



**ASE STUDENT CERTIFICATION
TEST SPECIFICATIONS AND TASK LISTS**

COLLISION REPAIR AND REFINISHING

The ASE Student Certification test series for the collision repair and refinishing programs is comprised of four examinations. Listed below are the test specifications and task lists for each of these four exams.

The task lists are simply lists of the tasks involved in the process of diagnosing and repairing collision damage, and painting / refinishing. The tasks may also be thought of as competencies. Each question found on the tests is keyed to one of these tasks. The tasks are organized into content categories, and these content categories, along with the number of questions included in each category, comprise the test specifications. Every form of the exams will be built to meet these specifications.

Students preparing for the ASE Student Certification tests should review the tasks (competencies) listed, and note areas where further preparation may be needed. It also helps students to note how many questions will be included on the exams in each content area.

Technical Areas

STRUCTURAL ANALYSIS AND DAMAGE REPAIR.....	2
NON-STRUCTURAL ANALYSIS AND DAMAGE REPAIR (BODY COMPONENTS).....	4
MECHANICAL AND ELECTRICAL COMPONENTS	6
PAINTING AND REFINISHING	9

STRUCTURAL ANALYSIS AND DAMAGE REPAIR

Content Area	Questions In Test
A. Frame Inspection and Repair	10
B. Unibody and Unitized Structure Inspection, Measurement, and Repair	14
C. Stationary Glass	2
D. Metal Welding and Cutting	14
Required To Pass: 22 of 40	TOTAL 40

Notes:

1. Effective August 1, 2017, this test is based on the *Structural Analysis And Damage Repair* tasks of the 2016 NATEF Collision Repair & Refinish Program Standards and is intended for students who have completed a course of study that corresponds with that level of instruction.

2. This test may include additional questions for statistical evaluation. These extra questions will not count for or against the final score. Since the extra questions are not identified, test candidates should answer every question to the best of their ability.

A. Frame Inspection and Repair

1. Measure and diagnose structural damage using a tram gauge.
2. Attach vehicle to anchoring devices.
3. Analyze, straighten and align mash (collapse) damage.
4. Analyze, straighten and align sag damage.
5. Analyze, straighten and align side sway damage.
6. Analyze, straighten and align twist damage.
7. Analyze, straighten and align diamond frame damage.
8. Remove and replace damaged structural components.
9. Replace protective coatings, restore corrosion protection to repaired or replaced frame areas and anchoring locations.
10. Analyze and identify misaligned or damaged steering, suspension, and powertrain mounting points.
11. Align or replace misaligned or damaged steering, suspension, and powertrain mounting points that can cause vibration, steering, and wheel alignment problems.
12. Identify heat limitations and monitoring procedures for structural components.
13. Demonstrate an understanding of structural foam applications.
14. Measure and diagnose structural damage using a three-dimensional measuring system (mechanical, electronic, laser), etc.
15. Determine the extent of the direct and indirect damage and the direction of impact; document the methods and sequence of repair.
16. Analyze and identify crush/collapse zones.

B. Unibody and Unitized Structure Inspection, Measurement, and Repair

1. Analyze and identify misaligned or damaged steering, suspension, and powertrain mounting points that can cause vibration, steering, and chassis alignment problems.
2. Align or replace misaligned or damaged steering, suspension, and powertrain mounting points that can cause vibration, steering and chassis alignment problems.
3. Measure and diagnose unibody damage using tram gauge.
4. Measure and diagnose unibody vehicles using a dedicated (fixture) measuring system.
5. Diagnose and measure unibody vehicles using a three-dimensional measuring system (mechanical, electronic, and laser, etc.).
6. Determine the extent of the direct and indirect damage and the direction of impact; plan and document the methods and sequence of repair.
7. Attach anchoring devices to vehicle; remove or reposition components as necessary.
8. Straighten and align roof rails/headers and roof panels.
9. Straighten and align rocker panels and pillars.
10. Straighten and align vehicle openings, and floor pans.
11. Straighten and align quarter panels, wheelhouse assemblies, and rear body sections (including rails and suspension/powertrain mounting points).
12. Straighten and align front-end sections (aprons, strut towers, upper and lower rails, steering, and suspension/power train mounting points, etc.).

13. Identify substrate and repair or replacement recommendations.
14. Identify proper cold stress relief methods.
15. Repair damage using power tools and hand tools to restore proper contours and dimensions.
16. Determine sectioning procedures of a steel body structure.
17. Remove and replace damaged structural components.
18. Restore corrosion protection to repaired or replaced structural areas, and anchoring locations.
19. Determine the extent of damage to aluminum structural components; repair, weld, or replace.
20. Analyze and identify crush/collapse zones.

C. Stationary Glass

1. Identify considerations for removal, handling, and installation of advanced glass systems (rain sensors, navigation, cameras, collision avoidance systems).
2. Remove and reinstall or replace modular glass using recommended materials.
3. Check for water leaks, dust leaks, and wind noise.

D. Metal Welding, Cutting, and Joining

1. Identify the considerations for cutting, removing, and welding various types of steel, aluminum, and other metals..
2. Determine the correct GMAW welder type, electrode/wire type, diameter, and gas to be used in a specific welding situation.
3. Set up, attach work clamp (ground), and adjust the GMAW welder to "tune" for proper electrode stickout, voltage, polarity, flow rate, and wire-feed speed required for the substrate being welded.
4. Store, handle, and install high-pressure gas cylinders; test for leaks.
5. Determine the proper angle of the gun to the joint and direction of gun travel for the type of weld being made.
6. Protect adjacent panels, glass, vehicle interior, etc., from welding and cutting operations.
7. Identify hazards; foam coatings and flammable materials prior to welding/cutting procedures.
8. Protect computers and other electronics/wires during welding procedures.
9. Clean and prepare the metal to be welded, assure good metal fit-up, apply weld-through primer if necessary, clamp or tack as required.
10. Determine the joint type (butt weld with backing, lap, etc.) for weld being made.
11. Determine the type of weld (continuous, stitch weld, plug, etc.) for each specific welding operation.
12. Perform the following welds: plug, butt weld with and without backing, and fillet, etc., in the flat, horizontal, vertical, and overhead positions.
13. Perform visual evaluation and destructive test on each weld type.
14. Identify the causes of various welding defects; make necessary adjustments.
15. Identify cause of contact tip burn-back and failure of wire to feed; make necessary adjustments.
16. Identify cutting process for different substrates and locations; perform cutting operation.
17. Identify different methods of attaching structural components (squeeze type resistance spot welding (STRSW), riveting, structural adhesive, MIG bronze, etc.).

NON-STRUCTURAL ANALYSIS AND DAMAGE REPAIR (BODY COMPONENTS)

Content Area	Questions In Test
A. Preparation	8
B. Outer Body Panel Repair, Replacements, and Adjustments	9
C. Metal Finishing and Body Filling	8
D. Moveable Glass and Hardware	3
E. Metal Welding and Cutting	8
F. Plastics and Adhesives	4
Required To Pass: 22 of 40	TOTAL 40

Notes:

1. Effective August 1, 2017, this test is based on the *Non-Structural Analysis And Damage Repair* tasks of the 2016 NATEF Collision Repair & Refinish Program Standards and is intended for students who have completed a course of study that corresponds with that level of instruction.

2. This test may include additional questions for statistical evaluation. These extra questions will not count for or against the final score. Since the extra questions are not identified, test candidates should answer every question to the best of their ability.

A. Preparation

1. Review damage report and analyze damage to determine appropriate methods for overall repair; develop, and document a repair plan.
2. Inspect, remove, label, store, and reinstall exterior trim and moldings.
3. Inspect, remove, label, store, and reinstall interior trim and components.
4. Inspect, remove, label, store, and reinstall body panels and components that may interfere with or be damaged during repair.
5. Inspect, remove, protect label, store, and reinstall vehicle mechanical and electrical components that may interfere with or be damaged during repair.
6. Protect panels, glass, interior parts, and other vehicles adjacent to the repair area.
7. Soap and water wash entire vehicle; complete pre-repair inspection checklist.
8. Prepare damaged area using water-based and solvent-based cleaners.
9. Remove corrosion protection, undercoatings, sealers, and other protective coatings as necessary to perform repairs.
10. Inspect, remove, and reinstall repairable plastics and other components for off-vehicle repair.

B. Outer Body Panel Repairs, Replacements, and Adjustments

1. Inspect/locate direct, indirect, or hidden damage and direction of impact.
2. Inspect, remove and replace mechanically fastened welded steel panel or panel assemblies.
3. Determine the extent of damage to aluminum body panels; repair or replace.
4. Inspect, remove, replace, and align hood, hood hinges, and hood latch.
5. Inspect, remove, replace, and align deck lid, lid hinges, and lid latch.
6. Inspect, remove, replace, and align doors, latches, hinges, and related hardware.
7. Inspect, remove, replace and align tailgates, hatches, liftgates and sliding doors.
8. Inspect, remove, replace, and align bumpers, covers, reinforcements, guards, impact absorbers, and mounting hardware.
9. Inspect, remove, replace and align fenders, and related panels.
10. Restore corrosion protection during and after the repair.
11. Replace door skins.
12. Restore sound deadeners and foam materials.
13. Perform panel bonding and weld bonding.
14. Diagnose and repair water leaks, dust leaks, and wind noise.
15. Identify one-time use fasteners.
16. Weld damaged or torn steel body panels; repair broken welds.

C. Metal Finishing and Body Filling

1. Prepare a panel for body filler by abrading or removing the coatings; featheredge and refine scratches before the application of body filler.

2. Locate and repair surface irregularities on a damaged body panel using power tools, hand tools, and weld-on pulling attachments.
3. Demonstrate hammer and dolly techniques.
4. Heat shrink stretched panel areas to proper contour.
5. Cold shrink stretched panel areas to proper contour.
6. Identify body filler defects; correct the cause and condition. (Pinholing, ghosting, staining, over catalyzing, etc.)
7. Identify different types of body fillers.
8. Shape body filler to contour; finish sand.
9. Perform proper metal finishing techniques for aluminum.
10. Perform proper application of body filler to aluminum.
11. Straighten contours of damaged panels to a suitable condition for body filling or metal finishing using power tools, hand tools, and weld-on pulling attachments.

D. Moveable Glass and Hardware

1. Inspect, adjust, repair or replace window regulators, run channels, glass, power mechanisms, and related controls.
2. Inspect, adjust, repair, remove, reinstall or replace weather-stripping.
3. Inspect, repair or replace, and adjust removable power operated roof panel and hinges, latches, guides, handles, retainer, and controls of sunroofs.
4. Inspect, remove, reinstall, and align convertible top and related mechanisms.
5. Initialize electrical components as needed.

E. Metal Welding, Cutting, and Joining

1. Identify the considerations for cutting, removing, and welding various types of steel, aluminum, and other metals..
2. Determine the correct GMAW welder type, electrode/wire type, diameter, and gas to be used in a specific welding situation.
3. Set up, attach work clamp (ground), and adjust the GMAW welder to "tune" for proper electrode stickout, voltage, polarity, flow rate, and wire-feed speed required for the substrate being welded.
4. Store, handle, and install high-pressure gas cylinders; test for leaks.
5. Determine the proper angle of the gun to the joint and direction of gun travel for the type of weld being made.
6. Protect adjacent panels, glass, vehicle interior, etc., from welding and cutting operations.
7. Identify hazards; foam coatings and flammable materials prior to welding/cutting procedures.
8. Protect computers and other electronics/wires during welding procedures.
9. Clean and prepare the metal to be welded, assure good metal fit-up, apply weld-through primer if necessary, clamp or tack as required.
10. Determine the joint type (butt weld with backing, lap, etc.) for weld being made.
11. Determine the type of weld (continuous, stitch weld, plug, etc.) for each specific welding operation.
12. Perform the following welds: plug, butt weld with and without backing, and fillet, etc., in the flat, horizontal, vertical, and overhead positions.
13. Perform visual evaluation and destructive test on each weld type.
14. Identify the causes of various welding defects; make necessary adjustments.
15. Identify cause of contact tip burn-back and failure of wire to feed; make necessary adjustments.
16. Identify cutting process for different substrates and locations; perform cutting operation.
17. Identify different methods of attaching structural components (squeeze type resistance spot welding (STRSW), riveting, structural adhesive, MIG bronze, etc.).

F. Plastics and Adhesives

1. Identify the types of plastics; determine repairability.
2. Clean and prepare the surface of plastic parts; identify the types of plastic repair procedures.
3. Repair rigid, semi-rigid, and flexible plastic panels.
4. Remove or repair damaged areas from rigid exterior composite panels.
5. Replace bonded rigid exterior composite body panels; straighten or align panel supports.

MECHANICAL AND ELECTRICAL COMPONENTS

<u>Content Area</u>	<u>Questions In Test</u>
A. Suspension and Steering	9
B. Electrical	8
C. Brakes	3
D. Heating and Air Conditioning	5
E. Cooling Systems	4
F. Drive Train	3
G. Fuel, Intake and Exhaust Systems	2
H. Restraint Systems	6
Required To Pass: 22 of 40	TOTAL 40

Notes:

1. Effective August 1, 2017, this test is based on the *Mechanical and Electrical Components* tasks of the 2016 NATEF Collision Repair & Refinish Program Standards and is intended for students who have completed a course of study that corresponds with that level of instruction.

2. This test may include additional questions for statistical evaluation. These extra questions will not count for or against the final score. Since the extra questions are not identified, test candidates should answer every question to the best of their ability.

A. Suspension and Steering

1. Perform visual inspection and measuring checks to identify steering and suspension collision damage.
2. Identify one-time use fasteners.
3. Clean, inspect, and prepare reusable fasteners.
4. Remove, replace, inspect or adjust power steering pump, pulleys, belts, hoses, fittings and pump mounts.
5. Remove and replace power steering gear (non-rack and pinion type).
6. Inspect, remove, and replace power rack and pinion steering gear and related components.
7. Inspect and replace parallelogram steering linkage components.
8. Inspect, remove and replace upper and lower control arms and related components.
9. Inspect, remove and replace steering knuckle/spindle/hub assemblies (including bearings, races, seals, etc.).
10. Inspect, remove and replace front suspension system coil springs and spring insulators (silencers).
11. Inspect, remove, replace, and adjust suspension system torsion bars, and mounts.
12. Inspect, remove and replace stabilizer bar bushings, brackets, and links.
13. Inspect, remove and replace MacPherson strut or assembly, upper bearing, and mount.
14. Inspect, remove, and replace rear suspension system transverse links, control arms, stabilizer bars, bushings, and mounts.
15. Inspect, remove, and replace suspension system leaf spring(s) and related components.
16. Inspect axle assembly for damage and misalignment.
17. Inspect, remove and replace shock absorbers.
18. Diagnose, inspect, adjust, repair or replace active suspension systems and associated lines and fittings.
19. Measure vehicle ride height and wheel base; determine necessary action.
20. Inspect, remove, replace, and align front and rear frame (cradles/sub).
21. Diagnose and inspect steering wheel, steering column, and components.
22. Verify proper operation of steering systems including electronically controlled, hydraulic and electronically assisted steering systems.
23. Diagnose front and rear suspension system noises and body sway problems; determine necessary action.
24. Diagnose vehicle wandering, pulling, hard steering, bump steer, memory steering, torque steering, and steering return problems; determine necessary action.
25. Demonstrate an understanding of wheel suspension and steering alignments (caster, camber, toe, SAI etc.).
26. Diagnose tire wear patterns; determine cause.
27. Inspect tires; identify direction of rotation and location; check tire size, tire pressure monitoring system (TPM) and adjust air pressure.
28. Diagnose wheel/tire vibration, shimmy, tire pull (lead), wheel hop problems; determine needed repairs.
29. Measure wheel, tire, axle, and hub runout; determine needed repairs.
30. Reinstall wheels and torque lug nuts.
31. Perform initialization or calibration procedures following suspension and/or steering system repairs.

B. Electrical

1. Check for available voltage, voltage drop and current, and resistance in electrical wiring circuits and components with a DMM (digital multimeter).
2. Repair wiring and connectors.
3. Inspect, test, and replace fusible links, circuit breakers, and fuses.
4. Perform battery state-of-charge test and slow/fast battery charge.
5. Inspect, clean, repair or replace battery, battery cables, connectors and clamps.
6. Dispose of batteries and battery acid according to local, state, and federal requirements.
7. Identify programmable electrical/electronic components and check for malfunction indicator lamp (MIL) and fault codes; record data for reprogramming before disconnecting battery.
8. Inspect alignment, adjust, remove and replace alternator (generator), drive belts, pulleys, and fans.
9. Check operation and aim headlamp assemblies and fog/driving lamps; determine needed repairs.
10. Inspect, test, and repair or replace bulbs, sockets, connectors, and ground wires of interior and exterior light circuits.
11. Remove and replace horn(s); check operation.
12. Check operation of wiper/washer systems; determine needed repairs.
13. Check operation of power side and tailgate window; determine needed repairs.
14. Inspect, remove and replace power seat, motors, linkages, cables, etc.
15. Inspect, remove and replace components of electric door and hatch/trunk lock.
16. Inspect, remove and replace components of keyless lock/unlock devices and alarm systems.
17. Inspect, remove and replace components of electrical sunroof and convertible/retractable hard top.
18. Check operation of electrically heated mirrors, windshields, back lights, panels, etc.; determine needed repairs.
19. Demonstrate self-grounding procedures (anti-static) for handling electronic components.
20. Check for module communication errors using a scan tool.
21. Use wiring diagrams, component location, and diagnostic flow charts during diagnosis of electrical circuit problems.
22. Identify safe disabling techniques of high voltage systems on hybrid/electric vehicles.
23. Identify potential safety and material handling concerns associated with high voltage hybrid/electric vehicle battery systems.

C. Brakes

1. Inspect brake lines, hoses, and fittings for damage or wear; tighten fittings and supports; replace brake lines (double flare and ISO types).
2. Replace hoses, fittings, seals, and supports.
3. Identify, handle, store, and fill with appropriate brake fluids.
4. Bleed (manual, pressure, or vacuum) hydraulic brake system.
5. Pressure test brake hydraulic system; determine necessary action.
6. Adjust brake shoes or pads; remove and reinstall brake drums or drum/hub assemblies.
7. Remove, clean and inspect caliper and rotor assembly and mountings for wear and damage; reinstall.
8. Inspect parking brake system operation; repair or adjust as necessary; verify operation.
9. Identify the proper procedures for handling brake dust.
10. Check for bent or damaged brake system components.
11. Demonstrate an understanding of various types of advanced braking systems (ABS, electronic parking brake, hydraulic, electronic, traction and stability control).

D. Heating and Air Conditioning

1. Identify and comply with environmental regulations relating to refrigerants and coolants.
2. Maintain and verify correct operation of certified refrigerant recovery and recharging equipment.
3. Locate and identify A/C system service ports.
4. Identify refrigerant contamination, recover, label, store, and recycle refrigerant from an A/C system.
5. Select refrigerant, evacuate, and recharge an A/C system; check for leaks.
6. Select oil type and install correct amount in A/C system.
7. Inspect, adjust, and replace A/C compressor drive belts; check pulley alignment.
8. Remove and replace A/C compressor; inspect, repair or replace A/C compressor mount.
9. Inspect, repair or replace A/C system mufflers, hoses, lines, fittings, orifice tube, expansion valve, and seals.

10. Inspect, test, and replace A/C system condenser and mounts.
11. Inspect and replace receiver/drier or accumulator/drier.
12. Inspect and repair A/C component wiring.
13. Demonstrate an understanding of safe handling procedures associated with high voltage A/C compressors and wiring.
14. Inspect and protect open A/C system components from contaminants during repairs.

E. Cooling Systems

1. Check engine cooling and heater system hoses and belts; determine necessary action.
2. Inspect, test, remove, and replace radiator, pressure cap, coolant system components, and water pump.
3. Recover, refill, and bleed system with proper coolant and check level of protection; leak test system and dispose of materials in accordance with EPA regulations.
4. Remove, inspect and replace fan (both electrical and mechanical), fan sensors, fan pulley, fan clutch, and fan shroud; check operation.
5. Inspect, remove, and replace auxiliary oil/fluid coolers; check oil levels.
6. Demonstrate an understanding of hybrid/electric cooling systems.

F. Drive Train

1. Remove, replace, and adjust shift or clutch linkage as required.
2. Remove and replace electronic sensors, wires, and connectors.
3. Remove and reinstall powertrain assembly; inspect, replace, and align powertrain mounts.
4. Remove and replace drive axle assembly.
5. Inspect, remove and replace half shafts and axle constant velocity (CV) joints.
6. Inspect, remove and replace drive shafts and universal joints.
7. Demonstrate an understanding of safe handling procedures associated with high voltage powertrain components.

G. Fuel, Intake and Exhaust Systems

1. Inspect, remove and replace exhaust pipes, mufflers, converters, resonators, tail pipes, and heat shields.
2. Inspect, remove and replace fuel/DEF tank, tank filter, cap, filler hose, pump/sending unit and inertia switch; inspect and replace fuel lines and hoses.
3. Inspect, remove and replace engine components of air intake components.
4. Inspect, remove and replace canister, filter, vent, and purge lines of fuel vapor (EVAP) control systems.

H. Restraint Systems

1. Inspect, remove, and replace seatbelt and shoulder harness assembly and components.
2. Inspect restraint system mounting areas for damage; repair as needed.
3. Inspect the operation of the seatbelt system.
4. Disable and enable Supplemental Restraint System (SRS).
5. Inspect, protect, remove and replace Supplemental Restraint Systems (SRS) sensors and wiring; ensure sensor orientation.
6. Verify that Supplemental Restraint System (SRS) is operational.
7. Inspect, remove, replace and dispose of deployed and non-deployed airbag(s) and pretensioners.
8. Use Diagnostic Trouble Codes (DTC) to diagnose and repair the Supplemental Restraint System (SRS).
9. Demonstrate an understanding of advanced restraint systems.
10. Identify components of Supplemental Restraint Systems (SRS).

PAINTING AND REFINISHING

<u>Content Area</u>	<u>Questions In Test</u>
A. Safety Precautions	7
B. Surface Preparation	8
C. Spray Gun and Related Equipment Operation	5
D. Paint Mixing, Matching, and Applying	9
E. Paint Defects – Cause and Cures	7
F. Final Detail	4
Required To Pass: 23 of 40	TOTAL 40

Notes:

1. Effective August 1, 2017, this test is based on the *Painting and Refinishing* tasks of the 2016 NATEF Collision Repair & Refinish Program Standards and is intended for students who have completed a course of study that corresponds with that level of instruction.

2. This test may include additional questions for statistical evaluation. These extra questions will not count for or against the final score. Since the extra questions are not identified, test candidates should answer every question to the best of their ability.

A. Safety Precautions

1. Select and use proper personal safety equipment; take necessary precautions with hazardous operations and materials according to federal, state, and local regulations.
2. Identify safety and personal health hazards according to OSHA guidelines and the "Right to Know Law".
3. Inspect spray environment and equipment to ensure compliance with federal, state and local regulations, and for safety and cleanliness hazards.
4. Select and use a NIOSH approved air purifying respirator. Inspect condition and ensure fit and operation. Perform proper maintenance in accordance with OSHA Regulation 1910.134 and applicable state and local regulation.
5. Select and use a NIOSH approved supplied air (Fresh Air Make-up) respirator system. Perform proper maintenance in accordance with OSHA Regulation 1910.134 and applicable state and local regulation
6. Select and use the proper personal safety equipment for surface preparation, spray gun and related equipment operation, paint mixing, matching and application, paint defects, and detailing (gloves, suits, hoods, eye and ear protection, etc.).

B. Surface Preparation

1. Inspect, remove, store, protect, and replace exterior trim and components necessary for proper surface preparation.
2. Soap and water wash entire vehicle; use appropriate cleaner to remove contaminants.
3. Inspect and identify type of finish, surface condition, and film thickness; develop and document a plan for refinishing using a total product system.
4. Remove paint finish as needed.
5. Dry or wet sand areas to be refinished.
6. Featheredge areas to be refinished.
7. Apply suitable metal treatment or primer in accordance with total product systems.
8. Mask and protect other areas that will not be refinished.
9. Demonstrate different masking techniques (recess/back masking, foam door type, etc.).
10. Mix primer, primer-surfacer and primer-sealer.
11. Identify a complimentary color or shade of undercoat to improve coverage.
12. Apply primer onto surface of repaired area.
13. Apply two-component finishing filler to minor surface imperfections.
14. Block sand area to which primer-surfacer has been applied.
15. Dry sand area to which finishing filler has been applied.
16. Remove dust from area to be refinished, including cracks or moldings of adjacent areas.
17. Clean area to be refinished using a final cleaning solution.
18. Remove, with a tack rag, any dust or lint particles from the area to be refinished.
19. Apply suitable primer sealer to the area being refinished.
20. Scuff sand to remove nibs or imperfections from a sealer.
21. Apply stone chip resistant coating.
22. Restore caulking and seam sealers to repaired areas.

23. Prepare adjacent panels for blending.
24. Identify the types of rigid, semi-rigid or flexible plastic parts to be refinished; determine the materials needed, preparation, and refinishing procedures.
25. Identify metal parts to be refinished; determine the materials needed, preparation, and refinishing procedures.

C. Spray Gun and Related Equipment Operation

1. Inspect, clean, and determine condition of spray guns and related equipment (air hoses, regulators, air lines, air source, and spray environment).
2. Select spray gun setup (fluid needle, nozzle, and cap) for product being applied.
3. Test and adjust spray gun using fluid, air and pattern control valves.
4. Demonstrate an understanding of the operation of pressure spray equipment.

D. Paint Mixing, Matching, and Applying

1. Identify color code by manufacturer's vehicle information label.
2. Shake, stir, reduce, catalyze/activate, and strain refinish materials.
3. Apply finish using appropriate spray techniques (gun arc, angle, distance, travel speed, and spray pattern overlap) for the finish being applied.
4. Apply selected product on test or let-down panel; check for color match.
5. Apply single stage topcoat.
6. Apply basecoat/clearcoat for panel blending and panel refinishing.
7. Apply basecoat/clearcoat for overall refinishing.
8. Remove nibs or imperfections from basecoat.
9. Identify product expiration dates as applicable.
10. Refinish plastic parts.
11. Apply multi-stage coats for panel blending and overall refinishing.
12. Identify and mix paint using a formula.
13. Identify poor hiding colors; determine necessary action.
14. Tint color using formula to achieve a blendable match.
15. Identify alternative color formula to achieve a blendable match.
16. Identify the materials, equipment, and preparation differences between solvent and waterborne technologies.

E. Paint Defects - Causes and Cures

1. Identify blistering (raising of the paint surface, air entrapment); correct the cause(s) and the condition.
2. Identify a dry spray appearance in the paint surface; correct the cause(s) and the condition.
3. Identify the presence of fish-eyes (crater-like openings) in the finish; correct the cause(s) and the condition.
4. Identify lifting; correct the cause(s) and the condition.
5. Identify clouding (mottling and streaking in metallic finishes); correct the cause(s) and the condition.
6. Identify orange peel; correct the cause(s) and the condition.
7. Identify overspray; correct the cause(s) and the condition.
8. Identify solvent popping in freshly painted surface; correct the cause(s) and the condition.
9. Identify sags and runs in paint surface; correct the cause(s) and the condition.
10. Identify sanding marks or sandscratch swelling; correct the cause(s) and the condition.
11. Identify contour mapping/edge mapping; correct the cause(s) and the condition.
12. Identify color difference (off-shade); correct the cause(s) and the condition.
13. Identify tape tracking; correct the cause(s) and the condition.
14. Identify low gloss condition; correct the cause(s) and the condition.
15. Identify poor adhesion; correct the cause(s) and the condition.
16. Identify paint cracking (shrinking, splitting, crowsfeet or line-checking, micro-checking, etc.); correct the cause(s) and the condition.
17. Identify corrosion; correct the cause(s) and the condition.
18. Identify dirt or dust in the paint surface; correct the cause(s) and the condition.
19. Identify water spotting; correct the cause(s) and the condition.
20. Identify finish damage caused by bird droppings, tree sap, and other natural causes; correct the condition.
21. Identify finish damage caused by airborne contaminants (acids, soot, rail dust, and other industrial-related causes); correct the condition.

22. Identify die-back conditions (dulling of the paint film showing haziness); correct the cause(s) and the condition.
23. Identify chalking (oxidation); correct the cause(s) and the condition.
24. Identify bleed-through (staining); correct the cause(s) and the condition.
25. Identify pin-holing; correct the cause(s) and the condition.
26. Identify buffing-related imperfections (swirl marks, wheel burns); correct the condition.
27. Identify pigment flotation (color change through film build); correct the cause(s) and the condition.

F. Final Detail

1. Apply decals, transfers, tapes, woodgrains, pinstripes (painted and taped), etc.
2. Sand, buff and polish fresh or existing finish to remove defects as required.
3. Clean interior, exterior, and glass.
4. Clean body openings (door jambs and edges, etc.).
5. Remove overspray.
6. Perform vehicle clean-up; complete quality control using a checklist.