COLLISION REPAIR TECHNOLOGY

PURPOSE

To evaluate each contestant's preparation for employment and to recognize outstanding students for excellence and professionalism in the field of collision repair technology.

First, download and review the General Regulations at: updates.skillsusa.org.

ELIGIBILITY

Open to active SkillsUSA members enrolled in programs with collision repair technology as the occupational objective.

CLOTHING REQUIREMENT

Official SkillsUSA light blue work shirt and navy pants, black or brown leather work shoes and safety glasses with side shields or goggles. (Prescription glasses can be used only if they are equipped with side shields. If not, they must be covered with goggles.)

These regulations refer to clothing items that are pictured and described at: www.skillsusastore.org. If you have questions about clothing or other logo items, call 800-401-1560 or 703-956-3723.

Note: Contestants must wear their official contest clothing to the contest orientation meeting.

EQUIPMENT AND MATERIALS

1. Supplied by the technical committee: Basic equipment of a collision repair and refinishing laboratory
   a. Materials for metalworking phase:
      1. Identical fenders to be repaired
      2. Plastic filler
      3. Various grits of sandpaper/DA sanders, hand sanding blocks, Roloc disc.
      4. Plastic filler mixing boards and spreaders
      5. Dust respirators
      6. Cartridge-type respirators
      7. Safety glasses
   b. Materials for plastic repair phase:
      1. Cleaning solvent
      2. Plastic repair material
      3. Mixing boards and spreaders
      4. Abrasive discs and sheets
      5. Plastic car parts
      6. Clamps
      7. Cartridge-type respirators
      8. Dust respirators
      9. Safety glasses
      10. Nitrogen welders
      11. Plastic welding rods
      12. Plastic welding tools
   c. Materials for estimating phase:
      1. Vehicle owner's name and address
      2. Scratch pads
      3. Estimate sheets
      4. Estimate books
      5. Calculator
      6. Parts price list for car involved
   d. Materials supplied for attachment methods phase:
      1. Welding helmets
      2. Welding respirators
      3. Skull caps
2. Supplied by the contestant:
   a. Specialty hand tools (i.e. bullseye pick, etc.). No power hand tools required
   b. Welding goggles
   c. Welding gloves
   d. Welding jacket
   e. $^{9}/_{16}$" and $^{5}/_{8}$" wrenches
   f. Tape measure
   g. Two hard copies of résumé

Note: Check the Contest Guidelines and/or the updates page on the SkillsUSA website: updates.skillsusa.org.

SCOPE OF THE CONTEST

The contest will be consistent with the Collision Repair/Refinishing Technician Task List outlined in the guidelines published by the National Institute for Automotive Service Excellence (ASE) and the National Technicians Education Foundation (NATEF), www.natef.org. Contestants will demonstrate their ability to perform jobs of skills selected from the standards mentioned above as determined by the SkillsUSA Championships technical committee. Committee membership includes:

3M Co., Anne Arundel County Public Schools, Assured Performance Car-O-Liner Co., Car-Part Pro, Carolina Collision Equipment, LLC., , Center of Applied Technology North, Chief Automotive Systems Inc., Fox Valley Technical College, General Motors Corp., I-CAR Tech Centre, Miller Electric Mfg. Co. Inc., National Institute for Automotive Service Excellence (ASE), National Automotive Technicians Education Foundation (NATEF), Nationwide Insurance Company, Polyvance, Saint-Gobain, Snap-on Inc., State Farm Insurance Companies, Toyota Motor Sales USA Inc. and Verifacts Automotive LLC.

Knowledge Performance

The contest includes a written knowledge test given by ASE, which will consist of 50 questions covering three areas of the Collision Repair areas that are identified in the NATEF Collision Repair/Refinishing Program Standards and the ASE Official Study Guide: Collision Repair/Refinish, an estimating test and a structural test. The tests for the high school and college contests will be comprised of diagnosis and repair content from these skill areas: Non-structural Analysis and Damage Repair, Structural Analysis and Damage Repair, Mechanical and Electrical Components, and Estimating.

1. Nonstructural Analysis — 22 questions in Nonstructural Analysis and Damage Repair (B3) ASE Certification Test in the content areas of: preparation, outer body panel repairs, replacements and adjustments, metal finishing and body filling, glass and hardware, welding, cutting and removal and plastic repair*
2. Structural Analysis — 14 questions in Structural Analysis and Damage Repair (B4) ASE Certification Test in the content areas of: frame inspection and repair, unibody inspection, measurement and repair, stationary glass and metal welding and cutting*
3. Mechanical and Electrical Components — 14 questions in Mechanical and Electrical Components (B5) ASE Certification Test in the content areas of: suspension and steering, electrical, brakes, heating and air conditioning, engine cooling systems, drive train, fuel intake and exhaust systems and restraint systems*

Skill Performance

Contestants will demonstrate their ability to perform jobs and skills based on the task list outlined by the National Institute for Automotive Service Excellence (ASE) and the National Automotive Technicians Education Foundation (NATEF). The competition includes a series of workstations to assess skills in the following areas: metal straightening, attachment methods, plastic repair and structural analysis. There will be a written test on estimating structural analysis, and an ASE exam. The competitors will also participate in an interview. The overall appearance of the finished product, speed and proper safety practices will be judged.

Note: "*" Denotes this material is covered on a separate written test prior to the official contest day.

Standards and Competencies

CRT 1.0 — Repair depressed area(s) on a steel panel with plastic body filler to related tasks in National Automotive Technicians Foundation (NATEF) Collision Repair/Refinishing Non-Structural Analysis and Damage Repair Technical Standards (ASE B3 Test)

- 1.1 Model proper safety procedures
- 1.2 Clean contaminants from a damaged panel
- 1.3 Locate surface irregularities on a damaged panel
- 1.4 Remove finish from the damaged area(s) as necessary
- 1.5 Apply hammer and dolly techniques to repair damage
  - 1.5.1 Differentiate between pressure in relation to the concept of force to realign a component
  - 1.5.2 Straighten and rough out contours of damaged panels to a suitable condition for body filling using hand tools
- 1.6 Mix and apply plastic body filler on a steel panel
  - 1.6.1 Determine the relative proportion of the desired versus the undesired ingredients or

elements of a mixture, and determine if that proportion is within the manufacturer's specifications

1.6.2 Describe chemical reactions that occur in various compounds and substances

1.6.3 Identify the role an additive or catalyst plays in the mixing of plastic fillers

1.6.4 Define the criticality of metals with different hardness depending upon the function and location of the metal as well as how plastic fillers adhere to metal

1.7 Rough sand cured body filler to contour

1.8 Finish sand

CRT 2.0 — Repair depressed area using shrinking techniques on a steel panel to related tasks in National Automotive Technicians Foundation (NATEF) Collision Repair/Refinishing Non-structural Analysis and Damage Repair Technical Standards (ASE B3 Test)

2.1 Model proper safety procedures

2.2 Clean contaminants from a damaged panel

2.3 Locate surface irregularities on a damaged panel

2.4 Remove finish from the damaged area(s) as necessary

2.5 Identify hammer and dolly techniques to repair damage

2.5.1 Demonstrate understanding of pressure in relation to the concept of force to realign a component

2.6 Describe the cold shrinking process as necessary

2.7 Describe the heat shrinking process as necessary

2.7.1 Straighten and rough out contours of damaged panels to a suitable condition for metal finishing using hand tools

2.8 Demonstrate the cold shrinking process as necessary

2.9 Demonstrate the heat shrinking process as necessary

2.9.1 Demonstrate an understanding of the effect that adding heat will cause in a state of matter, such as changing a solid to a liquid

CRT 3.0 — Repair depressed areas using metal finishing techniques on a steel panel to related tasks in National Automotive Technicians Foundation (NATEF) Collision Repair/Refinishing Non-Structural Analysis and Damage Repair Technical Standards (ASE B3 Test)

3.1 Model proper safety procedures

3.2 Clean contaminants from a damaged panel

3.3 Locate surface irregularities on a damaged panel

3.4 Remove finish from the damaged area(s) as necessary

3.5 Demonstrate various uses of the metal finishing tools

CRT 4.0 — Prepare steel panel for primer application to related tasks in National Automotive Technicians Foundation (NATEF) Collision Repair/Refinishing Painting and Refinishing Technical Standards (ASE B2 Test)

4.1 Model proper safety procedures

4.2 Clean contaminants from a damaged panel

4.3 Featheredge paint/E-coat as necessary

4.4 Sand/Scuff bare metal as necessary

4.4.1 Demonstrate an understanding of the criticality of metals with different hardness depending on the function and location of the metal as well as how plastic fillers adhere to metal

CRT 5.0 — Demonstrate attachment methods needed for collision repair of steel and aluminum panels to related tasks in National Automotive Technicians Education Foundation (NATEF) Collision Repair/Refinishing Non-structural Analysis and Damage Repair Technical Standards, National Automotive Technicians Education Foundation (NATEF) Collision Repair/Refinishing Structural Analysis and Damage Repair Technical Standards, (ASE B3 and B4 Tests), and the I-CAR Welding and Training and Certification Tests

5.1 Model proper safety procedures

5.2 Make a plug weld using steel coupons in the vertical position using a GMA (MIG) welder

5.2.1 Set up and adjust the welder for proper stickout, voltage, polarity, flow rate and wire speed required for the metal being welded

5.2.2 Determine work clamp (ground) location and attach

5.2.3 Use the proper angle of the gun to the joint and the direction of gun travel for the type of weld being made in a vertical position

5.2.4 Clean and prepare the metal to be welded, assure good fit-up, apply weld through primer if necessary, and clamp as required

5.2.5 Conduct a visual test on the vertical weld

5.3 Make a butt joint with backing weld using steel coupons in the vertical position using a GMA (MIG) welder

5.3.1 Set up and adjust the welder for proper stickout, voltage, polarity, flow rate and wire speed required for the metal being welded

5.3.2 Determine work clamp (ground) location and attach

5.3.3 Use the proper angle of the gun to the joint and the direction of gun travel for the type of weld being made in a vertical position

5.3.4 Clean and prepare the metal to be welded, assure good fit-up, apply weld through primer if necessary, and clamp as required

5.3.5 Perform a visual test on the vertical weld

5.4 Make a fillet weld on lap using steel coupons in the vertical position using a GMA (MIG) welder.

5.4.1 Set up and adjust the welder for proper stickout, voltage, polarity, flow rate and wire speed required for the metal being welded

5.4.2 Determine work clamp (ground) location and attach

5.4.3 Use the proper angle of the gun to the joint and the direction of gun travel for the type of weld being made in a vertical position

5.4.4 Clean and prepare the metal to be welded, assure good fit-up, apply weld through primer if necessary, and clamp as required

5.4.5 Perform a visual test on the vertical weld

5.5 Make a plug weld using steel coupons in the overhead position using a GMA (MIG) welder.

5.5.1 Set up and adjust the welder for proper stickout, voltage, polarity, flow rate and wire speed required for the metal being welded

5.5.2 Determine work clamp (ground) location and attach

5.5.3 Use the proper angle of the gun to the joint and the direction of gun travel for the type of weld being made in an overhead position

5.5.4 Clean and prepare the metal to be welded, assure good fit-up, apply weld through primer if necessary, and clamp as required

5.5.5 Perform a visual inspection on the overhead weld

5.6 Make a butt joint with backing weld using steel coupons in the overhead position using a GMA (MIG) welder.

5.6.1 Set up and adjust the welder for proper stickout, voltage, polarity, flow rate and wire speed required for the metal being welded

5.6.2 Determine work clamp (ground) location and attach

5.6.3 Use the proper angle of the gun to the joint and the direction of gun travel for the type of weld being made in an overhead position

5.6.4 Clean and prepare the metal to be welded, assure good fit-up, apply weld through primer if necessary, and clamp as required

5.6.5 Perform a visual inspection on the overhead weld

5.7 Make a fillet weld on lap using steel coupons in the overhead position using a GMA (MIG) welder.

5.7.1 Set up and adjust the welder for proper stickout, voltage, polarity, flow rate and wire speed required for the metal being welded

5.7.2 Determine work clamp (ground) location and attach

5.7.3 Use the proper angle of the gun to the joint and the direction of gun travel for the type of weld being made in an overhead position

5.7.4 Clean and prepare the metal to be welded, assure good fit-up, apply weld through primer if necessary, and clamp as required

5.7.5 Perform a visual inspection on the overhead weld

5.8 Make an open butt joint using steel coupons in the overhead position using a GMA (MIG) welder.

5.8.1 Set up and adjust the welder for proper stickout, voltage, polarity, flow rate and wire speed required for the metal being welded.

5.8.2 Determine work clamp (ground) location and attach.

5.8.3 Use proper angle of the gun to the joint and the direction of the gun travel for the type of weld being made in the overhead position.

5.8.4 Clean and prepare the metal to be welded, assure good fit-up, and apply weld through primer if necessary, and clamp as required.

5.8.5 Perform a visual inspection on the overhead weld.

5.9 Make a plug weld using aluminum coupons in the vertical position using a GMA (MIG) welder

5.9.1 Set up and adjust the welder for proper stickout, voltage, polarity, flow rate and wire speed required for the metal being welded

5.9.2 Determine work clamp (ground) location and attach

5.9.3 Use the proper angle of the gun to the joint and the direction of gun travel for the type of weld being made in a vertical position

5.9.4 Clean and prepare the metal to be welded, assure good fit-up, apply weld through primer if necessary, and clamp as required

5.9.5 Perform a visual test of the vertical weld

5.10 Make a butt joint with backing weld using aluminum coupons in the vertical position using a GMA (MIG) welder

5.10.1 Set up and adjust the welder for proper stickout, voltage, polarity, flow rate and wire speed required for the metal being welded

5.10.2 Determine work clamp (ground) location and attach

5.10.3 Use the proper angle of the gun to the joint and the direction of gun travel for the type of weld being made in a vertical position

5.10.4 Clean and prepare the metal to be welded, assure good fit-up, apply weld through primer if necessary, and clamp as required

5.10.5 Perform a visual test of the vertical weld

5.11 Make a fillet weld on lap using aluminum coupons in the vertical position using a GMA (MIG) welder.

5.11.1 Set up and adjust the welder for proper stickout, voltage, polarity, flow rate and wire speed required for the metal being welded

5.11.2 Determine work clamp (ground) location and attach

5.11.3 Use the proper angle of the gun to the joint and the direction of gun travel for the type of weld being made in a vertical position

5.11.4 Clean and prepare the metal to be welded, assure good fit-up, apply weld through primer if necessary, and clamp as required

5.11.5 Perform a visual test of the vertical weld

5.12 Make a plug weld using aluminum coupons in the overhead position using a GMA (MIG) welder.

5.12.1 Set up and adjust the welder for proper stickout, voltage, polarity, flow rate and wire speed required for the metal being welded

5.12.2 Determine work clamp (ground) location and attach

5.12.3 Use the proper angle of the gun to the joint and the direction of gun travel for the type of weld

being made in an overhead position

5.12.4 Clean and prepare the metal to be welded, assure good fit-up, apply weld through primer if necessary, and clamp as required

5.12.5 Perform a visual inspection on the overhead weld

5.13 Make a butt joint with backing weld using aluminum coupons in the overhead position using a GMA (MIG) welder

5.13.1 Set up and adjust the welder for proper stickout, voltage, polarity, flow rate and wire speed required for the metal being welded

5.13.2 Determine work clamp (ground) location and attach

5.13.3 Use the proper angle of the gun to the joint and the direction of gun travel for the type of weld being made in an overhead position

5.13.4 Clean and prepare the metal to be welded, assure good fit-up, apply weld through primer if necessary, and clamp as required

5.13.5 Perform a visual inspection on the overhead weld

5.14 Make a fillet weld on lap using aluminum coupons in the overhead position using a GMA (MIG) welder.

5.14.1 Set up and adjust the welder for proper stickout, voltage, polarity, flow rate and wire speed required for the metal being welded

5.14.2 Determine work clamp (ground) location and attach

5.14.3 Use the proper angle of the gun to the joint and the direction of gun travel for the type of weld being made in an overhead position

5.14.4 Clean and prepare the metal to be welded, assure good fit-up, apply weld through primer if necessary, and clamp as required

5.14.5 Perform a visual inspection on the overhead weld

5.15 Make an open butt joint using aluminum coupons in the overhead position using a GMA (MIG) welder

5.15.1 Set up and adjust the welder for proper stickout, voltage, polarity, flow rate and wire speed required for the metal being welded

5.15.2 Determine work clamp (ground) location and attach

5.15.3 Use the proper angle of the gun to the joint and the direction of gun travel for the type of weld being made in an overhead position

5.15.4 Clean and prepare the metal to be welded, assure good fit-up, apply weld through primer if necessary, and clamp as required

5.15.5 Perform a visual inspection on the overhead weld

5.16 Make a squeeze-type resistance spot weld (STRSW) using steel coupons

5.16.1 Set up and adjust the welder for the metal being welded

5.16.2 Clean and prepare the metal to be welded, assure good fit-up and apply weld through primer if necessary, and clamp as required

5.16.3 Inspect spot welds for visual defects and adjust the welder accordingly

5.16.4 Maintain and adjust spot welding electrode tips to ensure a quality weld.

5.17 Make a MIG brazing slot weld using steel coupons

5.17.1 Set up and adjust the welder for the metal being welded

5.17.2 Clean and prepare the metal to be welded, assure good fit-up and clamp as required

5.17.3 Inspect welds for visual defects and adjust the welder accordingly.

5.18 Make a MIG brazing open butt joint weld using steel coupons

5.18.1 Set up and adjust the welder for the metal being welded

5.18.2 Clean and prepare the metal to be welded, assure good fit-up and clamp as required

5.18.3 Inspect welds for visual defects and adjust the welder accordingly.

5.19 Remove and install self-piercing rivet (SPR)

5.19.1 Remove SPR
5.19.2 Identify correct rivet size
5.19.3 Identify correct rivet gun dies for rivet size
5.19.5 Install and inspect SPR for visual defects and determine corrective actions, if applicable
5.19.5 Maintain SPR gun.

5.20 Remove and install blind rivet.
5.20.1 Identify correct rivet size
5.20.2 Remove blind rivet
5.20.3 Install and inspect blind rivet for visual defects and determine corrective actions, if applicable.
5.20.4 Maintain and adjust blind rivet gun.

5.21 Install solid rivet.
5.21.1 Identify correct rivet size
5.21.2 Install and inspect solid rivet for visual defects and determine corrective actions, if applicable.

5.22 Install rivet bonded panel.
5.22.1 Identify correct type(s) and size of rivet
5.22.2 Identify proper adhesive for the application
5.22.3 Prepare panel(s) for adhesive and rivet installation
5.22.4 Apply adhesive and install rivet(s)
5.22.5 Inspect adhesive and rivet(s) for visual defects and determine corrective actions, if applicable.

5.23 Install weld bonded panel.
5.22.1 Identify proper adhesive for the application
5.22.2 Prepare panel(s) for adhesive and spot weld installation
5.22.3 Apply adhesive
5.22.4 Make spot weld(s)
5.23.5 Inspect weld bond for visual defects and determine corrective actions, if applicable.

CRT 6.0 — Complete backside reinforced cosmetic surface repair on a plastic vehicle part. Mix and apply appropriate material corresponding with the related tasks in the National Automotive Technicians Foundation (NATEF) Repair/Refinishing Non-Structural Analysis and Damage Analysis (ASE B3 Test). Participants will be expected to successfully complete each segment. Participants should have some basic knowledge in chemistry.

6.1 Demonstrate proper safety procedures
6.2 Demonstrate an understanding of the importance to clean before making any repair
6.3 Damage preparation before adhesive work
6.4 Demonstrate an understanding of appropriate abrasive grade sequence for reinforcing plastic repair. (Typically 50 and 80)
6.5 Apply a light coating of adhesion promoter and allow to dry adequately
6.6 Demonstrate the ability to open, load, and equalize the cartridge, attach the mixing nozzle, and discard the first pump of material
6.7 Demonstrate proper spreading techniques: Apply a thin, tight coat of material, then build a thin layer of adhesive followed by reinforcing mesh and an additional layer of adhesive

CRT 7.0 — Complete a front-side cosmetic surface repair on a plastic vehicle part. Mix and apply appropriate material corresponding with the related tasks in the National Automotive Technicians Foundation (NATEF) and the ASE Collision Repair/Refinishing Non-structural Analysis and Damage (B3) Certification Test. Participants will be expected to successfully complete each segment. Participants should have some basic knowledge in chemistry.

7.1 Demonstrate proper safety procedures
7.2 Demonstrate an understanding of the importance of cleaning before making any repair
7.3 Damage preparation before adhesive work
7.4 Demonstrate an understanding of appropriate abrasive grade sequence for plastic repair (Typically 50, 80, adhesive application, 80, 180, 320)
7.5 Demonstrate an understanding of the need to keep very coarse grade scratches (80 grit) inside valley of repair and not on surrounding plastic, to avoid creating "fuzzies" that will be difficult to conceal in the finished paint work
7.6 Demonstrate understanding of the difference between "Veeing Out" a repair (incorrect) and "Dishing Out" a repair (correct), and how that relates to the finished product (no ghost lines)
7.7 Apply a light coating of adhesion promoter and allow to dry adequately

7.8 Demonstrate the ability to load, open, and equalize the cartridge, attach the mixing nozzle, and discard the first pump of material

7.9 Demonstrate proper spreading techniques: Apply a thin, tight coat of material, build in thin layers, and avoid air entrapment as they build slightly higher than the surrounding areas

7.10 Demonstrate test to determine readiness to sand (check with fingernail, see if it leaves a white mark in the adhesive)

CRT 8.0 — Complete a tab repair on plastic vehicle part. Mix and apply appropriate material corresponding with the related tasks in the National Automotive Technicians Foundation (NATEF) and The ASE Collision Repair/Refinishing Non-Structural Analysis and Damage (B3) Certification Test. Participants will be expected to successfully complete each segment. Participants should have some basic knowledge in chemistry.

8.1 Demonstrate proper safety procedures

8.2 Demonstrate an understanding of the importance of cleaning before making any repair

8.3 Demonstrate an understanding of appropriate abrasive grade sequence for tab repair (typically 50 and 80)

8.4 Apply a light coating of adhesion promoter and allow to dry adequately

8.5 Demonstrate the ability to load, open and equalize the cartridge, attach the mixing nozzle, and discard the first pump of material

8.6 Demonstrate proper "molding" techniques, using contour sheeting, and form a new tab

8.7 Demonstrate test to determine readiness to sand (check with fingernail, see if it leaves a white mark in the adhesive)

CRT 9.0 — Complete surface preparation and related tasks in the National Automotive Technicians Foundation (NATEF) and the ASE Collision Repair/Refinishing Non-structural Analysis and Damage (B3) Certification Test. Participants will be expected to successfully complete each segment. Participants should have some basic knowledge in chemistry.

9.1 Demonstrate proper use of safety

9.2 Demonstrate the ability to use 50-grit abrasive on a high speed grinder to rough shape the formed tab, followed by 180-grit on a DA to finely shape the tab, and lastly, a 320-grit abrasive to prepare the featheredge for the painting process

9.3 Demonstrate the ability to use an 80-grit abrasive to "knock down" the bulk of the excess cosmetic repair material without abrading the surrounding plastic, which would leave "fuzzies"

9.4 Demonstrate the ability to use 180-grit abrasive to successfully level the repair material and feather into the surrounding area

9.5 Finish sand the repair and surrounding area with 320-grit abrasive to prepare for painting process

9.6 Demonstrate the best practice of reapplying adhesion promoter after the final sanding step, to assure paint adhesion

CRT 10.0 — Complete a tear repair on a plastic vehicle part using a plastic nitrogen welder. Apply appropriate material corresponding with the related tasks in The National Automotive Technicians Foundation (NATEF) Repair/Refinishing Non-Structural Analysis and Damage Analysis (ASE B3 Test). Participants will be expected to successfully complete each segment. Participants should have some basic knowledge in chemistry

10.1 Demonstrate the proper safety prcedures during the preparation and welding process.

10.2 Demonstrate an understanding of the importance of cleaning the plastic vehicle part before making any repairs.

10.3 Demonstrate proper backside surface preparation of the plastic vehicle part prior to a repair (roughing-up the surface with an abrasive).

10.4 Demonstrate proper alignment of the cosmetic side of the repair.

10.5 Demonstrate proper welding rod, ribbon selection, and proper nitrogen welding technique on the backside of the plastic vehicle part. Reinforce if necessary to ensure the integrity of the repair.

10.6 Demonstrate attention to the cooling of the cosmetic side of the repair before continuing the repair process.

10.7 Demonstrate the v-grooving of the tear on the cosmetic side of the repair to the proper depth and width.

10.8 Demonstrate proper nitrogen plastic welding technique to the cosmetic side of the plastic vehicle part.

10.9 Demonstrate proper attention to cooling the welded area before finish sanding the plastic vehicle part.

CRT 11.0 — Describe basic steering and suspension components of the vehicle to related tasks in National Automotive Technicians Foundation (NATEF) Collision Repair/Refinishing Mechanical and Electrical Components Technical Standards* (ASE B5 Test)

11.1 Identify the illustrated steering and suspension components

CRT 12.0 — Describe steering and suspension geometry to related tasks in National Automotive Technicians Foundation (NATEF) Collision Repair/Refinishing Mechanical and Electrical Components Technical Standards* (ASE B5 Test)

12.1 Apply the number of angle to the definition that describes it

12.2 Identify the problem or problems that result when the vehicle's tie rods and lower control arms pivot points do not remain parallel to each other as the vehicle's body moves down (jounce) and up (rebound) as it travels along the road

12.2.1 Analyze and identify misaligned or damaged steering, suspension, and powertrain components that can cause vibration, steering, and wheel alignment problems

CRT 13.0 — Perform structural damage analysis and related information to related tasks in National Automotive Technicians Foundation (NATEF) Collision Repair and Refinishing Structural Analysis and Damage Repair Technical Standards* (ASE B4 Test)

13.1 Describe the structural damage analysis questions or complete the statement using the choices given

CRT 14.0 —Perform structural realignment to related tasks in National Automotive Technicians Foundation (NATEF) Collision Repair and Refinishing Structural Analysis and Damage Repair Technical Standards* (ASE B4 Test)

14.1 Illustrate the different types of structural realignments along with choices for supporting (blocking), securing (holding) and pulling the structure to realign it

14.2 Select the setup that is the most efficient for a high-quality repair

14.2.1 Determine the extent of damage and the direction of the impact; document the methods and sequence of repair

CRT 15.0 — Determine the location of the vehicle's major control points using the damage simulator to related tasks in National Automotive Technicians Foundation (NATEF) Collision Repair and Refinishing Structural Analysis and Damage Repair Technical Standards* (ASE B4 Test)

15.1 Locate the major control points of the vehicle's lower structure

15.1.1 Determine the locations of all steering, suspension and powertrain component attaching points

CRT 16.0 — Gauge and measure the vehicle's lower structure using the damage simulator to related tasks in National Automotive Technicians Foundation (NATEF) Collision Repair and Refinishing Structural Analysis and Damage Repair Technical Standards (ASE B4 Test)

16.1 Demonstrate proper safety procedures

16.2 Set the correct height (datum) dimensions on the gauges by using the data chart

16.3 Install the gauges at the major control points

CRT 17.0 — Read the gauges and measure using the damage simulator to related tasks in National Automotive Technicians Foundation (NATEF) Collision Repair and Refinishing Structural Analysis and Damage Repair Technical Standards (ASE B4 Test)

17.1 Measure critical diagonal, length and width measurements of the structure

17.2 Sight the gauges and determine if there is a centerline (sideways) or height misalignment of the structure

CRT 18.0 — Diagram (document) the vehicle's structural misalignments using the damage simulator to related tasks in National Automotive Technicians Foundation (NATEF) Collision Repair and Refinishing Structural Analysis and Damage Repair Technical Standards (ASE B4 Test)

18.1 Determine the types of structural misalignment present and record on the damage analysis diagram

CRT 19.0 — Measure and analyze structural, steering and suspension misalignment of a body on frame vehicle using the gauge measuring system or mechanical measuring system to related tasks in National Automotive Technicians Foundation (NATEF) Collision Repair and Refinishing Structural Analysis and Damage Repair Technical Standards (ASE B4 Test)

19.1 Using a tram gauge and tape measure, measure the damaged vehicle's upper body, and steering and suspension control points.

19.2 Using a mechanical measuring system determine the different types of misalignments that the vehicle's lower structure has sustained.

19.3 Record the misalignments identified and analyze the types and amount of damage the vehicle has sustained

CRT 20.0 — Measure and analyze structural, steering and suspension misalignment of a unitized body vehicle using a computerized measuring system to related tasks in National Automotive Technicians Foundation (NATEF) Collision Repair and Refinishing Structural Analysis and Damage Repair Technical Standards* (ASE B4 Test)

20.1 Determine the different types of misalignment the vehicle's structure, steering and suspension have sustained*

20.2 Record the misalignments identified and analyze the type and amount of damage the vehicle has sustained*

20.3 Determine the material type and the sectioning or replacement procedures.

CRT 21.0 — Complete an estimate to related tasks in National Automotive Technicians Foundation (NATEF) Collision Repair and Refinishing Standards and ASE Catalog of Collision Repair/Refinishing Tests B6 (Damage Analysis and Estimating)*

21.1 Report heading/legibility*
- 21.1.1 List entrant number on estimating test*
- 21.1.2 Locate provided "Vehicle Description and Labor Rate Page" and complete owner and vehicle information segment on estimate (e.g., owner name, address, phone numbers, license plate, vehicle year, series, mileage, vehicle identification number)
- 21.1.3 Identify and record customer/vehicle information
- 21.1.4 Identify and record vehicle identification (VIN) information
- 21.1.5 Write legibly*

21.2 Identify parts replacement*
- 21.2.1 Locate and select vehicle to be estimated in the provided collision estimating guide*
- 21.2.2 Locate and list the correct part prices and replacement labor times and refinish labor times for the predetermined parts being replaced*
- 21.2.3 Estimate labor adjustments for vehicle options when appropriate*
- 21.2.4 Recognize and apply body labor overlap and refinish labor overlap where appropriate*
- 21.2.5 Consider and apply "included" and "not included" operations where appropriate*
- 21.2.6 Consider and apply labor footnotes (# signs) when necessary*

21.3 Prepare calculations*
- 21.3.1 Calculate and list the correct paint and materials allowance*
- 21.3.2 Calculate and list parts, body labor, refinish labor, paint and material column totals*
- 21.3.3 Calculate and list total labor hours (body labor plus refinish labor)*
- 21.3.4 Multiply total labor hours by providing labor rate and list labor dollar amount*
- 21.3.5 Calculate and list the total estimated amount*

CRT 22.0 —* Complete an oral assessment/interview to related tasks in National Automotive Technicians Foundation (NATEF) Collision Repair and Refinishing Standards

22.1 Exhibit personal skills such as attendance, time management and individual responsibility
- 22.1.1 Demonstrate promptness when required to meet interviewer at specific time and location*

CRT 23.0 — Maintain professional conduct to related tasks in National Automotive Technicians Foundation (NATEF) Collision Repair and Refinishing Standards

23.1 Demonstrate courteous behavior while waiting for the interviewer*

CRT 24.0 — Maintain professional appearance to related tasks in National Automotive Technicians Foundation (NATEF) Collision Repair and Refinishing Standards

24.1 Demonstrate proper attire (SkillsUSA uniform light blue shirt, dark blue pants)*

CRT 25.0 — Complete job application and résumé to related tasks in National Automotive Technicians Foundation (NATEF) Collision Repair and Refinishing Standards

25.1 Properly and legibly complete a job application and résumé*

CRT 26.0 — Demonstrate interview skills to related tasks in National Automotive Technicians Foundation (NATEF) Collision Repair and Refinishing Standards

Committee Identified Academic Skills

The technical committee has identified that the following academic skills are embedded in this contest.

Math Skills

- Understand the measurement angles on a three-dimensional object
- Understand the surface area and perimeter of three-dimensional objects
- Apply transformations (rotator turn, reflector flip, translator slide and dilator scale) to geometric figures
- Solve problems involving complementary, supplementary and congruent angles
- Solve problems involving symmetry and transformation
- Use measures of interior and exterior angles of polygons to solve problems
- Measure angles
- Make predictions using knowledge of probability
- Organize and describe data using matrixes
- Find surface area and perimeter of two-dimensional objects
- Use fractions to solve practical problems
- Solve practical problems using percents
- Calculate percentages
- Make comparisons, predictions and inferences using graphs and charts

Science Skills

- Use knowledge of mechanical, chemical and electrical energy
- Use knowledge of principles of electricity and magnetism (practical example: current and amperage settings on the GMA [MIG] welder in relationship to weld penetration)
- Use knowledge of static electricity
- Use knowledge of pressure in relation to the concept of force
- Use knowledge of simple machines and compound machines
- Use knowledge of potential and kinetic energy
- Use of knowledge of simple machines, compound machines, powered vehicles, rockets and restraining devices
- Describe characteristics of types of matter based on physical and chemical properties
- Use knowledge of physical properties (shape, density, solubility, odor, melting point, boiling point and color)
- Use knowledge of chemical properties
- Describe and identify physical changes to matter
- Use knowledge of heat, light and sound energy
- Use knowledge of temperature scales, heat and heat transfer
- Plan and conduct a scientific investigation
- Use knowledge of work, force, mechanical advantage, efficiency and power

Language Arts Skills

- Demonstrate comprehension of a variety of informational text
- Demonstrate knowledge of appropriate reference materials
- Use print, electronic databases, online resources to access information in books and articles
- Provide information in conversations and in group discussions
- Provide information in oral presentations
- Demonstrate use of verbal communication skills: word choice, pitch, feeling, tone and voice

- Demonstrate use of nonverbal communication skills: eye contact, posture and gestures using interviewing techniques to gain information
- Organize and synthesize information for use in written and oral presentations
- Edit writing for grammar, capitalization, punctuation, spelling, sentence structure and paragraphing

Connections to National Standards

State-level academic curriculum specialists identified the following connections to national academic standards.

Math Standards

- Problem solving
- Numbers and operations
- Measurement
- Geometry
- Representation
- Communication
- Connections

Source: NCTM Principles and Standards for School Mathematics. For more information, visit: http://www.nctm.org.

Science Standards

- Understands the structure and properties of matter
- Understands the sources and properties of energy
- Understands forces and motion
- Understands the nature of scientific inquiry

Source: McREL compendium of national science standards. To view and search the compendium, visit: www2.mcrel.org/compendium/browse.asp.

Language Arts Standards

- Students apply a wide range of strategies to comprehend, interpret, evaluate and appreciate texts. They draw on their prior experience, their interactions with other readers and writers, their knowledge of word meaning and of other texts, their word identification strategies and their understanding of textual features (e.g., sound-letter correspondence, sentence structure, context, and graphics)
- Students adjust their use of spoken, written and visual language (e.g., conventions, style, vocabulary) to communicate effectively with a variety of audiences and for different purposes
- Students use spoken, written and visual language to accomplish their own purposes (e.g., for learning, enjoyment, persuasion and the exchange of information)

Source: IRA/NCTE Standards for the English Language Arts. To view the standards, visit: www.ncte.org/standards.