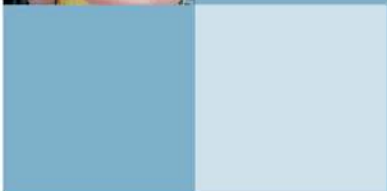
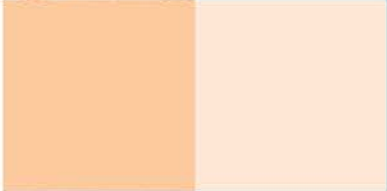
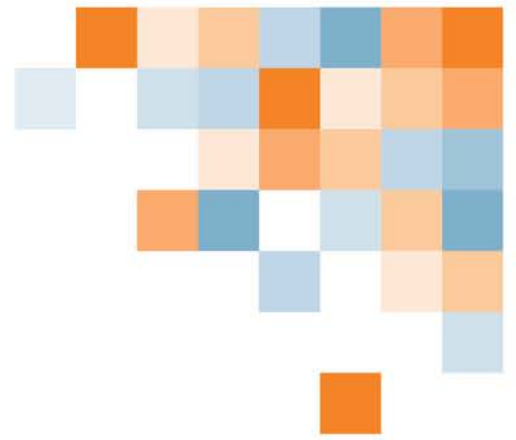


ita
YOUR TICKET.



PROGRAM OUTLINE

Automotive Refinishing
Technician



The latest version of this document is available in PDF format on the ITA website
www.itabc.ca

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AUTOMOTIVE REFINISHING TECHNICIAN PROGRAM OUTLINE

APPROVED BY INDUSTRY

MAY 2020

BASED ON

RSOS 2019

**Developed by
Industry Training Authority
Province of British Columbia**



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Section 1

INTRODUCTION

Automotive Refinishing 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 support 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 of 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

The Industry Training Authority would like to acknowledge the dedication and hard work of all representatives appointed to identify the training requirements of the Automotive Refinishing 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
Program Credentialing Model	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
OAC	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
Training Topics and Suggested Time Allocation	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
Program Content	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



Section	Training Providers	Employers/ Sponsors	Apprentices	Challengers
Training Provider Standards	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
Appendix – Glossary of Acronyms			Defines program specific acronyms	



Section 2

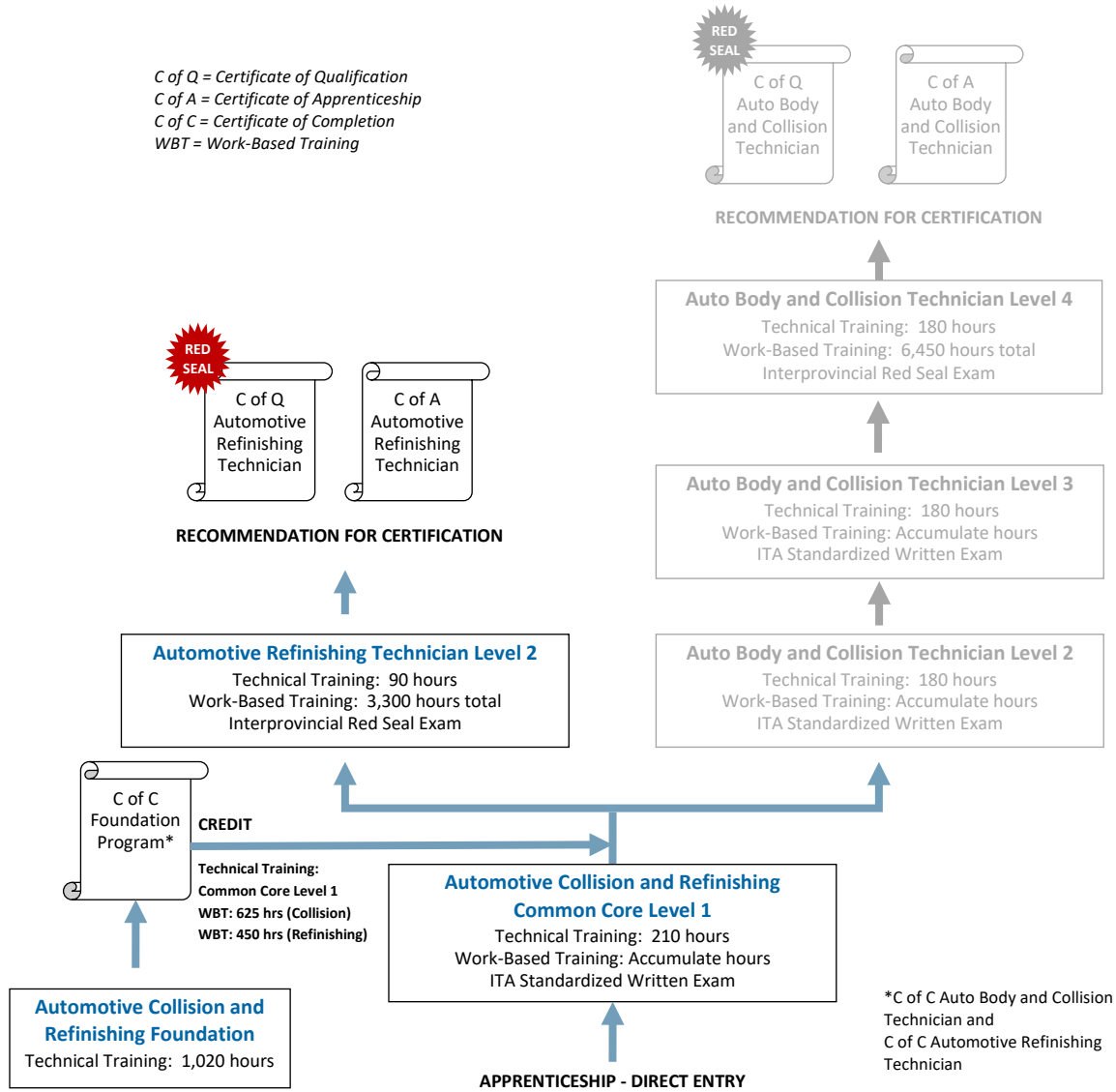
PROGRAM OVERVIEW

Automotive Refinishing Technician



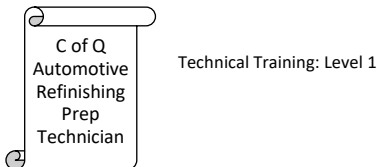
Program Credentialing Model

C of Q = Certificate of Qualification
 C of A = Certificate of Apprenticeship
 C of C = Certificate of Completion
 WBT = Work-Based Training



CROSS-PROGRAM CREDITS

Individuals who hold the credentials listed below are entitled to receive partial credit toward the completion requirements of this program





Occupational Analysis Chart

AUTOMOTIVE REFINISHING TECHNICIAN

Occupation Description:

Automotive refinishing technicians work on the surfaces of motor vehicles, primarily in restoring vehicle finishes once body work has been completed. Some of the duties that an automotive refinishing technician completes include: removing layers of old coatings; matching colours and mixing paints; preparing surfaces for painting by spot filling, sanding, and masking; applying primers, primer surfacers, sealers, base coats, single-stage and clear coats; cleaning and polishing painted surfaces; and applying protective coatings.

Many automotive refinishing technicians work in close contact with auto body and collision technicians who tend to work in multi-shop companies, independent or dealership auto body and collision shops. Automotive refinishing duties may overlap with auto body and collision technicians' duties, particularly in small shops. In larger places of employment, automotive refinishing technicians likely work as specialists, after body repairs have been completed. They may also work with estimators, partspersons, detailers, preppers, glass installers and production managers. While they may work as part of the repair team, automotive refinishing technicians tend to work independently. They may work in the automotive, truck and transport, commercial transport, heavy equipment, motorcycle, specialty vehicle, aviation and aerospace sectors.

CC1 = Automotive Collision and Refinishing Common Core Level 1

PERFORM SAFETY-RELATED FUNCTIONS A	Maintain safe work environment A1	Use personal protective equipment (PPE) and safety equipment A2												
	CC1	CC1												
USE TOOLS AND EQUIPMENT B	Maintain hand and power tools B1	Use lifting equipment B2	Maintain spray booth B3	Maintain spray equipment B4	Maintain mixing equipment B5	Maintain shop equipment B6								
	CC1	CC1	CC1	CC1 2	CC1 2	CC1								



Use curing and drying equipment				
B7				
CC1	2			

USE WELDING EQUIPMENT
C

Use cutting and heating equipment				
C1				
CC1				

Use welding equipment				
C2				
CC1				

Maintain welding equipment				
C3				
CC1				

ORGANIZE WORK AND USE DOCUMENTATION
D

Organize parts, materials and work area				
D1				
CC1				

Use documentation				
D2				
CC1	2			

Perform inspections				
D3				
CC1	2			

Organize production schedule				
D4				
CC1	2			

Prepare repair plan				
D5				
	2			

Prepare estimates and supplements				
D6				
	2			

USE COMMUNICATION AND MENTORING TECHNIQUES
E

Use communication techniques				
E1				
CC1				

Use mentoring techniques				
E2				
	2			

REMOVE AND INSTALL VEHICLE COMPONENTS
F

Identify vehicle components				
F1				
CC1				

Remove trim and hardware				
F2				
CC1				

Install trim and hardware				
F3				
CC1				

PREPARE SURFACE
G

Perform initial preparation				
G1				
CC1				

Mask surface				
G2				
CC1	2			

Strip surface				
G3				
CC1				

Sand surface				
G4				
CC1				



USE REPAIR MATERIALS AND EQUIPMENT 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		
APPLY REFINISHING MATERIALS 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	2	2
PERFORM POST-REFINISHING FUNCTIONS J	Remove masking materials J1	Correct surface imperfections J2	Perform final check J3			
	2	2	2			
REMOVE, REPAIR AND INSTALL METAL PANELS AND COMPONENTS 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	CC1	CC1	CC1	CC1	
REMOVE, REPAIR AND INSTALL PLASTIC AND COMPOSITE PANELS AND COMPONENTS 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	CC1	CC1	CC1	CC1	
DETAIL EXTERIOR M	Remove minor imperfections M1	Clean exterior and interior of vehicle M2				
	CC1	CC1				



Training Topics and Suggested Time Allocation

AUTOMOTIVE COLLISION AND REFINISHING – COMMON CORE LEVEL 1

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



% of Time Allocated to:

		% of Time	Theory	Practical	Total
H4	Apply repair materials		✓	✓	
Line I	APPLY REFINISHING MATERIALS	5%	60%	40%	100%
I1	Mix refinishing materials		✓	✓	
I2	Apply primer sealers		✓	✓	
I3	Apply single-stage paint		✓	✓	
I4	Apply base coat/clear coat		✓	✓	
Line K	REMOVE, REPAIR AND INSTALL METAL PANELS AND COMPONENTS	15%	60%	40%	100%
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		✓	✓	
Line L	REMOVE, REPAIR AND INSTALL PLASTIC AND COMPOSITE PANELS AND COMPONENTS	7%	30%	70%	100%
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		✓		
Line M	DETAIL EXTERIOR	4%	50%	50%	100%
M1	Remove minor imperfections		✓	✓	
M2	Clean exterior and interior of vehicle		✓		
Total Percentage for Automotive Collision and Refinishing Common Core Level 1		100%			



Training Topics and Suggested Time Allocation

AUTOMOTIVE REFINISHING TECHNICIAN – LEVEL 2

		% of Time Allocated to:			
		% of Time	Theory	Practical	Total
Line B	USE TOOLS AND EQUIPMENT	7%	80%	20%	100%
B4	Maintain spray equipment		✓		
B5	Maintain mixing equipment		✓	✓	
B7	Use curing and drying equipment		✓		
Line D	ORGANIZE WORK AND USE DOCUMENTATION	14%	50%	50%	100%
D2	Use documentation		✓	✓	
D3	Perform inspections		✓	✓	
D4	Organize production schedule		✓		
D5	Prepare repair plan		✓	✓	
D6	Prepare estimates and supplements		✓	✓	
Line E	USE COMMUNICATION AND MENTORING TECHNIQUES	7%	100%	0%	100%
E2	Use mentoring techniques		✓		
Line G	PREPARE SURFACE	6%	40%	60%	100%
G2	Mask surface		✓	✓	
Line H	USE REPAIR MATERIALS AND EQUIPMENT	4%	20%	80%	100%
H2	Prepare spray booth		✓	✓	
H3	Perform spray gun set up		✓	✓	
Line I	APPLY REFINISHING MATERIALS	50%	50%	50%	100%
I1	Mix refinishing materials		✓	✓	
I2	Apply primer sealers		✓	✓	
I3	Apply single-stage paint		✓	✓	
I4	Apply base coat/clear coat		✓	✓	
I5	Troubleshoot finish problems		✓	✓	
I6	Perform colour adjustment		✓	✓	
Line J	PERFORM POST-REFINISHING FUNCTIONS	12%	30%	70%	100%
J1	Remove masking materials		✓	✓	
J2	Correct surface imperfections		✓	✓	
J3	Perform final check		✓	✓	
Total Percentage for Automotive Refinishing Technician Level 2		100%			



Section 3

PROGRAM CONTENT

Automotive Refinishing Technician



Common Core Level 1

Automotive Collision and Refinishing



Line (GAC): A PERFORM SAFETY-RELATED FUNCTIONS

Competency: A1 Maintain safe work environment

Objectives

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

- Maintain safe work environment.

LEARNING TASKS

1. Describe WorkSafeBC and Occupational Health and Safety (OHS) regulations

2. Describe safe work practices

3. Describe fire safety procedures

CONTENT

- Rights and responsibilities
 - Right to refuse work
 - Reporting accidents
 - Investigations
- Substance use
- Volatile Organic Compounds (VOC)
- Spills
- Eye wash facilities

- Job hazard analysis (JHA)
- Location of safety equipment and exits
- Safe vehicle operation
 - Speed limit
 - Moving vehicles around shop
- Vehicle hazards
 - Alternative fuels
 - Electrical components
 - Battery disconnect
 - Jump start a vehicle
 - Surge protection
 - Supplemental Restraint Systems (SRS)
 - Heating, Ventilation and Air Conditioning (HVAC)
- Clean and organized work area
- Lockout procedures
- Flammable, explosion, and electrical hazards
- Using compressed air
- Ventilation systems

- Component and causes of fire
 - Fuel



LEARNING TASKS

4. Use Workplace Hazardous Materials Information System (WHMIS)

CONTENT

- Heat
- Oxygen
- Flammability
 - Flash points
- Types of fires
 - Class A, B, C and D fires
- Fire extinguishers
- Fire prevention equipment
 - Emergency fire blanket
- Precautions when working with flammable substances
- Storage of flammable materials
 - Gasoline
 - Solvents
- WHMIS
 - Right to know
 - Worker education
 - Product identification
- Roles and responsibilities
 - Employers
 - Suppliers
 - Workers
- Labelling
 - Symbols
- Safety Data Sheets (SDS)
 - Hazards
 - Handling
 - Ingredients
- Storage
- Disposal



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

2. Describe safety equipment

- Fire suppression systems
 - Extinguishers
 - Sprinklers
- Ventilation systems
- Eye wash stations
- Spill kits
- First aid kits



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



LEARNING TASKS

CONTENT

- Hydraulic
 - Function/type
 - Blow guns
 - Heat guns
 - Polishers
 - Sanders
 - Grinders
 - Ratchets
 - Eraser wheels
 - Impact guns
 - Cutting tools
 - Body jack
 - Riveters
 - Sealing guns
 - Static mixer

- 4. Describe the use of power tools
 - 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

1. Describe paint manufacturers' equipment

2. Use paint manufacturers' equipment

CONTENT

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

- 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
 - Refridgerant
 - Dessicant
 - Gun washers
 - Track systems
 - Drying equipment
 - Infra-red lamps
 - Ultraviolet (UV) lamps
 - Extractors
 - Masking machines
 - Paper compactors
-
- Types
 - Diaphragm
 - Piston

2. Describe air compressors



LEARNING TASKS

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

CONTENT

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



Line (GAC): **B USE TOOLS AND EQUIPMENT**
Competency: **B7 Use curing and drying equipment**

Objectives

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

- Operate curing and drying equipment.

LEARNING TASKS

1. Describe curing and drying equipment

2. Operate curing and drying equipment

CONTENT

- Types
 - Infra-red
 - UV
 - Forced air/make up air
 - Venturi
- Thermometers

- Paint manufacturers' specifications
- Vehicle protection
- Distance
- Time
- Temperature
 - Surface
 - Metal
 - Cool down



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

CONTENT

1. Describe oxyacetylene

- 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

2. Describe oxyacetylene components

- Cylinders
 - Oxygen
 - One-piece cylinder
 - Safety devices
 - High pressure
 - Acetylene
 - Two-piece cylinder
 - Safety devices
 - Low pressure
 - Filler material (acetone)



LEARNING TASKS

CONTENT

3. Perform oxyacetylene procedures

- Regulators
 - Single stage
 - Two stage
 - Pressure adjustments
 - Cleanliness
- Hoses
 - Colours
 - Maintenance
 - Fittings
 - Grooved (acetylene)
 - Smooth (oxygen)
- Torches
 - Valves
 - Tips
 - Welding
 - Cutting
 - Heating
- Flashback arresters
- 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
 - Neutral
 - Oxidizing
- Shutdown procedures
- Heating procedures
 - Controlling expansion
 - Shrinking
- Cutting procedures
- Storage of oxyacetylene equipment



LEARNING TASKS

4. Describe plasma arc cutting

CONTENT

- 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

- Oxyacetylene equipment
- Steel

Criteria The learner will be evaluated on

- Safety
- Procedure
- Technique
- Accuracy



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 welds on 22-gauge steel in flat position, including:
 - Butt weld **without** backing
 - Lap weld
 - Plug weld

LEARNING TASKS

1. Identify the components of a GMAW Metal Inert Gas (MIG) welder

2. Describe GMAW/MIG transfer methods

3. Describe the safety precautions involved with GMAW/MIG welding

CONTENT

- Power supply
 - 110 volts
 - 220 volts
 - Cooling fan
 - Duty cycle
- Parts
- Wire sizes
- Shielding gas

- Methods
 - Short arc
 - Spray arc
 - Stitch spray arc
- Purpose
- Uses
- Voltage
- Current
- Ground/work clamp

- PPE
- Personal limitations
 - Pacemakers
 - Epilepsy
- Ventilation
- Grounded Alternating Current (AC) connections
- Flash shield placement
- Flammable fluids and coatings
- Vehicle safety
 - Battery disconnect
 - Proximity to electronic



LEARNING TASKS

CONTENT

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

Achievement Criteria

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



Program Content Common Core Level 1



- Safety
- 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



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 under 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

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



LEARNING TASKS

CONTENT

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



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.
- Perform inspections of body repairs.

LEARNING TASKS

1. Perform visual inspection of coatings

2. Perform surface evaluation tests

3. Inspect body repairs

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
- Solvent
- Tape
- Mil thickness
- 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

1. Describe repair process

2. Describe process timelines

3. Communicate with technicians

CONTENT

- 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
- Cycle time
- Dry/cure time
- Flash time
- 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

1. Describe shop roles and responsibilities

2. Describe business relations

3. Use active listening

CONTENT

- Technicians
- Estimators
- Detailer
- Parts person
- Administration
- Management

- Employer/employee relations
- Staff morale
- Customer service
- Relationship with the insurance industry
- Professionalism
- Clear communication
- Conflict resolution

- Paying attention
 - Eye contact
 - Acknowledge speaker
 - Mindful listening
 - Don't interrupt
- Non-confrontational
- Reflecting
- Responding
 - Verbally
 - Non-verbally
 - Appropriately



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)



LEARNING TASKS

CONTENT

- Specifications)
- 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

 - Decals
 - OEM
 - Aftermarket
 - Vinyl
 - Clear/mylar (OEM stone guard)
 - Applique (black-out tape)
 - Pressure sensitive
 - Reactive (adhesive)
 - Striping
3. Describe exterior components
4. Describe decals and striping



LEARNING TASKS

CONTENT

- Accent stripes
- Wrapping
 - 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

1. Describe fasteners

CONTENT

- 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

1. Describe installation procedures

2. Re-install reusable trim

3. Install trim and accessories

4. Apply decals and striping

CONTENT

- Fastener identification
- Replacement procedures
 - Torque specifications
- Replacement of retainers
- Final operation/fit and finish

- Mouldings
- Name plates
- Emblems
- After-market trim and components

- Prep
- Tools
- Fasteners
- Adhesives
- Double-sided tape
- Sequence to install
- Prepare trim and accessories for installation
- Fresh paint considerations
- Protect surfaces

- Clean surface
- Cured surface
- Decal location
- Backer removal
- Surface temperature
- Manufacturers' specifications
- Remove air bubbles
- Wet set
- Dry set
- Equipment and materials



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:

- Door handle
- Side moulding
- Side mirror

Conditions The learner will be given

- Reference resources
- Vehicle
- Trim and accessories
- Tools

Criteria The learner will be evaluated on

- Safety
- Method of removal
- Method of installation
- Fit and finish



Line (GAC): **G PREPARE SURFACE**
Competency: **G1 Perform initial preparation**

Objectives

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

- Clean surface.
- Identify substrate condition.

LEARNING TASKS

1. Clean surface

CONTENT

- Water-borne contaminants
 - Dirt
 - Tree sap
 - Bugs
 - Blood
 - Salt
- Solvent-borne contaminants
 - Road tar
 - Oil
 - Paint sealants
 - Wax
 - Silicone
- Cleaning products
 - Chemical compatibility
 - Soap and water
 - Wax and grease remover
 - Solvents
 - Fall out removers
- Procedures
 - Compressed air
 - Chamois
 - Two towel system

2. Describe substrates

- Raw substrate
 - Steel
 - Aluminum
 - Plastics
- Topcoat
 - Thermoset
 - Thermoplastic
 - Single stage
 - Base clear



LEARNING TASKS

3. Identify substrate condition.

CONTENT

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



LEARNING TASKS

4. Describe masking deficiencies and corrective procedures

5. Remove masking for primer

CONTENT

- Faults
 - Under mask
 - Over mask
 - Over spray
 - 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

CONTENT

1. Describe sanding materials

- 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

3. Use sanding techniques and procedures

- Sanding area
 - Existing finish
 - Repair area
 - Raw substrate
 - Blend panel
- Techniques
 - Wet or dry
 - Hand
 - Block



LEARNING TASKS

CONTENT

- 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.



Line (GAC): H USE REPAIR MATERIALS AND EQUIPMENT

Competency: H1 Mix repair materials

Objectives

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

- Mix body fillers.
- Mix undercoats.

LEARNING TASKS

1. Describe body fillers

2. Mix body fillers

3. Describe undercoats

CONTENT

- Fibre reinforced
- Light weight
- Aluminium based
- Polyester
 - Sprayable
 - Spreadable
- Equipment
 - Non-porous mixing board
 - Static mixing tips
 - Spreaders
- Ratios
- Techniques
 - Folding vs. stirring
 - Uniform colour
- Working times
 - Mixing
 - Application
- Primer
 - Etch
 - Epoxy
- Primer surfacer
 - High build
 - Direct-to-metal (DTM)
 - Polyester
 - UV
 - Water-borne
- Primer sealer
- Metal treatments
- Chip guards
- Plastic adhesion promoters



LEARNING TASKS

CONTENT

4. Describe solvents and additives

- Brush
- 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



Line (GAC): H USE REPAIR MATERIALS AND EQUIPMENT

Competency: H2 Prepare spray booth

Objectives

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

- Operate a spray booth.

LEARNING TASKS

1. Describe spray booth operation

CONTENT

- Overall function of spray booth
 - Safety
 - Environmental considerations
 - Cost-effectiveness
 - Job quality
- Climate control
- Cycles
 - Spray
 - Purge
 - Bake
 - Ramp up times
 - Cool down
- Pressure adjustment
 - Negative
 - Positive
- Temperature adjustment
- Air flow
- Interlock switch

2. Describe the various spray booth controls

- Air flow direction
- Air flow controls
- Temperature controls
- Curing/drying times
- Filter types and changes
- Pressure readings
 - Manometer
 - Magnehelic
- Interlock switch
- Plenum fan
- Fire suppression systems



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: H3 Perform spray gun set up

Objectives

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

- Set up and use spray guns for application of coatings.

LEARNING TASKS

1. Select spray guns
2. Set up spray guns
3. Use spray guns

CONTENT

- Types of materials
- Types of guns
- Fluid tips
- Needle
- Air cap
- Air pressure
- Fan adjustment
- Fluid adjustment
- Test patterns
- Troubleshooting gun operation
- Techniques
 - Overlap
 - Gun distance
 - Travel speed
 - Gun position
 - Trigger control
- Atomization
- Transfer efficiency
- Cleaning



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 from this project for use in achievement criteria (LINE I).

Performance The learner will

- Prepare and mask a panel for a primer spot repair
- Mix and apply repair materials

Conditions The learner will be given

- Imperfection to repair
- Tools and equipment
- Various repair materials
- Access to manufacturers' specifications

Criteria The learner will be evaluated on

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

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



Line (GAC): I APPLY REFINISHING MATERIALS

Competency: I1 Mix refinishing materials

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



LEARNING TASKS

CONTENT

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



Line (GAC): I APPLY REFINISHING MATERIALS

Competency: I4 Apply base coat/clear coat

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



LEARNING TASKS

CONTENT

- Spray technique
 - 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 <ul style="list-style-type: none"> • Repaired panel from LINE H • Materials and equipment • Access to manufacturers' specifications
Criteria	The learner will be evaluated on <ul style="list-style-type: none"> • 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

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



LEARNING TASKS

5. Identify types of sheet metal damage

CONTENT

- Composition
- 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

1. Describe repair methods

2. Describe shrinking procedures

3. Demonstrate repair procedures

CONTENT

- Visualize desired outcome
- Cold repair
- Heat repair
- Pushing/pulling
- Roughing
- On/off dolly
- Patching
- Expansion and contraction
- Restricted and unrestricted sheet metal
- Oxyacetylene
- Spitznagle™
- Panel beater™
- Cold shrinking (stretching)
- Select
 - Equipment
 - Material
 - Technique
- Perform repair
- Control of panel movement

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

2. Perform panel alignment

CONTENT

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

- 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 identifying plastics and composites

- 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

2. Describe plastic repair procedures



LEARNING TASKS

CONTENT

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

Achievement Criteria

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



- 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



LEARNING TASKS

CONTENT

2. Polish fender

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



Level 2

Automotive Refinishing 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

CONTENT

1. Describe solvent recycling machines

- Manufacturers' specifications
- Environmental regulations
- Procedures

2. Describe water borne recycling machines

- Manufacturers' specifications
- Environmental regulations
- Procedures



LEARNING TASKS

3. Maintain mixing room

CONTENT

- Computers
 - Scales
 - Colour-corrective light
-
- Cleanliness
 - Functioning



Line (GAC): **B USE TOOLS AND EQUIPMENT**
Competency: **B7 Use curing and drying equipment**

Objectives

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

- Use curing and drying equipment.

LEARNING TASKS

1. Use curing and drying equipment

CONTENT

- Identification of time to reach target temperature
- Diagnosis and analysis of surface temperature
 - Plastics
 - Metal
 - Bonding materials



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:

- Apply regulations.
- Use manufacturers' documentation.
- Contribute to a repair estimate.

LEARNING TASKS

1. Apply environmental and jurisdictional regulations

2. Use manufacturers' documentation

3. Contribute to a repair estimate

CONTENT

- Hazardous waste disposal
 - Solvents manifest
- Daily coating logs
- VOC

- OEM specifications
- Equipment maintenance logs
 - Filters
 - Intake/exhaust

- Supplements
 - Blend areas
 - Spot repair
 - Overlaps
 - Chip guards
 - Colour, sand and buff
 - Two tones



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.

LEARNING TASKS

1. Evaluate the refinish area to determine next steps

CONTENT

- Review work order
 - Work complete
 - Parts are present
 - Parts have been prepped
- Blend panels
- Shop standards
- Defects
 - Mil thickness
 - Sand scratches
 - Colour mismatch
 - Sand through
 - Under-sanding
 - Chips
 - Pinholes
 - Under-mask
 - Over-mask

2. Identify blend requirements

- Size of repair
 - Base coat/clear coat
 - Multi-stage
- Locations
- Adjacent panels
- Previous colour match
- Condition of blend panels
- Panel to panel
- Cut-off points



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 production schedules.

LEARNING TASKS

1. Describe production schedules

2. Describe process timelines

3. Describe the development of a production schedule

4. Describe the maintenance of a production schedule

CONTENT

- Description of work in progress (WIP)
- Sequence of WIP
- Target timelines

- Type and size of repair
- Time of day
- Dry time
 - Material selection
 - Methods
 - Forced air
 - Infrared

- Shop management system
- Cycle times
- Customer expectations
- Insurance expectations
- Parts availability
- Booth management
- Communicate with:
 - Partsperson
 - Prep technician
 - Repair technician
 - Production manager
 - Detailer
 - Customer

- Update
- Department communication
- Re-work



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:

- Develop a refinish plan.

LEARNING TASKS

CONTENT

- | | |
|---|---|
| <p>1. Describe productive organizational skills</p> | <ul style="list-style-type: none"> • Repair analysis • Repair plan <ul style="list-style-type: none"> ○ Production deadlines ○ Tools and materials required • Timing of repair steps |
| <p>2. Refer to work order</p> | <ul style="list-style-type: none"> • Protection of personal information • Vehicle make, model and year • Location of repair • Paint codes • VIN • Expected delivery times • Customer service notes |
| <p>3. Visualize process</p> | <ul style="list-style-type: none"> • Mapping out repair <ul style="list-style-type: none"> ○ Pre-existing damage ○ Priorities ○ Sub-lets • Developing checklist • Photo documentation |
| <p>4. Itemize requirements</p> | <ul style="list-style-type: none"> • Tools • Materials • Parts <ul style="list-style-type: none"> ○ Availability ○ Sacrificial (one-time use) ○ Missing from vehicle |
| <p>5. Determine repair sequence</p> | <ul style="list-style-type: none"> • Timing <ul style="list-style-type: none"> ○ Awareness of cycle times ○ Order of operations ○ Dry times |



LEARNING TASKS

6. Develop a refinish plan

CONTENT

- Standard Operating Procedures (SOP)

- Consult production schedule
- Interpret work order
- Verify parts to be refinished
- Evaluate substrate
- Select materials
- Select tools
- Efficiency of the refinish plan
 - Eliminating redundant steps
 - Maximizing cycle time

Achievement Criteria

Performance	The learner will develop a refinish plan.
Conditions	The learner will be given <ul style="list-style-type: none"> • Work order or estimate • Vehicle or panel to refinish
Criteria	The learner will be evaluated on <ul style="list-style-type: none"> • Safety • Accuracy of the refinish plan



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:

- Prepare repair plan.

LEARNING TASKS

CONTENT

- | | |
|---|---|
| <p>1. Describe refinish estimates</p> | <ul style="list-style-type: none"> • Terminology <ul style="list-style-type: none"> ○ Depreciation ○ Sublet ○ Supplement ○ Included and not-included operations ○ Betterment • Sections of estimates <ul style="list-style-type: none"> ○ Customer information ○ Vehicle information ○ Estimate detail lines (damage assessment) ○ Estimate sub-totals ○ Final totals |
| <p>2. Use software to prepare estimates and supplements</p> | <ul style="list-style-type: none"> • Types <ul style="list-style-type: none"> ○ Mitchell ○ Audatex • Procedures for use • Updates |
| <p>3. Identify information used in the preparation of estimates and supplements</p> | <ul style="list-style-type: none"> • Customer information • Mileage • VIN • Make and model • Production date • Paint codes • Plate number • OEM specifications |
| <p>4. Create estimates and supplements</p> | <ul style="list-style-type: none"> • Visual assessment <ul style="list-style-type: none"> ○ Previous or pre-existing damage |



LEARNING TASKS

CONTENT

- Tear down
- Photo documentation
- JT
- Identification of job requirements
 - Re & I
 - Flexibility of components
 - Overhaul
- Note-taking
 - 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 panel
 - Estimating software or manuals
- Criteria The learner will be evaluated on
- Note-taking while inspecting
 - Accuracy of final estimate



Line (GAC): E USE COMMUNICATION AND MENTORING TECHNIQUES
Competency: E2 Use mentoring techniques

Objectives

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

- Use mentoring techniques.

LEARNING TASKS

1. Describe the role of mentor

2. Describe mentoring skills

3. Describe workplace diversity and inclusion

CONTENT

- Valuing Aprentice
- Identifying goals
- Encouraging
- Provide a nurturing environment
- Managing risk
- Providing feedback, coaching and counselling
- Developing capabilities
- Maintaining confidentiality

- Inspiration
- Active listening
- Building trust
- Encouragement
- Preparedness
- Approachability
- Objectiveness
- Fairness
- Compassionate

- Fair recruiting and hiring practices
- Acceptance
- Accommodations
- Anti-harrassment/anti-bullying policies



Line (GAC): G PREPARE SURFACE

Competency: G2 Mask surface

Objectives

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

- Use masking techniques for topcoat.

LEARNING TASKS

CONTENT

- | | |
|---|--|
| <p>1. Describe masking materials</p> | <ul style="list-style-type: none"> • Tapes • Paper • Plastics • Lifting cord • Liquid mask |
| <p>2. Describe masking equipment</p> | <ul style="list-style-type: none"> • Masking machine • Paper dispenser • Hand masker • Razor blade |
| <p>3. Use masking techniques for topcoat</p> | <ul style="list-style-type: none"> • Edge • Reverse mask • Inners • Back mask • Tunnel mask • Aperture • Flush mount • Perimeter masking • Fine line • Two-tone • Blend |
| <p>4. Describe masking deficiencies and corrective procedures</p> | <ul style="list-style-type: none"> • Faults <ul style="list-style-type: none"> ○ Under mask ○ Over mask ○ Over spray ○ Bleed through ○ Bridging and peeling • Corrective procedures <ul style="list-style-type: none"> ○ Re-do ○ Solvent cleaning ○ Polish |



LEARNING TASKS

CONTENT

- Clay bar

Achievement Criteria

Performance The learner will mask a vehicle for topcoat.

- Conditions The learner will be given
- A vehicle or component
 - A work order
 - Masking materials
 - Required tools

- Criteria The learner will be evaluated on
- Safety
 - Material selection
 - Masking technique



Line (GAC): I APPLY REFINISHING MATERIALS

Competency: I1 Mix refinishing materials

Objectives

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

- Mix refinishing materials.

LEARNING TASKS

1. Use refinishing materials

CONTENT

- Types
 - Sealers
 - Tintable
 - Non-tintable
 - Plastic
 - Transparent
 - Primer sealers
 - Single-stage
 - Base coat
 - Clear coat
 - Nano-technology
 - Scratch-resistant
 - Ceramic
- Powder coating
- Pigments
- Characteristics
 - Durability
 - Adhesion
 - Chemical resistance
 - Viscosity
- Components
 - Binders
 - Resins
 - Additives
 - Pigments
 - Metallics
 - Pearls
 - Micas
 - Xirallic
 - Flex (colour-shift)
 - Dyes



LEARNING TASKS

2. Describe solvents

3. Describe additives

4. Describe hardeners

5. Describe mix ratios

6. Mix refinishing materials

CONTENT

- Types
 - Reducers
 - Thinners
 - Blending
 - Cleaning
- Functions
 - Viscosity
 - Flash time
 - VOC
 - Temperatures
- Flattening agents
- Blending agents
- Fish eye eliminators
- Accelerators
- Retarders
- Base coat catalyzers
- Isocyanates/crosslinking
- Percentage
- Volume
- Weight
- Manufacturers' software
- TDS
- Equipment selection
- Product selection
- Amounts
- Computerized tracking
 - Costs
 - Paint codes
 - Mix history
 - Custom formulas
 - Overpour compensation
 - VOC usage
 - Inventory
 - Colour adjustment
 - Ground coat (value shade)
- Factors



LEARNING TASKS

CONTENT

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

Achievement Criteria

Note: Mixing refinishing materials will be assessed with other projects in Line I. See I6 for Achievement Criteria



Line (GAC): I APPLY REFINISHING MATERIALS

Competency: I4 Apply base coat/clear coat

Objectives

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

- Apply and blend base coat/clear coat and multi-stage 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

2. Apply base coat/clear coat and multi-stage paint

- Manufacturers' specifications
- Surface cleaning
- Orientation coating
- Colour blending
- Dry times
- Flash times
- Spray booth operation



LEARNING TASKS

CONTENT

- Spray gun set up
- Troubleshooting
- Blending
- Let down panel
- Spray out card
- Equipment clean up



Line (GAC): I APPLY REFINISHING MATERIALS

Competency: I5 Troubleshoot refinish problems

Objectives

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

- Describe refinish problems and their causes.
- Describe methods for correcting refinish problems.

LEARNING TASKS

1. Describe refinish problems

CONTENT

- Orange peel
- Sags and runs
- Dry spray
- Sand piling
- Mismatch
- Fish eyes
- Dirt nibs
- Delamination
- Soft paint
- Die back
- Solvent trapping
- Halo
- Mottling
- Wrinkling
- Sand scratches
- Checking
- Staining
- Blushing
- Contour mapping
- Topcoat absorption (hold out)
- Overspray
- Customer satisfaction

2. Describe causes of paint problems

- Contamination
 - Dirty equipment
 - Environment
 - Painter
 - Improper cleaning
- Poor spray technique
- Improper mixing procedures
- Inter-mixing of products



LEARNING TASKS

3. Describe methods of correcting paint problems

CONTENT

- Expired product
- Poor equipment
- Poor booth conditions
- Taking short cuts
- Miscommunications

- Prevention
 - Good work habits
 - Product knowledge
 - Preparation technique
 - Equipment knowledge
 - Corrosion protection
 - Application technique
 - Substrate knowledge
 - Mil thickness
 - SOP
 - Training
 - Housekeeping
- During spraying
 - Fish eye eliminator
 - Sanding
 - Tacking
 - Taping
 - Re-coat
 - Adjust
 - Application technique
 - Environmental conditions
 - Equipment
 - Material



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

Objectives

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

- Perform colour 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

2. Perform colour adjustment

- 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

Achievement Criteria 1 (THIS PROJECT ASSESSES ALL OF LINE I)

Performance The learner will apply a metallic two-stage finish.
 Conditions The learner will be given



- | | |
|----------|---|
| Criteria | <ul style="list-style-type: none"> • Vehicle or component • Material and equipment • Access to manufacturers' specifications <p>The learner will be evaluated on</p> <ul style="list-style-type: none"> • Safety • Preparation of surface • Quality • Colour matching • Orientation • Coverage • Mil thickness • Application technique • Housekeeping |
|----------|---|

Achievement Criteria 2 (THIS PROJECT ASSESSES ALL OF LINE I)

- | | |
|-------------|--|
| Performance | The learner will apply a multi-stage finish. |
| Conditions | <p>The learner will be given</p> <ul style="list-style-type: none"> • Vehicle or component • Material and equipment • Access to manufacturers' specifications |
| Criteria | <p>The learner will be evaluated on</p> <ul style="list-style-type: none"> • Safety • Quality • Preparation of surface • Accuracy of let down panel • Orientation • Coverage • Mil thickness • Application technique • Housekeeping |



Line (GAC): J PERFORM POST-REFINISHING FUNCTIONS

Competency: J1 Remove masking materials

Objectives

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

- Remove masking materials.

LEARNING TASKS

1. Remove masking for paint

CONTENT

- When to remove
- Techniques
 - Angle
 - Direction
- Disposal



Achievement Criteria

- | | |
|-------------|---|
| Performance | <p>The learner will remove surface imperfections, such as:</p> <ul style="list-style-type: none"> • Nibs • Runs • Orange peel |
| Conditions | <p>The learner will be given</p> <ul style="list-style-type: none"> • Vehicle or component with surface imperfection • Materials and equipment • Access to manufacturers' specifications |
| Criteria | <p>The learner will be evaluated on</p> <ul style="list-style-type: none"> • Safety • Product and tool selection • Efficiency • Quality of repair • Housekeeping |



Line (GAC): J PERFORM POST-REFINISHING FUNCTIONS

Competency: J3 Perform final check

Objectives

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

- Perform final check.

LEARNING TASKS

1. Perform final check

CONTENT

- Completion of work order
- Completion of job pre-delivery checklist
 - Contents
 - Importance
 - Quality standard
 - Customer relations
- Colour match
- Overspray
- Blend areas
- Polish residue

Achievement Criteria

Performance The learner will perform a final check.

Conditions The learner will be given

- Refinished vehicle or component
- Work order
- Pre-delivery checklist

Criteria The learner will be evaluated on

- Efficiency
- Accuracy
- Thoroughness of final check



Section 4

ASSESSMENT 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%
In-school theory/practical subject competency weighting		60%	40%
Final in-school percentage score		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>In-school Percentage Score Combined theory and practical subject competency multiplied by</p>	80%
<p>Standardized Level Exam Percentage Score The exam score is multiplied by</p>	20%
<p>Final Percentage Score</p>	FINAL%



Assessment Guidelines – Level 2

Level 2 Grading Sheet: Subject Competency and Weightings

PROGRAM: IN-SCHOOL TRAINING:		AUTOMOTIVE REFINISHING TECHNICIAN LEVEL 2	
LINE	SUBJECT COMPETENCIES	THEORY WEIGHTING	PRACTICAL WEIGHTING
B	USE TOOLS AND EQUIPMENT	10%	0%
D	ORGANIZE WORK AND USE DOCUMENTATION	5%	5%
E	USE COMMUNICATION AND MENTORING TECHNIQUES	5%	0%
G	PREPARE SURFACE	10%	5%
H	USE REPAIR MATERIALS AND EQUIPMENT	20%	0%
I	APPLY REFINISHING MATERIALS	40%	70%
J	PERFORM POST-REFINISHING FUNCTIONS	10%	20%
	Total	100%	100%
In-school theory/practical subject competency weighting		40%	60%
Final in-school percentage score		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 2 of the Automotive Refinishing Technician program with a FINAL level percentage score of 70% or greater will write the Interprovincial Red Seal examination as their final assessment.

ITA will enter the apprentices' Automotive Refinishing Technician Interprovincial Red Seal examination percentage score into ITA Direct Access.

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 fiberglass 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
- Spill kit
- Respirators (P100)

Power Tools

- Air pressure regulator
- Decal removal tool
- Drill
- Dual action sander
- Heat gun



Refinishing Equipment and Materials

- Colour chips
- Colour books
- Colour corrective light
- Digital surface temperature guage
- Glazes
- Infrared curing lamps
- Intermix computer system
 - Digital scales
- Magnahelic
- Manometer
- Mil thickness gauge
- Mixing cup
- Paint strainer
- Paint gun
 - Gravity feed
 - HVLP
 - Pressure pot system
 - Reduced pressure
 - Suction feed
- Polishing compound
- Spray out card
- Spectrophotometer
- Ratio stick
- Rubbing compound
- Tack cloths
- Viscosity cup

Detailing and Cleaning Equipment

- Brushes
- Buffer/polisher
- Chamois
- Clay bar
- Cleaning Solutions
 - All purpose
 - Dressings
 - Glass
- De-nibbing file
- Magnifying glass
- Microfiber cloth
- Polishing pads
- Pressure washer
- Razor blade and holder
- Rubber squeegee
- Spray bottle
- Vacuum cleaner

Shop Equipment

- Air dryer
- Clipboard
- Compressor
- Computer and software
- Curing lamp
- Dual action sander
- Fresh air respirator (air feed)
- Masking machine
- Mixing room
- Paint booth
- Spray booth
- Transformer

Shop Tools and Equipment – Miscellaneous

- Adhesive material
- Aluminum material
- Cleaning materials
- Complete undercoat/topcoat materials
- Body filler material
- Electrical components
- Fibreglass material
- Primer undercoats
- Sanding equipment
- SMC material



Reference Materials

Recommended Resources

www.i-car.ca

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

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

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

www.tech-cor.com



Instructor Requirements

Occupation Qualification

The instructor must possess:

- Automotive Refinishing Technician - Certificate of Qualification with an Interprovincial Red Seal endorsement, or
- Automotive Refinishing Technician - 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 Refinishing Technician Journeyperson.
- Must have diverse Automotive Refinishing Technician industry experience including that which covers all the competencies in the program outline.
- Must have recent Automotive Refinishing Technician trade experience.

Instructional Experience and Education

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

- Instructors Certificate (minimum 30 hr course).
- Instructors must have or be registered in an Instructor's Diploma Program, to be completed within a five year period or hold a Bachelors or Masters Degree in Education.



Appendices



Appendix A: Acronyms and Glossary

Acronyms

AC	Alternating Current
Apps	Applications
ATSO	Automotive Training Standards Organization
CSA	Canadian Standards Association
DA	Dual-Action
DC	Direct Current
DTM	Direct-to-metal
GAC	General Area of Competency
GMAW	Gas Metal Arc Welding
HVAC	Heating, Ventilation and Air Conditioning
HVLP	High volume, low pressure
ISO	International Organization for Standardization
JHA	Job hazard analysis
JT	Judgement Time
MIG	Metal Inert Gas
NAGS	National Auto Glass Specifications
OD	Old damage
OEM	Original Equipment Manufacturer
OHS	Occupational Health and Safety
PPE	Personal Protective Equipment
Re & I	Remove and Install
Re & Re	Remove and Repair
RFC	Recommendation for certification
RRIM	Reinforced reaction injection moulded
RSOS	Red Seal Occupational Standard
SDS	Safety Data Sheets
SMC	Sheet-molded compound
SOP	Standard Operating Procedures
SRS	Supplemental Restraint Systems
STRSW	Squeeze-type resistance spot weld
TDS	Technical Data Sheets
UV	Ultra Violet
VIN	Vehicle Identification Number
VOC	Volatile Organic Compounds
WHMIS	Workplace Hazardous Materials Information System
WIP	Work in Progress



Glossary

Abrasives

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

Active restraint system

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

Refers to 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
B2 Use lifting equipment	The learner will perform vehicle lifting.
B4 Maintain spray equipment	The learner will perform spray equipment maintenance and test spray.
C1 Use cutting and heating equipment	The learner will perform oxyacetylene set up, cutting, heating and shut down.
C2 Use welding equipment	The learner will perform welds on 22-gauge steel in flat position, including butt weld without backing, lap weld, and plug weld.
LINE F* REMOVE AND INSTALL VEHICLE COMPONENTS	The learner will remove and install vehicle components, such as door handle, side moulding, and side mirror.
LINE H** USE REPAIR MATERIALS AND EQUIPMENT	The learner will prepare and mask a panel for a primer spot repair and mix and apply repair materials.
LINE I*** APPLY REFINISHING MATERIALS	The learner will perform base coat/clear coat refinishing procedures.
K4 Repair metal panels and components	The learner will perform a minor repair on a sheet metal panel.
L4 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. Note to Instructor: Retain panel upon completion of project for later achievement criteria in LINE I.
***All of LINE I (I1, I2, I3, I4) Note to Instructor: Use repaired panel from LINE H for this achievement criteria.



AUTOMOTIVE REFINISHING TECHNICIAN – LEVEL 2 SUMMARY OF PRACTICAL ASSESSMENTS	
SUBJECT COMPETENCY OR LINE	PRACTICAL ASSESSMENT TASK
D5 Prepare repair plan	The learner will develop a refinish plan.
D6 Prepare estimates and supplements	The learner will create an estimate.
G2 Mask surface	The learner will mask a vehicle for topcoat.
LINE I* APPLY REFINISHING MATERIALS	The learner will apply a metallic two-stage finish. The learner will apply a multi-stage finish.
J2 Correct surface imperfections	The learner will remove surface imperfections, such as nibs, runs and orange peel.
J3 Perform final check	The learner will perform a final check.

*All of LINE I (I1, I2, I3, I4, I5, I6)



Appendix C: Previous Contributors

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

- 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 2017 Program Outline:

- 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
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The Industry Training Authority 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.