect low-voltage and high-voltage batteries	low-voltage and high-voltage batteries are inspected for damage and leaks according to OEM and manufacturers' specifications
D-15.01.03P	test electrolyte for pH level	electrolyte is tested and neutralized according to OEM and manufacturers' specifications
D-15.01.04P	ensure zero energy	zero energy is achieved by using ***methods***
D-15.01.05P	disconnect low-voltage battery for 12V power systems	low-voltage battery for 12V power systems is disconnected according to OEM procedures
D-15.01.06P	disable high-voltage system	high-voltage system is disabled by using ***disabling methods*** according to OEM procedures

D-15.01.07P	remove battery pack	battery pack is removed when performing repairs in proximity according to OEM procedures
D-15.01.08P	close alternative-fuel supply valves	alternative-fuel supply valves are closed according to OEM specifications
D-15.01.09P	remove alternative-fuel cells	alternative-fuel cells are removed when performing repairs in proximity according to manufacturers' procedures

RANGE OF VARIABLES

alternative-fuel systems include: propane, compressed natural gas (CNG), hybrid gas-electric, hybrid diesel-electric, full electric

methods include: turning ignition off, removing keys and separating from vehicle, removing the ignition circuit relay or high-voltage fuse, placing vehicle on wheel dollies, testing with DVOM

disabling methods include: removing service plug or locking tab, deactivating the master shut-off switch, disabling 12V power system

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
D-15.01.01L	demonstrate knowledge of ***alternative-fuel systems***	identify types of ***alternative-fuel systems***
		define terminology associated with ***alternative-fuel systems***
D-15.01.02L	demonstrate knowledge of procedures to deactivate ***alternative-fuel systems***	identify the dangers associated with the deactivation of electric and fuel/electric hybrids
		identify the dangers associated with the deactivation of compressed fuels
		identify the dangers associated with battery electrolytes
		explain capacitor discharge times
		describe the procedures used to remove batteries
		identify the considerations relating to the removal and replacement of battery packs in hybrid/alternative-fuel vehicles
		describe ***handling and storage considerations*** and procedures of low-voltage and high-voltage batteries
		explain residual power after deactivation of power supply
		describe colour coding of high current wiring

RANGE OF VARIABLES

alternative-fuel systems include: propane, compressed natural gas (CNG), hybrid gas-electric, hybrid diesel-electric, full electric

handling and storage considerations include: cool, dry, well-ventilated location and away from sources of ignition, use of PPE

D-15.02 Reactivates alternative-fuel systems

Essential Skills	Document Use, Numeracy, Thinking

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
D-15.02.01P	install battery pack	battery pack is installed when repairs have been completed
D-15.02.02P	enable high-voltage system	high-voltage system is enabled by using ***reactivation methods*** according to OEM specifications
D-15.02.03P	open alternative-fuel supply valves	alternative-fuel supply valves are opened according to OEM specifications
D-15.02.04P	connect low-voltage battery for 12V power systems	low-voltage battery for 12V power systems is connected according to OEM procedures
D-15.02.05P	charge low-voltage battery	low-voltage battery is charged according to OEM procedures

RANGE OF VARIABLES

reactivation methods include: re-installing service plug or locking tab, reactivating the master shut-off switch, returning the key to the vehicle, re-installing the ignition circuit relay or high-voltage fuse, removing vehicle from wheel dollies, opening the alternative-fuel supply valves

KNOWLEDGE

	Learning Outcomes	Learning Objectives
D-15.02.01L	demonstrate knowledge of procedures to reactivate ***alternative-fuel systems***	identify the dangers associated with the reactivation of electric and fuel/electric hybrids
		identify types of ***PPE and safety equipment*** used to work on ***alternative-fuel systems***
		describe the procedures used to install batteries

	identify the considerations relating to the installation of battery packs in hybrid/alternative-fuel vehicles
	describe ***handling and storage considerations*** and procedures of low-voltage and high-voltage batteries
	describe colour coding of high current wiring

RANGE OF VARIABLES

alternative-fuel systems include: propane, CNG, hybrid gas-electric, hybrid diesel-electric, full electric

PPE and safety equipment includes: safety goggles, insulated gloves, face shield, insulated hand tools, insulated footwear, pylons, safety hook

handling and storage considerations include: cool, dry, well-ventilated location and away from sources of ignition, use of PPE

TASK D-16 Removes and installs mechanical components

TASK DESCRIPTOR

Auto body and collision technicians require the knowledge of the operation and purpose of mechanical components to fully remove, and install them safely and to OEM specifications and procedures.

D-16.01 Removes mechanical components

Essential Skills	Document Use, Thinking, Continuous Learning

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
D-16.01.01P	select and use ***specialized tools and equipment***	***specialized tools and equipment*** are selected and used according to job requirements and manufacturers' specifications
D-16.01.02P	determine removal procedure of ***mechanical components***	removal procedure of ***mechanical components*** are determined according to extent of damage
D-16.01.03P	identify type of ***refrigerant*** and coolant	type of ***refrigerant*** and coolant is identified

D-16.01.04P	recover air conditioning (A/C) ***refrigerant***	A/C ***refrigerant*** is recovered according to jurisdictional and environmental regulations
D-16.01.05P	drain coolant system	coolant system is drained according to jurisdictional and environmental regulations
D-16.01.06P	disconnect lines and hoses for ***mechanical systems***	***mechanical system*** lines and hoses are disconnected according to OEM procedures
D-16.01.07P	disconnect electrical connections from ***mechanical systems***	electrical connections are disconnected from ***mechanical systems*** according to OEM procedures
D-16.01.08P	remove ***mechanical fasteners*** from components	***mechanical fasteners*** from components are removed using hand and power tools
D-16.01.09P	remove ***mechanical systems*** and ***components***	***mechanical systems*** and ***components*** are removed according to OEM procedures and specifications

RANGE OF VARIABLES

specialized tools and equipment include: A/C recovering/recycling machine, wheel alignment machine, fuel line and A/C line release tools, suspension spring compressors, pneumatic tools

mechanical components include: A/C condensers, radiators, fan cooling assemblies, control arms, leaf springs, drive shafts, exhaust pipes, ball joints, gas tanks, fuel lines, coil springs, struts

refrigerants include: R134a, 1234yf

mechanical systems include: heating, ventilation and air conditioning (HVAC), cooling, power steering, braking, sensors, fuel, suspension

mechanical fasteners include: bolts, rivets, retaining clips, clamps, screws

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
D-16.01.01L	demonstrate knowledge of ***mechanical systems*** and ***components***	define terminology associated with ***mechanical systems*** and ***components***
		identify types of ***mechanical systems*** and ***components***
		identify types of ***mechanical fasteners*** used with components
D-16.01.02L	demonstrate knowledge of procedures to remove ***mechanical systems*** and ***components***	describe the procedures used to inspect ***mechanical systems*** and ***components*** for collision-related damage
		describe the procedures used to identify damaged ***mechanical systems*** and ***components***
		describe the procedures used to remove ***mechanical systems*** and ***components***

	identify types of ***specialized tools and equipment*** used
	identify ***hazards*** and describe safe work practices pertaining to ***mechanical systems*** and ***components***

RANGE OF VARIABLES

mechanical systems include: heating, ventilation and air conditioning (HVAC), cooling, power steering, braking, sensors, fuel, suspension

mechanical components include: A/C condensers, radiators, fan cooling assemblies, control arms, leaf springs, drive shafts, exhaust pipes, ball joints, gas tanks, fuel lines, coil springs, struts

mechanical fasteners include: bolts, rivets, retaining clips, clamps, screws

specialized tools and equipment include: A/C recovering/recycling machine, wheel alignment machine, fuel line and A/C line release tools, suspension spring compressors, pneumatic tools

hazards include: explosive fumes, vapours, spills, forces (tension, weight)

D-16.02 Installs mechanical components

Essential Skills Document Use, Thinking, Numeracy

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
D-16.02.01P	determine installation procedure	installation procedure is determined according to OEM specifications
D-16.02.02P	lubricate ***mechanical components***	***mechanical components*** are lubricated if required according to OEM specifications
D-16.02.03P	preassemble ***mechanical components***	***mechanical components*** are preassembled according to application and efficiency requirements
D-16.02.04P	torque ***mechanical components*** to specified tolerances	***mechanical components*** are torqued to specified tolerances according to OEM specifications
D-16.02.05P	connect hoses and lines, and fasten clamps to ***mechanical components***	hoses and lines are connected, and clamps are fastened to ***mechanical components*** according to OEM specifications
D-16.02.06P	refill systems with fluids	systems are refilled with fluids according to OEM specifications and procedures to ensure proper fluid levels and avoid air locks

D-16.02.07P	connect electrical connections to ***mechanical systems*** and reprogram	electrical connections are connected to ***mechanical systems*** and reprogrammed according to OEM procedures
D-16.02.08P	recharge A/C system	A/C system is recharged using A/C recovering/recycling machine according to manufacturers' procedures, OEM specifications and jurisdictional regulations
D-16.02.09P	verify ***mechanical systems*** operation	***mechanical systems*** are operational

RANGE OF VARIABLES

mechanical components include: A/C condensers, radiators, fan cooling assemblies, control arms, leaf springs, drive shafts, exhaust pipes, ball joints, gas tanks, fuel lines

mechanical systems include: HVAC, cooling, power steering, braking, sensors, suspension

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
D-16.02.01L	demonstrate knowledge of procedures to install ***mechanical systems*** and ***components***	describe the procedures used to install ***mechanical systems*** and ***components***
		identify regulations and documentation relating to installing ***mechanical systems*** and ***components***
		identify hazards and describe safe work practices pertaining to installing ***mechanical systems*** and ***components***
		describe procedures and ***considerations used when installing fasteners***
		define terminology associated with the alignment process
		identify the alignment process and describe its importance in the repair of steering and suspension system components
		describe the procedures used to perform operational check of ***mechanical systems*** and ***components***

RANGE OF VARIABLES

mechanical systems include: HVAC, cooling, power steering, braking, sensors, suspension

mechanical components include: A/C condensers, radiators, fan cooling assemblies, control arms, leaf springs, drive shafts, exhaust pipes, ball joints, gas tanks, fuel lines

considerations used when installing fasteners include: identifying one-time-use fasteners, identifying the requirement for anti-seize and thread-locker materials, torque specifications

TASK D-17 Removes, repairs and installs electrical and electronic components

TASK DESCRIPTOR

Auto body and collision technicians require the knowledge of the operation and purpose of electrical and electronic components to fully remove, repair and replace them safely and to OEM and manufacturers' specifications.

D-17.01 Removes electrical components

Essential Skills	Document Use, Thinking, Reading

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
D-17.01.01P	disconnect and isolate 12V battery	12V battery is disconnected and isolated, and time is allowed for residual charge to dissipate according to OEM procedures
D-17.01.02P	disconnect ***electrical components***	***electrical components*** are disconnected according to OEM and manufacturers' procedures and specifications
D-17.01.03P	remove ***electrical components***	***electrical components*** are removed by releasing ***fasteners***
D-17.01.04P	dispose of damaged ***electrical components***	damaged ***electrical components*** are disposed of according to jurisdictional and environmental regulations

RANGE OF VARIABLES

electrical components include: fuses and fuse boxes, relays, fan motors, power accessories, batteries
fasteners include: clips, bolts, nuts

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
D-17.01.01L	demonstrate knowledge of electrical theory and its applications	explain basic electrical theory
		define ***terminology*** associated with ***electrical*** and ***electronic components***
		identify hazards and describe safe work practices pertaining to ***electrical*** and ***electronic components***
		identify basic ***electrical*** and ***electronic components*** and describe their applications and operation
D-17.01.02L	demonstrate knowledge of electrical schematics, their applications and interpretation	identify electrical schematics and describe their purpose and applications
		describe the procedures used to interpret electrical schematics in the repair of ***electrical*** and ***electronic components***
		identify DTCs
D-17.01.03L	demonstrate knowledge of procedures to remove 12V batteries	identify hazards and describe safe work practices pertaining to 12V batteries
		describe the procedures used to remove batteries
D-17.01.04L	demonstrate knowledge of procedures to remove ***electrical components***	describe the procedures used to disconnect and remove ***electrical components***
		interpret jurisdictional and environmental regulations pertaining to the disposal of damaged ***electrical components***

RANGE OF VARIABLES

terminology includes: resistors, switches, circuits, path, input

electrical components include: fuses and fuse boxes, relays, fan motors, power accessories, batteries

electronic components include: sensors, modules, computers, entertainment systems, on-board cameras

D-17.02 Repairs damaged wires and protective coverings

Essential Skills Document Use, Thinking, Reading

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
D-17.02.01P	remove components and protective coverings	components and protective coverings are removed to access damaged wiring connectors according to OEM and manufacturers' procedures
D-17.02.02P	determine necessary repairs	repairs are determined according to visual inspection, result of diagnostic testing, and OEM and manufacturers' specifications
D-17.02.03P	perform repairs using ***methods***	repairs are performed using ***methods*** according to OEM and manufacturers' specifications
D-17.02.04P	identify and remove corrosion from connections and apply ***corrosion protection***	corrosion from connections is identified and removed and ***corrosion protection*** is applied according to OEM and manufacturers' specifications
D-17.02.05P	identify ***areas requiring protection***	***areas requiring protection*** are identified
D-17.02.06P	verify operation of electrical and related components	electrical and related components are operational
D-17.02.07P	complete repair	repair is completed by routing wires in original locations

RANGE OF VARIABLES

methods include: soldering, crimping, shrink tubing, reattaching connectors

corrosion protection includes: dielectric grease, shrink tubing, electrical tape, weather-pack connections (rubber seals)

areas requiring protection include: grounding, connectors, splices

KNOWLEDGE

	Learning Outcomes	Learning Objectives
D-17.02.01L	demonstrate knowledge of procedures to determine damage to electrical and electronic systems and components	identify ***testing equipment*** used to test electrical and electronic circuits and components and describe their applications and procedures for use
		describe the procedures used to test electrical and electronic circuits and components

D-17.02.02L	demonstrate knowledge of procedures for diagnosing electrical and electronic systems and components	describe the procedures used to diagnose electrical or electronic systems and their associated components
		describe the procedures used to identify signs of corrosion
		identify DTCs
D-17.02.03L	demonstrate knowledge of procedures to repair damaged wires and ***protective coverings***	describe the ***removal procedures*** for component and ***protective coverings***
		identify types of wiring and ***protective coverings***
		identify considerations when handling wiring and components
		identify types of ***repair tools***
		identify types of ***corrosion protection***
		describe the procedures used to restore corrosion protection to electrical components
		identify types of ***connectors***
		describe ***methods*** used to repair damaged wires and protective coverings
		describe procedures used to verify operation of electrical and related components
		describe the procedures used to protect electrical and electronic systems during repairs
		describe electrical and electronic damage associated with collisions
D-17.02.04L	demonstrate knowledge of types of ***corrosion protection*** for electrical components, their characteristics and applications	describe the procedures used to inspect for corrosion to electrical component related damage
		identify types of ***corrosion protection*** for electrical components and describe their characteristics and applications
		identify hazards and describe safe work practices pertaining to corrosion and ***corrosion protection*** for electrical components
		identify environmental and atmospheric conditions that influence the rate of corrosion to electrical components

RANGE OF VARIABLES

testing equipment includes: DVOM, test lights, diagnostic scanners

protective coverings include: insulated plastic coatings, wire looms, shrink tubing

removal procedures include: cutting, dismantling, disconnecting

repair tools include: soldering equipment, wire strippers, crimpers, side cutters, terminal release tools, heat guns

corrosion protection includes: dielectric grease, shrink tubing, electrical tape, weather-pack connections (rubber seals)

connectors include: locking tabs, screw-type fastening blocks, locking pins, loom connectors, spade-type connectors

methods include: soldering, crimping, shrink tubing, reattaching connectors

D-17.03 Installs electrical components

Essential Skills	Document Use, Thinking, Reading

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
D-17.03.01P	preassemble ***electrical components*** prior to final installation	***electrical components*** are preassembled prior to final installation according to application
D-17.03.02P	install fasteners	fasteners are installed according to OEM specifications to secure ***electrical components*** in place
D-17.03.03P	connect ***electrical components***	***electrical components*** are connected according to OEM and manufacturers' procedures and specifications
D-17.03.04P	connect battery and check operation of ***electrical components***	battery is connected and operation of ***electrical components*** is checked
D-17.03.05P	scan vehicle for codes	vehicle is scanned for active related codes and codes are cleared or reprogrammed if required

RANGE OF VARIABLES

electrical components include: fuses and fuse boxes, relays, sensors, fan motors, entertainment systems, power accessories, computers

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
D-17.03.01L	demonstrate knowledge of procedures to install ***electrical components***	describe procedures used to install ***electrical components***
		identify clips and fasteners used in the installation of ***electrical components***
		describe procedures used to connect ***electrical components***
		describe procedures used to connect 12V battery
		describe procedures used to verify operation of ***electrical components***

RANGE OF VARIABLES

electrical components include: fuses and fuse boxes, relays, sensors, fan motors, entertainment systems, power accessories, computers

D-17.04 Services advanced electronic components

Essential Skills	Document Use, Digital Technology, Continuous Learning

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
D-17.04.01P	identify type of ***advanced electronic component***	***advanced electronic component*** is identified according to visual inspection
D-17.04.02P	perform pre-scan of vehicle	pre-scan of vehicle is performed to identify DTCs and system operation
D-17.04.03P	repair or replace damaged component	damaged component is repaired or replaced according to OEM procedures and specifications
D-17.04.04P	perform or arrange recalibration of system	recalibration of system is performed or arranged according to OEM procedures and specifications
D-17.04.05P	perform road test	road test is performed to verify operation of ***advanced electronic components***
D-17.04.06P	perform post-scan	post-scan is performed to verify operation of ***advanced electronic components*** and to ensure no DTCs relating to system are present

RANGE OF VARIABLES

advanced electronic components include: lane departure, adaptive cruise control, adaptive and auto-levelling headlights, traction control, rain sensing, auto-dimming mirrors, blind-spot monitoring, lane-keep assist, driver attention systems, accident avoidance systems, back-up cameras

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
D-17.04.01L	demonstrate knowledge of procedures to service ***advanced electronic components***	identify types of ***advanced electronic components***, their applications and characteristics
		describe procedures used to service ***advanced electronic components***
		define terminology associated with ***advanced electronic components***
		identify ***considerations*** when handling ***advanced electronic components***

RANGE OF VARIABLES

advanced electronic components include: lane departure, adaptive cruise control, adaptive and auto-levelling headlights, traction control, rain sensing, auto-dimming mirrors, blind-spot monitoring, lane-keep assist, driver attention systems, accident avoidance systems, back-up cameras

considerations include: recycling, disposal, core charges

MAJOR WORK ACTIVITY E

Repairs interior components and services restraint systems

TASK E-18 Repairs and replaces interior components

TASK DESCRIPTOR

Auto body and collision technicians replace and repair interior components such as trim panels to bring the interior of the vehicle back to its pre-damage condition.

E-18.01 Repairs interior components

Essential Skills	Continuous Learning, Document Use, Thinking

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
E-18.01.01P	handle and store ***interior components*** with care during repair	***interior components*** are handled and stored with care during repair to avoid ***damage***
E-18.01.02P	clean components	components are cleaned using ***appropriate cleaners*** to determine extent of damage and to facilitate repair
E-18.01.03P	select and use ***tools and equipment for repair***	***tools and equipment for repair*** are selected and used according to manufacturers' specifications
E-18.01.04P	select and use ***repair materials***	***repair materials*** are selected based on type of damage and substrate according to manufacturers' specifications
E-18.01.05P	re-attach mounting points for clips	mounting points for clips are re-attached
E-18.01.06P	repair ***plastics***	***plastics*** are repaired using heat, plastic welder, panel bonders and epoxy

E-18.01.07P	install in original location with original type fasteners	original type fasteners are installed in original location to ensure it remains a serviceable piece, after confirming there is no secondary damage to mounting locations
E-18.01.08P	complete installation	installation is completed by verifying fit, finish and operation

RANGE OF VARIABLES

interior components include: trim panels, seats, head liners, door panels, center consoles
damage includes: scratches, staining, cracks, tears, bruising
appropriate cleaners include: soap and water, damp cloths
tools and equipment for repair include: plastic welding equipment, heat guns, spray guns (adhesives)
repair materials include: epoxies, adhesives, welding rods
plastics include: thermoplastics, thermoset, rigid, flexible

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
E-18.01.01L	demonstrate knowledge of procedures to repair ***interior components***	identify types of ***interior components***
		define terminology associated with ***interior components***
		identify types of ***substrates***
		describe fasteners and adhesives relating to ***interior components***
		identify types of ***tools and equipment for repair***
		identify types of ***repair materials***
		describe procedures used to establish removal and installation sequence
		identify types of ***tools and equipment for removal and installation***
		describe procedures used to repair ***interior components***
		describe procedures used to verify fit, finish and operation of ***interior components***

RANGE OF VARIABLES

interior components include: trim panels, seats, head liners, door panels, center consoles
substrates include: steel, plastic, aluminum, composites, cloth
tools and equipment for repair include: plastic welding equipment, heat guns, spray guns (adhesives)
repair materials include: epoxies, adhesives, welding rods
tools and equipment for removal and installation include: various hand tools, flashlights

E-18.02 Replaces interior components

Essential Skills	Thinking, Document Use, Reading

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
E-18.02.01P	disconnect and isolate battery when replacing trim and ***interior components***	battery is disconnected and isolated when replacing trim and ***interior components*** according to OEM procedures
E-18.02.02P	verify replacement ***interior component matches*** damaged component	replacement ***interior component*** is verified that it ***matches*** damaged component
E-18.02.03P	identify types and locations of fasteners	types and locations of fasteners are identified
E-18.02.04P	remove ***interior components***	***interior components*** are removed using ***tools and equipment***
E-18.02.05P	transfer fasteners, clips and retainers from removed component to replacement component	fasteners, clips and retainers from removed component are transferred to replacement component in the event they are not provided
E-18.02.06P	install new component into its original location with OEM-type fasteners	new component is installed into its original location with OEM-type fasteners to ensure it remains a serviceable piece, after confirming there is no secondary damage to mounting locations
E-18.02.07P	secure ***interior components***	***interior components*** are secured using fasteners according to OEM specifications
E-18.02.08P	connect ***electrical components*** and reconnect battery	***electrical components*** are connected and battery is reconnected
E-18.02.09P	complete installation	installation is completed by re-initializing ***electrical components*** and verifying operation according to OEM procedures

RANGE OF VARIABLES

interior components include: trim panels, seats, head liners, door panels, center consoles, dash

matches include: colours, features, textures

tools and equipment include: steering wheel pullers, screwdrivers, clip removers, various hand and power tools

electrical components include: power-assisted features, control switches, handles, convenience systems

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
E-18.02.01L	demonstrate knowledge of procedures to replace ***interior components***	identify types of ***interior components***
		define terminology associated with ***interior components***
		describe fasteners and adhesives relating to ***interior components***
		identify types of ***tools and equipment***
		describe procedures used to replace ***interior components***
		describe procedures used to disconnect, isolate and reconnect battery
		describe procedures used to verify fit, finish and operation of ***interior components***
E-18.02.02L	demonstrate knowledge of procedures to install ***electrical components***	describe procedures used to connect ***electrical components***
		describe procedures to verify operation

RANGE OF VARIABLES

interior components include: trim panels, seats, head liners, door panels, center consoles, dash

tools and equipment include: steering wheel pullers, screwdrivers, clip removers, various hand and power tools

electrical components include: power-assisted features, control switches, handles, convenience systems

TASK E-19 Services supplemental restraint systems (SRS)

TASK DESCRIPTOR

Auto body and collision technicians service restraint systems such as air bags and seat belts in a safe and systematic way in order to return the system to its original condition.

E-19.01 Services seat belt restraint systems

Essential Skills	Document Use, Digital Technology, Continuous Learning

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
E-19.01.01P	perform diagnostic pre-scan	diagnostic pre-scan is performed to identify failed components
E-19.01.02P	disconnect battery and allow residual charge to dissipate	battery is disconnected and residual charge is dissipated according to OEM specifications and procedures to prevent unintentional activation
E-19.01.03P	identify type of ***seat belt restraint system*** and safe handling procedures	type of ***seat belt restraint system*** is identified and handled according to OEM specifications
E-19.01.04P	identify ***failed seat belt component indicators***	***failed seat belt component indicators*** are identified
E-19.01.05P	remove components in sequence	components are removed in sequence according to OEM specifications
E-19.01.06P	inspect for ***secondary damage*** to surrounding components	***secondary damage*** to surrounding components is identified
E-19.01.07P	install seat belt components	seat belt components are installed ensuring fasteners are torqued according to OEM specifications and procedures
E-19.01.08P	verify seat belt installation and operation	tests are performed to ensure seat belts are operational according to OEM specifications
E-19.01.09P	reconnect battery	system is energized after complete supplemental restraint system (SRS) has been serviced
E-19.01.10P	allow vehicle to complete a self-diagnostic check	vehicle has completed a self-diagnostic check
E-19.01.11P	perform diagnostic post-scan	diagnostic post-scan is performed to ensure that codes are cleared

RANGE OF VARIABLES

seat belt restraint systems include: passive, active
failed seat belt component indicators include: visible damage, DTCs, deployed seat belt retractor
secondary damage includes: seat belt mounting locations, seat structure, interior trim damage

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
E-19.01.01L	demonstrate knowledge of electrical theory and its relationship with seat belt restraint systems	define role of batteries in seat belt restraint systems
		describe the procedures used to disconnect, isolate and reconnect batteries
E-19.01.02L	demonstrate knowledge of ***seat belt restraint systems***, their location, components, operation and ***failed seat belt component indicators***	identify types of ***seat belt restraint systems*** and describe their location, components and operation
		define terminology associated with ***seat belt restraint systems***
		identify hazards and describe safe work practices pertaining to ***seat belt restraint systems***
E-19.01.03L	demonstrate knowledge of procedures to service ***seat belt restraint systems*** and their related components	interpret and follow ***documentation*** pertaining to ***seat belt restraint systems***
		describe the procedures used to service ***seat belt restraint systems*** and their related components
		describe the procedures used to perform operational check of ***seat belt restraint systems***

RANGE OF VARIABLES

seat belt restraint systems include: passive, active
failed seat belt component indicators include: visible damage, DTCs, deployed seat belt retractor
documentation includes: service manuals, OEM specifications

E-19.02 Services air bags and related components

Essential Skills	Digital Technology, Document Use, Continuous Learning

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
E-19.02.01P	perform diagnostic pre-scan	diagnostic pre-scan is performed to identify failed components
E-19.02.02P	disconnect battery and allow residual charge to dissipate	battery is disconnected and residual charge is dissipated according to OEM specifications and procedures to prevent unintentional activation or deployment
E-19.02.03P	identify type of ***air bag system***	type of ***air bag system*** is identified
E-19.02.04P	take precautionary measures during air bag removal, handling, storage and disposal	precautionary measures are taken during air bag removal, handling, storage and disposal to avoid damage and personal injury
E-19.02.05P	remove ***components*** in sequence	***components*** are removed in sequence according to OEM specifications
E-19.02.06P	inspect for ***secondary damage*** to surrounding ***components***	***secondary damage*** to surrounding ***components*** is identified
E-19.02.07P	verify ***components*** for installation	***components*** for installation are verified according to OEM specifications
E-19.02.08P	install ***components***	***components*** are installed ensuring fasteners are torqued according to OEM specifications and procedures
E-19.02.09P	verify installation, fit and alignment of ***air bag system*** and ***components***	installation, fit and alignment of ***air bag system*** and ***components*** are verified
E-19.02.10P	reconnect battery	system is energized after complete SRS has been repaired
E-19.02.11P	allow vehicle to complete a self-diagnostic check	vehicle has completed a self-diagnostic check
E-19.02.12P	perform diagnostic post-scan	diagnostic post-scan is performed to ensure that codes are cleared

RANGE OF VARIABLES

air bag systems include: passive, active
components include: sensors, air bags, modules, seats, pop-up roll bars, clock springs
secondary damage includes: air bag mounting locations, seat structure, interior trim damage, windshield

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
E-19.02.01L	demonstrate knowledge of electrical theory and its relationship with ***air bag systems*** and related ***components***	define role of batteries in ***air bag systems*** and related ***components***
		describe the procedures used to disconnect, isolate and reconnect batteries
E-19.02.02L	demonstrate knowledge of ***air bag systems***, their ***components***, operation and safety	identify types of ***air bag systems*** and describe their location, ***components***, operation and safe precautions
		define terminology associated with ***air bag systems***
		identify hazards and describe safe work practices pertaining to ***air bag systems***
E-19.02.03L	demonstrate knowledge of procedures to service ***air bag systems*** and their related ***components***	interpret and follow ***documentation*** pertaining to ***air bag systems***
		describe the procedures used to service ***air bag systems*** and their related ***components***
		describe the procedures used to perform a diagnostic check of ***air bag systems***
		describe the procedures used to clear codes from vehicle

RANGE OF VARIABLES

air bag systems include: passive, active
components include: sensors, air bags, modules, seats, pop-up roll bars, clock springs
documentation includes: warning labels, OEM specifications and procedures

MAJOR WORK ACTIVITY F

Performs refinishing procedures

TASK F-20 Prepares surfaces

TASK DESCRIPTOR

Auto body and collision technicians must prepare substrates and existing surfaces for the application of undercoats and topcoats. Using proper tools, materials and techniques are important to achieve a smooth transition from repaired area to existing finish.

F-20.01 Performs initial preparation

Essential Skills	Document Use, Thinking, Continuous Learning

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
F-20.01.01P	remove residual two-way tape and decal adhesive	residual two-way tape and decal adhesive is removed using ***tools, products and cleaners*** according to job requirements and manufacturers' specifications
F-20.01.02P	clean substrate with ***products and cleaners***, and dry surface	substrate is cleaned with ***products and cleaners*** and surface is dried using ***methods*** to ensure a finish free of ***surface contamination***
F-20.01.03P	apply a ***pre-wash cleaner*** based on substrate and refinish material to be applied	***pre-wash cleaner*** is applied using the wipe-on wipe-off method, to improve adhesion and to avoid static charged flash fires
F-20.01.04P	inspect substrate	substrate is inspected for ***surface imperfections*** and ***surface evaluation*** is performed

RANGE OF VARIABLES

tools include: heat guns/lamps, rotary tool (eraser wheel), razor blades
products and cleaners include: soapy water, degreasers, solvents, fallout remover
methods include: using chamois or cloths, compressed air
surface contamination includes: tar, tree sap, bugs, waxes, paint sealants
pre-wash cleaners include: water-based, alcohol-based, solvent-based, anti-static plastic cleaners
surface imperfections include: stone chips, corrosion, peeling, oxidization, cracking, scratches, checking, environmental damage
surface evaluation includes: paint thickness, chemical compatibility, adhesion

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-20.01.01L	demonstrate knowledge of performing initial preparation of substrates and surfaces	define terminology associated with surface preparation
		describe the procedures used to remove dust, loose debris and moisture
		describe the procedures used to remove residual two-way tape and decal adhesive
		identify ***tools, products and cleaners*** used to remove residual two-way tape and decal adhesive
		identify types of ***products and cleaners*** and describe their applications and procedures for use
		identify types of ***pre-wash cleaners*** and describe their applications and procedures for use
		describe cleaning techniques
		identify hazards and describe safe work practices pertaining to surface preparation
		identify types of ***surface imperfections***

RANGE OF VARIABLES

tools include: heat guns/lamps, rotary tool (eraser wheel), razor blades
products and cleaners include: soapy water, degreasers, solvents, fallout remover
pre-wash cleaners include: water-based, alcohol-based, solvent-based, anti-static plastic cleaners
surface imperfections include: stone chips, corrosion, peeling, oxidization, cracking, scratches, checking, environmental damage

F-20.02 Masks surface

Essential Skills	Thinking, Continuous Learning, Working with Others

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
F-20.02.01P	apply soft edge tape to panels	soft edge tape is applied to panels to protect against overspray and to leave a soft edge
F-20.02.02P	apply masking tape and paper	masking tape and paper are applied to protect against damage during preparation, avoiding over and under masking
F-20.02.03P	apply spray mask (liquid mask)	spray mask (liquid mask) is applied using equipment to protect areas not to be refinished from overspray
F-20.02.04P	apply plastic sheeting	plastic sheeting is applied according to manufacturers' specifications to cover vehicle and secure edges, to protect from overspray
F-20.02.05P	apply edging tape behind flexible moulding	edging tape is used behind flexible moulding to prevent ***problems***
F-20.02.06P	apply final ***masking materials*** before refinishing	final ***masking materials*** are applied using ***methods*** to avoid hard edges
F-20.02.07P	apply vinyl tape (fine edge)	vinyl tape (fine edge) is applied according to job requirements

RANGE OF VARIABLES

problems include: bridging, peeling, overspray

masking materials include: masking tape, paper, plastic sheeting, liquid mask, soft edge tape, fine edge tape

methods include: back masking, reverse masking

KNOWLEDGE

	Learning Outcomes	Learning Objectives
F-20.02.01L	demonstrate knowledge of ***masking materials***, their applications and procedures for use	describe the procedures and ***methods*** used to mask surfaces
		describe ***masking uses***

	identify types of ***masking materials*** and describe their applications and compatibilities
	describe potential ***problems*** if masking is not done properly

RANGE OF VARIABLES

masking materials include: masking tape, paper, plastic sheeting, liquid mask, soft edge tape, fine edge tape

methods include: back masking, reverse masking

masking uses include: for protection (sanding, stripping), for primer, for paint

problems include: bridging, peeling, overspray

F-20.03 Strips surface

Essential Skills Document Use, Thinking, Continuous Learning

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
F-20.03.01P	protect surrounding area	surrounding area is protected with ***materials***
F-20.03.02P	apply chemical stripper to work area using ***tools***	chemical stripper is applied to work area according to manufacturers' specifications using ***tools***
F-20.03.03P	neutralize and remove chemical residue	chemical residue is neutralized and removed according to manufacturers' specifications
F-20.03.04P	mechanically strip work area using ***tools***	work area is mechanically stripped using ***tools*** according to job requirements and manufacturers' specifications
F-20.03.05P	***media*** blast work area using ***media***	work area is ***media*** blasted using ***media*** according to substrate and environmental regulations
F-20.03.06P	remove dust and residue from work area after mechanical or ***media*** stripping	dust and residue is removed from work area after mechanical or ***media*** stripping according to manufacturers' specifications and jurisdictional regulations

RANGE OF VARIABLES

materials include: duct tape, cardboard, masking

tools (for chemical stripping) include: brushes, aerosol sprays, scrapers, wire brushes, plastic sheeting

tools (for mechanical stripping) include: dual action sanders, stripping wheels, scrapers, razor blades, putty knives, rotary tools, compressed air blower, pressure washer

media includes: glass, sand, soda, plastic beads

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-20.03.01L	demonstrate knowledge of stripping equipment and products, their applications, safety precautions and procedures for use	identify ***methods*** used to strip topcoats and undercoats and describe their applications and associated safety or environmental considerations
		identify the ***tools*** used to mechanically strip topcoats and undercoats
		describe the effect of chemical stripping, mechanical stripping and ***media*** blasting on ***substrates***
		describe the procedures used to remove dust and residue from work area after chemical, mechanical or ***media*** stripping
		identify types of ***media*** blasting
		identify hazards and describe safe work practices pertaining to surface preparation

RANGE OF VARIABLES

methods include: chemical strippers, media blasting, mechanical

tools (for chemical stripping) include: brushes, aerosol sprays, scrapers, wire brushes, plastic sheeting

tools (for mechanical stripping) include: dual action sanders, stripping wheels, scrapers, razor blades, putty knives, rotary tools, compressed air blower, pressure washer

media includes: glass, sand, soda, plastic beads

substrates are: aluminum, steel, composites, plastic

F-20.04 Sands surface

Essential Skills Document Use, Thinking, Continuous Learning

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
F-20.04.01P	prepare blend area	blend area is prepared by using ***methods*** to achieve a uniform surface according to paint manufacturers' specifications
F-20.04.02P	featheredge repaired area	repaired area is featheredged according to job requirements and manufacturers' specifications to achieve a smooth transition from repaired area to existing finish
F-20.04.03P	back sand repaired area	repaired area is back sanded according to job requirements and manufacturers' specifications
F-20.04.04P	scuff sand repaired area	repaired area is scuff sanded according to job requirements and manufacturers' specifications to prepare for the application of undercoats
F-20.04.05P	level surface by removing excess primer surfacer and filler material	excess primer surfacer and filler material are removed by guide coating and block sanding using the cross hatch method to achieve a level surface

RANGE OF VARIABLES

methods include: using wet or dry sandpaper, scuff pads and scuff paste; guide coating; machine sanding; manual sanding

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-20.04.01L	demonstrate knowledge of ***sanding equipment*** and ***materials***, their applications, safety precautions and procedures for use	identify ***sanding equipment*** and ***materials***, their applications and procedures for use
		identify ***methods*** used to sand surfaces and describe their applications and associated safety and environmental considerations
		identify hazards and describe safe work practices pertaining to surface preparation

RANGE OF VARIABLES

sanding equipment includes: power sanders, sanding blocks

materials include: scuff paste, wet or dry sandpaper, scuff pads, guide coat

methods include: using wet or dry sandpaper, scuff pads and scuff paste; guide coating; machine sanding; manual sanding

TASK F-21 Uses repair materials

TASK DESCRIPTOR

Auto body and collision technicians use repair materials such as two-part putties, primers, primer surfacers and gravel guards. The proper use and application of these products is important to set the foundation for the refinishing process.

F-21.01 Mixes repair materials

Essential Skills	Document Use, Digital Technology, Numeracy

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
F-21.01.01P	mix polyester putties	polyester putties are mixed with hardener on a non-porous mixing board according to manufacturers' specifications
F-21.01.02P	measure and stir quantities of primers and primer surfacers	quantities of primers and primer surfacers are measured and stirred according to job size and manufacturers' specifications

F-21.01.03P	agitate ***aerosol-type repair materials***	***aerosol-type repair materials*** are agitated according to manufacturers' specifications
F-21.01.04P	incorporate additives while mixing ***repair material***	additives are incorporated while mixing ***repair material*** according to substrate and manufacturers' specifications

RANGE OF VARIABLES

aerosol-type repair materials include: etch primers, adhesion promoters, gravel guards
repair materials include: putties, primers, primer surfacers, gravel guards

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-21.01.01L	demonstrate knowledge of ***repair materials***, their applications and procedures for use	define terminology associated with ***repair materials***
		identify types of ***repair materials*** and describe their characteristics and applications
		describe the procedures used to mix ***repair materials***
		describe ***application techniques***
		describe the considerations taken for selecting ***repair materials*** that will maintain characteristics of existing substrate
		identify types of ***additives*** and describe their uses, characteristics and applications
		describe role of environmental conditions on working and curing times
		describe the limitations of ***repair materials***

RANGE OF VARIABLES

repair materials include: putties, primers, primer surfacers, gravel guards
application techniques include: spraying, rolling, spreading
additives include: flex additives, accelerators, retarders, adhesion promoters

F-21.02 Applies repair materials

Essential Skills	Document Use, Numeracy, Thinking

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
F-21.02.01P	spread two-part putties firmly and evenly over imperfections	two-part putty is spread firmly and evenly over imperfections using ***tools*** according to manufacturers' specifications
F-21.02.02P	select and use spray gun with recommended fluid tip size	spray gun with recommended fluid tip size is selected and used according to technical data sheet (TDS)
F-21.02.03P	adjust spray gun pattern, fluid delivery and air pressure	spray gun pattern, fluid delivery and air pressure are adjusted according to manufacturers' specifications
F-21.02.04P	apply primers and primer surfacer	primers and primer surfacer are applied according to TDS

RANGE OF VARIABLES

tools include: putty knives, plastic spreaders, spray guns

KNOWLEDGE

	Learning Outcomes	Learning Objectives
F-21.02.01L	demonstrate knowledge of applying ***repair materials***	describe the procedures and techniques used for applying ***repair materials***
		identify types of ***repair materials*** and describe their characteristics and applications
		identify types of ***tools*** used for applying ***repair materials*** and describe their characteristics and applications
		identify health and safety considerations when working with ***repair materials***
		explain limitations of types of ***repair materials***

RANGE OF VARIABLES

repair materials include: two-part putties, primers, primer surfacer, gravel guards
tools include: putty knives, plastic spreaders, spray guns

TASK F-22 Prepares refinishing equipment

TASK DESCRIPTOR

Spray guns and spray booths need to be set up properly to ensure quality refinish results. Auto body and collision technicians identify and correct problems with refinishing equipment.

F-22.01 Prepares spray booth

Essential Skills	Document Use, Thinking, Numeracy

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
F-22.01.01P	clean ***spray booth***	***spray booth*** is cleaned to ensure a dust-free environment prior to vehicle or part setup
F-22.01.02P	adjust ***spray booth*** pressure	***spray booth*** pressure is adjusted according to equipment manufacturers' specifications
F-22.01.03P	adjust ***spray booth*** temperature	***spray booth*** temperature is adjusted according to paint and equipment manufacturers' specifications
F-22.01.04P	utilize ***spray booth*** space to accommodate work to be completed	***spray booth*** space is utilized according to work to be completed
F-22.01.05P	position air movers	air movers are positioned for optimal coverage and to decrease flash times
F-22.01.06P	tack off ***equipment***	***equipment*** is tacked off to be free of dust
F-22.01.07P	identify ***spray booth*** problems	***spray booth*** problems are identified
F-22.01.08P	correct ***spray booth*** problems	***spray booth*** problems are corrected or reported

RANGE OF VARIABLES

spray booths include: down draft, cross draft, semi-down draft

equipment includes: hoses, stands, blowers, benches, hangers, PPE, spray equipment

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-22.01.01L	demonstrate knowledge of ***spray booths***, their function and preparation procedures	describe types of ***spray booths*** and their functions
		describe the ***cycles of spray booths***
		describe the procedures to adjust ***spray booth*** pressure
		describe the procedures to adjust ***spray booth*** temperature
		describe the procedures to adjust air movers
F-22.01.02L	demonstrate knowledge of ***spray booth*** problems and troubleshooting methods	explain utilization of ***spray booth*** space, and operating temperatures, air flow, and humidity and their effects on topcoat quality
		explain the effect of positive and negative ***spray booth*** pressures on topcoat quality
		describe corrective actions for ***spray booth*** problems

RANGE OF VARIABLES

spray booths include: down draft, cross draft, semi-down draft
cycles of spray booths include: spray, purge, ramp-up time, bake, cool down

F-22.02 Performs spray gun setup

Essential Skills	Document Use, Thinking, Numeracy

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
F-22.02.01P	select spray gun, fluid tip, needle and air cap	spray gun, fluid tip, needle and air cap are selected according to equipment and product manufacturers' specifications
F-22.02.02P	install fluid tip, needle and air cap	fluid tip, needle and air cap are installed using tools supplied by manufacturer
F-22.02.03P	attach paint cup to the spray gun	product is supplied to the spray gun according to equipment manufacturers' specifications

F-22.02.04P	attach spray gun to hose/coupler	spray gun is attached to hose/coupler according to equipment manufacturers' specifications
F-22.02.05P	adjust air pressure, fluid delivery and fan width	air pressure, fluid delivery and fan width are adjusted according to manufacturers' specifications and application requirements
F-22.02.06P	verify spray pattern	spray pattern is verified to match job requirements by performing spray pattern test
F-22.02.07P	identify ***spray pattern problems***	***spray pattern problems*** are identified visually by performing a flood test
F-22.02.08P	correct ***spray pattern problems***	***spray pattern problems*** are corrected

RANGE OF VARIABLES

spray pattern problems include: heavy on top or bottom, hourglass, heavy in the middle, crescent shape, sputter

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-22.02.01L	demonstrate knowledge of spray guns, their applications and setup	describe ***spray gun components***
		describe manufacturers' specifications in the selection and assembly of spray guns
		describe adjustment of spray gun air pressure, air volume and fluid delivery
F-22.02.02L	demonstrate knowledge of ***spray pattern problems*** and correction methods	describe factors affecting spray patterns
		describe corrective actions for ***spray pattern problems***

RANGE OF VARIABLES

spray gun components include: fluid tips, needles, springs, seals, baffles, air caps, gun body, trigger, paint cup, pressure gauge

spray pattern problems include: heavy on top or bottom, hourglass, heavy in the middle, crescent shape, sputter

TASK F-23 Prepares refinishing materials

TASK DESCRIPTOR

Auto body and collision technicians must accurately mix refinishing materials and adjust colour in order to achieve desired colour and finish on the vehicle.

F-23.01 Mixes refinishing materials

Essential Skills	Digital Technology, Document Use, Numeracy

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
F-23.01.01P	agitate or shake ***toners***	***toners*** are agitated or shaken according to manufacturers' specifications
F-23.01.02P	clean mixing equipment before mixing	mixing equipment is cleaned before mixing
F-23.01.03P	determine required quantity of ***refinishing materials***	quantity of ***refinishing materials*** required is determined according to ***factors***
F-23.01.04P	place mixing cup and tare (zero) the scale	mixing cup is placed and scale is tared (zeroed)
F-23.01.05P	select mixing ratio and mixing equipment	mixing ratio and mixing equipment are selected according to manufacturers' specifications and ***factors***
F-23.01.06P	select ***products***, reducers, ***additives*** and activators	***products***, reducers, ***additives*** and activators are selected according to ***ambient conditions***, job size and manufacturers' specifications
F-23.01.07P	pour ***products***, reducers, ***additives*** and activators	***products***, reducers, ***additives*** and activators are poured according to manufacturers' specifications, by weight or by volume
F-23.01.08P	mix ready-to-spray product	ready-to-spray product is mixed according to manufacturers' specifications
F-23.01.09P	strain paint	paint is strained according to manufacturers' specifications

RANGE OF VARIABLES

toners include: metallic, pearls, micas, pigments, dyes

refinishing materials include: water-borne, solvent-based

factors include: size of job, coverage required, paint reduction

products include: toners, clearcoats, sealers

additives include: flattening agents, blending agents, accelerators, retarders, solvents, hardeners, adhesion promoters, flex agent

ambient conditions include: humidity, temperature

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-23.01.01L	demonstrate knowledge of ***refinishing materials*** and their applications	identify types of ***refinishing materials*** and their applications
		identify types of ***refinishing material components*** and their applications
		identify types of ***sealers*** and their applications
		identify types of ***toners*** and their applications
		identify types of ***additives*** and their applications
		identify types of ***topcoats*** and their applications
		identify types of ***clear coats*** and their applications
		identify ***refinishing material characteristics***
F-23.01.02L	demonstrate knowledge of procedures used to mix ***refinishing materials***	describe procedures to use ***refinishing material*** manufacturer software
		identify paint codes
		identify ***factors*** to consider when choosing quantity of ***refinishing material***
		calculate required quantity of ***refinishing material***

RANGE OF VARIABLES

refinishing materials include: water-borne, solvent-based

refinishing material components include: binders, pigments, solvents, additives

sealers include: tintable, non-tintable, plastic, transparent, epoxy, polyester, urethane

toners include: metallic, pearls, micas, pigments, dyes

additives include: flattening agents, blending agents, accelerators, retarders, solvents, hardeners, adhesion promoters, flex agent

topcoats include: single-stage, two-stage, multi-coat

clear coats include: nano-technology, scratch-resistant, ceramic, urethane

refinishing material characteristics include: durability, colour, adhesion, gloss, dry time, evaporation rate, viscosity, curing, water-resistance, chemical resistance

factors include: size of job, coverage required, paint reduction

F-23.02 Performs colour adjustments

Essential Skills Digital Technology, Continuous Learning, Numeracy

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	no	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
F-23.02.01P	select variant	variant is selected according to vehicle and job requirements
F-23.02.02P	spray spray-out card	spray-out card is sprayed using spray gun that has been set up to spray vehicle to verify coverage, value, hue and chroma
F-23.02.03P	spray a let-down panel	let-down panel is sprayed to determine number of mid-coats required
F-23.02.04P	visually compare test card against an adjacent polished panel	test card is visually compared against an adjacent polished panel in natural light or using colour-corrective lighting
F-23.02.05P	adjust colour formula	colour formula is adjusted for value, hue and chroma to achieve necessary colour in natural light or using colour-corrective lighting
F-23.02.06P	adjust spray gun or spraying technique	spray gun or spraying technique is adjusted as needed to achieve desired result
F-23.02.07P	seek ***technical support*** for challenging and non-existent colour formulas	***technical support*** is sought for challenging and non-existent colour formulas

RANGE OF VARIABLES

technical support includes: OEM, paint manufacturer

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-23.02.01L	demonstrate knowledge of performing colour matching	describe ***elements of colour theory***
		describe spray gun techniques and procedures for their setup
		explain procedures for use of spectrophotometer (colour camera)
		explain procedures for use of colour corrective lighting
		describe procedures used to obtain colour formulas
		describe procedures used to adjust colour formulas
		describe procedure to create a spray-out card and let-down panel

RANGE OF VARIABLES

elements of colour theory include: value, hue, chroma, colour spectrum, primary and secondary colours, metamerism (role of light in colour perception), face, pitch, flop, metallic, pearls

TASK F-24 Applies refinishing materials

TASK DESCRIPTOR

Auto body and collision technicians must apply refinishing materials to achieve desired colour and finish on vehicle.

F-24.01 Applies sealers

Essential Skills	Document Use, Thinking, Numeracy

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	no	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
F-24.01.01P	check for undercoat ***defects***	undercoat ***defects*** are identified
F-24.01.02P	correct undercoat ***defects***	undercoat ***defects*** are corrected
F-24.01.03P	select and use ***cleaning materials***	***cleaning materials*** are selected and used according to manufacturers' specifications
F-24.01.04P	tack surface	surface is tacked according to job requirements
F-24.01.05P	spray sealer	sealer is sprayed according to manufacturers' specifications and job requirements
F-24.01.06P	blend sealer	sealer is blended to avoid halos and dry edges according to manufacturers' specifications
F-24.01.07P	verify coverage of sealer	coverage of sealer is verified using visual inspection
F-24.01.08P	verify sealer is flashed prior to subsequent application	sealer is verified to ensure it is flashed prior to subsequent application and according to manufacturers' specifications

RANGE OF VARIABLES

defects include: fish-eyes, dry spray, contaminants, runs, scratches, pin holes, orange peel, unsanded surfaces

cleaning materials include: tack cloths, low-static solvents, water-borne cleaners, solvent-borne cleaners, low-lint wipes

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-24.01.01L	demonstrate knowledge of applying sealers	identify types of ***cleaning materials***
		describe ***topcoat application factors*** as they apply to sealers
		describe the role of sealers in the refinishing process
		describe ***spray techniques***
		describe ***blending techniques***
		identify types of ***defects***
		explain the effect of contaminants and methods of removal
		explain flash-off times
		explain forced drying and forced curing
		explain drying times of materials in relation to ***defect*** correction

RANGE OF VARIABLES

cleaning materials include: tack cloths, low-static solvents, water-borne cleaners, solvent-borne cleaners, low-lint wipes

topcoat application factors include: spray techniques, spray sequence, tacking between coats, blending

spray techniques include: distance, overlap, gun speed, trigger control, angle

blending techniques include: reverse blending, arcing, trigger control, melting in, blending agents

defects include: fish-eyes, dry spray, contaminants, runs, scratches, pin holes, orange peel, unsanded surfaces

F-24.02 Applies base coat

Essential Skills	Document Use, Thinking, Numeracy

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	no	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
F-24.02.01P	correct undercoat and top coat ***defects***	undercoat and top coat ***defects*** are corrected
F-24.02.02P	spray base coat	base coat is sprayed according to manufacturers' specifications and job requirements

F-24.02.03P	blend base coat	base coat is blended to avoid dry edges and to ensure a uniform transition according to job requirements and manufacturers' specifications
F-24.02.04P	apply drop/orientation coat on metallic and pearl/mica	drop/orientation coat on metallic and pearl/mica is applied according to manufacturers' specifications
F-24.02.05P	spray mid-coat	mid-coat is sprayed according to let-down panel and manufacturers' specifications
F-24.02.06P	tack or anti-static treat surface prior to first base coat and between subsequent coats	surface is tacked or treated with anti-static prior to base coat and between subsequent coats according to manufacturers' specifications
F-24.02.07P	verify base coat is flashed prior to subsequent application	base coat is verified to ensure it is flashed prior to subsequent application and according to manufacturers' specifications
F-24.02.08P	verify coverage of base coat	coverage of base coat is verified using visual inspection

RANGE OF VARIABLES

defects include: fish-eyes, dry spray, contaminants, runs, orange peel, mottling, halo, striping, poor colour match, poor coverage

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-24.02.01L	demonstrate knowledge of applying base coats	describe ***topcoat application factors*** as they apply to base coats
		describe the role of base coats in the refinishing process
		describe ***spray techniques***
		describe ***blending techniques***
		describe ***drop/orientation coat techniques***
		identify types of ***defects***
		explain the effect of contaminants and methods of removal
		explain flash-off times
		explain forced drying and forced curing
		explain drying times of materials in relation to ***defect*** correction

RANGE OF VARIABLES

topcoat application factors include: spray techniques, spray sequence, tacking between coats, blending

spray techniques include: distance, overlap, gun speed, gun adjustments, trigger control, angle

blending techniques include: reverse blending, arcing, trigger control, melting in, blending agents

drop/orientation coat techniques include: arcing, trigger control, speed, temperature, cross patterns, reverse blending, air pressure, spray gun distance

defects include: fish-eyes, dry spray, contaminants, runs, orange peel, mottling, halo, striping, poor colour match, poor coverage

F-24.03 Applies single-stage paint

Essential Skills	Document Use, Thinking, Numeracy

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	no	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
F-24.03.01P	ensure undercoat ***defects*** are corrected	undercoat ***defects*** are corrected
F-24.03.02P	select and use ***cleaning materials***	***cleaning materials*** are selected and used according to manufacturers' specifications
F-24.03.03P	spray single-stage paint	single-stage paint is sprayed according to manufacturers' specifications and job requirements
F-24.03.04P	blend single-stage paint	single-stage paint is blended to avoid dry edges and ensure a uniform transition according to job requirements and manufacturers' specifications
F-24.03.05P	verify single-stage paint is flashed prior to subsequent application	single-stage paint is verified to ensure it is flashed prior to subsequent application and according to manufacturers' specifications

RANGE OF VARIABLES

defects include: fish-eyes, dry spray, contaminants, runs, orange peel, mottling, halo, striping, poor colour match, poor coverage

cleaning materials include: tack cloths, low-static solvents, water-borne cleaners, solvent-borne cleaners, low-lint wipes

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-24.03.01L	demonstrate knowledge of applying single-stage paint	identify types of ***cleaning materials***
		describe ***topcoat application factors*** as they apply to single-stage paint
		describe the role of single-stage paint in the refinishing process
		describe ***spray techniques***
		describe ***blending techniques***
		identify types of ***defects***
		explain flash-off times
		explain forced drying and forced curing
		explain the effect of contaminants
		identify applications of clear coat over single-stage paint

RANGE OF VARIABLES

cleaning materials include: tack cloths, low-static solvents, water-borne cleaners, solvent-borne cleaners, low-lint wipes

topcoat application factors include: spray techniques, spray sequence, blending

spray techniques include: distance, overlap, gun speed, trigger control, angle

blending techniques include: reverse blending, arcing, trigger control, melting in, blending agents

defects include: fish-eyes, dry spray, contaminants, runs, orange peel, mottling, halo, striping, poor colour match, poor coverage

F-24.04 Applies clear coat

Essential Skills	Document Use, Thinking, Numeracy

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	no	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
F-24.04.01P	ensure topcoat ***defects*** are corrected	topcoat ***defects*** are corrected
F-24.04.02P	spray clear coat	clear coat is sprayed according to manufacturers' specifications and job requirements
F-24.04.03P	blend clear coat	clear coat is blended to a uniform texture according to manufacturers' specifications

F-24.04.04P	verify clear coat is flashed prior to subsequent application	clear coat is verified to ensure it is flashed prior to subsequent application and according to manufacturers' specifications
F-24.04.05P	correct ***defects***	***defects*** are corrected

RANGE OF VARIABLES

defects include: fish-eyes, dry spray, contaminants (hair, bugs, dirt, water), runs, orange peel, solvent popping

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-24.04.01L	demonstrate knowledge of applying clear coat	describe ***topcoat application factors*** as they apply to clear coat
		describe the role of clear coats in the refinishing process
		describe ***spray techniques***
		describe ***blending techniques***
		identify types of ***defects***
		explain the effect of contaminants
		explain flash-off times
		explain forced drying and forced curing
		explain drying times of materials in relation to ***defect*** correction

RANGE OF VARIABLES

topcoat application factors include: spray techniques, spray sequence, blending

spray techniques include: distance, overlap, gun speed, trigger control, angle, air pressure

blending techniques include: arcing, trigger control, melting in, blending agents

defects include: fish-eyes, dry spray, contaminants (hair, bugs, dirt, water), runs, orange peel, solvent popping

TASK F-25 Performs post-refinishing functions

TASK DESCRIPTOR

Auto body and collision technicians inspect vehicles after the refinishing process. They are responsible for removing all masking materials, correcting imperfections, and verifying the quality and completion of the refinish work.

F-25.01 Removes masking materials

Essential Skills	Thinking, Working with Others, Oral Communication

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
F-25.01.01P	select ***removal procedures***	***removal procedures*** are selected according to ***masking products*** and ***masking technique***
F-25.01.02P	remove masking plastic, paper and tape	masking plastic, paper and tape are removed according to job requirements to prevent damaging refinished and existing surfaces
F-25.01.03P	remove spray mask	spray mask is removed by washing with water
F-25.01.04P	inspect for ***masking issues***	***masking issues*** are identified visually and ***corrective actions*** are determined

RANGE OF VARIABLES

removal procedures include: timing of removal, removal tools

masking products include: tapes, paper, plastics, trim mask, foam tape, spray mask, foam earplugs, tin foil

masking techniques include: perimeter masking, back masking, reverse masking, tunnel masking, two-tone masking

masking issues include: bridging, under-masking, over-masking, over spray, adhesive residue

corrective actions include: re-application, polishing, use of solvents, use of glass cleaner, use of blades, application of detail products

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-25.01.01L	demonstrate knowledge of removing ***masking products***	identify types of ***masking products*** and describe their applications
		describe procedures used to remove ***masking products***
F-25.01.02L	demonstrate knowledge of ***masking issues***	identify ***masking issues*** and their corresponding ***corrective actions***

RANGE OF VARIABLES

masking products include: tapes, paper, plastics, trim mask, foam tape, spray mask, foam earplugs, tin foil

masking issues include: bridging, under-masking, over-masking, over spray, adhesive residue

corrective actions include: re-application, polishing, use of solvents, use of glass cleaner, use of blades, application of detail products

F-25.02 Corrects surface imperfections

Essential Skills	Document Use, Thinking, Working with Others

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	no	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
F-25.02.01P	identify surface ***imperfections***	surface ***imperfections*** are identified visually and by touch
F-25.02.02P	determine ***corrective actions***	***corrective actions*** are determined according to surface ***imperfection***
F-25.02.03P	sand or de-nib refinish area	refinish area is sanded or de-nibbed according to surface ***imperfection***
F-25.02.04P	compound refinish area	refinish area is compounded according to surface ***imperfection***
F-25.02.05P	polish refinish area	refinish area is polished to restore lustre and to match existing finish

RANGE OF VARIABLES

imperfections include: sags, fish-eyes, solvent popping, runs, orange peel, dust nibs, dry spray, dieback, sinking, top-coat bridging, contour mapping, bleeding, colour mismatch, mottling, transparency, gloss mismatch, texture mismatch

corrective actions include: re-application, polishing, use of blades, sanding, nib/run filing

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
F-25.02.01L	demonstrate knowledge of surface ***imperfections***	identify types of surface ***imperfections***
F-25.02.02L	demonstrate knowledge of the ***corrective action*** of various surface ***imperfections***	identify the ***corrective action*** to remedy various surface ***imperfections***
		identify limitations of repair based on coating type
		describe procedures used to sand when correcting surface ***imperfections***
		describe procedures used to compound when correcting surface ***imperfections***
		describe procedures used to polish when correcting surface ***imperfections***
F-25.02.03L	demonstrate knowledge of the ***causes*** of various surface ***imperfections***	identify the ***causes*** of various surface ***imperfections***

RANGE OF VARIABLES

imperfections include: sags, fish-eyes, solvent popping, runs, orange peel, dust nibs, dry spray, dieback, sinking, top-coat bridging, contour mapping, bleeding, colour mismatch, mottling, transparency, gloss mismatch, texture mismatch

corrective actions include: re-application, polishing, use of blades, sanding, nib/run filing

causes include: contamination, poor spray technique, improper mixing procedures, inter-mixing of products, expired product, poor equipment, poor booth conditions, incorrect prepping procedures, environmental effects

MAJOR WORK ACTIVITY G

Performs detailing and cleaning

TASK G-26 Details exterior

TASK DESCRIPTOR

Auto body and collision technicians detail the exterior of vehicles to re-enhance their finish. This includes cleaning and polishing, and touching up stone chips.

G-26.01 Removes minor imperfections

Essential Skills	Document Use, Oral Communication, Continuous Learning

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
G-26.01.01P	identify ***minor imperfections***	***minor imperfections*** are identified
G-26.01.02P	determine ***corrective actions***	***corrective actions*** are determined according to ***minor imperfection***
G-26.01.03P	wet sand, de-nib and shave required area	required area is wet sanded, de-nibbed and shaved according to ***minor imperfection***
G-26.01.04P	remove overspray	overspray is removed from paint surface and glass using ***tools and materials***

RANGE OF VARIABLES

minor imperfections include: sags, fish-eyes, solvent popping, runs, orange peel, dust nibs, dry spray, dieback, scratches, top-coat bridging, oxidization, brake dust, gloss mismatch, texture mismatch

corrective actions include: re-application, polishing, use of blades, sanding

tools and materials include: razor blades, polishers, clay bar, rubbing compounds, chemicals, de-nib files

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
G-26.01.01L	demonstrate knowledge of procedures to remove overspray and ***minor imperfections***	identify types of topcoat defects and describe their characteristics
		identify types of ***minor imperfections***
		describe the procedures used to remove overspray
		identify ***tools and materials*** used to remove overspray and ***minor imperfections*** and describe their applications and procedures for use
		identify hazards and describe safe work practices pertaining to removing overspray and ***minor imperfections***
		define terminology associated with removing overspray and ***minor imperfections***
		identify the ***corrective action*** to remedy various ***minor imperfections***
		identify limitations of repair based on top coat type
		describe procedures used to sand when correcting ***minor imperfections***
		describe procedures used to compound when correcting ***minor imperfections***
		describe procedures used to polish when correcting ***minor imperfections***
G-26.01.02L	demonstrate knowledge of the ***causes*** of ***minor imperfections***	identify the ***causes*** of ***minor imperfections***

RANGE OF VARIABLES

minor imperfections include: sags, fish-eyes, solvent popping, runs, orange peel, dust nibs, dry spray, dieback, scratches, top-coat bridging, oxidization, brake dust, gloss mismatch, texture mismatch

tools and materials include: razor blades, polishers, clay bar, rubbing compounds, chemicals, de-nib files

corrective actions include: re-application, polishing, use of blades, sanding

causes include: contamination, poor spray technique, improper mixing procedures, inter-mixing of products, expired product, poor equipment, poor booth conditions, incorrect prepping procedures, environmental effects

G-26.02 Polishes vehicle

Essential Skills	Working with Others, Document Use, Thinking

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
G-26.02.01P	evaluate paint finish	paint finish is evaluated
G-26.02.02P	determine polishing procedure	polishing procedure is determined according to paint finish evaluation
G-26.02.03P	protect surrounding ***areas***	surrounding ***areas*** are protected
G-26.02.04P	select and use ***tools, equipment and materials***	***tools, equipment and materials*** are selected and used according to job requirements
G-26.02.05P	polish surfaces	surfaces are polished to restore lustre and to remove micro-scratches from compounding
G-26.02.06P	wet sand and polish headlights	headlights are polished to restore clarity
G-26.02.07P	control speed, pressure and angle of polisher	speed, pressure and angle of polisher are controlled to avoid ***damage*** to surface

RANGE OF VARIABLES

areas include: plastic mouldings, tires, soft surfaces

tools, equipment and materials include: mil thickness gauge, variable speed buffers, polishing cloths and pads

damage includes: burning through the finish, scratching, dulling the finish

KNOWLEDGE

	Learning Outcomes	Learning Objectives
G-26.02.01L	demonstrate knowledge of procedures used to polish vehicle	identify terminology associated with polishing
		describe the surface preparation procedures used for polishing
G-26.02.02L	demonstrate knowledge of polishing materials and their characteristics	identify types of ***topcoat finishes*** and describe their characteristics
		identify products used in vehicle polishing and describe their related safety considerations
G-26.02.03L	demonstrate knowledge of polishing equipment, its applications and procedures for use	identify hazards and describe safe work practices pertaining to polishing

	identify polishing tools and equipment and describe their applications
	describe the procedures used to set up, operate and adjust polishing equipment

RANGE OF VARIABLES

topcoat finishes include: single-stage, multi-stage

G-26.03 Touches up stone chips

Essential Skills	Thinking, Working with Others, Oral Communication

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	no	yes	yes	NV	NV	NV

SKILLS

	Performance Criteria	Evidence of Attainment
G-26.03.01P	identify ***severity*** of stone chip damage	***severity*** of stone chip damage is identified
G-26.03.02P	determine vehicle colour	vehicle colour is determined using vehicle paint codes
G-26.03.03P	prepare damaged area and apply touch-up paint	damaged area is prepared and touch-up paint is applied using ***tools and materials***

RANGE OF VARIABLES

severity includes: depth of chip, presence of corrosion

tools and materials include: touch-up pen, paint brush, tape, toothpicks

KNOWLEDGE

	Learning Outcomes	Learning Objectives
G-26.03.01L	demonstrate knowledge of stone chips, their characteristics and repair procedures	describe the characteristics of stone chips
		identify method of repair
		identify ***tools and materials*** used to touch up stone chips
		identify paint codes
		describe procedure to prepare area and apply touch-up paint

RANGE OF VARIABLES

tools and materials include: touch-up pen, paint brush, tape, toothpicks

TASK G-27 Cleans vehicle

TASK DESCRIPTOR

Auto body and collision technicians must clean vehicles prior to repair and prior to delivery.

G-27.01 Cleans exterior

Essential Skills	Oral Communication, Working with Others, Document Use

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
G-27.01.01P	select and use ***tools and equipment***	***tools and equipment*** are selected and used according to job requirements
G-27.01.02P	select ***materials***	***materials*** are selected according to job requirements
G-27.01.03P	follow ***washing sequence***	***washing sequence*** is followed with ***caution***
G-27.01.04P	dry vehicle	vehicle is dried using ***drying techniques***
G-27.01.05P	clean and dry glass	glass is cleaned and dried to ensure it is spot and streak free

RANGE OF VARIABLES

tools and equipment include: pressure washers, hoses, brushes, wash mitts, sponges, steel wool

materials include: tire and glass cleaners, car wash soap (silicone free), tire dressing (silicone free), degreasers, dish soap, exterior cleaning solvents

washing sequence includes: using pressure washer, pre-soaking vehicle, washing, rinsing, top to bottom

caution includes: biohazards (blood, fecal matter), sharp edges, using PPE (gloves, goggles)

drying techniques include using: chamois, squeegees, air blowers

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
G-27.01.01L	demonstrate knowledge of vehicle exterior cleaning ***tools and equipment***	identify types of vehicle exterior cleaning ***tools and equipment*** and describe their applications
G-27.01.02L	demonstrate knowledge of vehicle exterior cleaning ***materials***	identify ***materials*** used to clean vehicle exterior
G-27.01.03L	demonstrate knowledge of practices and procedures to clean vehicle exterior	describe the procedures used to clean vehicle exterior
		describe the procedures used to clean un-painted plastic exterior components
		describe situations where ***caution*** should be observed

RANGE OF VARIABLES

tools and equipment include: pressure washers, hoses, brushes, wash mitts, sponges, steel wool

materials include: tire and glass cleaners, car wash soap (silicone free), tire dressing (silicone free), degreasers, dish soap, exterior cleaning solvents

caution includes: biohazards (blood, fecal matter), sharp edges, using PPE (gloves, goggles)

G-27.02 Cleans interior

Essential Skills	Document Use, Thinking, Oral Communication

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
yes	yes	NV	NV	NV	yes	NV	yes	yes	yes	NV	NV	NV

	SKILLS	
	Performance Criteria	**Evidence of Attainment**
G-27.02.01P	remove items from interior	items are removed from interior with caution and held for customer
G-27.02.02P	vacuum interior	interior is vacuumed to remove debris
G-27.02.03P	shampoo upholstery	upholstery is shampooed to remove stains and other contaminants
G-27.02.04P	deodorize interior	interior is deodorized
G-27.02.05P	apply silicone-free surface conditioners, cleaners and dressings to ***surfaces***	silicone-free surface conditioners, cleaners and dressings are applied to ***surfaces*** according to manufacturers' specifications
G-27.02.06P	clean interior of glass	interior of glass is cleaned with glass cleaning ***materials***

RANGE OF VARIABLES

surfaces include: dashes, consoles, door panels, head liners, seats, floor mats, steering wheel
materials include: lint-free rags, glass cleaners, paper products, interior shampoo, leather conditioners

	KNOWLEDGE	
	Learning Outcomes	**Learning Objectives**
G-27.02.01L	demonstrate knowledge of vehicle interior cleaning ***tools and equipment***	identify types of vehicle interior cleaning ***tools and equipment*** and describe their applications
G-27.02.02L	demonstrate knowledge of vehicle interior cleaning ***materials***	identify ***materials*** used to clean vehicle interior
G-27.02.03L	demonstrate knowledge of practices and procedures to clean vehicle interior	describe the practices and procedures used to clean vehicle interior surfaces
		describe situations where ***caution*** should be observed

RANGE OF VARIABLES

tools and equipment include: vacuum, steam cleaner, brushes
materials include: lint-free rags, glass cleaners, paper products, interior shampoo, leather conditioners
caution includes: biohazards (blood, fecal matter, needles), weapons, sharp edges, using PPE (gloves, goggles)

APPENDIX A
ACRONYMS

A/C	air conditioning
ADAS	advanced driver-assistance system
AHJ	authorities having jurisdiction
CNG	compressed natural gas
DTC	diagnostic trouble code
DVOM	digital volt-ohm meter
GMAW	gas metal arc welding
GTAW	gas tungsten arc welding
HSS	high-strength steel
ISO	International Standards Organization
JHA	job hazard assessment
MAG	metal active gas
MIG	metal inert gas
NVH	noise, vibration and harshness
OEM	original equipment manufacturer
OH&S	Occupational Health and Safety
PPE	personal protective equipment
SDS	safety data sheet
SPR	self-piercing rivets
SRS	supplemental restraint systems
STRSW	squeeze-type resistance spot welder
TDS	technical data sheet
TIG	tungsten inert gas
UHSS	ultra-high-strength steel
UV	ultraviolet
VIN	vehicle identification number
WHMIS	Workplace Hazardous Materials Information System

APPENDIX B

TOOLS AND EQUIPMENT / OUTILS ET ÉQUIPEMENT

Hand Tools / Outils à main

adjustable hood props	béquilles de capot réglables
adjustable locking pliers	pinces-étaux réglables
air blow guns	soufflettes
aluminum-dedicated tools	outils dédiés à la réparation d'aluminium
ball joint removers	extracteurs de joint à rotule
body fill spreaders	spatules à mastic pour carrosserie
body spoons	cuillères à débosseler
brushes	brosses
caulking guns	pistolets à calfeutrer
chisels	burins
clamps	serre-joints
clip release tools	pinces à enlèvement de clip et garniture
crimping tools	outils de sertissage
cut-out tools (windshield)	outils à tronçonner (pare-brise)
dollies	tas
files	limes
flange tools	outils de brides
hack saws	scies à métaux
hammers	marteaux
hex keys	clés hexagonales
levels	niveaux
leverage type door adjusters	leviers d'ajustement de portières
magnets	aimants
marking tools	outils de marquage
measuring tapes	rubans de mesure
paintless dent repair tools	outils de débosselage sans peinture
picks	pics
plastic pry tools	barres-leviers en plastique
pliers	pinces
pry bars	leviers
pullers	extracteurs
punches	poinçons
putty knives and scrapers	couteaux à mastic et grattoirs
quick-connect joint release tools (A/C lines, fuel lines)	clips pour déconnecter les tuyaux (conduits de climatiseur, conduits de carburant)
ratchets	clés à rochet
razor blades and holders	lames de rasoir et porte-lames
resin injection tools (windshield repair tools)	outils d'injection de résine (outils de réparation de pare-brise)
rivet guns	pistolets à rivets
roller applicators	applicateurs à rouleau
rubber mallets	maillets en caoutchouc
sanding blocks	blocs de ponçage
screwdrivers	tournevis
slide hammers	marteaux à inertie

sockets, extensions and swivels	douilles, rallonges et pivots
soldering tools	fers à souder
specialty bits	mèches spécialisées
spring compressor (door hinge)	compresseur de ressort (charnière de portière)
squeegees	raclettes
stands	supports
steering wheel pulling kits	extracteurs de volant
straight edges	règles droites
suction cups	ventouses
tie rod removal tool	outils d’extraction de biellette de direction
tin snips	cisailles de ferblantier
torque wrenches	clés dynamométriques
trim clip removal tools	outils d’extraction d’attaches de garniture
utility knives	couteaux universels
vices	étaux
windshield removal wires	fils à piano
wire cutters	coupe-fils
wire stripping tools	pinces à dénuder
wire wheel brushes	brosses métalliques circulaires
wiring terminal release tools	outils de desserrage de borne de raccordement
wrenches	clés

Power Tools / Outils mécaniques

A/C tools and equipment	outils et équipement pour les climatiseurs
air compressors	compresseurs d’air
air drills	perceuses pneumatiques
air hoses	tuyaux d’air
aluminum dust extractor	extracteur de poussière d’aluminium
applicator guns	pistolets applicateurs
battery chargers	chargeurs de batterie
battery jump packs	blocs d’alimentation pour démarrage de secours
bench grinders	meuleuses d’établi
circular fans	ventilateurs circulaires
computer and software	ordinateur et logiciels
computerized diagnostic equipment	matériel de diagnostic informatisé
corrosion protection applicator	applicateur d’enduit de protection contre la corrosion
curing light	lampe de séchage
cut-off tools	outils à tronçonner
cut-out knives (pneumatic, electric)	couteaux de découpage (pneumatiques, électriques)
dent pullers	extracteurs de bosses
digital cameras	caméras numériques
door flange tool	outil à emboutir pour portière
door jacks	vérins de portière
drill and drill bits	perceuses et forets
frame flange tools	outils pour les brides de cadre
frame gauging equipment	équipement de calibrage de cadres
fuel storage unit	réservoir d’entreposage du carburant
grinders (belt, angle, die)	meuleuses (à ruban, d’angle, à matrice)
heat guns	pistolets thermiques
heating equipment	équipement de chauffage
impact guns	pistolets cloueurs
induction heaters	appareils chauffants à induction
metal saws	scies à métaux

plastic repair equipment	matériel pour réparer les matières plastiques
pneumatic air chisels	burins pneumatiques
pneumatic hole punches	emporte-pièces pneumatiques
pneumatic moulding removers	enlève-moulures pneumatiques
rivet guns (pneumatic)	pistolets à rivets (pneumatiques)
sand blasters (spot, conventional)	sableuses au jet (pour sablage par points et sablage conventionnel)
sanders (belt, orbital, dual-action)	ponceuses (à courroie, orbitale, à double action)
seam sealer applicators	applicateurs de produits d'étanchéité pour joints
trouble lights (electric and portable)	lampe baladeuse

Welding and Cutting Equipment and Consumables / Équipement de soudage et de coupage et consommables

calipers	compas d'épaisseur
consumables (anti-spatter material, oxygen, acetylene, welding rods/wires)	consommables (matériel anti-éclaboussures, oxygène, acétylène, baguettes et fils de soudage)
flow meter	débitmètre
oxy-fuel equipment (cutting and heating)	équipement de soudage à l'oxygaz
plasma cutters	coupeuses au plasma
plastic welders	soudeuses à plastique
propane torches	chalumeaux au gaz propane
regulator	régulateur
shielding gas	gaz de protection
shunting clamps	pinces de shuntage
squeeze-type resistance spot welder (STRSW)	soudeuses STRSW
stud/pin welders	soudeuses de goujons
tip cleaners	cure-buses
welders (GMAW, GTAW, pulse)	soudeuses (GMAW, GTAW, par impulsion)
welding blankets	toiles de protection
welding carts	chariots de soudage
welding clamps	pinces à souder
welding coveralls/aprons	combinaisons de soudeur et tabliers
welding curtains	écrans de soudeur
welding fume extractors	extracteurs de fumée de soudage
welding gauges and hoses	calibres et tuyaux de soudage
welding gloves	gants de soudeur
welding jackets	manteaux de soudage
welding respirators	respirateurs pour le soudage
welding shields	masques de soudage
welding tips	becs de soudage
welding/cutting glasses and helmets	lunettes et casques de soudage et de coupage

Frame and Unibody Repair Equipment / Équipement de redressage de cadres

chains	chaînes
clamps and fixtures	pinces et raccords
come-alongs (ratcheting winches)	palans manuels à leviers
electric winches	treuils électriques
friction jacks	vérins à friction
frame benches	appareils à redresser les cadres
hook tools	outils à crochets
hydraulic jacking equipment	équipement de levage hydraulique
leverage bars	leviers de tirage

portable hydraulic pulling towers and related equipment	tours de tirage hydraulique portatifs et équipement connexe
pulling straps	sangles de traction
safety straps	sangles de sécurité
structural straightening equipment	équipement de redressage structural

Lifting Equipment / Équipement de levage

air bag jack	vérins à ballons
door lifts	dispositifs de levage de portière
engine lifts	dispositifs de levage de moteur
hoists	palans de levage
jacks and jack stands	crics de levage et chandelles
portable truck box racks	racks portatif pour les caisses de camion
transmission lifts	dispositifs de levage de transmission
vehicle lifts	ponts élévateurs
wheel alignment racks	bancs d'alignement
wheel dollies	charriots à roues

Measuring and Testing Equipment / Équipement de mesure et d'essai

body dimensional measuring equipment	équipement de mesure de la dimension de la carrosserie
computerized 3D measuring equipment	système de mesure en 3D
centering gauges	jauges autocentreuses
diagnostic/testing equipment	équipement de diagnostic et équipement d'essai
digital volt-ohm meter (DVOM)	multimètres numériques
heat crayons	crayons indicateurs de chaleur
lasers	lasers
mechanical measuring system	système de mesure mécanique
mil thickness gauge (ferrous and non-ferrous)	jauges d'épaisseur du feuil (métaux ferreux et non ferreux)
tape measures	rubans à mesurer
test cards	gabarit
test lights	lampes témoins
thermometers	thermomêtres
tram gauges	piges de contrôle
ultrasonic equipment	équipement à ultrasons

Refinishing and Detailing Equipment / Équipement de refinition et d'esthétique

agitators (shakers)	agitateurs
air blower nozzles	bouches de soufflage d'air
blow guns	soufflettes
brushes	brosses
chamois	peau de chamois
colour corrective lighting	éclairage correcteur de couleur
colour identification cameras	caméras pour l'identification des couleurs
computerized mixing systems	systèmes de mélange informatisé
drying equipment (curing light)	équipement de séchage (lampe de séchage)
exhaust fans	ventilateurs d'extraction
gun wash stations	postes de lavage pour pistolets à peinture
hazardous materials disposal containers	contenants pour l'élimination des matières dangereuses
masking equipment	matériel de masquage
mixing tools	outils à mélanger

paint application equipment	équipement d’application de peinture
paint booths	cabines de peinture
paint database	base de données sur la peinture
paint measuring sticks	doseurs de peinture
paint mixing machines	mélangeurs de peinture
paint rollers	rouleaux à peinture
paint scales	échelles de peinture
paint suits	combinaisons de peintre
power polishers	polisseuses électriques
preparation stations	postes de préparation
pressure washers	laveuses à pression
primer application equipment	équipement d’application d’apprêt
sanding equipment	équipement de ponçage
shampooers	laveuses à tapis
solvent recyclers	recycleurs de solvant
solvent resistant gloves	gants à l’épreuve des solvants
spray guns	pistolets pulvérisateurs
spray out cards and let down panels	cartes de pulvérisation et panneaux de comparaison
strainers	tamis
stripe/adhesive removal wheel	roue pour enlever les adhésifs
tack cloths	chiffons à dépoussiérer
tweezers	pinces à cils
ultraviolet light gun	pistolet à peinture UV
vacuum cleaners (wet and dry)	aspirateurs (pour déchets secs et humides)
venturi blowers	ventilateurs à effet Venturi
wash mitts	gants de lavage
water hoses	tuyaux d’arrosage

Personal Protective Equipment (PPE) and Safety Equipment / Équipement de protection individuelle et de sécurité (EPI)

automotive paint suit	combinaison de peintre automobile
coveralls	combinaison
creepers	sommiers roulants
dust masks	masques antipoussières
eye wash stations	douches oculaires
face shields	écrans faciaux
fire blankets	couvertures ignifuges
fire extinguishers	extincteurs
fire hoses	tuyaux d’incendie
first aid kit	trousse de premiers soins
fresh air respirator	respirateur à adduction d’air
gloves (high-voltage, rubber, impact, welding, solvent-proof)	gants (gants de protection contre la haute tension, gants en caoutchouc, gants résistants aux chocs, gants de soudeur, gants résistants aux solvants)
goggles	lunettes de protection
hearing protection (ear plugs, ear muffs)	protecteurs auditifs (bouchons d’oreilles, protège-oreilles)
knee pads	genouillères
respirator (particulate and organic vapour)	respirateur (antiparticules et anti-vapeurs organiques)
safety footwear	chaussures de sécurité

safety glasses	lunettes de sécurité
showers	douches
storage containers for used oils and fuels	conteneurs d’entreposage pour les huiles et les carburants usagés

APPENDIX C
GLOSSARY / GLOSSAIRE

active restraint system	is a system you need to physically enable such as seat belts, passenger side airbag	**systèmes de retenue actifs**	système qu'il faut activer physiquement comme les ceintures de sécurité et le coussin gonflable passager
advanced electronic components	components that enhance occupants safety such as advanced warning, lane departure, adaptive cruise control, collision mitigation	**composants électroniques avancés**	composants qui améliorent la sécurité des occupants du véhicule, comme les systèmes évolués d'assistance au conducteur, l'avertisseur de sortie de voie, le régulateur de vitesse adaptatif et le système anti-collision
advanced driver-assistance systems	systems which automate, adapt and enhance vehicle systems for safety and better driving	**système avancé d'aide à la conduite**	système qui automatise, régule et améliore les systèmes du véhicule pour faciliter sa conduite et la rendre plus sûre
air bags	refers to inflatable restraints located in steering wheels, dashes, seats, doors, pillars, roof rails, and headliners	**coussins de sécurité gonflables**	dispositifs de retenue gonflables insérés dans le volant, le tableau de bord, les sièges, les portières, les montants, les longerons de toit et les garnitures de toit
air bag matrix	manufacturers' specifications for components that need to be replaced or checked in the event of a deployment	**matrice de coussins gonflables**	spécifications du fabricant pour les composants à remplacer ou à vérifier après un déploiement
detailing	all activities performed for final preparation for delivery to the customer; detailing includes but is not limited to installation of trim and accessories, cleaning and polishing	**vérification de l'esthétique**	toutes les activités effectuées dans le cadre de la préparation finale du véhicule en vue de la livraison au client, y compris l'installation des garnitures et des accessoires, le nettoyage et le polissage

frame and structural components	provide the vehicle with strength and structural integrity	**cadre et composants structuraux**	renforcent la résistance et l'intégrité structurale du véhicule
glass	a hard transparent substance that is laminated or tempered and sometimes tinted. Motor vehicle glass can be fixed as in windshields and rear windows or moveable as in side windows	**vitre**	substance transparente dure laminée ou trempée et parfois teintée; les vitres d'un véhicule peuvent être fixes (pare-brise et lunettes arrière) ou mobiles (vitres latérales)
glass hardware	glass hardware consists of moveable and adjustable parts and components that ensure the operation of moveable glass and consists of but is not limited to tracks, glass run channels, plastic guides, stops and regulators	**éléments de fixation des vitres**	pièces et composants mobiles et réglables garantissant le fonctionnement des vitres mobiles et comprenant entre autres les glissières, les coulisses, les guides en plastique, les butées et les lève-vitres
interior components	interior components consist of trim, upholstery and panels within the vehicle	**composants de l'habitacle**	garnitures, revêtements et panneaux à l'intérieur du véhicule
mechanical and electrical components	mechanical components consist of the moving parts that produce motion or a state of balance including suspension systems (steering and suspension), cooling systems, air conditioning systems, brake systems, fuel systems, the power train and the exhaust system. Electrical components are designed to perform a specific function (e.g. radio, defrost, cruise control) or to generate, store and distribute electricity (e.g. battery, charging system, relays)	**composants mécaniques et électriques**	composants mécaniques : pièces mobiles produisant un mouvement ou un balancement et comprenant le système de suspension (direction et suspension), le système de refroidissement, le système de conditionnement d'air, le système de freinage, le système d'alimentation en carburant, le groupe motopropulseur et le système d'échappement composants électriques : conçus pour des fonctions spécifiques (par exemple la radio, le dégivreur et le régulateur de vitesse) ou pour la génération, l'entreposage et la distribution de l'électricité aux composants électriques (par exemple la batterie, le système de charge et les relais)

outer body panels	portions of a motor vehicle that are attached to the frame or structural components of the vehicle by welding, bonding or by mechanical attachments	**panneaux de carrosserie**	parties d'un véhicule automobile attachées au cadre ou aux composants structuraux par soudage, collage ou par des moyens mécaniques
passive restraint systems	passive restraint systems include components such as dash, pads, head rest, collapsible steering columns and knee bolsters, motorized seat belts, air bags	**systèmes de retenue passifs**	dispositifs comprenant les composants comme le tableau de bord, les coussins, les appuie-têtes, les colonnes de direction télescopiques, les appuie-genoux, les ceintures de sécurité motorisées et les coussins de sécurité gonflables
refinishing	provides a smooth and level surface upon which paint will adhere, by sanding, filling, cleaning and priming the surface prior to, and including, the application of a final colour coat	**finition**	assure un fini lisse et uniforme auquel la peinture doit adhérer en ponçant, en remplissant, en nettoyant et en apprêtant la surface avant l'application de la dernière couche de couleur
restraint systems (also see definition for active and passive restraint systems)	restraint systems consist of passive or active safety components which provide occupants with injury protection in the event of a collision	**systèmes de retenue (voir aussi les définitions des systèmes de retenue actifs et passifs)**	dispositifs comportant des composants de sécurité actifs ou passifs protégeant les occupants dans l'éventualité d'une collision
structural components	any primary-stress-bearing portion of the body structure that affects its over-the-road performance or crash-worthiness	**composants structuraux**	toute surface primaire de la carrosserie supportant les contraintes qui a un effet sur le comportement routier ou sur la capacité de résistance aux chocs du véhicule
structural glass	a specific type of glass with a special design and installation process that adds to the structural integrity of the vehicle	**verre structurel**	type de verre dont la conception et l'installation particulières améliorent l'intégrité structurale du véhicule
unibody motor vehicle	vehicle design in which parts of the body structure serve as support for overall vehicle	**véhicule automobile monocoque**	véhicule conçu de façon à ce que sa structure serve de support à l'ensemble du véhicule