

## Paint & Refinishing 1

### Course Information

**Developers:** Automotive Collision and Repair State Curriculum Committee

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**KBOR Facilitators:** Shirley Antes/ April Henry

**Credit Hours:** 3

### Description:

Through a variety of classroom and/or shop/lab learning and assessment activities, students in this course will: identify safety and personal health hazards according to OSHA guidelines; determine the different types of substrates and sanding materials relevant to auto body surface preparation; identify the process to clean and prepare a substrate for paint; distinguish between the properties, uses and manufacturer specifications of metal treatments and primers; distinguish among the various types of spray guns and equipment; explore various paint codes and specifications for use; Identify the various paint systems; explore the types of paint defects; distinguish between damage and non-damage related corrosion; and identify final detail procedures.

### Exit Learning Outcomes

#### External Standards

- A By meeting any institution-required NATEF Tasks from the criteria outlined below. NATEF Guidelines of: 95% of HP-I items must be taught in the curriculum; 90% of HP-G items must be taught in the curriculum
- B 4.A Safety Precautions
- C 4.B Surface Preparation
- D 4.C Spray Gun and Related Equipment Operation
- E 4.D Paint Mixing, Matching, and Applying
- F 4.E Paint Defects - Causes and Cures
- G 4.F Final Detail

## Competencies

### 1. Identify safety and personal health hazards according to OSHA guidelines

#### Linked External Standards

4.A Safety Precautions

EDS02: Refinishing Supplement

REF01: Refinishing Equipment And VOC Regulations

REF02: Surface Preparation And Masking

REF03: Color Theory, Application, Tinting, And Blending

WKR01: Hazardous Materials, Personal Safety, And Refinish Safety

#### You will demonstrate your competence:

- o in the classroom or classroom shop setting

#### Your performance will be successful when:

- o 4.A.1 Identify and take necessary precautions with hazardous operations and materials according to federal, state, and local regulations. HP-I
- o 4.A.2 Identify safety and personal health hazards according to OSHA guidelines. HP-I
- o 4.A.3 Inspect spray environment to ensure compliance with federal, state and local regulations, and for safety and cleanliness hazards. HP-I
- o 4.A.4 Select and use the NIOSH approved personal sanding respirator. Inspect condition and ensure fit and operation. Perform proper maintenance in accordance with OSHA Regulation 1910.134 and applicable state and local regulation. HP-I
- o 4.A.5 Select and use the NIOSH approved (Fresh Air Make-up System) personal painting/refinishing respirator system. Perform proper maintenance in accordance with OSHA Regulation 1910.134 and applicable state and local regulation. HP-I
- o 4.A.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.). HP-I

### 2. Determine the different types of substrates and sanding materials relevant to auto body surface preparation

#### Linked External Standards

4.B Surface Preparation

CPS01: Corrosion Protection

DAM01: Vehicle Identification, Estimating Systems, And Terminology

DAM04: Restraints, Interior, Glass, Side And Rear Impact Analysis

EDS02: Refinishing Supplement

REF02: Surface Preparation And Masking

REF03: Color Theory, Application, Tinting, And Blending

REF04: Detailing

TRM01: Trim And Hardware

#### You will demonstrate your competence:

- o in the classroom or classroom shop setting

**Your performance will be successful when:**

- o 4.B.1 Inspect, remove, store, and replace exterior trim and components necessary for proper surface preparation. HP-I
- o 4.B.2 Soap and water wash entire vehicle; use appropriate cleaner to remove contaminants. HP-I
- o 4.B.3 Inspect and identify substrate, type of finish, surface condition, and film thickness; develop and document a plan for refinishing using a total product system. HP-I
- o 4.B.4 Remove paint finish. HP-I
- o 4.B.5 Dry or wet sand areas to be refinished. HP-I
- o 4.B.6 Featheredge damaged areas to be refinished. HP-I
- o 4.B.7 Apply suitable metal treatment or primer in accordance with total product systems. HP-I
- o 4.B.8 Mask and protect other areas that will not be refinished. HP-I
- o 4.B.9 Mix primer, primer-surfacer or primer-sealer. HP-I
- o 4.B.10 Apply primer onto surface of repaired area. HP-I
- o 4.B.11 Apply two-component finishing filler to minor surface imperfections. HP-I
- o 4.B.12 Dry or wet sand area to which primer-surfacer has been applied. HP-I
- o 4.B.13 Dry sand area to which two-component finishing filler has been applied. HP-I
- o 4.B.14 Remove dust from area to be refinished, including cracks or moldings of adjacent areas. HP-I
- o 4.B.15 Clean area to be refinished using a final cleaning solution. HP-I
- o 4.B.16 Remove, with a tack rag, any dust or lint particles from the area to be refinished. HP-I
- o 4.B.17 Apply suitable sealer to the area being refinished when sealing is needed or desirable. HP-I
- o 4.B.18 Scuff sand to remove nibs or imperfections from a sealer. HP-I
- o 4.B.19 Apply stone chip resistant coating. HP-G
- o 4.B.20 Restore corrosion-resistant coatings, caulking, and seam sealers to repaired areas. HP-I
- o 4.B.21 Prepare adjacent panels for blending. HP-I
- o 4.B.22 Identify the types of rigid, semi-rigid or flexible plastic parts to be refinished; determine the materials, preparation, and refinishing procedures. HP-I
- o 4.B.23 Identify aluminum parts to be refinished; determine the materials, preparation, and refinishing procedures. HP-G

**3. Identify the process to clean and prepare a substrate for paint**

**Linked External Standards**

4.B Surface Preparation

EDS02: Refinishing Supplement

REF02: Surface Preparation And Masking

REF04: Detailing

**You will demonstrate your competence:**

- o in the classroom or classroom shop setting

**Your performance will be successful when:**

- o 4.B.2 Soap and water wash entire vehicle; use appropriate cleaner to remove contaminants. HP-I
- o 4.B.14 Remove dust from area to be refinished, including cracks or moldings of adjacent areas. HP-I
- o 4.B.15 Clean area to be refinished using a final cleaning solution. HP-I
- o 4.B.16 Remove, with a tack rag, any dust or lint particles from the area to be refinished. HP-I

**4. Distinguish between the properties, uses and manufacturer specifications of metal treatments and primers**

**Linked External Standards**

4.B Surface Preparation

CPS01: Corrosion Protection

DAM01: Vehicle Identification, Estimating Systems, And Terminology

EDSO1: Non-Structural Supplement Diagnose electrical concerns Complete headlamp and fog/driving lamp assemblies and repairs Demonstrate self-grounding procedures for handling electronic components Determine diagnosis, inspection and service needs for brake system hydraulic components Examine components of heating and air conditioning systems Determine the inspection, service and repair needs for collision damaged cooling system components Distinguish between the under car components and systems Determine the diagnosis, inspection and service requirements of active and passive restraint systems

EDS02: Refinishing Supplement

REF01: Refinishing Equipment And VOC Regulations

REF02: Surface Preparation And Masking

REF03: Color Theory, Application, Tinting, And Blending

STS01: Cosmetic Straightening Steel

**You will demonstrate your competence:**

- o in the classroom or classroom shop setting

**Your performance will be successful when:**

- o 4.B.3 Inspect and identify substrate, type of finish, surface condition, and film thickness; develop and document a plan for refinishing using a total product system. HP-I
- o 4.B.7 Apply suitable metal treatment or primer in accordance with total product systems. HP-I
- o 4.B.9 Mix primer, primer-surfacer or primer-sealer. HP-I
- o 4.B.10 Apply primer onto surface of repaired area. HP-I
- o 4.B.11 Apply two-component finishing filler to minor surface imperfections. HP-I
- o 4.B.15 Clean area to be refinished using a final cleaning solution. HP-I
- o 4.B.20 Restore corrosion-resistant coatings, caulking, and seam sealers to repaired areas. HP-I
- o 4.B.23 Identify aluminum parts to be refinished; determine the materials, preparation, and refinishing procedures. HP-G

**5. Distinguish among the various types of spray guns and equipment**

**Linked External Standards**

4.C Spray Gun and Related Equipment Operation

EDS02: Refinishing Supplement

REF01: Refinishing Equipment And VOC Regulations

REF02: Surface Preparation And Masking

**You will demonstrate your competence:**

o in the classroom or classroom shop setting

**Your performance will be successful when:**

o 4.C.1 Inspect, clean, and determine condition of spray guns and related equipment (air hoses, regulators, air lines, air source, and spray environment). HP-I

o 4.C.2 Check and adjust spray gun operation for HVLP (high volume, low pressure) or LVLP (low volume, low pressure) guns. HP-I

o 4.C.3 Set-up (fluid needle, nozzle, and cap), adjust, and test spray gun using fluid, air, and pattern control valves. HP-I

**6. Explore various paint codes and specifications for use**

**Linked External Standards**

4.D Paint Mixing, Matching, and Applying

DAM01: Vehicle Identification, Estimating Systems, And Terminology

EDS02: Refinishing Supplement

REF01: Refinishing Equipment And VOC Regulations

REF03: Color Theory, Application, Tinting, And Blending

**You will demonstrate your competence:**

o in the classroom or classroom shop setting

**Your performance will be successful when:**

o 4.D.1 Determine type and color of paint already on vehicle by manufacturer s vehicle information label. HP-I

o 4.D.11 Identify and mix paint using a formula. HP-G

o 4.D.12 Identify poor hiding colors; determine necessary action. HP-G

o 4.D.14 Identify alternative color formula to achieve a blendable match. HP-G

**7. Identify the various paint systems**

**Linked External Standards**

4.D Paint Mixing, Matching, and Applying

DAM01: Vehicle Identification, Estimating Systems, And Terminology

EDS02: Refinishing Supplement

REF01: Refinishing Equipment And VOC Regulations

REF03: Color Theory, Application, Tinting, And Blending

**You will demonstrate your competence:**

- o in the classroom or classroom shop setting

**Your performance will be successful when:**

- o 4.D.1 Determine type and color of paint already on vehicle by manufacturer s vehicle information label. HP-I
- o 4.D.14 Identify alternative color formula to achieve a blendable match. HP-G
- o 4.D.5 Apply single stage topcoat. HP-I
- o 4.D.6 Apply basecoat/clearcoat for panel blending or partial refinishing. HP-I
- o 4.D.7 Apply basecoat/clearcoat for overall refinishing. HP-G
- o 4.D.10 Apply multi-stage coats for panel blending or overall refinishing. HP-G
- o 4.D.11 Identify and mix paint using a formula. HP-G

**8. Explore the types of paint defects**

**Linked External Standards**

4.E Paint Defects - Causes and Cures

DAM01: Vehicle Identification, Estimating Systems, And Terminology

EDS02: Refinishing Supplement

REF02: Surface Preparation And Masking

REF03: Color Theory, Application, Tinting, And Blending

REF04: Detailing

**You will demonstrate your competence:**

- o in the classroom or classroom shop setting

**Your performance will be successful when:**

- o 4.E.1 Identify blistering (raising of the paint surface); determine the cause(s) and correct the condition. HP-G
- o 4.E.2 Identify blushing (milky or hazy formation); determine the cause(s) and correct the condition. HP-G
- o 4.E.3 Identify a dry spray appearance in the paint surface; determine the cause(s) and

correct the condition. HP-G

- o 4.E.4 Identify the presence of fish-eyes (crater-like openings) in the finish; determine the cause(s) and correct the condition. HP-G
- o 4.E.5 Identify lifting; determine the cause(s) and correct the condition. HP-G
- o 4.E.6 Identify clouding (mottling and streaking in metallic finishes); determine the cause(s) and correct the condition. HP-G
- o 4.E.7 Identify orange peel; determine the cause(s) and correct the condition. HP-I
- o 4.E.8 Identify overspray; determine the cause(s) and correct the condition. HP-G
- o 4.E.9 Identify solvent popping in freshly painted surface; determine the cause(s) and correct the condition. HP-G
- o 4.E.10 Identify sags and runs in paint surface; determine the cause(s) and correct the condition. HP-G
- o 4.E.11 Identify sanding marks (sandscratch swelling); determine the cause(s) and correct the condition. HP-G
- o 4.E.12 Identify contour mapping (shrinking and splitting) while finish is drying; determine the cause(s) and correct the condition. HP-G
- o 4.E.13 Identify color difference (off-shade); determine the cause(s) and correct the condition. HP-G
- o 4.E.14 Identify tape tracking; determine the cause(s) and correct the condition. HP-G
- o 4.E.15 Identify low gloss condition; determine the cause(s) and correct the condition. HP-G
- o 4.E.16 Identify poor adhesion; determine the cause(s) and correct the condition. HP-G
- o 4.E.17 Identify paint cracking (crowsfeet or line-checking, micro-checking, etc.); determine the cause(s) and correct the condition. HP-G
- o 4.E.18 Identify corrosion; determine the cause(s) and correct the condition. HP-G
- o 4.E.19 Identify dirt or dust in the paint surface; determine the cause(s) and correct the condition. HP-I
- o 4.E.20 Identify water spotting; determine the cause(s) and correct the condition. HP-G
- o 4.E.21 Identify finish damage caused by bird droppings, tree sap, and other natural causes; correct the condition. HP-G

- o 4.E.22 Identify finish damage caused by airborne contaminants (acids, soot, rail dust, and other industrial-related causes); correct the condition. HP-G
- o 4.E.23 Identify die-back conditions (dulling of the paint film showing haziness); determine the cause(s) and correct the condition. HP-G
- o 4.E.24 Identify chalking (oxidation); determine the cause(s) and correct the condition. HP-G
- o 4.E.25 Identify bleed-through (staining); determine the cause(s) and correct the condition. HP-G
- o 4.E.26 Identify pin-holing; determine the cause(s) and correct the condition. HP-G
- o 4.E.27 Identify buffing-related imperfections (swirl marks, wheel burns); correct the condition. HP-G
- o 4.E.28 Identify pigment flotation (color change through film build); determine the cause(s) and correct the condition. HP-G
- o 4.E.29 Measure mil thickness. HP-I

**9. Distinguish between damage and non-damage related corrosion**

**Linked External Standards**

4.E Paint Defects - Causes and Cures

EDS02: Refinishing Supplement

REF03: Color Theory, Application, Tinting, And Blending

REF04: Detailing

**You will demonstrate your competence:**

- o in the classroom or classroom shop setting

**Your performance will be successful when:**

- o 4.E.1 Identify blistering (raising of the paint surface); determine the cause(s) and correct the condition. HP-G
- o 4.E.15 Identify low gloss condition; determine the cause(s) and correct the condition. HP-G
- o 4.E.18 Identify corrosion; determine the cause(s) and correct the condition. HP-G
- o 4.E.20 Identify water spotting; determine the cause(s) and correct the condition. HP-G



- o 4.E.22 Identify finish damage caused by airborne contaminants (acids, soot, rail dust, and other industrial-related causes); correct the condition. HP-G
- o 4.E.24 Identify chalking (oxidation); determine the cause(s) and correct the condition. HP-G

**10. Identify final detail procedures**

**Linked External Standards**

4.F Final Detail

EDS02: Refinishing Supplement

REF04: Detailing

TRM01: Trim And Hardware

**You will demonstrate your competence:**

- o in the classroom or classroom shop setting

**Your performance will be successful when:**

- o 4.F.1 Apply decals, transfers, tapes, wood grains, pinstripes (painted and taped), etc. HP-G
- o 4.F.2 Buff and polish finish to remove defects as required. HP-I
- o 4.F.3 Clean interior, exterior, and glass. HP-I
- o 4.F.4 Clean body openings (door jambs and edges, etc.). HP-I
- o 4.F.5 Remove overspray. HP-I