

SKILLED**TRADES**<sup>BC</sup>

PROGRAM OUTLINE

Auto Body and Collision Technician

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# **AUTO BODY AND COLLISION TECHNICIAN PROGRAM OUTLINE**

**APPROVED BY INDUSTRY  
MAY 2020**

**BASED ON  
RSOS 2019**

**Developed by  
SkilledTradesBC  
Province of British Columbia**

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# **Section 1**

## **INTRODUCTION**

### **Auto Body and Collision Technician**

## Foreword

This revised Program Outline is intended as a guide for instructors, apprentices, and employers of apprentices as well as for the use of industry organizations, regulatory bodies, and provincial and federal governments. It reflects updated standards based on the 2019 Red Seal Occupational Standard (RSOS). It was developed by British Columbia industry and instructor subject matter experts.

Practical instruction by demonstration and student participation should be integrated with classroom sessions. Safe working practices, even though not always specified in each operation or topic, are an implied part of the program and should be stressed throughout the apprenticeship.

This Program Outline includes a list of recommended reference textbooks that are available to support the learning objectives and the minimum shop requirements needed to support instruction.

Competencies are to be evaluated through written exams and practical assessments. A passing grade is achieved by getting an overall mark of 70%. See the Assessment Guidelines in Section 4 for more details.

Achievement Criteria are included for those competencies that require a practical assessment. The intent of including Achievement Criteria in the Program Outline is to ensure consistency in training across the many training institutions in British Columbia. Their purpose is to reinforce the theory and to provide a mechanism for evaluation of the learner's ability to apply the theory to practice. It is important that these performances be observable and measurable and that they reflect the skills spelled out in the competency. The conditions under which these performances will be observed and measured must be clear to the learner as well as the criteria by which the learner will be evaluated. The learner must also be given the evaluation criteria.

The performance spelled out in the Achievement Criteria is a suggested performance and is not meant to stifle flexibility of delivery. Training providers are welcome to substitute other practical performances that measure similar skills and attainment of the competency. Multiple performances may also be used to replace individual performances where appropriate.

### **SAFETY ADVISORY**

Be advised that references to the WorkSafeBC safety regulations contained within these materials do not/may not reflect the most recent Occupational Health and Safety Regulation (the current Standards and Regulation in BC can be obtained on the following website: <http://www.worksafebc.com>. Please note that it is always the responsibility of any person using these materials to inform him/herself about the Occupational Health and Safety Regulation pertaining to his/her work.

## **Acknowledgements**

The Credentialing Model was developed with the advice and direction of the Collision, Refinishing and Auto Glass focus group. Members include:

- Troy Campbell, Insurance Corporation of BC
- Darren Cox, Automotive Retailers Association
- Kyle Kushnir, Color Compass
- David Ribeiro, Automotive Retailers Association
- Kevin Walsh, Insurance Corporation of BC
- Tate Westerman, Doc's Autobody

The Program Outline was prepared with the advice and direction of a program review committee. Members include:

- Dave Cross, Vancouver Community College
- Mark Deroche, BC Institute Technology
- John Euloth, Okanagan College
- Byron Hyashi, College of New Caledonia
- Mike Japuncic, Craftsman Collision
- Kyle Kushnir, Color Compass
- Nick Penner, University of the Fraser Valley
- Oliver Teal, Auto Mind Collision Group
- Bianca Then, Craftsman Collision
- Norman Van der Linden, Don Beck Collision
- Tate Westerman, Doc's Auto Body

SkilledTradesBC would like to acknowledge the dedication and hard work of all representatives appointed to identify the training requirements of the Auto Body and Collision Technician occupation.

## How to Use this Document

This Program Outline has been developed for the use of individuals from several different audiences. The table below describes how each section can be used by each intended audience.

Section	Training Providers	Employers/ Sponsors	Apprentices	Challengers
<b>Program Credentialing Model</b>	Communicate program length and structure, and all pathways to completion	Understand the length and structure of the program	Understand the length and structure of the program, and pathway to completion	Understand challenger pathway to Certificate of Qualification
<b>Occupational Analysis Chart (OAC)</b>	Communicate the competencies that industry has defined as representing the scope of the occupation	Understand the competencies that an apprentice is expected to demonstrate in order to achieve certification	View the competencies they will achieve as a result of program completion	Understand the competencies they must demonstrate in order to challenge the program
<b>Training Topics and Suggested Time Allocation</b>	Shows proportionate representation of general areas of competency (GACs) at each program level, the suggested proportion of time spent on each GAC, and percentage of time spent on theory versus practical application	Understand the scope of competencies covered in the technical training, the suggested proportion of time spent on each GAC, and the percentage of that time spent on theory versus practical application	Understand the scope of competencies covered in the technical training, the suggested proportion of time spent on each GAC, and the percentage of that time spent on theory versus practical application	Understand the relative weightings of various competencies of the occupation on which assessment is based
<b>Program Content</b>	Defines the objectives, learning tasks, high level content that must be covered for each competency, as well as defining observable, measureable achievement criteria for objectives with a practical component.	Identifies detailed program content and performance expectations for competencies with a practical component; may be used as a checklist prior to signing a recommendation for certification (RFC) for an apprentice	Provides detailed information on program content and performance expectations for demonstrating competency	Allows individual to check program content areas against their own knowledge and performance expectations against their own skill levels



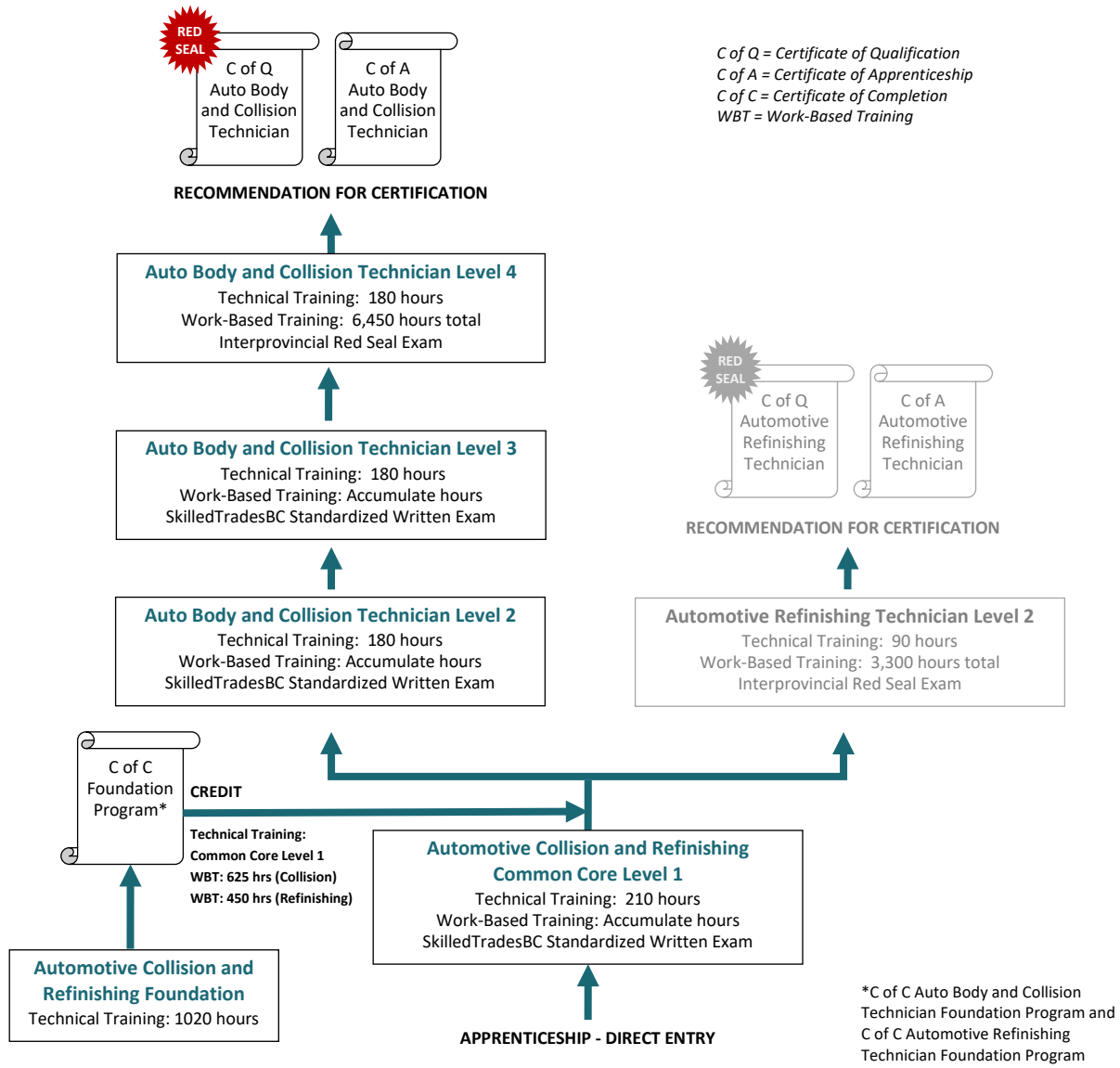
<b>Section</b>	<b>Training Providers</b>	<b>Employers/ Sponsors</b>	<b>Apprentices</b>	<b>Challengers</b>
<b>Training Provider Standards</b>	Defines the facility requirements, tools and equipment, reference materials (if any) and instructor requirements for the program	Identifies the tools and equipment an apprentice is expected to have access to; which are supplied by the training provider and which the student is expected to own	Provides information on the training facility, tools and equipment provided by the school and the student, reference materials they may be expected to acquire, and minimum qualification levels of program instructors	Identifies the tools and equipment a tradesperson is expected to be competent in using or operating; which may be used or provided in a practical assessment
<b>Appendix - Acronyms Glossary and</b>			Defines program specific acronyms and terms	

## **Section 2**

# **PROGRAM OVERVIEW**

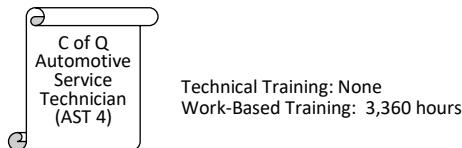
## **Auto Body and Collision Technician**

# Program Credentialing Model



**CROSS-PROGRAM CREDITS INTO COLLISION PROGRAM**

Individuals who hold the credentials listed below are entitled to receive partial credit toward the completion requirements of this program. This credit does not apply to the Refinishing program.



## Occupational Analysis Chart

### AUTO BODY AND COLLISION TECHNICIAN

**Occupation Description:**

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 include repairing scratches, minor damage, dents and extensive structural damage. Some components may need to be removed for access during repairs. Vehicle components that are damaged beyond repair are replaced. The alignment and replacement of suspension and steering components is also performed in this trade. Technicians may restore interior components of vehicles. They 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).

Many auto body and collision technicians work in close contact with automotive refinishing technicians and tend to work in multi-shop companies, independent, restoration or dealership shops. They may also work with estimators, partspersons, detailers, preppers, glass installers and production managers. 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.

CC1 = Automotive Collision and Refinishing Common Core Level 1

R-2 = Automotive Refinishing Technician Level 2 **only**

C-2 = Auto Body and Collision Technician Level 2 **only**

2 = **Both** Refinishing and Collision Level 2

<b>PERFORM SAFETY-RELATED FUNCTIONS</b> <span style="float: right;">A</span>	Maintain safe work environment <span style="float: right;">A1</span>	Use personal protective equipment (PPE) and safety equipment <span style="float: right;">A2</span>																																	
	<table border="1"> <tr> <td>CC1</td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	CC1					<table border="1"> <tr> <td>CC1</td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	CC1																											
CC1																																			
CC1																																			
<b>USE TOOLS AND EQUIPMENT</b> <span style="float: right;">B</span>	Maintain hand and power tools <span style="float: right;">B1</span>	Use lifting equipment <span style="float: right;">B2</span>	Maintain spray booth <span style="float: right;">B3</span>	Maintain spray equipment <span style="float: right;">B4</span>	Maintain mixing equipment <span style="float: right;">B5</span>	Maintain shop equipment <span style="float: right;">B6</span>																													
	<table border="1"> <tr> <td>CC1</td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	CC1					<table border="1"> <tr> <td>CC1</td> <td>C-2</td> <td></td> <td></td> <td></td> </tr> </table>	CC1	C-2				<table border="1"> <tr> <td>CC1</td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	CC1					<table border="1"> <tr> <td>CC1</td> <td>2</td> <td></td> <td></td> <td></td> </tr> </table>	CC1	2				<table border="1"> <tr> <td>CC1</td> <td>2</td> <td></td> <td></td> <td></td> </tr> </table>	CC1	2				<table border="1"> <tr> <td>CC1</td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	CC1			
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CC1																																			

**Program Overview**

	Use curing and drying equipment B7 CC1 R-2	Maintain frame and unibody repair and measuring equipment B8 3 4	Use diagnostic equipment B9 3			
<b>USE WELDING EQUIPMENT</b> C	Use cutting and heating equipment C1 CC1	Use welding equipment C2 CC1 C-2 3	Maintain welding equipment C3 CC1 C-2			
<b>ORGANIZE WORK AND USE DOCUMENTATION</b> D	Organize parts, materials and work area D1 CC1 C-2	Use documentation D2 CC1 R-2	Perform inspections D3 CC1 R-2	Organize production schedule D4 CC1 R-2	Prepare repair plan D5 2	Prepare estimates and supplements D6 R-2 3 4
<b>USE COMMUNICATION AND MENTORING TECHNIQUES</b> E	Use communication techniques E1 CC1	Use mentoring techniques E2 R-2 4				
<b>REMOVE AND INSTALL VEHICLE COMPONENTS</b> F	Identify vehicle components F1 CC1	Remove trim and hardware F2 CC1	Install trim and hardware F3 CC1			
<b>PREPARE SURFACE</b> G	Perform initial preparation G1 CC1	Mask surface G2 CC1 R-2	Strip surface G3 CC1	Sand surface G4 CC1		

**Program Overview**

<b>USE REPAIR MATERIALS AND EQUIPMENT</b> H	Mix repair materials H1	Prepare spray booth H2	Perform spray gun set up H3	Apply repair materials H4		
	CC1	CC1   2	CC1   2	CC1		
<b>APPLY REFINISHING MATERIALS</b> I	Mix refinishing materials I1	Apply primer sealers I2	Apply single-stage paint I3	Apply base coat/clear coat I4	Troubleshoot refinish problems I5	Perform colour adjustment I6
	CC1   2	CC1   2	CC1   2	CC1   2	R-2	2
<b>PERFORM POST-REFINISHING FUNCTIONS</b> J	Remove masking materials J1	Correct surface imperfections J2	Perform final check J3			
	R-2	2	R-2			
<b>REMOVE, REPAIR AND INSTALL METAL PANELS AND COMPONENTS</b> K	Identify fundamentals of vehicle construction, metal and damage K1	Prepare metal panels and components for repair K2	Remove metal panels and components K3	Repair metal panels and components K4	Install metal panels and components K5	
	CC1   C-2	CC1	CC1	CC1   C-2	CC1	
<b>REMOVE, REPAIR AND INSTALL PLASTIC AND COMPOSITE PANELS AND COMPONENTS</b> L	Identify fundamentals of plastics and composite panels and components L1	Prepare plastic and composite panels and components for repair L2	Remove plastic and composite panels and components L3	Repair plastic and composite panels and components L4	Install plastic and composite panels and components L5	
	CC1   C-2	CC1   C-2	CC1   C-2	CC1   C-2	CC1   C-2	
<b>DETAIL EXTERIOR</b> M	Remove minor imperfections M1	Clean exterior and interior of vehicle M2				
	CC1	CC1				

<b>PERFORM FINAL INSPECTIONS</b> <span style="float: right;">N</span>	Perform final operational check <span style="float: right;">N1</span>	Perform final quality control inspections <span style="float: right;">N2</span>												
	<table border="1" style="width: 100%;"> <tr> <td style="width: 25%;"></td> <td style="width: 25%; text-align: center;">3</td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> </tr> </table>		3			<table border="1" style="width: 100%;"> <tr> <td style="width: 25%;"></td> <td style="width: 25%; text-align: center;">4</td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> </tr> </table>			4					
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	4													
<b>APPLY CORROSION PROTECTION AND SOUND DEADENING MATERIALS</b> <span style="float: right;">O</span>	Apply corrosion inhibitors and undercoats <span style="float: right;">O1</span>	Apply seam sealers and sound deadeners <span style="float: right;">O2</span>												
	<table border="1" style="width: 100%;"> <tr> <td style="width: 25%;"></td> <td style="width: 25%; text-align: center;">C-2</td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> </tr> </table>		C-2			<table border="1" style="width: 100%;"> <tr> <td style="width: 25%;"></td> <td style="width: 25%; text-align: center;">C-2</td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> </tr> </table>			C-2					
	C-2													
	C-2													
<b>PREPARE FOR STRUCTURAL REPAIR</b> <span style="float: right;">P</span>	Identify extent of damage <span style="float: right;">P1</span>	Remove components for access <span style="float: right;">P2</span>	Perform vehicle set up <span style="float: right;">P3</span>											
	<table border="1" style="width: 100%;"> <tr> <td style="width: 25%;"></td> <td style="width: 25%; text-align: center;">3</td> <td style="width: 25%; text-align: center;">4</td> <td style="width: 25%;"></td> </tr> </table>		3	4		<table border="1" style="width: 100%;"> <tr> <td style="width: 25%;"></td> <td style="width: 25%; text-align: center;">3</td> <td style="width: 25%; text-align: center;">4</td> <td style="width: 25%;"></td> </tr> </table>		3	4		<table border="1" style="width: 100%;"> <tr> <td style="width: 25%;"></td> <td style="width: 25%; text-align: center;">3</td> <td style="width: 25%; text-align: center;">4</td> <td style="width: 25%;"></td> </tr> </table>		3	4
	3	4												
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	3	4												
<b>REMOVE, REPAIR AND INSTALL STRUCTURAL COMPONENTS</b> <span style="float: right;">Q</span>	Repair structural components <span style="float: right;">Q1</span>	Remove structural components <span style="float: right;">Q2</span>	Install structural components <span style="float: right;">Q3</span>											
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	3	4												
	3													
	3													
<b>REMOVE, INSTALL AND REPAIR STRUCTURAL AND LAMINATED GLASS</b> <span style="float: right;">R</span>	Remove structural glass <span style="float: right;">R1</span>	Install structural glass <span style="float: right;">R2</span>	Repair laminated glass <span style="float: right;">R3</span>											
	<table border="1" style="width: 100%;"> <tr> <td style="width: 25%;"></td> <td style="width: 25%; text-align: center;">C-2</td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> </tr> </table>		C-2			<table border="1" style="width: 100%;"> <tr> <td style="width: 25%;"></td> <td style="width: 25%; text-align: center;">C-2</td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> </tr> </table>		C-2			<table border="1" style="width: 100%;"> <tr> <td style="width: 25%;"></td> <td style="width: 25%; text-align: center;">C-2</td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> </tr> </table>		C-2	
	C-2													
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	C-2													
<b>REMOVE AND INSTALL NON-STRUCTURAL GLASS</b> <span style="float: right;">S</span>	Remove non-structural glass <span style="float: right;">S1</span>	Install non-structural glass <span style="float: right;">S2</span>												
	<table border="1" style="width: 100%;"> <tr> <td style="width: 25%;"></td> <td style="width: 25%; text-align: center;">C-2</td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> </tr> </table>		C-2			<table border="1" style="width: 100%;"> <tr> <td style="width: 25%;"></td> <td style="width: 25%; text-align: center;">C-2</td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> </tr> </table>			C-2					
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	C-2													

**Program Overview**

<b>DEACTIVATE AND REACTIVATE ALTERNATE-FUEL SYSTEMS</b> <b>T</b>	Deactivate alternate-fuel systems  T1	Reactivate alternate-fuel systems  T2			
	3	3			
<b>REMOVE AND INSTALL MECHANICAL COMPONENTS</b> <b>U</b>	Identify fundamentals of heating and cooling systems and components U1	Identify fundamentals of powertrain systems and components U2	Identify fundamentals of steering, suspension and braking systems U3	Remove mechanical components U4	Install mechanical components U5
	3	3	4	3 4	3 4
<b>REMOVE, REPAIR AND INSTALL ELECTRICAL AND ELECTRONIC COMPONENTS</b> <b>V</b>	Identify fundamentals of electrical systems and components V1	Remove electrical components V2	Repair damaged wires and protective coverings V3	Install electrical components V4	Service advanced electronic components V5
	3	3	3	3	3 4
<b>REPAIR AND REPLACE INTERIOR COMPONENTS</b> <b>W</b>	Repair interior components W1	Replace interior components W2			
	C-2	C-2			
<b>SERVICE SUPPLEMENTAL RESTRAINT SYSTEMS (SRS)</b> <b>X</b>	Service seat belt restraint systems X1	Service air bags and related components X2			
	3	3			



## Training Topics and Suggested Time Allocation

### AUTOMOTIVE COLLISION AND REFINISHING – COMMON CORE LEVEL 1

		% of Time Allocated to:			
		% of Time	Theory	Practical*	Total
<b>Line A</b>	<b>PERFORM SAFETY-RELATED FUNCTIONS</b>	<b>5%</b>	<b>100%</b>	<b>0%</b>	<b>100%</b>
A1	Maintain safe work environment		✓		
A2	Use personal protective equipment (PPE) and safety equipment		✓		
<b>Line B</b>	<b>USE TOOLS AND EQUIPMENT</b>	<b>8%</b>	<b>70%</b>	<b>30%</b>	<b>100%</b>
B1	Maintain hand and power tools		✓		
B2	Use lifting equipment		✓	✓	
B3	Maintain spray booth		✓		
B4	Maintain spray equipment		✓	✓	
B5	Maintain mixing equipment		✓	✓	
B6	Maintain shop equipment		✓		
B7	Use curing and drying equipment		✓	✓	
<b>Line C</b>	<b>USE WELDING EQUIPMENT</b>	<b>14%</b>	<b>50%</b>	<b>50%</b>	<b>100%</b>
C1	Use cutting and heating equipment		✓	✓	
C2	Use welding equipment		✓	✓	
C3	Maintain welding equipment		✓		
<b>Line D</b>	<b>ORGANIZE WORK AND USE DOCUMENTATION</b>	<b>3%</b>	<b>80%</b>	<b>20%</b>	<b>100%</b>
D1	Organize parts, materials and work area		✓	✓	
D2	Use documentation		✓	✓	
D3	Perform inspections		✓	✓	
D4	Organize production schedule		✓		
<b>Line E</b>	<b>USE COMMUNICATION AND MENTORING TECHNIQUES</b>	<b>3%</b>	<b>90%</b>	<b>10%</b>	<b>100%</b>
E1	Use communication techniques		✓	✓	
<b>Line F</b>	<b>REMOVE AND INSTALL VEHICLE COMPONENTS</b>	<b>13%</b>	<b>30%</b>	<b>70%</b>	<b>100%</b>
F1	Identify vehicle components		✓		
F2	Remove trim and hardware		✓	✓	
F3	Install trim and hardware		✓	✓	
<b>Line G</b>	<b>PREPARE SURFACE</b>	<b>18%</b>	<b>30%</b>	<b>70%</b>	<b>100%</b>
G1	Perform initial preparation		✓	✓	
G2	Mask surface		✓	✓	
G3	Strip surface		✓		
G4	Sand surface		✓	✓	
<b>Line H</b>	<b>USE REPAIR MATERIALS AND EQUIPMENT</b>	<b>5%</b>	<b>20%</b>	<b>80%</b>	<b>100%</b>
H1	Mix repair materials		✓	✓	
H2	Prepare spray booth		✓	✓	
H3	Perform spray gun set up		✓	✓	
H4	Apply repair materials		✓	✓	

		% of Time Allocated to:			
		% of Time	Theory	Practical*	Total
<b>Line I</b>	<b>APPLY REFINISHING MATERIALS</b>	<b>5%</b>	<b>60%</b>	<b>40%</b>	<b>100%</b>
I1	Mix refinishing materials		✓	✓	
I2	Apply primer sealers		✓	✓	
I3	Apply single-stage paint		✓	✓	
I4	Apply base coat/clear coat		✓	✓	
<b>Line K</b>	<b>REMOVE, REPAIR AND INSTALL METAL PANELS AND COMPONENTS</b>	<b>15%</b>	<b>60%</b>	<b>40%</b>	<b>100%</b>
K1	Identify fundamentals of vehicle construction, metal and damage		✓		
K2	Prepare metal panels and components for repair		✓	✓	
K3	Remove metal panels and components		✓	✓	
K4	Repair metal panels and components		✓	✓	
K5	Install metal panels and components		✓	✓	
<b>Line L</b>	<b>REMOVE, REPAIR AND INSTALL PLASTIC AND COMPOSITE PANELS AND COMPONENTS</b>	<b>7%</b>	<b>30%</b>	<b>70%</b>	<b>100%</b>
L1	Identify fundamentals of plastics and composite panels and components		✓		
L2	Prepare plastic and composite panels and components for repair		✓	✓	
L3	Remove plastic and composite panels and components		✓		
L4	Repair plastic and composite panels and components		✓	✓	
L5	Install plastic and composite panels and components		✓		
<b>Line M</b>	<b>DETAIL EXTERIOR</b>	<b>4%</b>	<b>50%</b>	<b>50%</b>	<b>100%</b>
M1	Remove minor imperfections		✓	✓	
M2	Clean exterior and interior of vehicle		✓		
<b>Total Percentage for Automotive Collision and Refinishing Common Core Level 1</b>		<b>100%</b>			

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## Training Topics and Suggested Time Allocation

### AUTO BODY AND COLLISION TECHNICIAN – LEVEL 2

		% of Time Allocated to:			
		% of Time	Theory	Practical*	Total
<b>Line B</b>	<b>USE TOOLS AND EQUIPMENT</b>	<b>3%</b>	<b>30%</b>	<b>70%</b>	<b>100%</b>
B2	Use lifting equipment		✓	✓	
B4	Maintain spray equipment		✓	✓	
B5	Maintain mixing equipment		✓	✓	
<b>Line C</b>	<b>USE WELDING EQUIPMENT</b>	<b>11%</b>	<b>30%</b>	<b>70%</b>	<b>100%</b>
C2	Use welding equipment		✓	✓	
C3	Maintain welding equipment		✓		
<b>Line D</b>	<b>ORGANIZE WORK AND USE DOCUMENTATION</b>	<b>2%</b>	<b>50%</b>	<b>50%</b>	<b>100%</b>
D1	Organize parts, materials and work area		✓	✓	
D5	Prepare repair plan		✓	✓	
<b>Line H</b>	<b>USE REPAIR MATERIALS AND EQUIPMENT</b>	<b>2%</b>	<b>10%</b>	<b>90%</b>	<b>100%</b>
H2	Prepare spray booth		✓		
H3	Perform spray gun set up		✓	✓	
<b>Line I</b>	<b>APPLY REFINISHING MATERIALS</b>	<b>14%</b>	<b>90%</b>	<b>10%</b>	<b>100%</b>
I1	Mix refinishing materials		✓	✓	
I2	Apply primer sealers		✓	✓	
I3	Apply single-stage paint		✓		
I4	Apply base coat/clear coat		✓		
I6	Perform colour adjustment		✓		
<b>Line J</b>	<b>PERFORM POST-REFINISHING FUNCTIONS</b>	<b>3%</b>	<b>25%</b>	<b>75%</b>	<b>100%</b>
J2	Correct surface imperfections		✓	✓	
<b>Line K</b>	<b>REMOVE, REPAIR AND INSTALL METAL PANELS AND COMPONENTS</b>	<b>30%</b>	<b>40%</b>	<b>60%</b>	<b>100%</b>
K1	Identify fundamentals of vehicle construction, metal and damage		✓		
K4	Repair metal panels and components		✓	✓	
<b>Line L</b>	<b>REMOVE, REPAIR AND INSTALL PLASTIC AND COMPOSITE PANELS AND COMPONENTS</b>	<b>10%</b>	<b>50%</b>	<b>50%</b>	<b>100%</b>
L1	Identify fundamentals of plastics and composite panels and components		✓		
L2	Prepare plastic and composite panels and components for repair		✓	✓	
L3	Remove plastic and composite panels and components		✓		
L4	Repair plastic and composite panels and components		✓	✓	
L5	Install plastic and composite panels and components		✓		
<b>Line O</b>	<b>APPLY CORROSION PROTECTION AND SOUND DEADENING MATERIALS</b>	<b>6%</b>	<b>60%</b>	<b>40%</b>	<b>100%</b>

		% of Time Allocated to:			
		% of Time	Theory	Practical*	Total
O1	Apply corrosion inhibitors and undercoats		✓	✓	
O2	Apply seam sealers and sound deadeners		✓	✓	
<b>Line R</b>	<b>REMOVE, INSTALL AND REPAIR STRUCTURAL AND LAMINATED GLASS</b>	<b>6%</b>	<b>100%</b>	<b>0%</b>	<b>100%</b>
R1	Remove structural glass		✓		
R2	Install structural glass		✓		
R3	Repair laminated glass		✓		
<b>Line S</b>	<b>REMOVE AND INSTALL NON-STRUCTURAL GLASS</b>	<b>7%</b>	<b>40%</b>	<b>60%</b>	<b>100%</b>
S1	Remove non-structural glass		✓	✓	
S2	Install non-structural glass		✓		
<b>Line W</b>	<b>REPAIR AND REPLACE INTERIOR COMPONENTS</b>	<b>6%</b>	<b>100%</b>	<b>0%</b>	<b>100%</b>
W1	Repair interior components		✓		
W2	Replace interior components		✓		
<b>Total Percentage for Auto Body and Collision Technician Level 2</b>		<b>100%</b>			

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## Training Topics and Suggested Time Allocation

### AUTO BODY AND COLLISION TECHNICIAN – LEVEL 3

		% of Time Allocated to:			
		% of Time	Theory	Practical*	Total
<b>Line B</b>	<b>USE TOOLS AND EQUIPMENT</b>	<b>8%</b>	<b>80%</b>	<b>20%</b>	<b>100%</b>
B8	Maintain frame and unibody repair and measuring equipment		✓		
B9	Use diagnostic equipment		✓	✓	
<b>Line C</b>	<b>USE WELDING EQUIPMENT</b>	<b>7%</b>	<b>20%</b>	<b>80%</b>	<b>100%</b>
C2	Use welding equipment		✓	✓	
<b>Line D</b>	<b>ORGANIZE WORK AND USE DOCUMENTATION</b>	<b>3%</b>	<b>40%</b>	<b>60%</b>	<b>100%</b>
D6	Prepare estimates and supplements		✓	✓	
<b>Line N</b>	<b>PERFORM FINAL INSPECTIONS</b>	<b>2%</b>	<b>20%</b>	<b>80%</b>	<b>100%</b>
N1	Perform final operational check		✓	✓	
<b>Line P</b>	<b>PREPARE FOR STRUCTURAL REPAIR</b>	<b>13%</b>	<b>50%</b>	<b>50%</b>	<b>100%</b>
P1	Identify extent of damage		✓	✓	
P2	Remove components for access		✓		
P3	Perform vehicle set up		✓	✓	
<b>Line Q</b>	<b>REMOVE, REPAIR AND INSTALL STRUCTURAL COMPONENTS</b>	<b>13%</b>	<b>50%</b>	<b>50%</b>	<b>100%</b>
Q1	Repair structural components		✓		
Q2	Remove structural components		✓		
Q3	Install structural components		✓	✓	
<b>Line T</b>	<b>DEACTIVATE AND REACTIVATE ALTERNATE-FUEL SYSTEMS</b>	<b>3%</b>	<b>90%</b>	<b>10%</b>	<b>100%</b>
T1	Deactivate alternate-fuel systems		✓	✓	
T2	Reactivate alternate-fuel systems		✓		
<b>Line U</b>	<b>REMOVE AND INSTALL MECHANICAL COMPONENTS</b>	<b>18%</b>	<b>100%</b>	<b>0%</b>	<b>100%</b>
U1	Identify fundamentals of heating and cooling systems and components		✓		
U2	Identify fundamentals of powertrain systems and components		✓		
U4	Remove mechanical components		✓		
U5	Install mechanical components		✓		
<b>Line V</b>	<b>REMOVE, REPAIR AND INSTALL ELECTRICAL AND ELECTRONIC COMPONENTS</b>	<b>26%</b>	<b>70%</b>	<b>30%</b>	<b>100%</b>
V1	Identify fundamentals of electrical systems and components		✓	✓	
V2	Remove electrical components		✓		
V3	Repair damaged wires and protective coverings		✓	✓	
V4	Install electrical components		✓		
V5	Service advanced electronic components		✓		

		% of Time Allocated to:			
Line X		% of Time	Theory	Practical*	Total
	<b>SERVICE SUPPLEMENTAL RESTRAINT SYSTEMS (SRS)</b>	<b>7%</b>	<b>100%</b>	<b>0%</b>	<b>100%</b>
X1	Service seat belt restraint systems		✓		
X2	Service air bags and related components		✓		
<b>Total Percentage for Auto Body and Collision Technician Level 3</b>		<b>100%</b>			

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## Training Topics and Suggested Time Allocation

### AUTO BODY AND COLLISION TECHNICIAN – LEVEL 4

		% of Time Allocated to:			
		% of Time	Theory	Practical*	Total
<b>Line B</b>	<b>USE TOOLS AND EQUIPMENT</b>	3%	100%	0%	100%
B8	Maintain frame and unibody repair and measuring equipment		✓		
<b>Line D</b>	<b>ORGANIZE WORK AND USE DOCUMENTATION</b>	7%	50%	50%	100%
D6	Prepare estimates and supplements		✓	✓	
<b>Line E</b>	<b>USE COMMUNICATION AND MENTORING TECHNIQUES</b>	7%	100%	0%	100%
E2	Use mentoring techniques		✓		
<b>Line N</b>	<b>PERFORM FINAL INSPECTIONS</b>	2%	25%	75%	100%
N2	Perform final quality control inspections		✓	✓	
<b>Line P</b>	<b>PREPARE FOR STRUCTURAL REPAIR</b>	22%	40%	60%	100%
P1	Identify extent of damage		✓	✓	
P2	Remove components for access		✓		
P3	Perform vehicle set up		✓	✓	
<b>Line Q</b>	<b>REMOVE, REPAIR AND INSTALL STRUCTURAL COMPONENTS</b>	25%	25%	75%	100%
Q1	Repair structural components		✓	✓	
<b>Line U</b>	<b>REMOVE AND INSTALL MECHANICAL COMPONENTS</b>	20%	75%	25%	100%
U3	Identify fundamentals of steering, suspension and braking systems		✓		
U4	Remove mechanical components		✓	✓	
U5	Install mechanical components		✓	✓	
<b>Line V</b>	<b>REMOVE, REPAIR AND INSTALL ELECTRICAL AND ELECTRONIC COMPONENTS</b>	14%	100%	0%	100%
V5	Service advanced electronic components		✓		
<b>Total Percentage for Auto Body and Collision Technician Level 4</b>		<b>100%</b>			

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**Section 3**  
**PROGRAM CONTENT**  
**Auto Body and Collision Technician**



# **Common Core Level 1**

## **Automotive Collision and Refinishing**



**LEARNING TASKS**

**CONTENT**

- |                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>4. Use Workplace Hazardous Materials Information System (WHMIS)</p> | <ul style="list-style-type: none"> <li>○ Oxygen</li> <li>● Flammability             <ul style="list-style-type: none"> <li>○ Flash points</li> </ul> </li> <li>● Types of fires             <ul style="list-style-type: none"> <li>○ Class A, B, C and D fires</li> </ul> </li> <li>● Fire extinguishers</li> <li>● Fire prevention equipment             <ul style="list-style-type: none"> <li>○ Emergency fire blanket</li> </ul> </li> <li>● Precautions when working with flammable substances</li> <li>● Storage of flammable materials             <ul style="list-style-type: none"> <li>○ Gasoline</li> <li>○ Solvents</li> </ul> </li> </ul><br><ul style="list-style-type: none"> <li>● WHMIS             <ul style="list-style-type: none"> <li>○ Right to know</li> <li>○ Worker education</li> <li>○ Product identification</li> </ul> </li> <li>● Roles and responsibilities             <ul style="list-style-type: none"> <li>○ Employers</li> <li>○ Suppliers</li> <li>○ Workers</li> </ul> </li> <li>● Labelling             <ul style="list-style-type: none"> <li>○ Symbols</li> </ul> </li> <li>● Safety Data Sheets (SDS)             <ul style="list-style-type: none"> <li>○ Hazards</li> <li>○ Handling</li> <li>○ Ingredients</li> </ul> </li> <li>● Storage</li> <li>● Disposal</li> </ul> |
|------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**Line (GAC):**        **A    PERFORM SAFETY-RELATED FUNCTIONS**  
**Competency:**       **A2   Use personal protective equipment (PPE) and safety equipment**

**Objectives**

To be competent in this area, the individual must be able to:

- Use PPE.
- Describe safety equipment.

**LEARNING TASKS**

1. Use PPE

**CONTENT**

- Canadian Standards Association (CSA) approved
- Eye protection
  - Goggles
  - Glasses
  - Face shields
- Respiratory protection
  - Particulate mask
  - Air-supplied/breathable air
  - Cartridge
  - Fit test
- Skin protection
  - Gloves
    - Insulated
    - Nitrile
    - Leather
  - Coveralls
  - Barrier creams
- Foot/knee protection
- Hearing protection
- Selection
- Storage
- Maintenance
  
- Fire suppression systems
  - Extinguishers
  - Sprinklers
- Ventilation systems
- Eye wash stations
- Spill kits
- First aid kits

2. Describe safety equipment

**Line (GAC):**        **B    USE TOOLS AND EQUIPMENT**  
**Competency:**      **B1   Maintain hand and power tools**

**Objectives**

To be competent in this area, the individual must be able to:

- Describe the use of hand tools for collision and refinishing.
- Describe the use of power tools for collision and refinishing.

**LEARNING TASKS**

**CONTENT**

- |                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. Describe hand tools for collision and refinishing</p>  | <ul style="list-style-type: none"> <li>• Basic hand tools <ul style="list-style-type: none"> <li>○ Screwdrivers</li> <li>○ Sockets</li> <li>○ Wrenches</li> <li>○ Pliers</li> <li>○ Cutting tools</li> <li>○ Scraping tools</li> </ul> </li> <li>• Bumping and straightening tools <ul style="list-style-type: none"> <li>○ Hammers</li> <li>○ Dollies</li> <li>○ Spoons</li> <li>○ Picks/pry bars</li> </ul> </li> <li>• Material application tools</li> <li>• Removal and installation tools <ul style="list-style-type: none"> <li>○ Trim tools</li> </ul> </li> <li>• Sanding blocks</li> <li>• Measuring equipment <ul style="list-style-type: none"> <li>○ Tape measure</li> <li>○ Tram gauge</li> <li>○ Metric/imperial</li> </ul> </li> </ul> |
| <p>2. Describe the use of hand tools</p>                     | <ul style="list-style-type: none"> <li>• Hazards/safety <ul style="list-style-type: none"> <li>○ Recognizing worn, broken and defective hand tools</li> </ul> </li> <li>• Limitations</li> <li>• Torque specifications</li> <li>• Maintainance</li> <li>• Storage</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <p>3. Describe power tools for refinishing and collision</p> | <ul style="list-style-type: none"> <li>• Power source <ul style="list-style-type: none"> <li>○ Electric/cordless</li> <li>○ Pneumatic</li> <li>○ Hydraulic</li> </ul> </li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

**LEARNING TASKS**

**CONTENT**

- 4. Describe the use of power tools
  - Function/type
    - Blow guns
    - Heat guns
    - Polishers
    - Sanders
    - Grinders
    - Ratchets
    - Eraser wheels
    - Impact guns
    - Cutting tools
    - Body jack
    - Riveters
    - Sealing guns
    - Static mixer
  - Hazards/safety
    - Frayed cords
    - Cracked casings
    - Leaking lines
    - Work environment
  - Operating procedures
  - Limitations
  - Maintenance
  - Sharpening/dressing
  - Storage







**Line (GAC):**        **B    USE TOOLS AND EQUIPMENT**  
**Competency:**      **B4   Maintain spray equipment**

**Objectives**

To be competent in this area, the individual must be able to:

- Maintain spray equipment.

**LEARNING TASKS**

1. Describe spray equipment

**CONTENT**

- Spray gun types
  - Gravity feed
  - Pressure feed
  - Siphon feed
  - Electrostatic
- Spray gun components
  - Body
  - Trigger
  - Regulators
  - Air cap
  - Seals and packings
  - Spreader adjustment
  - Fluid adjustment
  - Fluid nozzle
  - Fluid needle
  - Cup
- Nitrogen generators
- Anti-static guns

2. Maintain spray equipment

- Inspection
- Cleaning
- Lubrication
- Disassembly and reassembly
  - Specialty wrenches
- Storage

**Achievement Criteria**

**Performance**    The learner will perform spray equipment maintenance and test spray.

**Conditions**      The learner will be given:

- Spray equipment
- Task guideline
- Necessary materials

**Criteria**         The learner will be evaluated on:

- Safety
- Tool use
- Environmental practices
- Assembly and disassembly
- Spray equipment cleanliness and performance

**Line (GAC):**        **B    USE TOOLS AND EQUIPMENT**  
**Competency:**      **B5    Maintain mixing equipment**

**Objectives**

To be competent in this area, the individual must be able to:

- Use paint manufacturers’ equipment.

**LEARNING TASKS**

**CONTENT**

1. Describe paint manufacturers’ equipment

- Computers and software
- Scales
- Agitating machines
- Mixing sticks
- Cups
- Shakers
- Spectrophotometers
- Colour corrective light
- Colour chips/variant deck

2. Use paint manufacturers’ equipment

- Navigating software
- Updating software
- Mixing product
- Equipment maintenance

**Line (GAC):**        **B    USE TOOLS AND EQUIPMENT**  
**Competency:**     **B6   Maintain shop equipment**

**Objectives**

To be competent in this area, the individual must be able to:

- Describe shop equipment for collision and refinishing.
- Describe the maintenance of shop equipment for collision and refinishing.

**LEARNING TASKS**

1. Describe shop equipment for collision and refinishing

**CONTENT**

- Stud welder
  - Dent puller
  - Welding equipment
    - Resistance spot welders
    - Plastic welders
    - Gas Metal Arc Welding (GMAW)
    - Surge protectors
  - Battery chargers and boosters
  - Hydraulic body jack
  - Stands
  - Scan tools
  - Pulling equipment
  - Paintless
  - Hydraulic
    - Jacks
    - Lifts
  - Air dryer
    - Refrigerant
    - Dessicant
  - Gun washers
  - Track systems
  - Drying equipment
    - Infra-red lamps
    - Ultra Violet (UV) lamps
  - Extractors
  - Masking machines
  - Paper compactors
- 
- Types
    - Diaphragm
    - Piston
    - Rotary

2. Describe air compressors

**LEARNING TASKS**

3. Describe the maintenance of shop equipment for collision and refinishing

**CONTENT**

- Properties
  - Air pressure
  - Volume
  - Displacement
  - Pressure loss
  
- Lubrication
- Cleaning
- Consumables replacement
- Unsafe tools
- Storage



**Line (GAC):** C **USE WELDING EQUIPMENT**  
**Competency:** C1 **Use cutting and heating equipment**

**Objectives**

To be competent in this area, the individual must be able to:

- Use cutting and heating equipment.

**LEARNING TASKS**

1. Describe oxyacetylene

**CONTENT**

- Safety
  - PPE
  - Leak test (soap and water)
  - Drop hazards
  - Surroundings
  - Flint strikers
  - Shields
  - Cool-down time
  - Fire suppression
  - Hazardous substrates
  - Ventilation
  - Flashback
  - Heating on concrete
- Gas characteristics
  - Oxygen
  - Acetylene
- Purposes
  - Cutting
  - Heating
  - Shrinking

**LEARNING TASKS**

2. Describe oxyacetylene components

**CONTENT**

- Cylinders
  - Oxygen
    - One-piece cylinder
    - Safety devices
    - High pressure
  - Acetylene
    - Two-piece cylinder
    - Safety devices
    - Low pressure
    - Filler material (acetone)
- Regulators
  - Single stage
  - Two stage
  - Pressure adjustments
  - Cleanliness
- Hoses
  - Colours
  - Maintenance
  - Fittings
    - Grooved (acetylene)
    - Smooth (oxygen)
- Torches
  - Valves
  - Tips
    - Welding
    - Cutting
    - Heating
- Flashback arresters

3. Perform oxyacetylene procedures

- Cracking cylinders
- Attaching regulators
- Hoses, fittings and arresters
- Regulator diaphragm care
- Leak checks
- Relationship between
  - Tip size and material thickness
  - Tip size and gas pressure
- Lighting procedures
- Flames
  - Carburizing



**LEARNING TASKS**

**CONTENT**

4. Describe plasma arc cutting

- Neutral
- Oxidizing
- Shutdown procedures
- Heating procedures
  - Controlling expansion
  - Shrinking
- Cutting procedures
- Storage of oxyacetylene equipment
  
- Operating procedures
  - Equipment set up
  - Gun angle and speed
  - Penetration
- Compressed air and tips
- Material identification
- Maintenance
- Storage
- Potential hazards
- Cutting area
- Limitations
- Gouging feature

**Achievement Criteria**

Performance	The learner will perform oxyacetylene set up, cutting, heating and shut down.
Conditions	The learner will be given <ul style="list-style-type: none"> <li>• Oxyacetylene equipment</li> <li>• Steel</li> </ul>
Criteria	The learner will be evaluated on <ul style="list-style-type: none"> <li>• Safety</li> <li>• Procedure</li> <li>• Technique</li> <li>• Accuracy</li> </ul>



**LEARNING TASKS**

**CONTENT**

- |    |                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4. | Describe the set up procedures for GMAW/MIG welding | <ul style="list-style-type: none"> <li>• Cool down time</li> <li>• Manufacturer suggested settings               <ul style="list-style-type: none"> <li>○ Chart</li> </ul> </li> <li>• Drive roller pressure</li> <li>• Wire speed (current)</li> <li>• Wire stick out</li> <li>• Voltage (heat) selection</li> <li>• Shielding gas flow rate</li> <li>• Grounding methods               <ul style="list-style-type: none"> <li>○ Direct Current (DC) reverse polarity</li> <li>○ DC straight polarity</li> </ul> </li> <li>• Troubleshooting weld defects</li> </ul> |
| 5. | Perform a butt weld <b>without</b> backing          | <ul style="list-style-type: none"> <li>• Gun angle and speed</li> <li>• Penetration</li> <li>• Build-up</li> <li>• Consistent bead width</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 6. | Perform a lap weld                                  | <ul style="list-style-type: none"> <li>• Gun angle and speed</li> <li>• Penetration</li> <li>• Build-up</li> <li>• Consistent bead width</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 7. | Perform various size plug welds                     | <ul style="list-style-type: none"> <li>• Gun angle and speed</li> <li>• Penetration</li> <li>• Build-up</li> <li>• Complete closure of plug hole</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                           |

**Achievement Criteria**

- |             |                                                                                                                                                                                                            |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Performance | The learner will perform welds on 22-gauge steel in flat position, including <ul style="list-style-type: none"> <li>• Butt weld <b>without</b> backing</li> <li>• Lap weld</li> <li>• Plug weld</li> </ul> |
| Conditions  | The learner will be given <ul style="list-style-type: none"> <li>• Welding equipment</li> <li>• Sheet metal</li> </ul>                                                                                     |
| Criteria    | The learner will be evaluated on <ul style="list-style-type: none"> <li>• Safety</li> </ul>                                                                                                                |

- Procedure
- Technique
- Destructive testing

**Line (GAC):** C **USE WELDING EQUIPMENT**  
**Competency:** C3 **Maintain welding equipment**

**Objectives**

To be competent in this area, the individual must be able to:

- Describe the maintenance of welding equipment.

**LEARNING TASKS**

1. Describe the maintenance of welding equipment

**CONTENT**

- Checking and replacing parts
  - Wire spool
  - Liner
  - Trigger connections
  - Main hose assembly
  - Gas diffuser
  - Contact tip
  - Nozzle
  - Ground (work) clamp
  - Cables
  - Drive rollers
- Securing cylinders
- Leak tests
- Cleaning interior
- Welding carts
- Storage

<b>Line (GAC):</b>	<b>D</b>	<b>ORGANIZE WORK AND USE DOCUMENTATION</b>
<b>Competency:</b>	<b>D1</b>	<b>Organize parts, materials and work area</b>

**Objectives**

To be competent in this area, the individual must be able to:

- Organize parts, materials and work area with close supervision.

**LEARNING TASKS**

1. Organize parts, materials and work area with close supervision

**CONTENT**

- Repair planning
- Parts and equipment management
  - Storage location
  - Labelling
  - Tool and material requirements
  - Notifying supervisor of missing or damaged parts
- Time management
  - Work flow
  - Timing of repair steps
  - Avoidance of repetitive repair steps
- Work area preparation
  - Tool selection and layout
  - Housekeeping

**Line (GAC):**        **D    ORGANIZE WORK AND USE DOCUMENTATION**  
**Competency:**      **D2   Use documentation**

**Objectives**

To be competent in this area, the individual must be able to:

- Interpret specifications and procedures.
- Use paint manufacturers' software.

**LEARNING TASKS**

**CONTENT**

- |                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Interpret trade terminology              | <ul style="list-style-type: none"> <li>• Removal and Repair (R &amp; R)</li> <li>• R &amp; I</li> <li>• Refinish</li> <li>• Edge/inner</li> <li>• Multi-stage</li> <li>• Overhaul (O/H)</li> <li>• Judgement Time (JT)</li> <li>• Old damage (OD)</li> </ul>                                                                                                                                                                     |
| 2. Locate and interpret vehicle information | <ul style="list-style-type: none"> <li>• Paint code</li> <li>• Manufacturer</li> <li>• Model</li> <li>• Year</li> <li>• Vehicle Identification Number (VIN)</li> </ul>                                                                                                                                                                                                                                                           |
| 3. Use specifications and procedures        | <ul style="list-style-type: none"> <li>• Original Equipment Manufacturer (OEM)</li> <li>• Non-OEM</li> <li>• Access <ul style="list-style-type: none"> <li>○ Online</li> <li>○ Hard copy</li> <li>○ Manuals</li> <li>○ Bulletins</li> </ul> </li> <li>• Interpretation <ul style="list-style-type: none"> <li>○ Paint formulas</li> <li>○ Product information</li> <li>○ Procedure</li> </ul> </li> <li>• Application</li> </ul> |
| 4. Identify environmental regulations       | <ul style="list-style-type: none"> <li>• Jurisdictional Regulations <ul style="list-style-type: none"> <li>○ National</li> <li>○ Provincial</li> </ul> </li> </ul>                                                                                                                                                                                                                                                               |

**LEARNING TASKS**

**CONTENT**

- |    |                                            |                                                                                                                                                                                                                                                                                                                                                                                  |
|----|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5. | Describe compliance documentation          | <ul style="list-style-type: none"> <li>○ Municipal           <ul style="list-style-type: none"> <li>● Hazardous waste disposal</li> <li>● VOC</li> <li>● Spills</li> </ul> </li> <li>● Spill kit usage</li> <li>● Hazardous materials log</li> <li>● Booth filter replacement log</li> <li>● Service records</li> </ul>                                                          |
| 6. | Interpret repair documentation             | <ul style="list-style-type: none"> <li>● Damage report</li> <li>● Work order</li> <li>● Estimate</li> </ul>                                                                                                                                                                                                                                                                      |
| 7. | Describe the insurance claim process in BC | <ul style="list-style-type: none"> <li>● Accreditation</li> <li>● Public insurance</li> <li>● Private insurance</li> </ul>                                                                                                                                                                                                                                                       |
| 8. | Use paint manufacturers' software          | <ul style="list-style-type: none"> <li>● Software           <ul style="list-style-type: none"> <li>○ Apps</li> <li>○ Technical data sheets (TDS)</li> <li>○ SDS</li> <li>○ Mixing ratios</li> <li>○ Tracking               <ul style="list-style-type: none"> <li>▪ Product inventory</li> <li>▪ Product usage</li> <li>▪ VOC</li> <li>▪ Cost</li> </ul> </li> </ul> </li> </ul> |



**Line (GAC):** D ORGANIZE WORK AND USE DOCUMENTATION  
**Competency:** D3 Perform inspections

**Objectives**

To be competent in this area, the individual must be able to:

- Perform inspections of coatings.
- Inspect body repairs.

**LEARNING TASKS**

1. Perform visual inspection of coatings

**CONTENT**

- Damage identification
  - Environmental
    - Acid rain
    - Tree sap
    - Industrial fall out
    - UV damage
  - Stone chips
  - Corrosion
  - Brake dust
  - Scratches and dents
- Surface conditions
  - Colour mismatch
  - Checking
  - Adhesion
- Confirmation of work order

2. Perform surface evaluation tests

- Solvent
- Tape
- Mil thickness

3. Inspect body repairs

- Sand scratches
- Featheredge
- Pinholes
- Panel alignment
- Body lines
- Contour
- Missed damage
- Pre-existing damage

**Line (GAC):**           **D    ORGANIZE WORK AND USE DOCUMENTATION**  
**Competency:**       **D4   Organize production schedule**

**Objectives**

To be competent in this area, the individual must be able to:

- Describe repair process and timelines.
- Communicate with technicians.

**LEARNING TASKS**

**CONTENT**

1. Describe repair process

- Shop layout
- Job duties
- Workflow
  - Inspection
  - Estimate
  - Order parts
  - Pre- and post- scan
  - Body repair
  - Prep
  - Refinish
    - Blend areas
    - Cut-off point
    - Colour match
  - Reassembly
  - Detail
  - Final inspection

2. Describe process timelines

- Cycle time
- Dry/cure time
- Flash time

3. Communicate with technicians

- Impacts on production schedule
- Impacts on costs
- Problem solving

**Line (GAC):** E **USE COMMUNICATION AND MENTORING TECHNIQUES**  
**Competency:** E1 **Use communication techniques**

**Objectives**

To be competent in this area, the individual must be able to:

- Use communication techniques.

**LEARNING TASKS**

**CONTENT**

- |                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. Describe shop roles and responsibilities</p> | <ul style="list-style-type: none"> <li>• Technicians</li> <li>• Estimators</li> <li>• Detailer</li> <li>• Parts person</li> <li>• Administration</li> <li>• Management</li> </ul>                                                                                                                                                                                                                                                              |
| <p>2. Describe business relations</p>              | <ul style="list-style-type: none"> <li>• Employer/employee relations</li> <li>• Staff morale</li> <li>• Customer service</li> <li>• Relationship with the insurance industry</li> <li>• Professionalism</li> <li>• Clear communication</li> <li>• Conflict resolution</li> </ul>                                                                                                                                                               |
| <p>3. Use active listening</p>                     | <ul style="list-style-type: none"> <li>• Paying attention             <ul style="list-style-type: none"> <li>○ Eye contact</li> <li>○ Acknowledge speaker</li> <li>○ Mindful listening</li> <li>○ Don't interrupt</li> </ul> </li> <li>• Non-confrontational</li> <li>• Reflecting</li> <li>• Responding             <ul style="list-style-type: none"> <li>○ Verbally</li> <li>○ Non-verbally</li> <li>○ Appropriately</li> </ul> </li> </ul> |

**Line (GAC):** F REMOVE AND INSTALL VEHICLE COMPONENTS  
**Competency:** F1 Identify vehicle components

**Objectives**

To be competent in this area, the individual must be able to:

- Identify vehicle components.

**LEARNING TASKS**

1. Describe interior vehicle components

**CONTENT**

- Components
  - Seats
  - Steering wheel
  - Dash
  - Console
  - Headliner
  - Door panels
  - Carpet
  - Switches
  - Trim
  - Spare tire
  - Accessories
  - Air bags
- Removal
  - Tool selection
- Installation
  - Tool selection

2. Describe automotive glass

- Movable
- Stationary
- Types
  - Tempered
  - Laminated
- Characteristics
  - Safety
  - Clear
  - Tinted
  - Shaded
  - Heated
  - Electronics
- Regulators
- Application
- NAGS (National Auto Glass Specifications)

**LEARNING TASKS**

**CONTENT**

3. Describe exterior components

- Mountings
  - Mechanical
  - Gasket
  - Adhesive
  
- Mouldings
  - Belt
  - Side
  - Rocker
- Roof racks
- Door handles
- Mirrors
- Wipers
- Bumpers
  - Cover
  - Reinforcement bar
  - Filler panels
  - Impact absorbers
  - Sensors
  - Camera
  - Brackets or braces
- Lights
- Antennas
- Cameras
- Cladding
- Emblems
- Name plates
- Badges
- After market

4. Describe decals and striping

- Decals
  - OEM
  - Aftermarket
  - Vinyl
  - Clear/mylar (OEM stone guard)
  - Applique (black-out tape)
  - Pressure sensitive
  - Reactive (adhesive)
- Striping
  - Accent stripes
- Wrapping

**LEARNING TASKS**

**CONTENT**

- Full body graphic
- Paint protection film

**Line (GAC):** F REMOVE AND INSTALL VEHICLE COMPONENTS  
**Competency:** F2 Remove trim and hardware

**Objectives**

To be competent in this area, the individual must be able to:

- Remove trim and hardware.
- Remove decals and striping.

**LEARNING TASKS**

**CONTENT**

1. Describe fasteners

- Types
  - Bolts
  - Nuts
  - Washers/insulators
  - Clips
  - Rivets
  - Moulding clips
  - Adhesives
  - Screws
- One-time use
- Functions
- Costs

2. Remove trim and hardware

- Reference resources
- Repair planning
- Vehicle protection
- Identification of electronic components
- Fastener identification
  - One-time use
  - Torque
- Tool selection
- Organization and storage of removed parts
- Identification of fasteners needing replacement

3. Remove decals and striping

- Eraser wheel
- Heat gun
- Plastic razor blade
- Release solvent

**Line (GAC):** F **REMOVE AND INSTALL VEHICLE COMPONENTS**  
**Competency:** F3 **Install trim and hardware**

**Objectives**

To be competent in this area, the individual must be able to:

- Install trim and accessories.
- Apply decals and striping.

**LEARNING TASKS**

**CONTENT**

- |                                     |                                                                                                                                                                                                                                                                                                                               |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Describe installation procedures | <ul style="list-style-type: none"> <li>• Fastener identification</li> <li>• Replacement procedures               <ul style="list-style-type: none"> <li>○ Torque specifications</li> </ul> </li> <li>• Replacement of retainers</li> <li>• Final operation/fit and finish</li> </ul>                                          |
| 2. Re-install reusable trim         | <ul style="list-style-type: none"> <li>• Mouldings</li> <li>• Name plates</li> <li>• Emblems</li> <li>• After-market trim and components</li> </ul>                                                                                                                                                                           |
| 3. Install trim and accessories     | <ul style="list-style-type: none"> <li>• Prep</li> <li>• Tools</li> <li>• Fasteners</li> <li>• Adhesives</li> <li>• Double-sided tape</li> <li>• Sequence to install</li> <li>• Prepare trim and accessories for installation</li> <li>• Fresh paint considerations</li> <li>• Protect surfaces</li> </ul>                    |
| 4. Apply decals and striping        | <ul style="list-style-type: none"> <li>• Clean surface</li> <li>• Cured surface</li> <li>• Decal location</li> <li>• Backer removal</li> <li>• Surface temperature</li> <li>• Manufacturers' specifications</li> <li>• Remove air bubbles</li> <li>• Wet set</li> <li>• Dry set</li> <li>• Equipment and materials</li> </ul> |



**LEARNING TASKS**

**CONTENT**

- Plastic razor blade/spreader
- Detergent
- Alcohol
- Water
- Tape
- Squeegee
- Knife
- Heat gun
- Application techniques
  - Sequence
  - Hinge method
- Wrapping (sublet)

**Achievement Criteria (FOR ALL OF LINE F)**

- |             |                                                                                                                                                                                      |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Performance | The learner will remove and install vehicle components, such as: <ul style="list-style-type: none"> <li>• Door handle</li> <li>• Side moulding</li> <li>• Side mirror</li> </ul>     |
| Conditions  | The learner will be given <ul style="list-style-type: none"> <li>• Reference resources</li> <li>• Vehicle</li> <li>• Trim and accessories</li> <li>• Tools</li> </ul>                |
| Criteria    | The learner will be evaluated on <ul style="list-style-type: none"> <li>• Safety</li> <li>• Method of removal</li> <li>• Method of installation</li> <li>• Fit and finish</li> </ul> |



**LEARNING TASKS**

3. Identify substrate condition

**CONTENT**

- Paint issues
  - Cracking
  - Rust
  - Checking
  - Excessive mil thickness
  - Poor adhesion
  - Checking
  - Bridging
  - Runs and sags
  - Orange peel
- Environmental damage



**LEARNING TASKS**

5. Remove masking for primer

**CONTENT**

- Bleed through
- Bridging and peeling
- Corrective procedures
  - Re-do
  - Solvent cleaning
  - Polish
  - Clay bar
- When to remove
- Techniques
  - Angle
  - Direction
- Disposal

**Line (GAC):**        **G    PREPARE SURFACE**  
**Competency:**      **G3   Strip surface**

**Objectives**

To be competent in this area, the individual must be able to:

- Describe paint removal techniques.

**LEARNING TASKS**

1. Describe paint removal techniques

**CONTENT**

- Chemical
  - Application
  - Neutralizing residue
- Mechanical
  - Sanding
  - Grinding
  - Scraping
  - Compressed air
- Media blasting
  - Silica
  - Plastic
  - Glass
  - Soda
- Considerations
  - Substrate
  - Heat management
  - Damage to adjacent panels
  - Cost
  - Time
  - Area

**Line (GAC):**        **G    PREPARE SURFACE**  
**Competency:**      **G4   Sand surface**

**Objectives**

To be competent in this area, the individual must be able to:

- Sand surface.

**LEARNING TASKS**

1. Describe sanding materials

**CONTENT**

- Paper
  - Open coat/closed coat
  - Wet/dry
  - Sizes
  - Grit
  - Backing
- Attachment methods
  - Velcro
  - Adhesive
  - Mandrel (twist on)
- Scuff pads
- Scuff paste
- Guide coats

2. Describe sanding equipment

- Machine
  - Single action
  - Dual action
  - Inline
- Blocks/pads
  - Soft
  - Hard
- Vacuum assist
- Ventilation

**LEARNING TASKS**

3. Use sanding techniques and procedures

**CONTENT**

- Sanding area
  - Existing finish
  - Repair area
  - Raw substrate
  - Blend panel
- Techniques
  - Wet or dry
  - Hand
  - Block
  - Cross-hatching
  - Feather-edging
  - Back sanding
  - Scuff sanding
  - Guide coating

**ACHIEVEMENT CRITERIA**

**NOTE:** See Competency H4 for an achievement criteria that assesses all of Line G PREPARE SURFACE and Line H USE REPAIR MATERIALS AND EQUIPMENT. Results will be applied to both Lines at a ratio of 50/50.





**LEARNING TASKS**

**CONTENT**

4. Describe solvents and additives

- Spray
- Wipe
- Types of solvents
  - Reducer
  - Lacquer
  - Wax and grease remover
  - Acetone
- Types of additives
  - Accelerators
  - Flex agents
  - Hardeners
- Functions
  - Cleaning
  - Adhesion
  - Flexibility
  - Curing
  - Viscosity
  - VOC
  - Productivity

5. Mix undercoats

- Manufacturers' specifications
- Environmental factors
  - Temperature
  - Humidity
  - Pot life
- Mix ratios
  - Basic calculations
  - Scale
  - Graduated cups
  - Mixing stick
  - Viscosity cup
- Induction time
- Mixing techniques
- Mixing procedures
- Ratios



**LEARNING TASKS**

3. Operate a spray booth

**CONTENT**

- Inspect operating parameters
- Manage operation
  - Bake cycles
  - Temperature
  - Pressure



**Line (GAC):** H USE REPAIR MATERIALS AND EQUIPMENT  
**Competency:** H4 Apply repair materials

**Objectives**

To be competent in this area, the individual must be able to:

- Apply body fillers.
- Apply undercoats.

**LEARNING TASKS**

1. Apply body fillers

2. Apply undercoats

**CONTENT**

- Techniques
  - Tool selection
  - Direction
  - Pressure
  - Area per application
  - Taping for body lines
  - Higher than countour
- Limitations
  - Thickness
  - Size of surface area
- Timing
- Troubleshooting
  
- Spray conditions
  - Size of repair
  - Temperature
  - Humidity
- Tool and equipment selection
  - Spray guns
  - Rollers
  - Brushes
- Aerosol
- TDS
  - Number of coats
  - Minimum dry times
  - Minimum flash times
  - Air pressure
- Limitations

**Achievement Criteria (FOR ALL OF LINES G AND H)**

**NOTE TO INSTRUCTOR:** Retain panel upon completion of project for later achievement criteria (LINE I).

- |             |                                                                                                                                                                                                                                   |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Performance | <p>The learner will</p> <ul style="list-style-type: none"> <li>• Prepare and mask a panel for a primer spot repair</li> <li>• Mix and apply repair materials</li> </ul>                                                           |
| Conditions  | <p>The learner will be given</p> <ul style="list-style-type: none"> <li>• Imperfection to repair</li> <li>• Tools and equipment</li> <li>• Various repair materials</li> <li>• Access to manufacturers' specifications</li> </ul> |
| Criteria    | <p>The learner will be evaluated on</p> <ul style="list-style-type: none"> <li>• Safety</li> <li>• Housekeeping</li> <li>• Selection of tools</li> <li>• Technique</li> <li>• Quality of repair</li> </ul>                        |

**NOTE:** Apply marks to both Line G and H at a ratio of 50/50.

<b>Line (GAC):</b>	<b>I</b>	<b>APPLY REFINISHING MATERIALS</b>
<b>Competency:</b>	<b>II</b>	<b>Mix refinishing materials</b>

**Objectives**

To be competent in this area, the individual must be able to:

- Mix refinishing materials, including sealers, primer sealers, single-stage, and base coat/clear coat.

**LEARNING TASKS**

1. Describe refinishing materials

**CONTENT**

- Types
  - Sealers
  - Primer sealers
  - Single-stage
  - Base coat
  - Clear coat
  - Under hood
- Characteristics
  - Durability
  - Adhesion
  - Chemical resistance
  - Viscosity
- Components
  - Binders
  - Resins
  - Solvents
  - Additives
  - Pigments
    - Metallics
    - Pearls
    - Micas
    - Dyes
- Additives
  - Hardeners
  - Reducers
  - Accelerators
  - Flattening agents
  - Retarders

2. Mix refinishing materials

- Manufacturers' software
- TDS
  - Ratios
- Factors
  - Size of job



**LEARNING TASKS**

**CONTENT**

- Coverage
- Reduction
- Ambient conditions
  - Temperature
  - Humidity
- Equipment
  - Scales
  - Sticks
  - Computer
  - Strainers
  - Cups
- Toners (tinters)
- Mixing techniques
  - Agitation
  - Non-agitation
- Clean up





<b>Line (GAC):</b>	<b>I</b>	<b>APPLY REFINISHING MATERIALS</b>
<b>Competency:</b>	<b>I4</b>	<b>Apply base coat/clear coat</b>

**Objectives**

To be competent in this area, the individual must be able to:

- Apply base coat/clear coat finish.

**LEARNING TASKS**

1. Use cleaning materials

2. Apply base coat

3. Apply clear coat

**CONTENT**

- Blow-off
- Pre-selection according to TDS
  - Solvent
  - Water-borne
  - Anti-static
  - Low-lint wipes
- Tacking
  - Types
  - Techniques
- Visual inspection
  - Sand scratches
  - Pin holes
- Spray technique
  - Distance
  - Overlap
  - Gun speed
  - Trigger control
  - Air pressure
  - Drop/Orientation coat
- Flash-off time verification
- Force drying
- Defects
  - Mottling/stripping
  - Dry spray
  - Contamination
    - Dirt nib
  - Hiding
- Final visual inspection
  - Sand scratches
  - Pigment orientation
  - Dirt
- Spray technique

**LEARNING TASKS**

**CONTENT**

- Distance
- Overlap
- Gun speed
- Trigger control
- Air pressure
- Flash-off time verification
- Force drying
- Defects
  - Dry spray
  - Contamination
  - Orange peel
- Mil thickness

**Achievement Criteria (FOR ALL OF LINE I)**

**NOTE TO  
INSTRUCTORS**

**Use repaired panel from Line H for this achievement criteria.**

**Performance**

The learner will perform base coat/clear coat refinishing procedures.

**Conditions**

The learner will be given

- Repaired panel from LINE H
- Materials and equipment
- Access to manufacturers' specifications

**Criteria**

The learner will be evaluated on

- Safety
- Housekeeping
- Selection of tools
- Technique
- Quality
- Coverage

**Line (GAC):**        **K    REMOVE, REPAIR AND INSTALL METAL PANELS AND COMPONENTS**

**Competency:**     **K1   Identify fundamentals of vehicle construction, metal and damage**

**Objectives**

To be competent in this area, the individual must be able to:

- Identify types of body/frame construction.
- Describe characteristics of mild (low-carbon/low-alloy) steel.
- Identify types of sheet metal damage.

**LEARNING TASKS**

**CONTENT**

- |                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Identify types of body/frame construction                     | <ul style="list-style-type: none"> <li>• Conventional</li> <li>• Unibody</li> <li>• Space</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 2. Describe sheet metal components                               | <ul style="list-style-type: none"> <li>• Front end (cosmetic) <ul style="list-style-type: none"> <li>○ Fenders</li> <li>○ Hood panel</li> <li>○ Doors</li> </ul> </li> <li>• Rear end <ul style="list-style-type: none"> <li>○ Trunk</li> <li>○ Hatch</li> <li>○ Box</li> <li>○ Tail gate</li> </ul> </li> <li>• Structural <ul style="list-style-type: none"> <li>○ Quarter panel</li> <li>○ Rocker panel</li> <li>○ Radiator supports</li> <li>○ Frame rails</li> <li>○ Cross members</li> <li>○ Pillars (A,B,C,D)</li> <li>○ Cowl</li> </ul> </li> </ul> |
| 3. Describe metals                                               | <ul style="list-style-type: none"> <li>• Types</li> <li>• Characteristics</li> <li>• Location on vehicle</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 4. Describe characteristics of mild (low-carbon/low-alloy) steel | <ul style="list-style-type: none"> <li>• Tensile strength</li> <li>• Yield strength</li> <li>• Spring-back</li> <li>• Composition</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                |

**LEARNING TASKS**

5. Identify types of sheet metal damage

**CONTENT**

- Work hardening
- Annealing
- Effects of heat
  
- Direct and indirect
- Displaced metal
- Hinge and roll buckle
- Stretched area
- Upset area
- Tears

**Line (GAC):**        **K    REMOVE, REPAIR AND INSTALL METAL PANELS AND COMPONENTS**

**Competency:**      **K2   Prepare metal panels and components for repair**

### **Objectives**

To be competent in this area, the individual must be able to:

- Prepare panel for repair.

### **LEARNING TASKS**

1. Prepare panel for repair

### **CONTENT**

- Cleaning
- Repair planning
  - Inspection
  - Topcoat identification
  - Substrate identification
  - Repair materials
  - Cleaning products
  - Abrasives and strippers
  - Panel composition
- Protecting surrounding area
- Gaining access (as needed)
  - Removal of panel
  - Removal of adjacent components



**Line (GAC):**        **K    REMOVE, REPAIR AND INSTALL METAL PANELS AND COMPONENTS**

**Competency:**     **K3   Remove metal panels and components**

**Objectives**

To be competent in this area, the individual must be able to:

- Remove mechanically-fastened panel.

**LEARNING TASKS**

1. Remove panel

**CONTENT**

- Panel types
  - Bumper
  - Hood
  - Fender
  - Door
  - Trunk lid (hatch)
- Tool and equipment selection
- Reference materials
- Procedures
  - Mechanically-fastened (bolt on) vs. weld on
  - Noting panel alignment
  - Disconnection of electrical components
  - Sequence of removal
  - Fastener removal
    - Location
    - Identification
    - Labelling
    - Storage

2. Describe components of a door assembly and their functions

- Door latching hardware
- Door glass components
- Hinges and methods of attachment
- Door trim items
- Servicing operations
- Verifying alignment before removal

**Line (GAC):**        **K    REMOVE, REPAIR AND INSTALL METAL PANELS AND COMPONENTS**

**Competency:**     **K4    Repair metal panels and components**

**Objectives**

To be competent in this area, the individual must be able to:

- Repair cosmetic sheet metal damage.

**LEARNING TASKS**

**CONTENT**

- |                                  |                                                                                                                                                                                                                                                 |
|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Describe repair methods       | <ul style="list-style-type: none"> <li>• Visualize desired outcome</li> <li>• Cold repair</li> <li>• Heat repair</li> <li>• Pushing/pulling</li> <li>• Roughing</li> <li>• On/off dolly</li> <li>• Patching</li> </ul>                          |
| 2. Describe shrinking procedures | <ul style="list-style-type: none"> <li>• Expansion and contraction</li> <li>• Restricted and unrestricted sheet metal</li> <li>• Oxyacetylene</li> <li>• Spitznagel™</li> <li>• Panel beater™</li> <li>• Cold shrinking (stretching)</li> </ul> |
| 3. Demonstrate repair procedures | <ul style="list-style-type: none"> <li>• Select               <ul style="list-style-type: none"> <li>○ Equipment</li> <li>○ Material</li> <li>○ Technique</li> </ul> </li> <li>• Perform repair</li> <li>• Control of panel movement</li> </ul> |

**Achievement Criteria**

**NOTE TO INSTRUCTOR:**    Keep panel for minor repair project.

**Performance**        The learner will perform a minor repair on a sheet metal panel.

**Conditions**         The learner will be given

- A damaged panel
- Materials and equipment
- Access to manufacturers' specifications

**Criteria**             The learner will be evaluated on

- Safety
- Housekeeping
- Selection of tools
- Technique
- Quality

**Line (GAC):**        **K    REMOVE, REPAIR AND INSTALL METAL PANELS AND COMPONENTS**

**Competency:**     **K5    Install metal panels and components**

**Objectives**

To be competent in this area, the individual must be able to:

- Perform metal panel alignment.

**LEARNING TASKS**

1. Describe panel alignment

**CONTENT**

- Operation
  - Moveable
  - Fixed
- Fit/alignment
- Seal
- Worn parts
- OEM and after market parts

2. Perform panel alignment

- Protection of adjacent panels
- Alignment sequence
- Method of fastening
- Adjusting
- Blocking
- Jacking
- Fitment/gap
- Lubrication
- Verify part movement (moveable parts)
  - Interference of adjacent components

**Line (GAC):** L REMOVE, REPAIR AND INSTALL PLASTIC AND COMPOSITE PANELS AND COMPONENTS

**Competency:** L1 Identify fundamentals of plastics and composite panels and components

**Objectives**

To be competent in this area, the individual must be able to:

- Describe and identify plastics and damage.

**LEARNING TASKS**

1. Describe plastics

**CONTENT**

- Types
  - Thermoset
    - Fibre reinforced plastics (FRP)
      - Resin and matte
      - Sheet-molded compound (SMC)
      - Carbon fibre
  - Thermoplastic
    - Olefin
      - Polypropylene
    - Non-Olefin
      - Acrylic butyle styrene (ABS)
  - Reinforced reaction injection moulded (RRIM)
- Characteristics
  - Rigid
  - Flexible
- Location on vehicle

2. Describe methods of identification

- International Organization for Standardization (ISO) code
- Manufacturers' service bulletins
- Grind test
- Float test

**LEARNING TASKS**

3. Describe types of plastic damage

**CONTENT**

- One-sided (cosmetic)
  - Gouge
- Two-sided (structural)
  - Tear
  - Tab
  - Puncture

**Line (GAC): L REMOVE, REPAIR AND INSTALL PLASTIC AND COMPOSITE PANELS AND COMPONENTS**

**Competency: L2 Prepare plastic and composite panels and components for repair**

**Objectives**

To be competent in this area, the individual must be able to:

- Prepare plastic panel for repair.

**LEARNING TASKS**

1. Prepare plastic panel for repair

**CONTENT**

- Cleaning
- Repair planning
  - Inspection
  - Topcoat identification
  - Substrate identification
  - Repair materials
  - Cleaning products
- Protecting surrounding area
- Gaining access (as needed)
  - Removal of panel
  - Removal of adjacent components

**Line (GAC): L REMOVE, REPAIR AND INSTALL PLASTIC AND COMPOSITE PANELS AND COMPONENTS**

**Competency: L3 Remove plastic and composite panels and components**

**Objectives**

To be competent in this area, the individual must be able to:

- Describe removal of plastic panel.

**LEARNING TASKS**

1. Describe removal of plastic panel

**CONTENT**

- Plastic panel types
  - Bumpers
  - Grills
  - Box liners
  - Fender liners
  - Hoods
  - Fenders
  - Door skins
  - Trunk lids/hatches
- Tool and equipment selection
- Reference materials
- Procedures
  - Bonded vs. non-bonded
  - Noting panel alignment
  - Disconnection of electrical components
  - Sequence of removal
  - Fastener removal
    - Location
    - Identification
    - Labelling
    - Storage



**Line (GAC): L REMOVE, REPAIR AND INSTALL PLASTIC AND COMPOSITE PANELS AND COMPONENTS**

**Competency: L4 Repair plastic and composite panels and components**

**Objectives**

To be competent in this area, the individual must be able to:

- Perform plastic repairs.

**LEARNING TASKS**

1. Describe tools, equipment, and materials for plastic repair

**CONTENT**

- Plastic welders
    - Hot air
    - Airless
    - Nitrogen
    - Staples
  - Grinders
    - Considerations
      - Speed
      - Bit
    - Die
    - Angle
  - Sanders
    - Belt
    - Dual-Action (DA)
  - Tape
    - Aluminum
    - Mesh
  - Backers
  - Adhesives
    - Epoxy
    - Urethane
  - Adhesion promoters
  - Welding rods/ribbons
  - Tab forming pliers
- 
- Manufacturers' training and recommendations
  - Tools, equipment and materials selection
  - Cleaning
  - Identification of types of damage
    - Cracks
    - Deep scratches
    - Tabs

2. Describe plastic repair procedures

**LEARNING TASKS**

**CONTENT**

- |    |                                    |                                                                                                                                                                                                                                                                                                                                                         |
|----|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3. | Perform hot-air welding techniques | <ul style="list-style-type: none"> <li>○ Low/high spots</li> <li>○ Dents</li> <li>○ Deformations</li> <li>● Removal of imperfections               <ul style="list-style-type: none"> <li>○ Heat re-shaping</li> <li>○ Sanding</li> <li>○ Coating removal</li> </ul> </li> </ul>                                                                        |
| 4. | Perform airless welding techniques | <ul style="list-style-type: none"> <li>● Purpose and application</li> <li>● Potential risks to repair               <ul style="list-style-type: none"> <li>○ Air pressure</li> <li>○ Surface temperature</li> </ul> </li> </ul>                                                                                                                         |
| 5. | Perform adhesive repairs           | <ul style="list-style-type: none"> <li>● Purpose and application</li> <li>● Thermoplastic and thermoset repair</li> <li>● Maintain welding equipment</li> <li>● Store welding equipment</li> <li>● Potential risks to repair               <ul style="list-style-type: none"> <li>○ Surface temperature</li> <li>○ Contamination</li> </ul> </li> </ul> |
| 5. | Perform adhesive repairs           | <ul style="list-style-type: none"> <li>● Product manufacturers' specifications</li> <li>● Types of repairs</li> <li>● Types of adhesives</li> <li>● Adhesion promoters</li> <li>● Surface preparation steps</li> <li>● Application and finishing</li> </ul>                                                                                             |

**Achievement Criteria**

- |             |                                                                                                                                                                    |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Performance | The learner will perform plastic repairs, including <ul style="list-style-type: none"> <li>● Welded</li> <li>● Adhesive</li> </ul>                                 |
| Conditions  | The learner will be given <ul style="list-style-type: none"> <li>● Welding equipment</li> <li>● Adhesive materials</li> <li>● Plastic panel</li> </ul>             |
| Criteria    | The learner will be evaluated on <ul style="list-style-type: none"> <li>● Safety</li> <li>● Procedure</li> <li>● Technique</li> <li>● Quality of repair</li> </ul> |

**Line (GAC): L REMOVE, REPAIR AND INSTALL PLASTIC AND COMPOSITE PANELS AND COMPONENTS**

**Competency: L5 Install plastic and composite panels and components**

**Objectives**

To be competent in this area, the individual must be able to:

- Describe the methods of panel installation.

**LEARNING TASKS**

1. Describe the methods of panel installation

**CONTENT**

- Protection of surrounding area
- Fasteners
  - Sequence
  - Location
- Buddy system for installation
- Verification of fit and finish
- Verification of related component operation
  - Lights
  - Sensors
  - Washers

**Line (GAC):** M **DETAIL EXTERIOR**  
**Competency:** M1 **Remove minor imperfections**

**Objectives**

To be competent in this area, the individual must be able to:

- Describe the post-refinish detailing process.
- Polish panel.

**LEARNING TASKS**

1. Describe the post-refinish detailing process

**CONTENT**

- Pre-delivery checklist
- Paint defects
  - Dirt nibs
  - Overspray
  - Stone chips
  - Scratches
  - Environmental contaminants
    - Oxidation
    - Tree sap
    - Rail dust
    - Brake dust
    - Industrial fall out
- Materials
  - Polish/compound
  - Sand paper
  - Clay bar
  - Pads
  - Razor blades
  - Microfibre cloths
  - Touch up paint
  - Steel wool
- Equipment
  - Polisher
    - Electric
    - Pneumatic
  - Blowers
  - Nib blocks
  - Touch up brush
- Sanding
  - Wet vs. dry
- Polishing
  - Speed
  - Direction
  - Angle

**LEARNING TASKS**

**CONTENT**

2. Polish fender

- Polisher motion
- Sequencing
- Edges

- Equipment and tool selection
- Technique

**NOTE TO INSTRUCTOR:** Although there is no Achievement Criteria for this competency, you may wish to have students polish a fender. Use fender saved from Line H and K

**Line (GAC):** M **DETAIL EXTERIOR**  
**Competency:** M2 **Clean exterior and interior of vehicle**

**Objectives**

To be competent in this area, the individual must be able to:

- Describe exterior vehicle cleaning.
- Describe interior vehicle cleaning.

**LEARNING TASKS**

**CONTENT**

- |                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. Describe post-refinish exterior vehicle cleaning</p> | <ul style="list-style-type: none"> <li>• Cleaners               <ul style="list-style-type: none"> <li>○ Tire</li> <li>○ Engine</li> <li>○ Soap</li> <li>○ Window</li> </ul> </li> <li>• Paint care procedures</li> <li>• Washing               <ul style="list-style-type: none"> <li>○ Two bucket</li> <li>○ Top to bottom</li> <li>○ Equipment</li> </ul> </li> </ul>                                                                      |
| <p>2. Describe post-refinish interior vehicle cleaning</p> | <ul style="list-style-type: none"> <li>• Cleaning products               <ul style="list-style-type: none"> <li>○ pH scale</li> </ul> </li> <li>• Stain removal products</li> <li>• Stain removal tools</li> <li>• Cleaning tools               <ul style="list-style-type: none"> <li>○ Vacuum</li> <li>○ Air blower</li> <li>○ Extractors</li> </ul> </li> <li>• Conditioners</li> <li>• Ozone generators</li> <li>• Deodorizers</li> </ul> |

# **Level 2**

## **Auto Body and Collision Technician**





**Line (GAC):**        **B**    **USE TOOLS AND EQUIPMENT**  
**Competency:**     **B4**   **Maintain spray equipment**

**Objectives**

To be competent in this area, the individual must be able to:

- Describe recycling machines.

**LEARNING TASKS**

1. Describe recycling machines

**CONTENT**

- Solvent recycling
- Water borne recycling
- Manufacturers' specifications
- Environmental regulations
- Procedures

**Line (GAC):**        **B    USE TOOLS AND EQUIPMENT**  
**Competency:**      **B5   Maintain mixing equipment**

**Objectives:**

To be competent in this area, the individual must be able to:

- Maintain mixing systems and room.

**LEARNING TASKS**

1. Describe mixing systems

2. Maintain mixing room

**CONTENT**

- Manufacturers' specifications
- Components requiring maintenance
  - Mixing software
    - Product updates
  - Computer
  - Scales
    - Calibration
  - Spectrophotometers
    - Calibration
  - Toners
  - Agitators
  - Ratio sticks
  - Shakers
  - Mixing cups
- Technical information provided
  - TDS
  - SDS
  - Mixing ratios
  - Colour formulation
- Cleanliness
- Functioning



**Achievement Criteria**

Performance The learner will perform a lap weld and a plug weld on aluminum.

Conditions The learner will be given

- Welding equipment
- Panels

Criteria The learner will be evaluated on

- Safety
- Procedure
- Technique
- Quality of weld

**Line (GAC):** C USE WELDING EQUIPMENT  
**Competency:** C3 Maintain welding equipment

**Objectives**

To be competent in this area, the individual must be able to:

- Describe the maintenance of welding equipment for non-ferrous processes.

**LEARNING TASKS**

1. Describe the maintenance of welding equipment for non-ferrous processes

**CONTENT**

- Checking and replacing parts
  - Wire spool
  - Liner
  - Trigger connections
  - Main hose assembly
  - Gas diffuser
  - Contact tip
  - Nozzle
  - Ground (work) clamp
  - Cables
  - Rollers
- Securing cylinders
- Leak tests
- Cleaning interior
- Welding carts
- Storage

**Line (GAC):**        **D    ORGANIZE WORK AND USE DOCUMENTATION**  
**Competency:**      **D1   Organize parts, materials and work area**

**Objectives**

To be competent in this area, the individual must be able to:

- Organize parts, materials and work area with minimal supervision.

**LEARNING TASKS**

1. Organize parts, materials and work area with minimal supervision

**CONTENT**

- Repair planning
- Parts and equipment management
  - Storage location
  - Labelling
  - Tool and material requirements
  - Notifying supervisor of missing or damaged parts
- Time management
  - Work flow
  - Timing of repair steps
  - Avoidance of repetitive repair steps
- Work area preparation
  - Tool selection and layout
  - Housekeeping

**Line (GAC): D ORGANIZE WORK AND USE DOCUMENTATION**

**Competency: D5 Prepare repair plan**

**Objectives**

To be competent in this area, the individual must be able to:

- Prepare repair plan.

**LEARNING TASKS**

1. Refer to work order

2. Visualize process

3. Itemize requirements

4. Determine repair sequence

5. Describe productive organizational skills

**CONTENT**

- Protection of personal information
- Vehicle make, model and year
- Location of repair
- Paint codes
- VIN
- Expected delivery times
- Customer service notes
  
- Mapping out repair
  - Pre-existing damage
  - Priorities
  - Sub-lets
- Developing checklist
- Consultation with mentor
- Photo documentation
  
- Tools
- Materials
- Parts
  - Availability
  - Sacrificial (one time use)
  - Missing from vehicle
  
- Timing
  - Awareness of cycle times
  - Order of operations
  - Dry times
- Standard Operating Procedures (SOP)
  
- Repair analysis
- Repair plan
  - Production deadlines
  - Tools and materials required
- Timing of repair steps







<b>Line (GAC):</b>	<b>I</b>	<b>APPLY REFINISHING MATERIALS</b>
<b>Competency:</b>	<b>II</b>	<b>Mix refinishing materials</b>

**Objectives**

To be competent in this area, the individual must be able to:

- Mix refinishing materials, including sealers, primer sealers, single-stage, and base coat/clear coat.

**LEARNING TASKS**

1. Describe refinishing materials

**CONTENT**

- Types
  - Sealers
  - Primer sealers
  - Single-stage
  - Base coat
  - Clear coat
- Characteristics
  - Durability
  - Adhesion
  - Chemical resistance
  - Viscosity
- Components
  - Binders
  - Resins
  - Solvents
  - Additives
  - Pigments
    - Metallics
    - Pearls
    - Micas
    - Dyes
- Additives
  - Hardeners
  - Reducers
  - Accelerators
  - Flattening agents
  - Retarders

2. Mix refinishing materials

- Manufacturers' software
- TDS
  - Ratios
- Factors
  - Size of job
  - Coverage

**LEARNING TASKS**

**CONTENT**

- Reduction
- Ambient conditions
  - Temperature
  - Humidity
- Equipment
  - Scales
  - Sticks
  - Computer
  - Strainers
  - Cups
- Toners (tinters)
- Mixing techniques
  - Agitation
  - Non-agitation
- Clean up

<b>Line (GAC):</b>	<b>I</b>	<b>APPLY REFINISHING MATERIALS</b>
<b>Competency:</b>	<b>I2</b>	<b>Apply primer sealers</b>

**Objectives**

To be competent in this area, the individual must be able to:

- Select and apply primer sealers.

**LEARNING TASKS**

1. Select and apply primer sealer

**CONTENT**

- Substrate
  - Burn through
  - Plastic
- Primer sealer
- Transparent
- Tinting
- Value shade

<b>Line (GAC):</b>	<b>I</b>	<b>APPLY REFINISHING MATERIALS</b>
<b>Competency:</b>	<b>I3</b>	<b>Apply single-stage paint</b>

**Objectives**

To be competent in this area, the individual must be able to:

- Describe single-stage paint.

**LEARNING TASKS**

1. Describe single-stage paint

**CONTENT**

- Contexts and uses
  - Heavy equipment
  - Aircraft
  - Commercial transport
  - Marine
  - Agriculture
- Matte finishes
- Textured finishes
- Spray equipment
  - Pressure feeds
  - Airless
  - Electrostatic
- Spray techniques
- Blending techniques
  - Reverse blending
  - Arcing
  - Trigger control
  - Melting in
  - Blending agents
- Avoiding halos and dry edges
- Metallics
  - Mottling
  - Tiger striping
- Dry spray
- Runs and sags

2. Describe troubleshooting single-stage paint application

<b>Line (GAC):</b>	<b>I</b>	<b>APPLY REFINISHING MATERIALS</b>
<b>Competency:</b>	<b>I4</b>	<b>Apply base coat/clear coat</b>

**Objectives**

To be competent in this area, the individual must be able to:

- Describe applying and blending base coat/clear coat and multistage paint.

**LEARNING TASKS**

1. Describe base coat/clear coat application techniques

**CONTENT**

- Spray techniques
  - Distance
  - Overlap
  - Gun speed
  - Trigger control
  - Air pressure
  - Fanning/arcing
  - Heeling
- Job size
  - Spot repair
  - Partials
  - Complete
- Spray sequence
  - Routing
  - Wet edge
- Multi-stage
  - Let down panel
  - Specialty/candy
- Tacking between coats
- Blending
  - Orientation coat
  - Wet bed
  - Open blend (solvent blend)
- Matte finishes
- Textured finishes

**Line (GAC):** I **APPLY REFINISHING MATERIALS**  
**Competency:** I6 **Perform colour adjustment**

**Objectives**

To be competent in this area, the individual must be able to:

- Describe colour theory and adjustment.

**LEARNING TASKS**

1. Describe colour theory

**CONTENT**

- Value
- Hue
- Chroma
- Colour spectrum (ROYGBIV)
- Primary and secondary colours
- Low and high strength colours
- Face, pitch, and flop of colour
- Variance
  - OEM level
  - Industry level
- Light source
- Metamerism
- Colour-perception testing
- Equipment
  - Spectrophotometer
  - Colour corrective lighting
- Spray out card
- Let down panel
- Colour chips
- Variance deck
- Colour formula adjustments
- Metallic size
- Formula parameters
- Tint characteristics
- Comparison of colour to vehicle
- Adequate hiding

2. Describe colour adjustment

**Line (GAC):** J **PERFORM POST-REFINISING FUNCTIONS**  
**Competency:** J2 **Correct surface imperfections**

**Objectives**

To be competent in this area, the individual must be able to:

- Recognize surface imperfections.
- Describe correcting surface imperfections.

**LEARNING TASKS**

**CONTENT**

- |                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. Recognize post-paint defects</p>              | <ul style="list-style-type: none"> <li>• Dust nibs</li> <li>• Runs</li> <li>• Orange peel</li> <li>• Fish eyes</li> <li>• Solvent pop</li> <li>• Dye-back</li> <li>• Scratches</li> <li>• Contour mapping</li> <li>• Bleed-through</li> <li>• Masking problems               <ul style="list-style-type: none"> <li>○ Over-spray/under-mask</li> <li>○ Over-mask</li> </ul> </li> <li>• Colour mismatch</li> <li>• Mottling</li> <li>• Transparency</li> </ul> |
| <p>2. Describe evaluating surface imperfections</p> | <ul style="list-style-type: none"> <li>• Repairable</li> <li>• Non-repairable</li> </ul>                                                                                                                                                                                                                                                                                                                                                                       |
| <p>3. Describe removing surface imperfections</p>   | <ul style="list-style-type: none"> <li>• Wet sanding               <ul style="list-style-type: none"> <li>○ De-nib</li> <li>○ Block</li> <li>○ Hand</li> <li>○ Machine</li> </ul> </li> <li>• Solvents</li> <li>• Compounding</li> <li>• Polishing</li> <li>• Tools               <ul style="list-style-type: none"> <li>○ Razor blades</li> <li>○ Nib files</li> <li>○ Clay product</li> <li>○ Polishers</li> </ul> </li> </ul>                               |



**Line (GAC):**        **K    REMOVE, REPAIR AND INSTALL METAL PANELS AND COMPONENTS**

**Competency:**      **K1   Identify fundamentals of vehicle construction, metal and damage**

**Objectives**

To be competent in this area, the individual must be able to:

- Describe advanced steel and non-ferrous metals.
- Describe damage analysis.

**LEARNING TASKS**

1. Describe metals

2. Describe aluminum

3. Describe the characteristics of high-strength steel

**CONTENT**

- Types
  - Steel
    - Galvanized
    - Non-galvanized
  - Stainless
  - Magnesium
- Characteristics
- Location on vehicle
  
- Alloy series
- Manufacturing
  - Casting
  - Extruded
  - Stamping
- Considerations
  - Corrosion
  - Cross contamination
  - Equipment specific to aluminum
  - Clean room
  - Annealing
  
- Tensile strength
- Yield strength
- Spring-back
- Composition
- Characteristics
- Work hardening
- Affects of heat
- Hydro forming

**LEARNING TASKS**

4. Describe the characteristics of advanced and ultra-high strength steels

5. Describe damage analysis

**CONTENT**

- Yield strength
- Tensile strength
- Spring-back
- Advanced high-strength steel examples
  - Martensitic (MART)
  - Isotropic (IS)
  - High strength, low alloy (HSLA)
  - Laminated
- Ultra-high strength steel
  - Boron
  - Dual/Complex phase
  - Transformation induced plasticity (TRIP)
- Extent of damage
  - Cosmetic (minor)
  - Structural (major)
  - Kink versus bend (aluminum versus steel)
- Crush (collapse) zones
- Inertia
- Need for complete damage analysis
  - Visual
  - Touch

**Line (GAC):**        **K    REMOVE, REPAIR AND INSTALL METAL PANELS AND COMPONENTS**

**Competency:**     **K4    Repair metal panels and components**

**Objectives**

To be competent in this area, the individual must be able to:

- Repair complex sheet metal damage.
- Repair aluminum damage.
- Install door skin.

**LEARNING TASKS**

**CONTENT**

- |                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                               |
|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. Describe the roughing procedures for repairing complex sheet metal damage on steel</p> | <ul style="list-style-type: none"> <li>• Hammer on dolly/hammer off dolly</li> <li>• Edge alignment</li> <li>• Body line alignment</li> <li>• Sheet metal clamps and pulling devices</li> <li>• Stud welder</li> <li>• Sequencing</li> <li>• Stress relieving               <ul style="list-style-type: none"> <li>○ Heating</li> <li>○ Shrinking</li> <li>○ Hammering</li> </ul> </li> </ul> |
| <p>2. Describe filling procedures for repairing complex sheet metal damage on steel</p>      | <ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Surface preparation</li> <li>• Use of body fillers</li> <li>• Application</li> <li>• Abrasives</li> <li>• Contour blocking</li> <li>• Fit of adjacent parts</li> </ul>                                                                                                                                                           |
| <p>3. Describe the procedure to prepare a door skin for replacement</p>                      | <ul style="list-style-type: none"> <li>• Repair materials</li> <li>• Cleaning products</li> <li>• Abrasives and strippers</li> <li>• Panel composition</li> <li>• Removal of panel components               <ul style="list-style-type: none"> <li>○ SRS considerations</li> </ul> </li> </ul>                                                                                                |

4. Describe the procedure to repair door shell
  - Damaged door skin removal
    - Release adhesive
    - Grind hem flange
    - Spot weld removal
  - Damage analysis
    - Intrusion beam inspection
    - Window run channel inspection
    - Regulator inspections
  - Panel composition
  - Heating
  - Cold repair
  - Pushing/pulling
  - Shrinking
  - Hammer and dollying
    - Work hardening
    - Stress relieving
  
5. Describe preparing new door skin for installation
  - Adhesive removal
  - Seam sealer removal
  - Test fitting
  - Panel alignment
  - Plug weld preparation
  - Factory seams versus sectioning considerations
  - Fastening procedures and types
  - Panel inspection
    - Visual
    - Touch
  - Panel alignment and operation verification
  
6. Install door skin
  - Welding procedures
  - Bonding procedures
  - Hammering technique
  - Filling
  - Noise vibration harshness (NVH) application
  - Corrosion protection restoration
    - Seam sealing
    - Weld-thru primer
  
7. Perform a complex sheet metal repair
  - Cleaning

- Analysis
  - Roughing
  - Shrinking
  - Adjacent part fit-up
  - Body filler
  - Sanding
8. Perform roughing procedures on aluminum
- Hammering on dolly/off dolly
  - Pry tools
  - Stress relieving and annealing with heat
  - Contamination
    - Dedicated tools
    - Consumables
9. Perform shrinking procedures on aluminum
- Expansion and contraction
  - Restricted and unrestricted
  - Hot
  - Cold
  - Thermometers
10. Perform body filling procedures on aluminum
- Cleaning
  - Contamination
  - Surface preparation
  - Use of body fillers
  - Application
  - Contour blocking
  - Fit of adjacent parts

**Achievement Criteria**

<b>NOTE TO INSTRUCTOR:</b>	Retain project for later achievement criteria in Line O.
Performance	The learner will install a partial/simulated door skin (or equivalent).
Conditions	The learner will be given <ul style="list-style-type: none"> <li>• Tools and materials</li> <li>• Partial/simulated door skin (or equivalent)</li> </ul>
Criteria	The learner will be evaluated on <ul style="list-style-type: none"> <li>• Safety</li> <li>• Procedure</li> <li>• Technique</li> <li>• Quality of repair</li> </ul>

**Line (GAC): L REMOVE, REPAIR AND INSTALL PLASTIC AND COMPOSITE PANELS AND COMPONENTS**

**Competency: L1 Identify fundamentals of plastics and composite panels and components**

**Objectives**

To be competent in this area, the individual must be able to:

- Describe composites.
- Describe composites damage.

**LEARNING TASKS**

**CONTENT**

1. Describe composites

- Types
  - SMC
  - FRP/fibreglass
  - Carbon fibre
- Gel coats
- Location on vehicle

2. Describe methods of identification

- Manufacturers' service bulletins
- Touch
- Visual
- Smooth on both sides
- Grind test

3. Describe types of composite damage

- One-sided (cosmetic)
  - Gouge
- Two-sided (structural)
  - Fracture (spider crack)
  - Puncture

**Line (GAC):** L REMOVE, REPAIR AND INSTALL PLASTIC AND COMPOSITE PANELS AND COMPONENTS

**Competency:** L2 Prepare plastic and composite panels and components for repair

### Objectives

To be competent in this area, the individual must be able to:

- Prepare composite (SMC) panels.

### LEARNING TASKS

1. Prepare composite panel

### CONTENT

- Cleaning
- Repair planning
  - Inspection
  - Topcoat identification
  - Substrate identification
  - Repair materials
  - Cleaning products
- Protecting surrounding area
- Gaining access (as needed)
  - Removal of panel
  - Removal of adjacent components

**Line (GAC):** L REMOVE, REPAIR AND INSTALL PLASTIC AND COMPOSITE PANELS AND COMPONENTS

**Competency:** L3 Remove plastic and composite panels and components

**Objectives**

To be competent in this area, the individual must be able to:

- Describe the removal of composite panels.

**LEARNING TASKS**

1. Describe removal of composite panel

**CONTENT**

- Composite panel types
  - Grills
  - Hoods
  - Fenders
  - Door skins
  - Roof panels
  - Trunk lid/hatch
  - Truck boxes
  - Motorcycle/power sport components
- Tool and equipment selection
- Reference materials
- Procedures
  - Bonded vs. non-bonded
  - Noting panel alignment
  - Disconnection of electrical components
  - Sequence of removal
  - Fastener removal
    - Location
    - Identification
    - Labelling
    - Storage



**Line (GAC): L REMOVE, REPAIR AND INSTALL PLASTIC AND COMPOSITE PANELS AND COMPONENTS**

**Competency: L4 Repair plastic and composite panels and components**

**Objectives**

To be competent in this area, the individual must be able to:

- Describe composite repairs.

**LEARNING TASKS**

**CONTENT**

- |                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. Describe safety-considerations for working with composites</p>    | <ul style="list-style-type: none"> <li>• PPE</li> <li>• Ventilation</li> <li>• Solvents (cleaning)</li> <li>• Static</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <p>2. Describe tools, equipment, and materials for composite repair</p> | <ul style="list-style-type: none"> <li>• Grinders               <ul style="list-style-type: none"> <li>○ Considerations                   <ul style="list-style-type: none"> <li>▪ Speed</li> <li>▪ Bit</li> </ul> </li> <li>○ Die</li> <li>○ Angle</li> </ul> </li> <li>• Sanders               <ul style="list-style-type: none"> <li>○ Belt</li> <li>○ DA</li> </ul> </li> <li>• Tape               <ul style="list-style-type: none"> <li>○ Aluminum</li> <li>○ Mesh</li> <li>○ Matting</li> <li>○ Cloth</li> </ul> </li> <li>• Backers</li> <li>• Adhesives               <ul style="list-style-type: none"> <li>○ Epoxy</li> <li>○ Urethane</li> <li>○ Polyester</li> </ul> </li> <li>• Saturation roller</li> <li>• Brushes</li> <li>• Plastic sheeting</li> </ul> |
| <p>3. Describe composite repair procedures</p>                          | <ul style="list-style-type: none"> <li>• Manufacturers' training and recommendations</li> <li>• Tools, equipment and materials selection</li> <li>• Cleaning</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

**LEARNING TASKS**

**CONTENT**

- 4. Describe adhesive repairs techniques
  - Identification of imperfections
    - Cracks
    - Deep scratches
    - Fractures
  - Removal of imperfections
    - Sanding
    - Grinding
    - Coating removal
  - Product manufacturers' specifications
  - Types of repairs
  - Types of adhesives
  - Surface preparation steps
  - Mixing
    - Environmental conditions
      - Temperature
      - Humidity
    - Ratios
  - Application and finishing
- 5. Perform composite repairs
  - Identification of composite
  - Considerations
    - Contamination containment
    - Fibre wicking
  - Repair or replacement
  - Adhesive repairs
  - Post-repair clean up

**Line (GAC): L REMOVE, REPAIR AND INSTALL PLASTIC AND COMPOSITE PANELS AND COMPONENTS**

**Competency: L5 Install plastic and composite panels and components**

**Objectives**

To be competent in this area, the individual must be able to:

- Describe the methods for non-structural composite panel installation.

**LEARNING TASKS**

1. Describe methods for non-structural composite panel installation

**CONTENT**

- Manufacturers' product specifications
- Protection of surrounding area
- Fasteners
  - Sequence
  - Location
- Bonding
  - Dry fitting
  - Cure times
- Verification of fit and finish
- Verification of related component operation
  - Lights
  - Sensors
  - Washers

**Line (GAC):** O **APPLY CORROSION PROTECTION AND SOUND DEADENING MATERIALS**

**Competency:** O1 **Apply corrosion inhibitors and undercoats**

**Objectives**

To be competent in this area, the individual must be able to:

- Apply corrosion protection.

**LEARNING TASKS**

1. Describe corrosion

2. Describe galvanic corrosion

3. Describe sacrificial corrosion

4. Describe undercoats

**CONTENT**

- Causes
  - Environmental
  - Caustic fluids
  - Collision damage
  - Hot spots
- Chemical reaction
  - Oxygen
  - Electrolytes
  - Bare metal
- Types
  - Sacrificial
  - Galvanic
- Effects on structural integrity
- Dissimilar metal contact
- Chemical reactivity
- Relationship to sacrificial corrosion
- Galvanized metals
- Zinc enriched materials
- Relationship to galvanic corrosion
- Sacrificial metals chart
- Primers
  - Weld-through primer
  - DTM
    - Etch primer
    - Epoxy
- Seam sealers
- Metal conditioners
- Conversion coatings
- Wax based

**LEARNING TASKS**

5. Describe the areas of the vehicle requiring corrosion protection after repair
  
6. Apply corrosion protection

**CONTENT**

- Urethane based
- Petroleum based undercoating
  - Rubberized
- Washers
- Insulators
  
- Joints and seams
- Inside closed sections
- Exterior panels (inside and outside)
- Hot spots
  
- OEM requirements
- Material and equipment selection
- Liabilities
- Vehicle components or areas requiring corrosion protection
  - Enclosed interior surfaces
  - Exposed interior surfaces
  - Exposed exterior surfaces
  - Exposed joints
- Procedures
  - Safe handling
  - Application methods
- Product selection
- Tools
  - Spray gun
  - Sealing gun
  - Aerosol
  - Undercoat gun
  - Spray wand
  - Brush
- Timelines between repair and application of corrosion protection
- Quality control
- Shop policy

**Line (GAC):**        **O    APPLY CORROSION PROTECTION AND SOUND DEADENING MATERIALS**

**Competency:**      **O2    Apply seam sealers and sound deadeners**

**Objectives**

To be competent in this area, the individual must be able to:

- Apply seam sealers.
- Describe sound deadeners.

**LEARNING TASKS**

1. Describe seam sealers

2. Apply seam sealers

**CONTENT**

- Purposes
  - Water and air leaks
  - Wind noise
  - Fumes
- Types
  - One-part
  - Two-part
  - DTM
  - Epoxy
  - Urethane
  - Thin bodied
  - Heavy bodied
  - Sprayable
  - Tape
  - Brushable
- Characteristics
  - Paintable
  - Flexible
  - Non-shrinking
- Locations
  - Welded seams
  - Engine compartments
  - Floor pans
  - Quarter panels
  - End panels
  - Joints
  - Door skins
- Manufacturers' specifications
- Equipment
  - Spatter gun
  - Caulking gun
- Appearance

**LEARNING TASKS**

**CONTENT**

3. Describe sound deadeners

- Texture
- Colour
- Tooling
  
- Pads
- Foams
- Sprayables

**Achievement Criteria**

**NOTE TO INSTRUCTOR** Use door skin project from Line K for this achievement criteria.

**Performance** The learner will apply seam sealer to door skin.

**Conditions** The learner will be given

- Door skin
- Seam sealer
- Tools and equipment
- Access to OEM specifications

**Criteria** The learner will be evaluated on

- Safety
- Procedure
- Technique
- Appearance of repair

**Line (GAC): R REMOVE, INSTALL AND REPAIR STRUCTURAL AND LAMINATED GLASS**

**Competency: R1 Remove structural glass**

**Objectives**

To be competent in this area, the individual must be able to:

- Describe removal of laminated, structural glass.

**LEARNING TASKS**

**CONTENT**

- |                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. Describe automotive laminated, structural glass</p> | <ul style="list-style-type: none"> <li>• Characteristics               <ul style="list-style-type: none"> <li>○ Safety</li> <li>○ Clear</li> <li>○ Tinted</li> <li>○ Shaded</li> <li>○ Heated</li> </ul> </li> <li>• H.U.D. (heads-up display)</li> <li>• Rain/moisture sensors</li> <li>• Acoustic inner layer</li> <li>• Anti-lacerative</li> <li>• Application</li> <li>• NAGS</li> <li>• Repairable</li> </ul>                                                                                                                                                                                                                                                                                                                                                  |
| <p>2. Describe removal of laminated, structural glass</p> | <ul style="list-style-type: none"> <li>• Select removal method               <ul style="list-style-type: none"> <li>○ Vehicle construction                   <ul style="list-style-type: none"> <li>▪ Exposed pinchweld</li> <li>▪ Encapsulated</li> </ul> </li> <li>○ Replace vs. reinstall</li> </ul> </li> <li>• Tools and equipment               <ul style="list-style-type: none"> <li>○ Wire</li> <li>○ Cold knife</li> <li>○ Utility (razor) knife</li> <li>○ Reciprocating tool</li> </ul> </li> <li>• Remove bonded glass and material               <ul style="list-style-type: none"> <li>○ Safety and PPE</li> <li>○ Vehicle protection</li> <li>○ Mark fastener locations and positions</li> <li>○ Clean up</li> <li>○ Storage</li> </ul> </li> </ul> |

**NOTE:** In order to deliver training on glass, it is expected that students will have the opportunity to observe a live demonstration of a removal and installation of bonded glass.



**Line (GAC): R REMOVE, INSTALL AND REPAIR STRUCTURAL AND LAMINATED GLASS**

**Competency: R2 Install structural glass**

**Objectives**

To be competent in this area, the individual must be able to:

- Describe installation of laminated, structural glass.

**LEARNING TASKS**

1. Describe installation of laminated, structural glass

**CONTENT**

- Considerations
  - Safety and PPE
  - Environmental conditions
  - Drive away times
  - Contaminations
  - Electronics
    - Location
    - Calibration
- Vehicle construction
  - Exposed pinchweld
  - Encapsulated
  - Blocks
  - Pins
- Tools and equipment
  - Lifting devices
    - Suction cups
    - Ergonomic lift assists
  - Adhesive gun
  - Razor blades
  - Utility knife
  - Tape
- Materials
  - Urethane types
  - Primers
  - Adhesion promoters
  - Glass cleaner
- Installation
  - Vehicle protection
  - Buddy system
  - Prep surfaces
  - Dry fit
  - Reference fastener locations and positions
  - Adhesive application

**LEARNING TASKS**

**CONTENT**

- V-bead
- Clean up

**NOTE:** In order to deliver training on glass, it is expected that students will have the opportunity to observe a live demonstration of a removal and installation of bonded glass.

**Line (GAC):**        **R    REMOVE, INSTALL AND REPAIR STRUCTURAL AND LAMINATED GLASS**

**Competency:**     **R3    Repair laminated glass**

**Objectives**

To be competent in this area, the individual must be able to:

- Describe repair of laminated glass.

**LEARNING TASKS**

1. Describe repair of laminated glass

**CONTENT**

- Troubleshooting
  - Repairable or not
  - Line of vision
  - Leak check
    - Water
    - Wind
- Chip repair
  - Bullseye
  - Half moon
  - Star
- Mounting tabs (Mirror buttons)
- Tools and equipment
  - Bridge
  - Injector
  - UV lamp
  - Rotary tool
- Materials
  - Resins
  - Pit filler
  - Polish

**Line (GAC):** S REMOVE AND INSTALL NON-STRUCTURAL GLASS  
**Competency:** S1 Remove non-structural glass

**Objectives**

To be competent in this area, the individual must be able to:

- Remove non-structural glass.

**LEARNING TASKS**

1. Describe removal procedures for non-structural glass

**CONTENT**

- Considerations
  - AS1, AS2, AS3
  - Bug (id tag)
  - Tint colour
- Types
  - Stationary/movable
  - Tempered
  - Laminated
  - Mounting method
  - Encapsulated
  - Roped in
- Location
  - Door
  - Truck cab back glass (sliders)
  - Hinged, vented
  - Lift gate
  - Sun roof
    - Hinged
    - Sliding
    - Panorama
  - Quarter glass
- Fasteners
  - Bolts
  - Clips
  - Rivets
  - Everseal
  - Gaskets
  - Bonded
- Sealants
- Removal procedures
- Run channel
- Sash channel
- Clean up and disposal

**LEARNING TASKS**

2. Remove non-structural glass

**CONTENT**

- Manufacturers' specifications
  - Selection of removal method
  - Identification of parts
- Tool selection
- Disabling SRS
- Vehicle protection
- Removal of glass
- Clean up
  - Disposal of glass
- Warehousing of parts

**Line (GAC):**        **S    REMOVE AND INSTALL NON-STRUCTURAL GLASS**  
**Competency:**     **S2    Install non-structural glass**

**Objectives**

To be competent in this area, the individual must be able to:

- Describe the installation non-structural glass.

**LEARNING TASKS**

1. Describe the installation of non-structural glass

**CONTENT**

- Checking for glass defects
- Manufacturers' specifications
- Tool selection
- Vehicle protection
- Replacement of glass
- Torquing
- Fit, finish and operation
- Verification of calibration and synchronization of electronics
- Clean up

**Line (GAC): W REPAIR AND REPLACE INTERIOR COMPONENTS**

**Competency: W1 Repair interior components**

**Objectives**

To be competent in this area, the individual must be able to:

- Describe removal and repair of interior components.

**LEARNING TASKS**

1. Describe interior components

**CONTENT**

- Consoles
- Carpets
- Head liners
- Seats
- Trunks
- Trim panels
  - Pillars
  - Kick
  - Sill plates
  - Door
  - Lift gate
- Dash panels
  - Instrument clusters
- Attachment methods
  - Clips
  - Screws
  - Bolts
- Manufacturers' specifications
- Sublet
- Disabling SRS
- Tool selection
  - Upholstery
  - Non-marring
  - Battery saver
- Relieving stress lines (bruising)
- Stripping interiors
- Removal of head liner
  - Handling and storage
  - Visors
  - Dome lights
- Infant seat restraint brackets
- Clip and tab mounting surfaces
  - Hog rings
- Temporary warehousing (tag and bag)

2. Describe removal and repair of interior components

**Line (GAC):**        **W**    **REPAIR AND REPLACE INTERIOR COMPONENTS**  
**Competency:**     **W2**   **Replace interior components**

**Objectives**

To be competent in this area, the individual must be able to:

- Describe installation of interior components.

**LEARNING TASKS**

1. Describe installation of interior components

**CONTENT**

- Manufacturers' specifications
- Isolating (disconnecting) power source
- Tool selection
  - Upholstery
  - Non-marring
- Fasteners
  - OEM/approved equivalent
  - Identification
  - Transferring (O/H)
  - Torquing
- Installing components
- Reconnecting electrical components
- Reconnecting battery
- Clearing trouble codes



# **Level 3**

## **Auto Body and Collision Technician**

**Line (GAC):**        **B    USE TOOLS AND EQUIPMENT**  
**Competency:**      **B8   Maintain frame and unibody repair and measuring equipment**

**Objectives**

To be competent in this area, the individual must be able to:

- Describe the maintenance of measuring systems.

**LEARNING TASKS**

**CONTENT**

- |                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. Identify measuring equipment</p>                  | <ul style="list-style-type: none"> <li>• Mechanical (2D) <ul style="list-style-type: none"> <li>○ Tape measure</li> <li>○ Tram <ul style="list-style-type: none"> <li>▪ Digital</li> <li>▪ Analog</li> </ul> </li> <li>○ Self-centering</li> </ul> </li> <li>• Electronic (3D) <ul style="list-style-type: none"> <li>○ Computerized</li> <li>○ Laser</li> <li>○ Target</li> <li>○ Arm</li> <li>○ Acoustic</li> <li>○ Optic</li> </ul> </li> </ul> |
| <p>2. Describe the purpose of measuring systems</p>     | <ul style="list-style-type: none"> <li>• Design</li> <li>• Advantages</li> <li>• Disadvantages</li> <li>• Method of length measurement</li> <li>• Limitations of measuring equipment</li> </ul>                                                                                                                                                                                                                                                    |
| <p>3. Describe the maintenance of measuring systems</p> | <ul style="list-style-type: none"> <li>• Inspection</li> <li>• Cleaning</li> <li>• Smooth operation</li> <li>• Calibration</li> <li>• Updating software</li> <li>• Storage</li> </ul>                                                                                                                                                                                                                                                              |

**Line (GAC):           B    USE TOOLS AND EQUIPMENT**  
**Competency:         B9   Use diagnostic equipment**

**Objectives**

To be competent in this area, the individual must be able to:

- Maintain diagnostic equipment.
- Perform pre-scan and post-scan of vehicle.

**LEARNING TASKS**

**CONTENT**

- |                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Describe diagnostic equipment             | <ul style="list-style-type: none"> <li>• Scan tools</li> <li>• Digital Volt-ohm-milliammeter (DVOM)</li> <li>• Laptops</li> <li>• Tablets</li> </ul>                                                                                                                                                                                                                                                                                                                                      |
| 2. Maintain diagnostic equipment             | <ul style="list-style-type: none"> <li>• Checking for defects</li> <li>• Calibration</li> <li>• Cleaning</li> <li>• Storing</li> <li>• Updating software</li> </ul>                                                                                                                                                                                                                                                                                                                       |
| 3. Perform pre-scan and post-scan of vehicle | <ul style="list-style-type: none"> <li>• Faults               <ul style="list-style-type: none"> <li>○ Existing</li> <li>○ Current</li> </ul> </li> <li>• Diagnosing Advanced Driver Assistance Systems (ADAS) and safety features</li> <li>• Clearing fault codes</li> <li>• System calibrations               <ul style="list-style-type: none"> <li>○ Resetting vehicle components</li> <li>○ Lights/delays</li> <li>○ Relearning</li> </ul> </li> <li>• Confirming repairs</li> </ul> |

**Line (GAC): C USE WELDING EQUIPMENT**

**Competency: C2 Use welding equipment**

**Objectives**

To be competent in this area, the individual must be able to:

- Perform various welds, including:
  - Squeeze-type resistance spot weld (STRSW).
  - Vertical butt weld on steel using GMAW/MIG.
  - Vertical lap weld on steel using GMAW/MIG.
- Perform MIG brazing.

**LEARNING TASKS**

1. Describe resistance spot welders

2. Perform set up for STRSW

3. Perform STRSW procedures

**CONTENT**

- Components
  - Reach arms
  - Tips
  - Cooling systems
  - Pressurization handle
  - Transformer
  - Timer
  - Shunting clamp
- Purpose
- Use
  - Pressure
  - Time
  - Voltage
  - Current
- Manufacturers' specifications
- Destruction testing
- Vehicle and area preparation
  - Welding blankets
  - Spark paper
  - Flammables
- Metal preparation
- Joint
  - Clearance between surfaces
  - Anti-corrosion agents
  - Position of welds
  - Weld bond
- Tip pressure and alignment
- Weld time
- Current
- Test coupon

**LEARNING TASKS**

**CONTENT**

- |                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>4. Set up for out of position GMAW/MIG welding</p> | <ul style="list-style-type: none"> <li>• Evaluating weld             <ul style="list-style-type: none"> <li>○ Spatter</li> <li>○ Nugget size</li> <li>○ Squeeze out (weld bond)</li> <li>○ Blow throughs</li> <li>○ Pinholes</li> <li>○ Flange distortion</li> </ul> </li> <li>• Destructive testing             <ul style="list-style-type: none"> <li>○ Shear</li> <li>○ Peel</li> <li>○ Twist</li> </ul> </li> </ul>                                      |
| <p>5. Perform a vertical butt weld on steel</p>       | <ul style="list-style-type: none"> <li>• Manufacturer suggested settings             <ul style="list-style-type: none"> <li>○ Chart</li> </ul> </li> <li>• Wire speed (current)</li> <li>• Wire stick out</li> <li>• Voltage (heat) selection</li> <li>• Shielding gas flow rate</li> </ul>                                                                                                                                                                  |
| <p>6. Perform a vertical lap weld on steel</p>        | <ul style="list-style-type: none"> <li>• Gun angle and speed</li> <li>• Penetration</li> <li>• Build-up</li> <li>• Consistent bead width</li> </ul>                                                                                                                                                                                                                                                                                                          |
| <p>7. Describe MIG brazing</p>                        | <ul style="list-style-type: none"> <li>• Gun angle and speed</li> <li>• Penetration</li> <li>• Build-up</li> <li>• Consistent bead width</li> </ul>                                                                                                                                                                                                                                                                                                          |
| <p>7. Describe MIG brazing</p>                        | <ul style="list-style-type: none"> <li>• Set up</li> <li>• Drive roller pressure</li> <li>• Wire feed             <ul style="list-style-type: none"> <li>○ Spool/machine fed</li> <li>○ Spool gun fed</li> </ul> </li> <li>• Wire speed (current)</li> <li>• Voltage (heat) selection</li> <li>• Shielding gas             <ul style="list-style-type: none"> <li>○ Flow rate</li> <li>○ Type (100% Argon)</li> </ul> </li> <li>• Liner selection</li> </ul> |

**LEARNING TASKS**

**CONTENT**

8. Perform MIG brazing

- Conditioning of metal
- Destructive testing of coupons
  
- Preparation checklist
- Plug
- Slotted
- Butt

**Achievement Criteria**

Performance The learner will perform welds on coupons in a vertical position:

- lap weld
- butt weld
- plug weld

Conditions The learner will be given

- Welding equipment
- 22 gauge coupons
- 16 gauge coupons

Criteria The learner will be evaluated on

- Safety
- Procedure
- Technique
- Quality of weld (destructive test)

**Line (GAC): D ORGANIZE WORK AND USE DOCUMENTATION**

**Competency: D6 Prepare estimates and supplements**

**Objectives**

To be competent in this area, the individual must be able to:

- Create an estimate and supplement.

**LEARNING TASKS**

**CONTENT**

- |                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. Describe estimating terminology</p>                                 | <ul style="list-style-type: none"> <li>• Removal &amp; replacement (Re &amp; Re)</li> <li>• R &amp; I</li> <li>• JT</li> <li>• O/H</li> <li>• Repair</li> <li>• Sublet</li> <li>• Supplement</li> <li>• Access time</li> </ul>                                                                                                                                                                                                            |
| <p>2. Describe additional information contained in estimating systems</p> | <ul style="list-style-type: none"> <li>• Procedural pages (P Pages)</li> <li>• Vehicle systems information</li> <li>• Plastics identification</li> <li>• High strength steel locations</li> <li>• Computer module locations</li> <li>• 'Quick-check' under hood measurements</li> <li>• Airbag information</li> </ul>                                                                                                                     |
| <p>3. Perform vehicle measurement point to point</p>                      | <ul style="list-style-type: none"> <li>• Length</li> <li>• Width</li> <li>• Height</li> <li>• Upper body misalignment</li> <li>• Tolerances</li> </ul>                                                                                                                                                                                                                                                                                    |
| <p>4. Describe the parts of a damage estimate</p>                         | <ul style="list-style-type: none"> <li>• Estimate formats</li> <li>• Vehicle information</li> <li>• Customer information</li> <li>• Main body of estimate               <ul style="list-style-type: none"> <li>○ Required parts and material                   <ul style="list-style-type: none"> <li>▪ New</li> <li>▪ Used</li> <li>▪ After market/Like kind quality (LKQ)</li> </ul> </li> <li>○ Required labour</li> </ul> </li> </ul> |

**LEARNING TASKS**

**CONTENT**

5. Create estimates and supplements

- Required sublet
- Other costs
  - hazardous waste disposal
  - freight fees
  - taxes
- Photographs
- Cost calculations

- Visual assessment
  - Previous or pre-existing damage
  - Tear down
  - Photo documentation
  - JT
- Repair considerations
  - OEM specifications
  - After market accessories
  - R & I
  - Flexibility of components
  - O/H
- Note-taking during inspection
  - On the vehicle (blueprinting)
  - For photos
  - For input into software
  - Customer requests
- Entering information into software
- Finalizing and printing estimate or supplement

**Achievement Criteria**

Performance The learner will create an estimate.

Conditions The learner will be given

- A damaged vehicle or example of a damaged vehicle
- Estimating software or manuals

Criteria The learner will be evaluated on

- Note-taking while inspecting
- Accuracy of final estimate



**Line (GAC):** N **PERFORM FINAL INSPECTIONS**

**Competency:** N1 **Perform final operational check**

**Objectives**

To be competent in this area, the individual must be able to:

- Perform final operational checks.

**LEARNING TASKS**

**CONTENT**

1. Describe pre-delivery inspection

- Inspection checklist
- Value added
  - Touch up stone chips
  - Surface defects

2. Check affected fluid levels

- Coolant
- Windshield washer reservoir
- Fluids
  - Transmission
  - Engine
  - Brakes

3. Check operation of components that were repaired, replaced and calibrated

- A/C
- Windows
- Wipers
- Lights
  - Headlight aim
  - Signals
  - Brakes
  - Interior
- Accessories
- Clocks
- Radio codes
- Water leaks
- Battery connections
- Horn

4. Perform post-scan of vehicle

- Actuators
- SRS
- Fault codes

5. Check tire pressure and wheel torque
  - Manufacturers' specifications
  - Warning lights
  - Tire Pressure Monitoring System (TPMS)
  - Lug nuts
  
6. Perform road test
  - Confirming ADAS are operational
  - Drivability
  - Vibrations
  - Alignment
  - Air leaks
  - Checklist
  - Fluid levels

**Line (GAC): P PREPARE FOR STRUCTURAL REPAIR**

**Competency: P1 Identify extent of damage**

**Objectives**

To be competent in this area, the individual must be able to:

- Identify types and patterns of damage.

**LEARNING TASKS**

**CONTENT**

- |                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. Describe damage analysis procedures</p> | <ul style="list-style-type: none"> <li>• Purpose               <ul style="list-style-type: none"> <li>○ Estimating</li> <li>○ Creation of a repair plan</li> </ul> </li> <li>• Need for a complete damage analysis</li> <li>• Damage analysis techniques</li> <li>• Technology and sources of information</li> <li>• Documentation               <ul style="list-style-type: none"> <li>○ Improper previous repairs</li> <li>○ Unrelated damage</li> </ul> </li> </ul> |
| <p>2. Describe conventional frame designs</p> | <ul style="list-style-type: none"> <li>• Ladder</li> <li>• Perimeter</li> <li>• “X” frame</li> </ul>                                                                                                                                                                                                                                                                                                                                                                   |
| <p>3. Describe unibody designs</p>            | <ul style="list-style-type: none"> <li>• Semi-unitized</li> <li>• Composite</li> <li>• Torque box</li> <li>• Space frame</li> </ul>                                                                                                                                                                                                                                                                                                                                    |
| <p>4. Identify vehicle crush zones</p>        | <ul style="list-style-type: none"> <li>• Energy management system</li> <li>• Types</li> <li>• Repairability</li> </ul>                                                                                                                                                                                                                                                                                                                                                 |
| <p>5. Describe collision forces</p>           | <ul style="list-style-type: none"> <li>• Mass</li> <li>• Momentum</li> <li>• Inertia</li> </ul>                                                                                                                                                                                                                                                                                                                                                                        |
| <p>6. Identify damage patterns</p>            | <ul style="list-style-type: none"> <li>• Unibody and conventional frame</li> <li>• Types of impacts               <ul style="list-style-type: none"> <li>○ Front end</li> <li>○ Rear end</li> <li>○ Offset</li> <li>○ Side</li> </ul> </li> </ul>                                                                                                                                                                                                                      |

**LEARNING TASKS**

**CONTENT**

- |                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7. Identify type of damage               | <ul style="list-style-type: none"> <li>○ Roll over</li> <li>○ Stationary or moving</li> <li>• Direction of damage</li> <li>• Crush zones</li> <li>• Deflection</li> <li>• Primary and secondary               <ul style="list-style-type: none"> <li>○ Point of impact</li> <li>○ Buckling</li> <li>○ Gap misalignment</li> <li>○ Stressed spot welds</li> <li>○ Broken seam sealer</li> <li>○ Cracked paint</li> </ul> </li> <li>• Related and unrelated</li> </ul> |
| 8. Describe cross-measurement techniques | <ul style="list-style-type: none"> <li>• Structural</li> <li>• Non-structural</li> </ul>                                                                                                                                                                                                                                                                                                                                                                             |
| 9. Perform vehicle measurements          | <ul style="list-style-type: none"> <li>• Limitations               <ul style="list-style-type: none"> <li>○ Diamond checking</li> <li>○ Asymmetrical</li> </ul> </li> <li>• Sway checking</li> </ul>                                                                                                                                                                                                                                                                 |
| 9. Perform vehicle measurements          | <ul style="list-style-type: none"> <li>• Tram gauge               <ul style="list-style-type: none"> <li>○ Length, width, cross</li> </ul> </li> </ul>                                                                                                                                                                                                                                                                                                               |

**Achievement Criteria**

- |             |                                                                                                                                                                                                |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Performance | <p>The learner will perform vehicle point to point measurements, such as</p> <ul style="list-style-type: none"> <li>• Door opening</li> <li>• Trunk</li> <li>• Under hood</li> </ul>           |
| Conditions  | <p>The learner will be given</p> <ul style="list-style-type: none"> <li>• Tram gauge</li> <li>• Tape measure</li> <li>• Specifications/comparative</li> <li>• Vehicle or equivalent</li> </ul> |
| Criteria    | <p>The learner will be evaluated on</p> <ul style="list-style-type: none"> <li>• Procedure</li> <li>• Accuracy of measurements</li> </ul>                                                      |

**Line (GAC):** P **PREPARE FOR STRUCTURAL REPAIR**  
**Competency:** P2 **Remove components for access**

**Objectives**

To be competent in this area, the individual must be able to:

- Describe unibody components.
- Describe removal considerations.

**LEARNING TASKS**

1. Describe unibody components

2. Describe removal considerations

**CONTENT**

- Cowl
- Apron assemblies
- Radiator supports
- Cross-members
- Pillars
- Shock towers
- Rocker panels
- SRS sensors
  
- OEM recommendations
  - Warranty
- Customer expectations
- Replacement vs. repairability
- Part availability
- Liability
- Maintaining vehicle structural integrity
- Type of material
  - High strength steels
  - Composites
  - Ultra high strength steels
- Corrosion protection
  - Sound deadening application
  - Seam sealers
- Heating
- Joining and attachment methods

**Line (GAC):** P **PREPARE FOR STRUCTURAL REPAIR**  
**Competency:** P3 **Perform vehicle set up**

**Objectives**

To be competent in this area, the individual must be able to:

- Perform a unibody vehicle set up for anchoring.

**LEARNING TASKS**

**CONTENT**

- |                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Describe types of anchoring systems | <ul style="list-style-type: none"> <li>• Dedicated</li> <li>• Universal</li> <li>• Portable</li> <li>• Floor</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                     |
| 2. Describe unibody anchoring          | <ul style="list-style-type: none"> <li>• Purpose</li> <li>• Design</li> <li>• Anchoring locations               <ul style="list-style-type: none"> <li>○ Manufacturers' recommendations</li> <li>○ Structures</li> <li>○ Frames</li> </ul> </li> <li>• Center section principle</li> </ul>                                                                                                                                                                                                                                  |
| 3. Describe anchoring considerations   | <ul style="list-style-type: none"> <li>• Weight support</li> <li>• Vehicles without lower rocker panel pinch welds</li> <li>• Space frame</li> <li>• Types of clamps               <ul style="list-style-type: none"> <li>○ OEM specific</li> <li>○ Universal</li> </ul> </li> <li>• Custom fit clamps</li> <li>• Weld-on flanges</li> <li>• Through-the-floor clamps</li> <li>• Suspension mount clamps</li> <li>• Jacking points</li> <li>• Safety considerations</li> <li>• Attachment and removal procedures</li> </ul> |

**LEARNING TASKS**

4. Perform a unibody vehicle set up for anchoring

**CONTENT**

- Rocker panel flange preparation
- Weak rocker panels
- Adjacent components
  - Brake lines
  - Wiring
  - Fuel lines
- Drain holes
  
- Unibody
- Floor
- Anchoring procedures

**Line (GAC):** Q REMOVE, REPAIR AND INSTALL STRUCTURAL COMPONENTS

**Competency:** Q1 Repair structural components

**Objectives**

To be competent in this area, the individual must be able to:

- Describe repairing structural components.

**LEARNING TASKS**

**CONTENT**

- |                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. Describe straightening effects on damaged metal</p> | <ul style="list-style-type: none"> <li>• Shape/dimension             <ul style="list-style-type: none"> <li>○ Spring back</li> </ul> </li> <li>• State/strength             <ul style="list-style-type: none"> <li>○ Work hardening</li> </ul> </li> <li>• High strength steel</li> <li>• Aluminum</li> </ul>                                                                                                                                                                              |
| <p>2. Describe preparation for straightening</p>          | <ul style="list-style-type: none"> <li>• Removal for access             <ul style="list-style-type: none"> <li>○ Outer panel</li> <li>○ Mechanical components</li> <li>○ Glass</li> <li>○ Interior trim</li> </ul> </li> <li>• Visual inspection             <ul style="list-style-type: none"> <li>○ Door gaps</li> </ul> </li> <li>• Pinch weld flanges             <ul style="list-style-type: none"> <li>○ Wiring</li> <li>○ Trim</li> </ul> </li> </ul>                               |
| <p>3. Describe realignment equipment</p>                  | <ul style="list-style-type: none"> <li>• Types             <ul style="list-style-type: none"> <li>○ Floor pullers</li> <li>○ Hydraulic</li> <li>○ Electric</li> <li>○ Pneumatic</li> <li>○ Chain</li> <li>○ Chainless</li> </ul> </li> <li>• Attachments             <ul style="list-style-type: none"> <li>○ Clamps</li> <li>○ Safety cables</li> <li>○ Hooks</li> <li>○ Turnbuckles</li> <li>○ Slings</li> <li>○ Brackets</li> <li>○ Plates</li> </ul> </li> <li>• Advantages</li> </ul> |



**LEARNING TASKS**

**CONTENT**

4. Describe realignment procedures

- Time
- Mobility
  
- Types of pulls
  - Vector
  - Cowl
  - Up/down
  - Pillar
  - Push/pull
  - Inner structure
- Pulling strategies
  - Angle
  - Chain alignment
  - Forces applied
    - Anchoring
    - Pulling
    - Blocking
  - Number of pulls
  - Kink vs. bend
- Sectioning procedures
  - Pillar
    - A, B, C, D
  - Floor panel
  - Rocker panel

5. Describe stress-relieving considerations

- Cold
- Heat
- Vehicle construction
- Spring back
- Proper control of panel movement

**Line (GAC):** Q REMOVE, REPAIR AND INSTALL STRUCTURAL COMPONENTS

**Competency:** Q2 Remove structural components

**Objectives**

To be competent in this area, the individual must be able to:

- Describe procedures for structural panels removal.

**LEARNING TASKS**

1. Describe procedures for structural panels removal

**CONTENT**

- Analysis
  - Vehicle construction
- Reasons for sectioning
  - Time
  - Cost
  - Availability
  - Less disruption of OEM corrosion protection and coatings
- Identify areas for sectioning
  - Manufacturers' removal procedure and specifications
  - Layout
  - Foams
- Attachment methods
  - Spot weld
    - Location
    - Number
  - Rivets
    - Blind
    - SPR
  - Adhesive
  - Fasteners
    - One time
    - Bolts
- Removal methods
  - Cut off tool
  - Chiseling
  - Belt sanders
  - Drilling
  - Plasma torch
  - Heating



3. Section a welded-on body panel

- Removal procedures
- Installation procedures
- Riveting coupons
- Caution areas
  - Existing body holes
  - Inner reinforcements
  - Panel design
  - Multiple layers
  - Seat belt assembly mounting locations

**Achievement Criteria**

**Performance** The learner will section a welded-on body panel, including

- One with a bond
- One with a weld

**Conditions** The learner will be given

- Closed box panel
- Tools and equipment
- Materials
- Repair procedures and specifications

**Criteria** The learner will be evaluated on

- Safety
- Accuracy
- Quality
- Appearance

**Line (GAC):** T **DEACTIVATE AND REACTIVATE ALTERNATE-FUEL SYSTEMS**  
**Competency:** T1 **Deactivate alternate-fuel systems**

**Objectives**

To be competent in this area, the individual must be able to:

- Follow safety procedures for alternate fuel systems.
- Describe deactivating alternate fuel systems

**LEARNING TASKS**

**CONTENT**

- |                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. Identify type of alternate fuel system</p>               | <ul style="list-style-type: none"> <li>• Electric</li> <li>• Hybrid</li> <li>• Propane</li> <li>• Compressed natural gas (CNG)</li> <li>• Hydrogen</li> </ul>                                                                                                                                                                                                                                                                                                                                                        |
| <p>2. Follow safety procedures for alternate fuel vehicles</p> | <ul style="list-style-type: none"> <li>• Manufacturers' safety procedures</li> <li>• Potential for damage to vehicle and people</li> <li>• Deactivation of battery packs</li> <li>• Curing cycles</li> <li>• PPE, especially high voltage gloves</li> <li>• Closing fuel supply valves</li> <li>• Placing vehicle on wheel dollies</li> </ul>                                                                                                                                                                        |
| <p>3. Describe disabling high voltage systems</p>              | <ul style="list-style-type: none"> <li>• OEM specifications               <ul style="list-style-type: none"> <li>○ Shut down procedures</li> <li>○ Switch location</li> <li>○ Turning ignition off</li> <li>○ Separating keys from vehicle</li> </ul> </li> <li>• Ensuring zero energy</li> <li>• Colour identifier (orange)</li> <li>• Residual power after deactivation of power supply</li> <li>• Removing ignition circuit relay or fuse</li> <li>• Testing with DVOM</li> <li>• Battery pack removal</li> </ul> |
| <p>4. Describe removing alternate fuel cells</p>               | <ul style="list-style-type: none"> <li>• OEM specifications</li> <li>• Handling and storage considerations</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                |

**Line (GAC):** T **DEACTIVATE AND REACTIVATE ALTERNATE-FUEL SYSTEMS**  
**Competency:** T2 **Reactivate alternate-fuel systems**

**Objectives**

To be competent in this area, the individual must be able to:

- Describe reactivating alternate fuel systems.

**LEARNING TASKS**

1. Describe reactivating alternate fuel systems

**CONTENT**

- Safety
- OEM specifications
- Installation of battery pack
- Enabling high voltage systems
- Opening alternate fuel supply valves
- Connecting low-voltage battery
- Charging low-voltage battery

**Line (GAC):** U REMOVE AND INSTALL MECHANICAL COMPONENTS  
**Competency:** U1 Identify fundamentals of heating and cooling systems and components

**Objectives**

To be competent in this area, the individual must be able to:

- Identify fundamentals of heating and cooling systems and components.

**LEARNING TASKS**

**CONTENT**

1. Describe heating and cooling systems

- Oil cooling systems
  - Transmission
  - Engine
  - Power steering
- Climate control systems

2. Describe heating and cooling system components

- Radiators
- Thermostat
- Hoses
- Water pump
- Fan assembly
  - Electrical
  - Mechanical
  - Hydraulic
  - Shrouds
- Block heater/expansion plug
- Intercoolers
- Coolant
  - Types
  - Surge tank
  - Overflow tank
- Heater core
- Belts
- Pulleys

3. Describe air conditioning system components

- Condenser
- Receiver-drier
- Expansion valve
- Compressor
- Controls
- System Lines
- Refrigerant
  - R134a
  - 1234yf

**LEARNING TASKS**

4. Identify safe handling procedures of air conditioning components

**CONTENT**

- Oil
- Dyes
- Belts
  - Serpentine
  - V-belt
- Evaporator
  
- Regulations and required certification
- Manufacturers' specifications
  - Weight
  - Identification
- Pressurized system
- Welding in vicinity
- Evacuating the system (recovery)
- Sealing system
- Recharging the system
- Dye
- Oil



**Line (GAC):** U REMOVE AND INSTALL MECHANICAL COMPONENTS  
**Competency:** U2 Identify fundamentals of powertrain systems and components

**Objectives**

To be competent in this area, the individual must be able to:

- Identify fundamentals of powertrain systems and components.

**LEARNING TASKS**

**CONTENT**

1. Describe powertrain components

- Engine
- Transmission
- Axle
- Joints
  - CV
  - Universal
- Differentials
- Drive shaft

2. Describe exhaust system components

- Muffler
- Exhaust manifold
- Exhaust pipe
- Tail pipe
- Catalytic converter
- Resonator
- Hangers
- Clamps
- Sensors
- Heat shields
- Insulators
- Gaskets

3. Describe fuel system components

- Fuel pump
- Fuel injectors
- Fuel tank
- Fuel lines
- Throttle body
- Sending units
- Emergency shut-off switch
- Filters
- Air intake system



**Line (GAC):** U REMOVE AND INSTALL MECHANICAL COMPONENTS  
**Competency:** U5 Install mechanical components

**Objectives**

To be competent in this area, the individual must be able to:

- Describe installation of mechanical components.

**LEARNING TASKS**

**CONTENT**

- |                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. Describe re-assembly of cooling systems</p>                 | <ul style="list-style-type: none"> <li>• Manufacturers' specifications               <ul style="list-style-type: none"> <li>○ Fluid capacities</li> <li>○ Coolant types and mixture</li> </ul> </li> <li>• Radiator installation</li> <li>• Filling procedures</li> <li>• Troubleshooting               <ul style="list-style-type: none"> <li>○ Pressure testing</li> <li>○ Dye recognition</li> </ul> </li> </ul>                                                                                                                                                                                               |
| <p>2. Describe installation procedures for suspension systems</p> | <ul style="list-style-type: none"> <li>• Visual inspection</li> <li>• Manufacturers' installation procedures               <ul style="list-style-type: none"> <li>○ Reusability of components</li> <li>○ Torquing fasteners</li> </ul> </li> <li>• Procedures               <ul style="list-style-type: none"> <li>○ Brake system disconnect</li> <li>○ Cleaning</li> <li>○ Installation sequence</li> <li>○ Realignment requirements</li> <li>○ Brake system assembly and bleeding</li> </ul> </li> <li>• Specialty tools</li> <li>• Component storage</li> <li>• Determine reusability of components</li> </ul> |
| <p>3. Describe installation of power train components</p>         | <ul style="list-style-type: none"> <li>• Coordination with other trades</li> <li>• Sublet</li> <li>• OEM specifications and sequence</li> <li>• Reassembly               <ul style="list-style-type: none"> <li>○ Exhaust</li> <li>○ Drive shaft</li> <li>○ Re-connecting fuel systems</li> <li>○ Engine cradle</li> </ul> </li> </ul>                                                                                                                                                                                                                                                                            |

**Line (GAC):** V **REMOVE, REPAIR AND INSTALL ELECTRICAL AND ELECTRONIC COMPONENTS**

**Competency:** V1 **Identify fundamentals of electrical systems and components**

**Objectives**

To be competent in this area, the individual must be able to:

- Identify fundamentals of electrical systems and components.

**LEARNING TASKS**

1. Test electrical circuits

**CONTENT**

- Voltage
- Resistance
- Current flow
- Voltage drop
- Power consumption
- Circuits
  - Open
  - Closed
  - Series
  - Parallel
- Short circuits
  - Dead/high resistance
  - Intermittent
  - Cross circuit
- System schematics

2. Identify the safety precautions when working around low-voltage batteries

- Gases present
- Disconnecting
- Removal
- Charging
- Welding near a battery
- Computers/memory
- Jump starting

3. Describe electrical components

- Exterior and interior lighting
- Power accessories
- Antenna
- Switches and gauges
- Sending units
- Fuse boxes and fuses
- Fan motors
- Relays
- Horn

**Line (GAC):** V REMOVE, REPAIR AND INSTALL ELECTRICAL AND ELECTRONIC COMPONENTS

**Competency:** V2 Remove electrical components

### Objectives

To be competent in this area, the individual must be able to:

- Describe removal of electrical components.

### LEARNING TASKS

1. Describe removal of damaged electrical components

### CONTENT

- Inspection
- Identification of damaged component
- Manufacturers' removal procedure
- Disconnect components
- Storage and/or disposal of components
- Battery removal
- Wiring harnesses

**Line (GAC):** V REMOVE, REPAIR AND INSTALL ELECTRICAL AND ELECTRONIC COMPONENTS

**Competency:** V3 Repair damaged wires and protective coverings

**Objectives**

To be competent in this area, the individual must be able to:

- Repair damaged wires and protective coverings.
- Service low-voltage battery.

**LEARNING TASKS**

**CONTENT**

- |                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. Describe a minor electrical diagnosis on a simple circuit</p> | <ul style="list-style-type: none"> <li>• Types of damage               <ul style="list-style-type: none"> <li>○ Corrosion</li> <li>○ Burning/melting</li> <li>○ Chafing</li> <li>○ Pinching</li> <li>○ Broken</li> </ul> </li> <li>• Fault codes</li> <li>• Voltage drop</li> <li>• Wiring harness repair</li> <li>• Checking for poor grounds               <ul style="list-style-type: none"> <li>○ Corrosion</li> <li>○ Damaged wires</li> </ul> </li> <li>• Fuses/relays</li> <li>• Equipment and tools               <ul style="list-style-type: none"> <li>○ DVOM                   <ul style="list-style-type: none"> <li>▪ Ammeter</li> <li>▪ Volt</li> <li>▪ Ohmmeter</li> </ul> </li> <li>○ Test lights</li> <li>○ Jumper wires</li> <li>○ Repair tools                   <ul style="list-style-type: none"> <li>▪ Crimpers</li> <li>▪ Strippers</li> <li>▪ Soldering equipment</li> </ul> </li> </ul> </li> </ul> |
| <p>2. Repair damaged wires and exterior coatings</p>                | <ul style="list-style-type: none"> <li>• Types of wiring and coverings               <ul style="list-style-type: none"> <li>○ Gauge</li> <li>○ Composition                   <ul style="list-style-type: none"> <li>▪ Aluminum</li> <li>▪ Copper</li> </ul> </li> </ul> </li> <li>• Types of connectors               <ul style="list-style-type: none"> <li>○ Butt</li> <li>○ Bullet</li> </ul> </li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

**LEARNING TASKS**

**CONTENT**

3. Service low-voltage batteries

- Spade type
- Locking tabs
- Determine repairability of wires
- Volt meters and test lights
- Splice, cut and solder
- Reapply coverings
  - Electrical tape
  - Shrink tube
- Battery specifications
  - Grouping
  - Ratings
- Visual inspection
- State of charge test
- Disconnection
- Cleaning terminals
- Charging
- Load test
- Reconnection
- Parasitic draw test

**Achievement Criteria (This achievement criteria covers multiple competencies in Line V)**

**Performance** The learner will repair a damaged wire.

**Conditions** The learner will be given

- Tools and materials
- A damaged wire

**Criteria** The learner will be evaluated on

- Safety
- Procedure
- Technique
- Quality of repair
  - Resistance of circuit

**Line (GAC):** V REMOVE, REPAIR AND INSTALL ELECTRICAL AND ELECTRONIC COMPONENTS

**Competency:** V4 Install electrical components

**Objectives**

To be competent in this area, the individual must be able to:

- Describe installation of electrical components.

**LEARNING TASKS**

1. Describe installation of electrical components

**CONTENT**

- Part number verification
- Manufacturers' installation procedure
- Reconnection of components
  - Fasteners
- Battery installation
- Wiring harness
- Operational check
- Scanning vehicle for codes
- Reset if required



**Line (GAC):** V REMOVE, REPAIR AND INSTALL ELECTRICAL AND ELECTRONIC COMPONENTS

**Competency:** V5 Service advanced electronic components

**Objectives**

To be competent in this area, the individual must be able to:

- Describe electronic components.

**LEARNING TASKS**

1. Describe electronic components

**CONTENT**

- Location
- Modules
- Sensors
- Cameras
- Static straps
- Entertainment systems
- Engine Control Module (ECM)/Computer

<b>Line (GAC):</b>	<b>X</b>	<b>SERVICE SUPPLEMENTAL RESTRAINT SYSTEMS (SRS)</b>
<b>Competency:</b>	<b>X1</b>	<b>Service seat belt restraint systems</b>

**Objectives**

To be competent in this area, the individual must be able to:

- Describe servicing seat belt restraint systems.

**LEARNING TASKS**

**CONTENT**

1. Describe types of seat belt assemblies and their components	<ul style="list-style-type: none"> <li>• Active design</li> <li>• Passive design</li> <li>• Two-point lap</li> <li>• Three-point seatbelt</li> <li>• Continuous loop single retractor</li> <li>• Three-point dual retractor</li> <li>• Three-point passive</li> <li>• Motorized shoulder belt</li> <li>• Automatic tensioner</li> <li>• Seat integrated systems</li> <li>• Mounting hardware</li> <li>• Electrical connections</li> </ul>
2. Describe inspection procedures for seat belt assembly	<ul style="list-style-type: none"> <li>• Manufacturers' specifications</li> <li>• Examine seat belt restraint system</li> <li>• Tongue/buckle assembly</li> <li>• Retractor (tilt mechanism and inertia type)</li> <li>• Webbing</li> <li>• Anchoring points</li> <li>• Interior panel and upholstery removal</li> <li>• Inspection for secondary damage</li> <li>• Pre and post-scan and self-diagnostic check</li> </ul>
3. Describe installation of seat belts and components	<ul style="list-style-type: none"> <li>• OEM specifications and procedures               <ul style="list-style-type: none"> <li>○ Torque</li> <li>○ Thread lock sealant</li> </ul> </li> <li>• Operational check</li> </ul>

**Line (GAC):** X **SERVICE SUPPLEMENTAL RESTRAINT SYSTEMS (SRS)**  
**Competency:** X2 **Service air bags and related components**

**Objectives**

To be competent in this area, the individual must be able to:

- Follow safety procedures around air bags.
- Describe servicing air bags and related components.

**LEARNING TASKS**

**CONTENT**

- |                                                                              |                                                                                                                                                                                                                                                                    |
|------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. Describe airbag system components</p>                                  | <ul style="list-style-type: none"> <li>• Impact sensors</li> <li>• Control module</li> <li>• Energy reserve module</li> <li>• Voltage converter</li> <li>• Clock spring</li> <li>• Wiring harness</li> <li>• Airbag module</li> <li>• Inflator assembly</li> </ul> |
| <p>2. Follow safety procedures when working around an airbag system</p>      | <ul style="list-style-type: none"> <li>• Disarm</li> <li>• Electrical disconnect</li> <li>• Discharge time</li> <li>• Impact sensors</li> <li>• Deployed inflator module</li> <li>• Un-deployed inflator module</li> </ul>                                         |
| <p>3. Describe procedures to remove and replace airbag system components</p> | <ul style="list-style-type: none"> <li>• System scan</li> <li>• Manufacturer removal and replacement process</li> <li>• Required tools</li> <li>• Related components</li> <li>• Self-diagnostic system</li> <li>• Secondary damage</li> </ul>                      |

# **Level 4**

## **Auto Body and Collision Technician**

**Line (GAC):**        **B    USE TOOLS AND EQUIPMENT**  
**Competency:**      **B8    Maintain frame and unibody repair and measuring equipment**

**Objectives**

To be competent in this area, the individual must be able to:

- Describe maintaining frame pulling equipment.

**LEARNING TASKS**

1. Describe frame pulling equipment

**CONTENT**

- Unibody/full frame
- Rams
  - Pulling towers
  - Pneumatic
  - Hydraulic
- Safety straps
- Jack
  - Floor
  - Bottle
  - Porta power
- Chains
  - Rating (load)
  - Pulling
  - Holding
- Anchoring
  - Pinch weld clamps
  - Anchor pots
  - Floor rails
  - Turnbuckle/cinch
- Bench (rack)
  - Drive on
  - Lifting
  - Fixtures
- Hooks and clamps
  - Sill
  - Weld on
  - Specialty
  - Self-tightening

2. Describe maintaining frame pulling equipment

- Manufacturers' specifications
- Hydraulic fluid levels
- Inspection for damage
  - Chains
  - Hooks
  - Clamps

**LEARNING TASKS**

**CONTENT**

- Pulleys
- Lines
- Fittings
- Anchor pots
- Safety locking mechanisms
- Cleaning
- Lubrication
- Calibration

**Line (GAC):** D **ORGANIZE WORK AND USE DOCUMENTATION**  
**Competency:** D6 **Prepare estimates and supplements**

**Objectives**

To be competent in this area, the individual must be able to:

- Create supplements and sublets.

**LEARNING TASKS**

1. Create supplements

**CONTENT**

- Rationale for supplement
  - Missed damage
  - Price adjustments
  - Access time
- Criteria for determining total loss
  - Parts availability
  - Labour costs
  - Repairability
  - Safety
  - Liability

2. Create sublets

- Rationale for sublet
  - Cost
  - Equipment limitations
  - Parts availability
- Other trades
  - Wheel alignment
  - Mechanical repairs
  - OEM calibration
  - Interior repairers
- Warranty

**Achievement Criteria**

**Performance** The learner will interpret an estimate and create a supplement and a sublet.

**Conditions** The learner will be given

- An estimate
- A damaged vehicle or an example of a damage vehicle (pictures/video)

**Criteria** The learner will be evaluated on

- Safety
- Accuracy of supplement
- Accuracy of sublet





<b>Line (GAC):</b>	<b>N</b>	<b>PERFORM FINAL INSPECTIONS</b>
<b>Competency:</b>	<b>N2</b>	<b>Perform final quality control inspections</b>

**Objectives**

To be competent in this area, the individual must be able to:

- Perform quality control.

**LEARNING TASKS**

1. Perform quality control

**CONTENT**

- Inspection
- Checklist
- Panel gaps
- Panel alignment
- Corrosion protection
- Quality of sublets
- Quality of repair
- Operation of latches, catches and locks
- Alignment of trims, headlights, grilles and bumpers
- SRS
- Colour matching
- Cleanliness
- Customer courtesies
- Determining completeness of work based on repair order

**Line (GAC): P PREPARE FOR STRUCTURAL REPAIR**

**Competency: P1 Identify extent of damage**

**Objectives**

To be competent in this area, the individual must be able to:

- Perform measurements, including 3D measuring.
- Prepare a damage analysis report.

**LEARNING TASKS**

**CONTENT**

- |                                               |                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. Describe conventional frame designs</p> | <ul style="list-style-type: none"> <li>• Components               <ul style="list-style-type: none"> <li>○ Body mounts</li> <li>○ Cross members</li> </ul> </li> <li>• Construction               <ul style="list-style-type: none"> <li>○ Hydroformed</li> <li>○ Steel</li> <li>○ Aluminum</li> </ul> </li> </ul>                                                                         |
| <p>2. Describe unibody designs</p>            | <ul style="list-style-type: none"> <li>• Components               <ul style="list-style-type: none"> <li>○ Cradle</li> <li>○ Pillars</li> </ul> </li> <li>• Construction               <ul style="list-style-type: none"> <li>○ Steel</li> <li>○ Aluminum</li> <li>○ Ultra-high strength Steel (UHSS)</li> <li>○ Composites</li> <li>○ Overall structural integrity</li> </ul> </li> </ul> |
| <p>3. Describe measuring planes</p>           | <ul style="list-style-type: none"> <li>• Datum plane</li> <li>• Center line</li> <li>• Zero or base plane</li> <li>• Length, width and height</li> <li>• X, Y, Z</li> <li>• Three section principle               <ul style="list-style-type: none"> <li>○ Front</li> <li>○ Centre</li> <li>○ Rear</li> </ul> </li> </ul>                                                                  |
| <p>4. Identify types of measurement</p>       | <ul style="list-style-type: none"> <li>• Point-to-point</li> <li>• Parallel-to-datum</li> <li>• Parallel-to-center</li> <li>• Definition</li> <li>• Purpose</li> <li>• Type of equipment used</li> </ul>                                                                                                                                                                                   |

**LEARNING TASKS**

**CONTENT**

5. Identify and perform 3D measurement

- Examples of use
- System types
  - Universal mechanical measuring systems
  - Universal laser measuring systems
- Software/sheets
  - Under hood
  - Upper body
  - Symmetrical
  - Asymmetrical
  - Compensating for weight
  - Movable parts
- Equipment
  - Electronic
  - Digital
  - Sonar
- Procedures
- Considerations
- Limitations

6. Prepare a damage analysis report

- Visual damage
- Buckles, cracks, or panel distortion
- Mechanical mounts
- Visible wheelbase
- Dimensional analysis
- Formulate a repair plan

**Achievement Criteria**

**Performance** The learner will perform damage analysis using 3D measurement.

**Conditions** The learner will be given

- 3D measuring equipment
- A vehicle
- Access to specifications
- Damage analysis report

**Criteria** The learner will be evaluated on

- Safety
- Sequence of measurements
- Accuracy of measurement
- Accuracy of documentation

**Line (GAC):** P **PREPARE FOR STRUCTURAL REPAIR**  
**Competency:** P2 **Remove components for access**

**Objectives**

To be competent in this area, the individual must be able to:

- Describe removing and handling components for access.

**LEARNING TASKS**

1. Describe removing components for access

**CONTENT**

- Procedures for disarming and disabling
- Inner and outer panel
  - Doors
  - Fenders
  - Bumper covers
  - Trunks
  - Hoods
  - After market accessories
  - Trim
    - Interior
    - Exterior
- Mechanical
  - Suspension
  - Cooling systems
  - Fuel lines
  - Fluids
- Electrical/electronic
  - Wiring
  - Batteries
  - Sensors
  - SRS
- Glass

2. Describe handling removed components

- Inspection
  - For damage
  - Serviceability
- Cleaning
- Disposal
- Label, organize and store components

**Line (GAC): P PREPARE FOR STRUCTURAL REPAIR**

**Competency: P3 Perform vehicle set up**

**Objectives**

To be competent in this area, the individual must be able to:

- Perform vehicle set up for conventional frame repair.

**LEARNING TASKS**

**CONTENT**

- |                                                                             |                                                                                                                                                                                                                                |
|-----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. Describe chain wrapping techniques</p>                                | <ul style="list-style-type: none"> <li>• Purpose</li> <li>• Chain wrapping methods</li> <li>• Use with blocking</li> </ul>                                                                                                     |
| <p>2. Describe weight support techniques</p>                                | <ul style="list-style-type: none"> <li>• Loaded and unloaded suspension</li> <li>• Split between torque box and suspension areas</li> <li>• Even from side-to-side to prevent twisting</li> <li>• Use with blocking</li> </ul> |
| <p>3. Describe blocking method</p>                                          | <ul style="list-style-type: none"> <li>• Leverage principles</li> <li>• Twist removal</li> </ul>                                                                                                                               |
| <p>4. Describe the use of plug hooks</p>                                    | <ul style="list-style-type: none"> <li>• Fast, efficient anchor</li> <li>• Need for blocking</li> <li>• Level positioning</li> </ul>                                                                                           |
| <p>5. Perform a conventional or full frame vehicle set up for anchoring</p> | <ul style="list-style-type: none"> <li>• Conventional</li> <li>• Full frame</li> <li>• Floor</li> <li>• Anchoring procedures</li> </ul>                                                                                        |



**LEARNING TASKS**

**CONTENT**

- |                                                              |                                                                                                                                                                                                                                                                                                                                           |
|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>3. Describe pulling procedures for structural repairs</p> | <ul style="list-style-type: none"> <li>○ Adhesive</li> <li>○ Mechanical</li> <li>● Corrosion prevention</li> </ul>                                                                                                                                                                                                                        |
| <p>4. Describe multiple-pulling</p>                          | <ul style="list-style-type: none"> <li>● Types of frame damage               <ul style="list-style-type: none"> <li>○ Mash</li> <li>○ Sag</li> <li>○ Sway</li> <li>○ Diamond</li> <li>○ Twist</li> </ul> </li> <li>● Analysis</li> <li>● Set up</li> <li>● Pulling procedure</li> </ul>                                                   |
| <p>5. Describe the center-out pulling principle</p>          | <ul style="list-style-type: none"> <li>● Advantages               <ul style="list-style-type: none"> <li>○ Reduction of pressure</li> <li>○ Equalizing and dispersing energy</li> <li>○ Control</li> </ul> </li> <li>● Need to establish true center-section</li> <li>● Effects of center-section misalignment on end sections</li> </ul> |
| <p>6. Perform structural repair</p>                          | <ul style="list-style-type: none"> <li>● Frame rail</li> <li>● Sectioning</li> </ul>                                                                                                                                                                                                                                                      |

**Achievement Criteria**

- |                    |                                                                                                                                                                                                   |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Performance</p> | <p>The learner will perform a complex frame structural repair.</p>                                                                                                                                |
| <p>Conditions</p>  | <p>The learner will be given</p> <ul style="list-style-type: none"> <li>● Tools and equipment</li> <li>● Specifications</li> <li>● Damaged vehicle or equivalent, such as rail section</li> </ul> |
| <p>Criteria</p>    | <p>The learner will be evaluated on</p> <ul style="list-style-type: none"> <li>● Safety</li> <li>● Procedure</li> <li>● Accuracy of repair</li> </ul>                                             |

**Line (GAC):** U REMOVE AND INSTALL MECHANICAL COMPONENTS  
**Competency:** U3 Identify fundamentals of steering, suspension and braking systems

**Objectives**

To be competent in this area, the individual must be able to:

- Identify fundamentals of steering, suspension and braking systems.

**LEARNING TASKS**

**CONTENT**

- |                                                                                                   |                                                                                                                                                                                                                                                                                                                 |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Describe rack and pinion steering systems                                                      | <ul style="list-style-type: none"> <li>• Steering column</li> <li>• Pinion gear</li> <li>• Rack gear</li> <li>• Gear housing</li> <li>• Tie rods               <ul style="list-style-type: none"> <li>○ Inner/outer</li> </ul> </li> <li>• Bellows</li> <li>• Mounting points</li> <li>• Input shaft</li> </ul> |
| 2. Describe the relationship between the rack and pinion assembly and the lower control arms      | <ul style="list-style-type: none"> <li>• Misalignment angles</li> <li>• Jounce rebound toe change</li> <li>• Handling problems</li> <li>• Methods of checking</li> </ul>                                                                                                                                        |
| 3. Describe parallelogram steering systems                                                        | <ul style="list-style-type: none"> <li>• Steering gear</li> <li>• Steering column</li> <li>• Steering knuckle</li> <li>• Pitman arm</li> <li>• Idler arm</li> <li>• Centre link/drag link</li> <li>• Inner tie rods</li> <li>• Outer tie rods</li> <li>• Adjusting sleeves</li> </ul>                           |
| 4. Describe the relationship between the parallelogram steering system and the lower control arms | <ul style="list-style-type: none"> <li>• Misalignment angles</li> <li>• Jounce and rebound toe change</li> <li>• Handling problems</li> <li>• Methods of checking</li> </ul>                                                                                                                                    |



- |                                                                                                  |                                                                                                                                                                                                                                                                                                                                 |
|--------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5. Describe alignment angles                                                                     | <ul style="list-style-type: none"> <li>• Caster</li> <li>• Camber</li> <li>• Steering axis inclination</li> <li>• Toe</li> <li>• Turning radius</li> <li>• Thrust angle</li> </ul>                                                                                                                                              |
| 6. Describe handling and parts wear problems associated with each of the alignment angles        | <ul style="list-style-type: none"> <li>• Tire wear</li> <li>• Pulling problems</li> <li>• Drive line alignment</li> <li>• Steering wheel angle</li> <li>• Wheel bearings</li> </ul>                                                                                                                                             |
| 7. Describe tracking problems                                                                    | <ul style="list-style-type: none"> <li>• Alignment problems               <ul style="list-style-type: none"> <li>○ Thrust angle</li> </ul> </li> <li>• Drive line problems</li> <li>• Wheelbase</li> <li>• Tire wear</li> </ul>                                                                                                 |
| 8. Describe the effects of a misaligned unibody structure on the steering and suspension systems | <ul style="list-style-type: none"> <li>• Handling</li> <li>• Parts wear</li> <li>• Jounce and rebound toe change</li> <li>• Steering wheel angle</li> </ul>                                                                                                                                                                     |
| 9. Describe diagnosis of wheel alignment                                                         | <ul style="list-style-type: none"> <li>• Parts wear</li> <li>• Interpreting SAI readings</li> <li>• Caster</li> <li>• Camber</li> </ul>                                                                                                                                                                                         |
| 10. Describe the MacPherson strut suspension system                                              | <ul style="list-style-type: none"> <li>• Components               <ul style="list-style-type: none"> <li>○ Lower control arm</li> <li>○ Lower ball joint</li> <li>○ Strut assembly</li> <li>○ Spring</li> <li>○ Steering knuckle</li> <li>○ Upper bearing</li> <li>○ Bushings</li> <li>○ Rack and pinion</li> </ul> </li> </ul> |
| 11. Describe short and long arm suspension systems                                               | <ul style="list-style-type: none"> <li>• Components               <ul style="list-style-type: none"> <li>○ Control arms</li> <li>○ Lower ball joint</li> <li>○ Steering gear</li> </ul> </li> </ul>                                                                                                                             |

- Pitman arm
  - Idler arm
  - Spring
  - Steering knuckle
  - Torsion bar
  - Coil spring
  - Shock
  - Rack and pinion
12. Describe rear suspension systems
- Front wheel drive design
    - Trailing arm
    - Strut type
  - Rear wheel drive design
    - Independent
    - Solid axle
  - All-wheel/four wheel drive design
    - Independent
    - Solid axle
13. Describe braking system components
- Anti-lock brake (ABS)
    - Tone ring
    - Sensors
    - Wiring
    - Troublecodes
  - Wheel cylinder
  - Pads
  - Shoes
  - Drums
  - Rotors
  - Calipers
  - Master cylinder
  - Proportioning valves
  - Brake lines

**Line (GAC):** U REMOVE AND INSTALL MECHANICAL COMPONENTS  
**Competency:** U4 Remove mechanical components

**Objectives**

To be competent in this area, the individual must be able to:

- Remove steering, suspension and braking systems.

**LEARNING TASKS**

1. Remove steering, suspension and braking systems

**CONTENT**

- Visual inspection
  - Physical damage
  - Nicks and cracks
  - Bent sections
- Gaining access
- Hidden damage
- Repair plan
- Manufacturers' removal procedures
- Specialty tools and equipment
  - Coil spring compressor
- Vehicle support
  - Safety considerations
  - Jacking points
- Protecting components
- Spring type
  - Leaf
  - Composite
  - Coil
  - Torsion
  - Air
- Constant velocity joints
- Linkages
- Sway bars
- Brake system disconnect
- Sensors
- Component storage

**Line (GAC):** U REMOVE AND INSTALL MECHANICAL COMPONENTS  
**Competency:** U5 Install mechanical components

**Objectives**

To be competent in this area, the individual must be able to:

- Install steering, suspension and braking systems.

**LEARNING TASKS**

1. Install steering, suspension and braking systems

**CONTENT**

- Repair plan
- Installation sequence
- Determine reusability of components
- Replacement of parts
  - Torquing
- Manufacturers' installation procedures
- Specialty tools and equipment
- Vehicle support
  - Safety considerations
  - Jacking points
- Protecting components
- Constant velocity joints
- Linkages
- Sway bars
- Brake system re-connect
  - Bleeding
- Sensors

**Line (GAC):** V REMOVE, REPAIR AND INSTALL ELECTRICAL AND ELECTRONIC COMPONENTS

**Competency:** V5 Service advanced electronic components

**Objectives**

To be competent in this area, the individual must be able to:

- Describe servicing advanced electronic components.

**LEARNING TASKS**

1. Describe advanced electronic systems and components that may need servicing after repairing vehicle damage

**CONTENT**

- Location
- Modules
- Sensors
- Lane departure
- Adaptive cruise control
- Blind spot detection
- Adaptive and auto-levelling headlights
- Keyless entry
- Traction control
- Accident avoidance systems
- Driver attention systems
- Back up camera
- Parking assist
- Media systems
  - Entertainment
  - Navigation

2. Describe construction features and applications of wiring diagrams

- Electrical symbols
- Circuit identification methods
- Colour codes
- Circuit number codes, gauge and metric wire sizes
- Connectors

3. Describe on board computers

- Purpose
- Types
  - Microprocessors
  - Inputs and sensors
  - Storage memory
  - Communication signals
    - Controller Area Network bus (CANBUS)
    - Multiplex

**LEARNING TASKS**

**CONTENT**

4. Describe removal and replacement of advanced electronic components

- Part number verification
- Calibration
- Post-scan
- Road test

# **Section 4**

## **ASSESSEMENT GUIDELINES**

**Assessment Guidelines – Common Core Level 1**

**Common Core Level 1 Grading Sheet: Subject Competency and Weightings**

PROGRAM: IN-SCHOOL TRAINING:		AUTOMOTIVE COLLISION AND REFINISHING COMMON CORE LEVEL 1	
LINE	SUBJECT COMPETENCIES	THEORY WEIGHTING	PRACTICAL WEIGHTING
A	PERFORM SAFETY-RELATED FUNCTIONS	4%	0%
B	USE TOOLS AND EQUIPMENT	6%	10%
C	USE WELDING EQUIPMENT	10%	20%
D	ORGANIZE WORK AND USE DOCUMENTATION	3%	0%
E	USE COMMUNICATION AND MENTORING TECHNIQUES	2%	0%
F	REMOVE AND INSTALL VEHICLE COMPONENTS	10%	10%
G	PREPARE SURFACE**	15%	10%
H	USE REPAIR MATERIALS AND EQUIPMENT**	10%	5%
I	APPLY REFINISHING MATERIALS	10%	15%
K	REMOVE, REPAIR AND INSTALL METAL PANELS AND COMPONENTS	15%	20%
L	REMOVE, REPAIR AND INSTALL PLASTIC AND COMPOSITE PANELS AND COMPONENTS	10%	10%
M	DETAIL EXTERIOR	5%	0%
	Total	100%	100%
<b>In-school theory/practical subject competency weighting</b>		60%	40%
<b>Final in-school percentage score</b>		IN-SCHOOL %	

**\*\*NOTE:** The Line H Achievement Criteria applies to both Line G and H at 50/50 ratio.



**Common Core Level 1 Grading Sheet: Final Percentage Score**

<p><b>In-school Percentage Score</b> Combined theory and practical subject competency multiplied by</p>	<p>80%</p>
<p><b>Standardized Level Exam Percentage Score</b> The exam score is multiplied by</p>	<p>20%</p>
<p><b>Final Percentage Score</b></p>	<p>FINAL%</p>

**Assessment Guidelines – Level 2**
**Level 2 Grading Sheet: Subject Competency and Weightings**

PROGRAM: IN-SCHOOL TRAINING:		AUTO BODY AND COLLISION TECHNICIAN LEVEL 2	
LINE	SUBJECT COMPETENCIES	THEORY WEIGHTING	PRACTICAL WEIGHTING
B	USE TOOLS AND EQUIPMENT	3%	0%
C	USE WELDING EQUIPMENT	15%	40%
D	ORGANIZE WORK AND USE DOCUMENTATION	5%	0%
H	USE REPAIR MATERIALS AND EQUIPMENT	4%	0%
I	APPLY REFINISHING MATERIALS	10%	0%
J	PERFORM POST-REFINISHING FUNCTIONS	4%	0%
K	REMOVE, REPAIR AND INSTALL METAL PANELS AND COMPONENTS	20%	50%
L	REMOVE, REPAIR AND INSTALL PLASTIC AND COMPOSITE PANELS AND COMPONENTS	15%	0%
O	APPLY CORROSION PROTECTION AND SOUND DEADENING MATERIALS	6%	10%
R	REMOVE, INSTALL AND REPAIR STRUCTURAL AND LAMINATED GLASS	6%	0%
S	REMOVE AND INSTALL NON-STRUCTURAL GLASS	7%	0%
W	REPAIR AND REPLACE INTERIOR COMPONENTS	5%	0%
	Total	100%	100%
<b>In-school theory/practical subject competency weighting</b>		50%	50%
<b>Final in-school percentage score</b>		IN-SCHOOL %	

**Level 2 Grading Sheet: Final Percentage Score**

<p><b>In-school Percentage Score</b> Combined theory and practical subject competency multiplied by</p>	<p>80%</p>
<p><b>Standardized Level Exam Percentage Score</b> The exam score is multiplied by</p>	<p>20%</p>
<p><b>Final Percentage Score</b></p>	<p>FINAL%</p>

**Assessment Guidelines – Level 3**

**Level 3 Grading Sheet: Subject Competency and Weightings**

PROGRAM: IN-SCHOOL TRAINING:		AUTO BODY AND COLLISION TECHNICIAN LEVEL 3	
LINE	SUBJECT COMPETENCIES	THEORY WEIGHTING	PRACTICAL WEIGHTING
B	USE TOOLS AND EQUIPMENT	10%	0%
C	USE WELDING EQUIPMENT	10%	20%
D	ORGANIZE WORK AND USE DOCUMENTATION	5%	15%
N	PERFORM FINAL INSPECTIONS	2%	0%
P	PREPARE FOR STRUCTURAL REPAIR	13%	25%
Q	REMOVE, REPAIR AND INSTALL STRUCTURAL COMPONENTS	13%	30%
T	DEACTIVATE AND REACTIVATE ALTERNATE-FUEL SYSTEMS	3%	0%
U	REMOVE AND INSTALL MECHANICAL COMPONENTS	17%	0%
V	REMOVE, REPAIR AND INSTALL ELECTRICAL AND ELECTRONIC COMPONENTS	20%	10%
X	SERVICE SUPPLEMENTAL RESTRAINT SYSTEMS (SRS)	7%	0%
	Total	100%	100%
<b>In-school theory/practical subject competency weighting</b>		50%	50%
<b>Final in-school percentage score</b>		IN-SCHOOL %	

<b>In-school Percentage Score</b> Combined theory and practical subject competency multiplied by	80%
<b>Standardized Level Exam Percentage Score</b> The exam score is multiplied by	20%
<b>Final Percentage Score</b>	FINAL%

**Assessment Guidelines – Level 4**

**Level 4 Grading Sheet: Subject Competency and Weightings**

PROGRAM: IN-SCHOOL TRAINING:		AUTO BODY AND COLLISION TECHNICIAN LEVEL 4	
LINE	SUBJECT COMPETENCIES	THEORY WEIGHTING	PRACTICAL WEIGHTING
B	USE TOOLS AND EQUIPMENT	5%	0%
D	ORGANIZE WORK AND USE DOCUMENTATION	10%	10%
E	USE COMMUNICATION AND MENTORING TECHNIQUES	5%	0%
N	PERFORM FINAL INSPECTIONS	5%	0%
P	PREPARE FOR STRUCTURAL REPAIR	20%	40%
Q	REMOVE, REPAIR AND INSTALL STRUCTURAL COMPONENTS	25%	50%
U	REMOVE AND INSTALL MECHANICAL COMPONENTS	20%	0%
V	REMOVE, REPAIR AND INSTALL ELECTRICAL AND ELECTRONIC COMPONENTS	10%	0%
	Total	100%	100%
<b>In-school theory/practical subject competency weighting</b>		40%	60%
<b>Final in-school percentage score</b>		IN-SCHOOL %	
Apprentices must achieve a minimum 70% as the final in-school percentage score to be eligible to write the Interprovincial Red Seal exam.			

**All apprentices who complete Level 4 of the Auto Body and Collision Technician program with a FINAL level percentage score of 70% or greater will write the Interprovincial Red Seal examination as their final assessment.**

**SkilledTradesBC will enter the apprentices' Auto Body and Collision Technician Interprovincial Red Seal examination percentage score into SkilledTradesBC Portal.**

**A minimum percentage score of 70% on the examination is required for a pass.**

# **Section 5**

# **TRAINING PROVIDER STANDARDS**

## **Facility Requirements**

### **Classroom Area**

- Comfortable seating and tables suitable for training, teaching, and lecturing.
- Compliance with all local and national fire codes and occupational safety requirements.
- Lighting controls to allow easy visibility of projection screen allowing students to take notes.
- Windows must have shades or blinds to adjust sunlight.
- Heating/air conditioning for comfort all year round.
- In-room temperature regulation and ventilation to ensure comfortable room temperature.
- Acoustics in the room must allow the instructor to be heard.
- White marking board with pens and eraser (optional: flipchart in similar size).
- Projection screen or projection area at front of classroom.
- Overhead projector and/or multi-media projector.

### **Shop Area**

- Ceiling shall be a minimum height of sixteen feet or height approved through the building engineer.
- Suitable demonstration area.
- Lighting appropriate for good vision in ambient light.
- Compliance with all local and national fire codes and occupational safety requirements.
- Must meet Municipal and Provincial bylaws in regards to waste water management and environmental laws.
- Ability to enclose a separate aluminum repair area (i.e. curtained).

### **Lab Requirements**

- Does not apply to this program.

### **Student Facilities**

- Does not apply to this program.

### **Instructor's Office Space**

- Does not apply to this program.

## **Tools and Equipment**

This Tools and Equipment list is not exhaustive. Training providers may elect to have additional tools or equipment in excess of this list. The facilities and equipment must be in compliance with the appropriate zoning bylaws and safety regulations.

### **TOOLS AND EQUIPMENT – COMMON CORE LEVEL 1**

#### **Safety Equipment and PPE**

- Battery surge protector
- Coveralls for students
- Dust extraction/ventilation
- Eye glasses/goggles
- Eyewash station
- Fire extinguisher (ABC)
- First aid kit
- Fresh air respirators/hoods
- Gloves/hand protection
- Respirators (P100)
- Spill kit
- Welding helmets

#### **Hand Tools**

- General hand tools/tool kit sets
- Riveter
- Torque wrenches
- Trim tools

#### **Power Tools**

- Cutting tools
- General power tool sets
- General air tool sets
- Die grinders
- Decal eraser wheel
- Heat guns
- Impact guns
- Media blaster
- Rotary buffer

#### **Refinishing Equipment and Materials**

- Complete primer/undercoat/base coat/clear coat system
- DA Sander
- General sanding block sets
- High volume, low pressure (HVLP) spray guns
- Polishes
- Straight line sanders
- Wet sand kit (de-nibbing kit)

#### **Detailing and Cleaning Equipment**

- Bucket
- Clay
- Hose
- Micro-fibre cloths
- Squeegies
- Surface detail kit (de-nibbing kit)
- Wash mitt

#### **Shop Equipment**



- 220V Dent pulling station (DentFix)/panel beater
- Air compressor
- Air jack
- Airless plastic welding units
- Battery charger
- Complete vehicles
- Floor jack
- Hammer and dolly sets
- Hoist
- Hot air plastic welding units
- Hydraulic jack units
- Jack stands
- MIG welder units with ventilation capable of welding steel
- Oxyacetylene welding units with ventilation
- Parts rack
- Plasma arc units
- Porta-power
- Printer
- Sheet metal brake
- Sheet metal stretcher/shrinker
- Spray booth
- Stud welder
- Vacuum
- Wheel dollies

**Shop Tools and Equipment – Miscellaneous**

- Adhesive and fibreglass material
- Body filler material
- Buffing materials
- Computer stations with all applicable software
- Infrared heat lamp
- Masking equipment and material
- Paint mixing equipment
- Plastic, adhesive and fibreglass material
- Push broom
- Refinishing material
- Sanding material
- Sheet metal material

**TOOLS AND EQUIPMENT – LEVEL 2**

**Safety Equipment and PPE**

- Battery surge protector
- Coveralls for students
- Dust extraction/ventilation
- Eye glasses/goggles
- Eyewash station
- Gloves/hand protection
- First aid kit
- Fire extinguisher (ABC)
- Fresh air respirators/hoods
- Spill kit
- Respirators (P100)
- Welding helmets
- Welding gloves

**Hand Tools**

- Autoglass extended utility knife
- Body hammer
- Caulking guns
- Glass removal knife
- Reciprocating removal knife
- Side cutters
- Tape measures

**Power Tools**

- 6" DA Sander with 80 grit paper
- Belt grinder

- Die Grinder
- Drill
- Grinder

**Refinishing Equipment and Materials**

- Anticorrosion application gun
- Polisher
- Saturation rollers
- Schutz (spatter) gun

**Shop Equipment**

- Aluminum-only body repair tools
  - Hammers
  - Dollies
  - Spools
  - Pullers
- Door lift
- Laminated glass repair unit
- Flat dolly (Toe or heel)
- Glass lifting suction cups
- MIG Welder (pulsed)
- Paint mixing system
- Parts rack
- Spectrophotometer (access to)
- Spool feed with aluminum setup
- Stainless steel wire brush

**Shop Tools and Equipment – Miscellaneous**

- Computer stations with all applicable software
- Corrosion protection material
- Stainless steel wire brush

**TOOLS AND EQUIPMENT – LEVEL 3**

**Safety Equipment and PPE**

- Battery surge protector
- Coveralls for students
- Dust extraction/ventilation
- Eye glasses/goggles
- Eyewash station
- Gloves/hand protection
- First aid kit
- Fire extinguisher (ABC)
- Fresh air respirators/hoods
- Spill kit
- Respirators (P100)
- Welding helmets
- High voltage gloves
- Welding blankets

**Hand Tools**

- Centering gauges (set)
- Computerized laser measuring system
- Digital tram gauges
- DVOM

- Mechanic measuring systems
- Shunting clamp
- Scan tools
- Strut tower gauges

**Power Tools**

- Portable pulling systems
- Aluminum self-piercing rivet (SPR) Gun

- Blind rivet guns

**Shop Equipment**

- Anchoring systems
- Dimension manuals
- Electric wire stripper/crimper
- MIG welder units with ventilation capable of welding aluminum and steel

- STRSW
- Vehicle with conventional frame design
- Vehicle with unibody design
- Wheel alignment rack

**Shop Tools and Equipment - Miscellaneous**

- Computer stations with all applicable software
- Coupons - 16g and 22g

- Insurance Corporation of British Columbia (ICBC)/BC Private insurance compatible estimating system
- Sheet metal material
- Squeeze-type resistance spot welder

**TOOLS AND EQUIPMENT – LEVEL 4**

**Safety Equipment and PPE**

- Battery surge protector
- Coveralls for students
- Dust extraction/ventilation
- Eye glasses/goggles
- Eyewash station
- Gloves/hand protection
- First aid kit

- Fire extinguisher (ABC)
- Fresh air respirators/hoods
- Spill kit
- Respirators (P100)
- Welding helmets
- PPE
- EV safety kit

**Hand Tools**

- Mil thickness gauge
- Scan tools

- Tram gauge

**Shop Equipment**

- Aluminum self-piercing rivet (SPR) Gun

- Clamps (full set)/Mo-Clamps

- Computerized measuring system
  - Measuring system capable of 3D measuring
- Full frame and unibody pulling equipment
- GMAW welder
- Lab scopes
- MIG welder capable of aluminum welding
- Pulling chains
- Silicone bronze welder
- Squeeze-type resistance spot welder
- Wheel alignment rack
- Wedge clamp (P-4 system)

**Shop Tools and Equipment – Miscellaneous**

- Computer stations with all applicable software
- Tablets
- I-CAR access
- OEM specifications access

## Reference Materials

### Recommended Resources

[www.I-car.ca](http://www.I-car.ca)

Collision Repair and Refinishing: A foundation course for technicians  
Alfred Thomas and Michael Jund  
3<sup>rd</sup> Edition  
ISBN-10: 13059943

Auto Body Repair Technology Hardcover, 6<sup>th</sup> Edition  
James Duffy  
ISBN-10: 1133702856

<https://www.alldata.com/alldata-collision>

[www.tech-cor.com](http://www.tech-cor.com)

## **Instructor Requirements**

### **Occupation Qualification**

The instructor must possess:

- Automotive Collision Repair Technician - Certificate of Qualification with an Interprovincial Red Seal endorsement, or
- Auto Body and Collision Technician - Certificate of Qualification with an Interprovincial Red Seal endorsement, or
- Certificate of Qualification from another Canadian jurisdiction complete with Interprovincial Red Seal endorsement.

### **Work Experience**

- Must have a minimum of 5 years experience as an Automotive Collision Repair Technician/Auto Body and Collision Technician journey person.

### **Instructional Experience and Education**

It is preferred that the instructor possesses one of the following:

- Instructor's Diploma or equivalent
- A degree in Education

# Appendices

**Appendix A  
Acronyms and Glossary**

**Acronyms**

<b>ABS</b>	Anti-lock braking system
<b>A/C</b>	Air Conditioning
<b>AC</b>	Alternating Current
<b>ADAS</b>	Advanced Driver Assistance Systems
<b>Apps</b>	Applications
<b>CANBUS</b>	Controller Area Network bus
<b>CNG</b>	Compressed natural gas
<b>CSA</b>	Canadian Standards Association
<b>DA</b>	Dual-Action
<b>DC</b>	Direct Current
<b>DTM</b>	Direct-to-metal
<b>DVOM</b>	Digital Volt-ohm-milliammeter
<b>ECM</b>	Engine Control Module
<b>FRP</b>	Fibre-reinforced plastics
<b>GAC</b>	General Area of Competency
<b>GMAW</b>	Gas Metal Arc Welding
<b>H.U.D.</b>	Heads-Up Display
<b>HSLA</b>	High strength, low alloy
<b>HVAC</b>	Heating, Ventilation and Air Conditioning
<b>HVLP</b>	High volume, low pressure
<b>ICBC</b>	Insurance Corporation of British Columbia
<b>IS</b>	Isotropic
<b>ISO</b>	International Organization for Standardization
<b>JHA</b>	Job Hazard Analysis
<b>JT</b>	Judgement Time
<b>LKQ</b>	Like kind quality
<b>MART</b>	Martensitic
<b>MIG</b>	Metal Inert Gas
<b>NAGS</b>	National Auto Glass Specifications
<b>NVH</b>	Noise vibration harshness
<b>OAC</b>	Occupational Analysis Chart
<b>OD</b>	Old damage
<b>OEM</b>	Original Equipment Manufacturer
<b>OHS</b>	Occupational Health and Safety
<b>O/H</b>	Overhaul
<b>P Pages</b>	Procedural Pages
<b>PPE</b>	Personal Protective Equipment
<b>R &amp; I</b>	Remove and Install
<b>R &amp; R</b>	Remove and Repair
<b>Re &amp; Re</b>	Remove and Replace



**Appendices**

<b>RFC</b>	Recommendation for Certification
<b>RRIM</b>	Reinforced reaction injection moulded
<b>RSOS</b>	Red Seal Occupational Standard
<b>SAI</b>	Steering Axis Inclination
<b>SDS</b>	Safety Data Sheets
<b>SMC</b>	Sheet-molded compound
<b>SOP</b>	Standard Operating Procedures
<b>SRC</b>	Standards Review Committee
<b>SRS</b>	Supplemental Restraint Systems
<b>STRSW</b>	Squeeze-type resistance spot weld
<b>TDS</b>	Technical Data Sheets
<b>TPMS</b>	Tire Pressure Monitoring System
<b>TRIP</b>	Transformation induced plasticity
<b>UHSS</b>	Ultra-high Strength Steel
<b>UV</b>	Ultra Violet
<b>VIN</b>	Vehicle Identification Number
<b>VOC</b>	Volatile Organic Compounds
<b>WHMIS</b>	Workplace Hazardous Materials Information System

**Glossary****Abrasives**

Material used for cleaning or surface roughening such as sand, aluminum oxide or silicone carbide.

**Active restraint systems**

A system that requires physical enabling, such as seat belts.

**Air bag matrix**

Manufacturers' specifications for components that need to be replaced or checked in the event of a deployment.

**Air bags**

Inflatable restraints located in steering wheels, dashes, seats, doors, pillars, roof rails, and headliners.

**Detailing**

All activities performed in final preparation for delivery to the customer; detailing includes but is not limited to installation of trim and accessories, cleaning and polishing.

**Frame and structural components**

Provides the vehicle with strength and structural integrity.

**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.

**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.

**Interior components**

Interior components consist of trim, upholstery and panels within the vehicle.

**Mechanical and electrical components**

Mechanical components are moving parts that produce motion or a state of balance including suspension systems (steering and suspension), cooling systems, air conditioning systems, brake systems, the power train and the exhaust system. Electrical components perform a specific function (e.g. radio, defrost, cruise control) or generate, store and distribute electricity (e.g. battery, charging system, relays).

**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.

**Passive restraint systems**

Passive restraint systems include components such as dash, pads, head rest, collapsible steering columns, knee bolsters, and motorized seat belts.

**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.

**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.

**Structural components**

Any primary-stress-bearing portion of the body structure that affects its over-the-road performance or crash-worthiness.

**Structural glass**

A specific type of glass with a special design and installation process that adds to the structural integrity of the vehicle.

**Unibody motor vehicle**

Vehicle design in which parts of the body structure serve as support for overall vehicle.

## Appendix B: Practical Assessments

Achievement Criteria are included for those competencies that require a practical assessment. The intent of including Achievement Criteria in the Program Outline is to ensure consistency in training across the many training institutions in British Columbia. Their purpose is to reinforce the theory and to provide a mechanism for evaluation of the learner’s ability to apply the theory to practice. It is important that these performances be observable and measurable and that they reflect the skills spelled out in the competency. The conditions under which these performances will be observed and measured must be clear to the learner as well as the criteria by which the learner will be evaluated. The learner must also be given the evaluation criteria.

The performance spelled out in the Achievement Criteria is a suggested performance and is not meant to stifle flexibility of delivery. Training providers are welcome to substitute other practical performances that measure similar skills and attainment of the competency. Multiple performances may also be used to replace individual performances where appropriate.

The following tables summarize the practical assessments for each level. **For details, please refer to the Achievement Criteria following the particular competency in the Program Content section.**

AUTOMOTIVE COLLISION AND REFINISHING – COMMON CORE LEVEL 1	
SUMMARY OF PRACTICAL ASSESSMENTS	
SUBJECT COMPETENCY OR LINE	PRACTICAL ASSESSMENT TASK
<b>B2</b> Use lifting equipment	The learner will perform vehicle lifting.
<b>B4</b> Maintain spray equipment	The learner will perform spray equipment maintenance and test spray.
<b>C1</b> Use cutting and heating equipment	The learner will perform oxyacetylene set up, cutting, heating and shut down.
<b>C2</b> Use welding equipment	The learner will perform welds on 22-gauge steel in flat position, including butt weld <b>without</b> backing, lap weld, and plug weld.
<b>LINE F*</b> REMOVE AND INSTALL VEHICLE COMPONENTS	The learner will remove and install vehicle components, such as door handle, side moulding, and side mirror.
<b>LINE H**</b> USE REPAIR MATERIALS AND EQUIPMENT	The learner will prepare and mask a panel for a primer spot repair and mix and apply repair materials.
<b>LINE I***</b> APPLY REFINISHING MATERIALS	The learner will perform base coat/clear coat refinishing procedures.
<b>K4</b> Repair metal panels and components	The learner will perform a minor repair on a sheet metal panel.
<b>L4</b> Repair plastic and composite panels and components	The learner will perform plastic repairs, including welded and adhesive.

*All of LINE F (F1, F2, F3)
**All of LINES G and H (G1, G2, G3, G4; H1, H2, H3, H4). Results applied to both lines at a ratio of 50/50. <b>Note to Instructor:</b> Retain panel upon completion of project for later achievement criteria in LINE I.
***All of LINE I (I1, I2, I3, I4) <b>Note to Instructor:</b> Use repaired panel from LINE H for this achievement criteria.

AUTO BODY AND COLLISION TECHNICIAN – LEVEL 2 SUMMARY OF PRACTICAL ASSESSMENTS	
SUBJECT COMPETENCY	PRACTICAL ASSESSMENT TASK
<b>C2</b> Use welding equipment	The learner will perform a lap weld and plug weld on aluminum.
<b>K4*</b> Repair metal panels and components	The learner will install a partial/simulated door skin (or equivalent).
<b>O2**</b> Apply seam sealers and sound deadeners	The learner will apply seam sealer to door skin.

**\*Note to Instructor:** Retain project for later achievement criteria in LINE O.

**\*\*Note to Instructor:** Use door skin project from LINE K for this achievement criteria.

AUTO BODY AND COLLISION TECHNICIAN – LEVEL 3 SUMMARY OF PRACTICAL ASSESSMENTS	
SUBJECT COMPETENCY	PRACTICAL ASSESSMENT TASK
<b>C2</b> Use welding equipment	The learner will perform welds on coupons in a vertical position: lap weld, butt weld, and plug weld.
<b>D6</b> Prepare estimates and supplements	The learner will create an estimate.
<b>P1</b> Identify extent of damage	The learner will perform vehicle point to point measurements, such as door opening, trunk and under hood.
<b>Q3</b> Install structural components	The learner will section a welded-on body panel, including one with a bond and one with a weld.
<b>V3*</b> Repair damaged wires and protective coverings	The learner will repair a damaged wire.

**\*Note to Instructor:** This achievement criteria covers multiple competencies in LINE V.

AUTO BODY AND COLLISION TECHNICIAN – LEVEL 4 SUMMARY OF PRACTICAL ASSESSMENTS	
SUBJECT COMPETENCY	PRACTICAL ASSESSMENT TASK
<b>D6</b> Prepare estimates and supplements	The learner will interpret an estimate and create a supplement and a sublet.
<b>P1</b> Identify extent of damage	The learner will perform damage analysis using 3D measurement.
<b>Q1</b> Repair structural components	The learner will perform a complex frame structural repair.

## Appendix C: Previous Contributors

**Industry and Instructor Subject Matter Experts retained to assist in the development of the previous Program Outline (2017):**

- Mark Deroche                      British Columbia Institute of Technology
- John Euloth                        Okanagan College
- Nick Penner                        University of the Fraser Valley
- Ranjot Sandhu                      Rapid Autobody

**Industry and Instructor Subject Matter Experts retained to review the previous Program Outline (2017):**

- Don Anderson                      Automotive Collision Repair Technician
- Mark Deroche                      British Columbia Institute of Technology
- John Euloth                        Okanagan College
- Nick Penner                        University of the Fraser Valley
- Ranjot Sandhu                      Rapid Autobody
- Tate Westerman                    Vancouver Community College

SkilledTradesBC would like to acknowledge the dedication and hard work of all the industry and training provider representatives appointed to identify the training requirements of this trade.