

# STRANDS AND STANDARDS

## COLLISION REFINISHING & PAINTING



### Course Description

This course prepares individuals to safely prepare, mask, prime, seal, and paint vehicles and parts; use and maintain spray guns, booths, and equipment; address paint defects; mix, match, tint, and blend paint; store and dispose of hazardous materials; understand the corrosion protection process; and sand, buff, and detail a refinished vehicle. Work ethics and productivity are an integral part of the classroom and laboratory activities of this program. (asestudentcertification.com), ([http://pdmdev.i-car.com/pdf/education\\_foundation/natef\\_crosswalk\\_2016.pdf](http://pdmdev.i-car.com/pdf/education_foundation/natef_crosswalk_2016.pdf))

<b>Intended Grade Level</b>	10-12
Units of Credit	0.5 - 1.0
Core Code	40.09.00.00.015
Concurrent Enrollment Core Code	40.09.00.13.015
Prerequisite	Basic Automotive Collision Repair
Skill Certification Test Number	N/A
Test Weight	N/A
<b>License Type</b>	CTE and/or Secondary Education 6-12
<b>Required Endorsement(s)</b>	
Endorsement 1	Automotive Collision Repair
Endorsement 2	N/A
Endorsement 3	N/A

## STRAND 1

Students will participate in personal and leadership development activities through SkillsUSA or another appropriate career and technical student organization.

### Standard 1

Student will use communication skills to effectively communicate with others.

- Understand when it is appropriate to listen and to speak.
- Understand and follow verbal and written instructions for classroom and laboratory activities.

### Standard 2

Student will effectively use teamwork to respectfully work with others.

- Identify and understand different roles in working with a team.

### Standard 3

Student will use critical thinking and problem-solving skills.

- Analyze the cause of the problem.
- Develop a solution to address the problem.
- Implement the plan.
- Evaluate the effectiveness of the plan.

### Standard 4

Student will be dependable, reliable, steady, trustworthy, and consistent in performance and behavior.

- Set and meet goals on attendance and punctuality.
- Prioritize, plan, and manage work to complete assignments and projects on time.

### Standard 5

Student will be accountable for results.

- Use an achievement chart for activities and behaviors in class that encourages a personal evaluation of classroom performance.
- File a regular written report on progress toward completion of assignments and projects.

### Standard 6

Be familiar with the legal requirements and expectations of the course.

- Be familiar with the course disclosure statement and all requirements for successful completion of the course.
- Demonstrate workplace ethics, e.g. fair, honest, disciplined.

## STRAND 2

Students will participate in work-place readiness activities.

### Standard 1

Student will demonstrate employability skills.

- Use a career search network to find career choices.
- Write a resume including a list of demonstrated skills.
- Write a letter of application.
- Complete a job application.
- Participate in an actual or simulated job interview.

**Standard 2**

Student will participate in a work-based learning experience outside the classroom.

- Student will plan and implement a work-based learning experience aligned with their career goal.

**STRAND 3**

**Students will understand and demonstrate safety and environmental practices.**

**Standard 1**

Identify and take necessary precautions with hazardous operations and materials according to federal, state, and local regulations.

**Standard 2**

Identify safety and personal health hazards according to OSHA guidelines and the “Right to Know Law”.

**Standard 3**

Inspect spray environment and equipment to ensure compliance with federal, state and local regulations, and for safety and cleanliness hazards.

**Standard 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.

**Standard 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.

**Standard 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.).

**Performance Skills**

Understand and demonstrate safety and environmental practices.

- Identify and take necessary precautions with hazardous operations and materials according to federal, state, and local regulations.
- Identify safety and personal health hazards according to OSHA guidelines and the “Right to Know Law”.
- Inspect spray environment and equipment to ensure compliance with federal, state and local regulations, and for safety and cleanliness hazards.
- 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.
- 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.
- 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.).

## **STRAND 4**

**Students will understand and demonstrate proper surface preparation.**

### **Standard 1**

Inspect, remove, store, protect, and replace exterior trim and components necessary for proper surface preparation.

### **Standard 2**

Soap and water wash entire vehicle; use appropriate cleaner to remove contaminants.

### **Standard 3**

Inspect and identify type of finish, surface condition, and film thickness; develop and document a plan for refinishing using a total product system.

### **Standard 4**

Remove paint finish as needed.

### **Standard 5**

Properly sand areas to be refinished.

### **Standard 6**

Identify and select appropriate sand paper to featheredge areas to be refinished.

### **Standard 7**

Apply suitable metal treatment or primer in accordance with total product systems.

### **Standard 8**

Mask and protect other areas that will not be refinished.

### **Standard 9**

Demonstrate different masking techniques (recess/back masking, foam door type, etc.).

### **Standard 10**

Mix primer, primer-surfacer and primer-sealer following paint manufacturers technical data sheet instructions.

### **Standard 11**

Identify a complimentary color or shade of undercoat to improve coverage.

### **Standard 12**

Apply primer onto surface of repaired area; demonstrating control of primer application by keeping the areas small as possible.

### **Standard 13**

Apply two-component finishing filler to minor surface imperfections.

### **Standard 14**

Guide coat and block sand area with correct grade/grit sandpaper to which primer-surfacer has been applied.

### **Standard 15**

Dry sand area to which two-component finishing filler has been applied.

**Standard 16**

Remove dust from area to be refinished, including cracks or moldings of adjacent areas.

**Standard 17**

Clean area to be refinished using a recommended final cleaning solution.

**Standard 18**

Remove, with a tack rag, any dust or lint particles from the area to be refinished.

**Standard 19**

Apply suitable primer sealer to the area being refinished.

**Standard 20**

Scuff sand to remove nibs or imperfections from a sealer.

**Standard 21**

Apply stone chip resistant coating.

**Standard 22**

Restore caulking and seam sealers to repaired areas and replacement panels as required.

**Standard 23**

Prepare adjacent panels for blending using paint manufacturers procedures.

**Standard 24**

Identify the types of rigid, semi-rigid or flexible plastic parts to be refinished; determine the materials needed, preparation, and refinishing procedures.

**Standard 25**

Identify metal parts to be refinished; determine the materials needed, preparation, and refinishing procedures.

**Standard 26**

Identify chip resistant coatings and texture match.

**Standard 27**

Identify caulking and seam sealers that may need replacement.

**Standard 28**

Identify refinishing guidelines for stationary glass flange areas to be refinished.

**Performance Skills**

Understand and demonstrate proper surface preparation.

- Inspect, remove, store, protect, and replace exterior trim and components necessary for proper surface preparation.
- Soap and water wash entire vehicle; use appropriate cleaner to remove contaminants.
- Inspect and identify type of finish, surface condition, and film thickness; develop and document a plan for refinishing using a total product system.
- Remove paint finish as needed.
- Properly sand areas to be refinished.
- Identify and select appropriate sand paper to featheredge areas to be refinished.
- Apply suitable metal treatment or primer in accordance with total product systems.

- Mask and protect other areas that will not be refinished.
- Demonstrate different masking techniques (recess/back masking, foam door type, etc.).
- Mix primer, primer-surfacer and primer-sealer following paint manufacturers technical data sheet instructions.
- Identify a complimentary color or shade of undercoat to improve coverage.
- Apply primer onto surface of repaired area; demonstrating control of primer application by keeping the areas small as possible.
- Apply two-component finishing filler to minor surface imperfections.
- Guide coat and block sand area with correct grade/grit sandpaper to which primer-surfacer has been applied.
- Dry sand area to which two-component finishing filler has been applied.
- Remove dust from area to be refinished, including cracks or moldings of adjacent areas.
- Clean area to be refinished using a recommended final cleaning solution.
- Remove, with a tack rag, any dust or lint particles from the area to be refinished.
- Apply suitable primer sealer to the area being refinished.
- Scuff sand to remove nibs or imperfections from a sealer.
- Apply stone chip resistant coating.
- Restore caulking and seam sealers to repaired areas and replacement panels as required.
- Prepare adjacent panels for blending using paint manufacturers procedures.
- Identify the types of rigid, semi-rigid or flexible plastic parts to be refinished; determine the materials needed, preparation, and refinishing procedures.
- Identify metal parts to be refinished; determine the materials needed, preparation, and refinishing procedures.
- Identify chip resistant coatings and texture match.
- Identify caulking and seam sealers that may need replacement.
- Identify refinishing guidelines for stationary glass flange areas to be refinished.

## STRAND 5

**Students will safely operate, clean, and maintain spray guns and related equipment.**

### Standard 1

Inspect, clean, and determine condition of spray guns and related equipment (air hoses, regulators, air lines, air source, spray environment, and fillers).

### Standard 2

Select spray gun setup (fluid needle, nozzle, and cap) for product being applied.

### Standard 3

Test and adjust spray gun using fluid, air and pattern control valves.

### Standard 4

Demonstrate an understanding of the operation of pressure spray equipment.

## Performance Skills

Safely operate, clean, and maintain spray guns and related equipment.

- Inspect, clean, and determine condition of spray guns and related equipment (air hoses, regulators, air lines, air source, spray environment, and fillers).
- Select spray gun setup (fluid needle, nozzle, and cap) for product being applied.
- Test and adjust spray gun using fluid, air and pattern control valves.

- Demonstrate an understanding of the operation of pressure spray equipment.

## **STRAND 6**

**Students will correctly mix, match, and apply paint.**

### **Standard 1**

Identify color code by manufacturer's vehicle information label.

### **Standard 2**

Shake, stir, reduce, catalyze/activate, and strain refinish materials.

### **Standard 3**

Apply finish using appropriate spray techniques (gun arc, angle, distance, travel speed, and spray pattern overlap) for the finish being applied.

### **Standard 4**

Apply selected product on test or let-down panel; check for color match, properly store and maintain a color catalog.

### **Standard 5**

Understand the application of single stage topcoats.

### **Standard 6**

Apply basecoat/clearcoat for panel blending, panel refinishing and cut-in's.

### **Standard 7**

Apply basecoat/clearcoat for overall refinishing.

### **Standard 8**

Remove nibs or imperfections from basecoat.

### **Standard 9**

Identify product expiration dates as applicable.

### **Standard 10**

Refinish plastic parts.

### **Standard 11**

Apply multi-stage coats for panel blending and overall refinishing.

### **Standard 12**

Identify and mix paint using a formula.

### **Standard 13**

Identify poor hiding colors; determine necessary action.

### **Standard 14**

Tint color using formula to achieve a blendable match.

### **Standard 15**

Identify alternative color formula to achieve a blendable match.

**Standard 16**

Identify the materials, equipment, and preparation differences between solvent and waterborne technologies.

**Performance Skills**

Correctly mix, match, and apply paint.

- Identify color code by manufacturer's vehicle information label.
- Shake, stir, reduce, catalyze/activate, and strain refinish materials.
- Apply finish using appropriate spray techniques (gun arc, angle, distance, travel speed, and spray pattern overlap) for the finish being applied.
- Apply selected product on test or let-down panel; check for color match, properly store and maintain a color catalog.
- Understand the application of single stage topcoats.
- Apply basecoat/clearcoat for panel blending, panel refinishing and cut-in's.
- Apply basecoat/clearcoat for overall refinishing.
- Remove nibs or imperfections from basecoat.
- Identify product expiration dates as applicable.
- Refinish plastic parts.
- Apply multi-stage coats for panel blending and overall refinishing.
- Identify and mix paint using a formula.
- Identify poor hiding colors; determine necessary action.
- Tint color using formula to achieve a blendable match.
- Identify alternative color formula to achieve a blendable match.
- Identify the materials, equipment, and preparation differences between solvent and waterborne technologies.

**STRAND 7**

**Students will understand causes and demonstrate cures of paint defects.**

**Standard 1**

Identify blistering (raising of the paint surface); correct the cause(s) and the condition.

**Standard 2**

Identify a dry spray appearance in the paint surface; correct the cause(s) and the condition.

**Standard 3**

Identify the presence of fish-eyes (crater-like openings) in the finish; correct the cause(s) and the condition.

**Standard 4**

Identify lifting; correct the cause(s) and the condition.

**Standard 5**

Identify clouding (mottling and streaking in metallic finishes); correct the cause(s) and the condition.

**Standard 6**

Identify orange peel; correct the cause(s) and the condition.

**Standard 7**

Identify overspray; correct the cause(s) and the condition.



**Standard 8**

Identify solvent popping in freshly painted surface; correct the cause(s) and the condition.

**Standard 9**

Identify sags and runs in paint surface; correct the cause(s) and the condition.

**Standard 10**

Identify sanding marks or sandscratch swelling; correct the cause(s) and the condition.

**Standard 11**

Identify contour mapping/edge mapping; correct the cause(s) and the condition.

**Standard 12**

Identify color difference (off-shade); correct the cause(s) and the condition.

**Standard 13**

Identify tape tracking; correct the cause(s) and the condition.

**Standard 14**

Identify low gloss condition; correct the cause(s) and the condition.

**Standard 15**

Identify poor adhesion; correct the cause(s) and the condition.

**Standard 16**

Identify paint cracking (shrinking, splitting, crowsfeet or line-checking, micro-checking, etc.); correct the cause(s) and the condition.

**Standard 17**

Identify corrosion; correct the cause(s) and the condition.

**Standard 18**

Identify dirt or dust in the paint surface; correct the cause(s) and the condition.

**Standard 19**

Identify water spotting; correct the cause(s) and the condition.

**Standard 20**

Identify finish damage caused by bird droppings, tree sap, and other natural causes; correct the condition

**Standard 21**

Identify finish damage caused by airborne contaminants (acids, soot, rail dust, and other industrial-related causes); correct the condition.

**Standard 22**

Identify die-back conditions (dulling of the paint film showing haziness); correct the cause(s) and the condition.

**Standard 23**

Identify chalking (oxidation); correct the cause(s) and the condition.

**Standard 24**

Identify bleed-through (staining); correct the cause(s) and the condition.

**Standard 25**

Identify pinholing; correct the cause(s) and the condition.

**Standard 26**

Identify buffing-related imperfections (swirl marks, wheel burns); correct the condition.

**Standard 27**

Identify pigment flotation (color change through film build); correct the cause(s) and the condition.

**Performance Skills**

Understand and identify blistering (causing to the repair of surface) defects; correct the cause(s) and the condition.

- Identify a dry spray appearance in the paint surface; correct the cause(s) and the condition.
- Identify the presence of fish-eyes (crater-like openings) in the finish; correct the cause(s) and the condition.
- Identify lifting; correct the cause(s) and the condition.
- Identify clouding (mottling and streaking in metallic finishes); correct the cause(s) and the condition.
- Identify orange peel; correct the cause(s) and the condition.
- Identify overspray; correct the cause(s) and the condition.
- Identify solvent popping in freshly painted surface; correct the cause(s) and the condition.
- Identify sags and runs in paint surface; correct the cause(s) and the condition.
- Identify sanding marks or sandscratch swelling; correct the cause(s) and the condition.
- Identify contour mapping/edge mapping; correct the cause(s) and the condition.
- Identify color difference (off-shade); correct the cause(s) and the condition.
- Identify tape tracking; correct the cause(s) and the condition.
- Identify low gloss condition; correct the cause(s) and the condition.
- Identify poor adhesion; correct the cause(s) and the condition.
- Identify paint cracking (shrinking, splitting, crowsfeet or line-checking, micro-checking, etc.); correct the cause(s) and the condition.
- Identify corrosion; correct the cause(s) and the condition.
- Identify dirt or dust in the paint surface; correct the cause(s) and the condition.
- Identify water spotting; correct the cause(s) and the condition.
- Identify finish damage caused by bird droppings, tree sap, and other natural causes; correct the condition
- Identify finish damage caused by airborne contaminants (acids, soot, rail dust, and other industrial-related causes); correct the condition.
- Identify die-back conditions (dulling of the paint film showing haziness); correct the cause(s) and the condition.
- Identify chalking (oxidation); correct the cause(s) and the condition.
- Identify bleed-through (staining); correct the cause(s) and the condition.
- Identify pinholing; correct the cause(s) and the condition.
- Identify buffing-related imperfections (swirl marks, wheel burns); correct the condition.
- Identify pigment flotation (color change through film build); correct the cause(s) and the condition.

**STRAND 8**

Students will perform final detailing operations.

**Standard 1**

Apply decals, transfers, tapes, stone guards, moldings, and emblems, etc.

**Standard 2**

Sand, buff and polish fresh finish to remove defects and texture as required. Buff and polish finish to remove defects as required.

**Standard 3**

Sand, buff and polish existing finish to recondition defects as required, match existing finish.

**Standard 4**

Clean interior, exterior, and glass.

**Standard 5**

Clean body openings (door jambs, gaps, and edges, etc.).

**Standard 6**

Remove overspray.

**Standard 7**

Perform vehicle clean-up; complete quality control using a checklist.

**Standard 8**

Measure and record film thickness before and after buffing.

**Standard 9**

Perform nib sanding to remove small imperfections as required.

**Performance Skills**

Perform final detailing operations.

- Apply decals, transfers, tapes, stone guards, moldings, and emblems, etc.
- Sand, buff and polish fresh finish to remove defects and texture as required. Buff and polish finish to remove defects as required.
- Sand, buff and polish existing finish to recondition defects as required, match existing finish.
- Clean interior, exterior, and glass.
- Clean body openings (door jambs, gaps, and edges, etc.).
- Remove overspray.
- Perform vehicle clean-up; complete quality control using a checklist.
- Measure and record film thickness before and after buffing.
- Perform nib sanding to remove small imperfections as required.