NYS SkillsUSA Automotive Technology Virtual Project

Scope of the Contest
To evaluate each contestant’s preparation for employment and to recognize outstanding students for excellence and professionalism in the field of automotive technology.

Knowledge Performance
The contest will include a Resume and Video with Oral Presentation. The video demonstration is a presentation of a diagnostic procedure, correct tool usage and recommendations. Contestants should ensure they are narrating the steps they are taking and the results of their measurements and tests. The contestant will also have to complete a written test as part of the competition. The written test will be completed online in a secure testing environment.

*See SkillsUSA Virtual Technical Standards for competencies measured.

Contest Information (All items must be received by due date)

- PDF Resume
  - Upload one file with all contestant’s one-page resume’s and include the digital link(s) to Portfolio and Zoom Recording

Video of Demonstrated Procedures
- Through a recorded Zoom session, record the contestant diagnosing the customer complaint of a brake pulsation. The video needs to show the student explaining the steps they would use to diagnose the customers concern including: visual inspection, measurements taken and why they were taken. The student should explain what the expected results would be. The camera should show the entire lab/workspace the student is in, with the instructor in the shot so that it is clear they are not being coached during the video recording.. *Ensure lighting, audio and video are high quality

- The video may be recorded as one continues recording, or it can be broken into segments if needed for time constraints. All video segments must be uploaded as hyperlinks along with the contestant’s resume.

- Contestant number must be shown at all times.

- *Ensure lighting, audio and video are high quality

Scoring Information
The following pre-submission items will be judged by industry professionals prior to virtual in-person Zoom session
1. Resume with embedded links to written outline and Zoom video
2. Written submission for clarity, conciseness, grammar, punctuation, and spelling. This submission will be used to clarify the steps and procedures in their video submission.
3. Skill demonstration in video
Diagnose and advise on the following customer complaint.

**Symptom: The Customer states that the brake pedal pulsates when the brakes are applied.** 

**Instructions:** A time limit of twenty minutes applies to the diagnostic scenario video. No actual bug or fault needs to be installed on the vehicle. Instead, the participant will treat each test he or she completes as if it has passing results and explain what would be a failing result. This will send the participant to the next logical diagnostic step. The participant should run out of tests and end with an inconclusive result. The participant shall announce what test he or she is about to perform before proceeding with that test. The vehicle can be setup before filming begins with the wheels off and the calipers unbolted to facilitate testing. All four wheels do not need to be tested.

**Necessary Equipment:**
- A vehicle that utilizes hydraulic brake system with either front rear master cylinder or diagonal brake master cylinder.

**Suggested Tooling:**
- Micrometer
- Dial indicator
- Brake pad thickness gauge
- Basic tool set.
- Service information on brake specifications
- Proper PPE
NYS Automotive Technology (VIRTUAL)

PURPOSE
To evaluate each contestants preparation for employment and to recognize outstanding students for excellence and professionalism in the field of automotive technology. First, download and review the General Regulations at: http://updates.skillsusa.org.

ELIGIBILITY
Open to active SkillsUSA members enrolled in programs with automotive technology as the occupational objective.

CLOTHING REQUIREMENT
Contest Specific – Mechanic
- White crew neck short-sleeved T-shirt
- Work pants or jeans,
- Leather or steel toed work shoes.
- Hair must be contained.
- Safety glasses with side shields or goggles, (Prescription glasses can be used only if they are equipped with side shields approved by OSHA(Z-87). If not, they must be covered with goggles.)

Contest Clothing Notes (Apply ONLY to Virtual Competitions):
- Official SkillsUSA Competition Clothing recommended but NOT required.
- Contestant clothing options include the following:
  o Official Competition Clothing.
  o Trade Appropriate Clothing.
  o Professional Dress.
  o Business Casual.
- Clothing must meet industry safety standards.
- No identification of the contestant, school or state is allowed on clothing.
- No offensive, vulgar or inappropriate images or text are not allowed on contestants clothing.
- No shorts or sleeveless shirts are allowed.
- Skirts must be at least knee-length.
- Proper Personal Protective Equipment (PPE) must be worn by contestant to meet all state, local and school requirements due to COVID-19.
• Scoring deductions may only be given and/or disqualification of contestant if clothing safety standards are not met.

SAFETY INSTRUCTION AND VERIFICATION OF TRAINING
Important: Both the instructor and the contestant certify by agreeing to enter this contest that the contestant has received instruction in automotive technology and has demonstrated knowledge of the operation and safe use of the following tools and equipment:
1. Battery/alternator/starter load tester
2. Digital Multi Meter
3. Test light
4. Impact wrench
5. Micrometer
6. Dial indicator
7. Basic hand tools

They also certify that NYS SkillsUSA Inc., the national technical committee and national judges are released from all responsibilities relating to personal injury resulting from their use.

Contestants will be removed from competition if proper training has not been provided and/or they are using the equipment in an unsafe manner.

EQUIPMENT AND MATERIALS
Supplied by the contestant:
1. All materials, tools and equipment needed for the contest
2. Computer with high-speed internet capability and camera to use applications such as Zoom, Teams, etc. The minimum recommended internet bandwidth speeds for joining Zoom meetings, accessing on-demand curriculum and other online operations is 2.0 Mbps up and down. You can test your current internet speeds by following this link: [https://www.speedtest.net/](https://www.speedtest.net/). Allow the page to load and click on GO.
3. A secondary camera(s) may be required to provide judges with the ability to view contestants from different angles. Additional camera requirements will be located on the SkillsUSA website at http://updates.skillsusa.org.

4. A contest Proctor will be required to be on site to assist judges. A local industry expert is preferred to serve as the Proctor and shall not be an individual that has been involved with the training of the contestant(s). The Proctor will serve as the onsite ‘hands and eyes’ for the judges. Proctor will follow instructions from the judges for safety and operations related to the competition. Proctor may be asked by judges to perform several tasks such as operating a portable camera to show specific components or steps, measure parts, or any task that will provide judges with information needed to assist in accurate scoring of the contestants work or presentation. However, the Proctor shall not serve as a judge nor have any influence on contestant scores.

5. The contestants instructor or advisor shall be on site to observe all competition activities to ensure a safe and healthy competition experience for all participants. That instructor or advisor will not be allowed to interact or interfere with the competitor unless a safety issue arises that requires interaction. Any other support or interaction between the contestant and the instructor/advisor will result in disqualification.

6. All competitors must create a one-page résumé and submit an electronic copy to the technical committee chair at least seven (7) days in advance of the competition. Failure to do so will result in a 10-point penalty. Instructions for submission of the electronic résumé copy will be provided on the SkillsUSA website at http://updates.skillsusa.org.

Note: Check the Contest Guidelines and/or the updates page on the NYS SkillsUSA website: http://nysskillsusa.org.
**Scope of the Contest**

The contest will be consistent with the automobile technician task list outlined in guidelines published by the National Institute for Automotive Service Excellence (ASE) and the National Automotive Technicians Education Foundation (NATEF), www.natef.org. Contestants will demonstrate their ability to perform jobs and or skills selected from all eight of the ASE/NATEF areas and standards mentioned above as determined by the test administering group from SUNY Morrisville, Ford Motor Company, Subaru, Fiat Chrysler, Drivers Village, and Snap-On Industrial.

**Skills Performance**

The contest is based on the two videos the student will record diagnosing his or her choices of customer complaints.

**Contest Guidelines**

1. Contestants may be assigned problems or projects requiring as little as 20 minutes to perform or as long as four hours.
2. The following general shop safety rules will be followed:
   a. Safety glasses must be worn at all times when in the work area. If the contestant is taking a written test or is in a job interview, safety glasses can be removed.
   b. No loose clothing is permitted.
   c. Long hair must be tied behind the head or netted.
   d. Gloves must not be worn during operation of machinery, except while doing electric welding and oxyacetylene welding and cutting operations.
   e. Any liquid or grease spilled must be cleaned up immediately and reported to the judge.
   f. All injuries, no matter how slight, must be reported immediately to the judge.
3. In addition, contestants will be judged on general shop skills, problem-solving skills, and shop safety. Points allowed will be assigned by the technical committee based on the difficulty of the assigned task.

Standards and Competencies

Note for Virtual Competitions: Contestants may not be required to perform all the standards and competencies listed in this section. However, contestants should be prepared to perform components in all areas. Prior to the competition, the technical committee may determine which standards and competencies contestants will be perform for the virtual contests. The technical committee will determine if additional information is needed for contestants prior to the competition. These changes will be posted on the SkillsUSA Championships contest update website at: http://updates.skillsusa.org.

6  AST 1.0 — Perform vehicle HVAC system diagnosis and testing to related tasks in the NATEF Automobile Program Standards — Automobile Heating and Air Conditioning Task List (ASE Test A7)
7  1.1 Diagnose and repair an inoperative
8  HVAC system on a current model vehicle
9  1.2 Use a provided factory scan tool for
10  current model vehicle
11  1.2.1 Read DTC with scan tool
12  1.2.3 Perform actuator test with scan tool
13  1.3 Use factory service information provided 1.3.1 Identify correct test procedures 1.3.2 Follow the correct test procedure 1.3.3 Identify connector pin-outs
14  1.3.4 Identify component locations
15  1.3.5 Read and interpret wiring schematics
16  1.4 Use provided test equipment
17  1.4.1 Use a DVOM or DMM
18  1.4.2 Use a test light
19  1.4.3 Use A/C service gauges 1.5 Use a repair order
20  1.5.1 Verify complaint
21  1.5.2 Repair vehicle
22  1.5.3 Verify repair was successful 1.5.4 Identify components in the system
23  AST 2.0 — Perform vehicle engine performance diagnosis and testing to related tasks in the NATEF Automobile Program Standards — Automobile Engine Repair Task List (ASE Test A1)
24  2.1 Diagnose and repair an engine performance issue on a current model vehicle
25  2.2 Use a provided factory scan tool for the current model vehicle
26  2.2.1 Read DTC with scan tool
27  2.2.2 Read data with scan tool
28  2.2.3 Perform actuator test with scan tool
29  2.3 Use factory service information provided 2.3.1 Identify correct test procedures 2.3.2 Follow the correct test procedure
30  2.3.3 Identify connector pin-outs 2.3.4 Identify component locations 2.3.5 Use wiring schematics
31  2.4 Use provided test equipment
32  2.4.1 Use a DVOM or DMM
33  2.4.2 Use a test light
34  2.4.3 Use a fuel

Skills USA NY Standards
pressure gauge 2.5 Use a repair order

35 2.5.1 Verify complaint
36 2.5.2 Repair vehicle
37 2.5.3 Verify repair was successful 2.5.4 Identify components in the system

38 AST 3.0 — Perform vehicle body electrical diagnosis and testing to related tasks identified in the NATEF Automobile Program Standards — Automobile Electrical/Electronic Systems Task List (ASE Test A6)

39 3.1 Diagnose and repair a body electrical issue on a current model vehicle
40 3.2 Use a provided factory scan tool for the current model vehicle
41 3.2.1 Read DTC with scan tool
42 3.2.2 Read data with scan tool
43 3.2.3 Perform actuator test with scan tool
44 3.3 Use factory service information provided 3.3.1 Identify correct test procedures 3.3.2 Follow the correct test procedure
45 3.3.3 Identify connector pin-outs 3.3.4 Identify component locations 3.3.5 Use wiring schematics
46 3.4 Use provided test equipment
47 3.4.1 Use a DVOM or DMM
48 3.4.2 Use a test light
49 3.4.3 Use a battery or charging system tester
50 3.5 Use a repair order
51 3.5.1 Verify complaint
52 3.5.2 Repair vehicle
53 3.5.3 Verify repair was successful 3.5.4 Identify components in the system

56 AST 4.0 — Demonstrate application of environment, health and safety knowledge in auto service situations to related OSHA section 1910 standards and EPA standards

57 4.1 Identify personal protective equipment 4.2 Explain the use of personal protective equipment
58 4.3 Recall information about related EPA and OSHA requirements
59 4.4 Identify blood borne pathogens kits 4.5 Explain the use of blood borne pathogens kits
60 4.6 Answer questions from a provided MSDS sheet
61 4.7 Describe proper use of a fire extinguisher

64 AST 5.0 — Complete a job interview for an automotive service technology related position

65 5.1 Conduct a job interview with appropriate professional behavior
66 5.2 Communicate clearly and effectively 5.3 Clearly and completely fill out a job application
67 5.4 Provide a printed copy of résumé

68 AST 6.0 — Perform electronic circuit diagnosis, testing and wire repair to related tasks identified in the NATEF Automobile Program Standards — Automobile Electrical/Electronic Systems Task List (ASE Test A6)

69 6.1 Construct an electrical circuit from supplied material and a wiring diagram
70 6.1.1 Check electrical circuit operation
71 6.1.2 Take electrical readings on the circuit with a DVOM
72 6.1.3 Diagnose and repair the circuit 6.1.4 Confirm the repair of the circuit
73 6.2 Diagnose electrical/electronic integrity of series, parallel and series-parallel circuits 6.2.1 Check electrical circuits with a test light and determine necessary action
74 6.3 Repair connectors and
6.3.1 Repair wiring harness

6.3.2 Perform solder repair of electrical wiring

79  AST 7.0 — Perform steering, suspension and wheel alignment to related tasks identified in the NATEF Automobile Program Standards — Automobile Suspension and Steering Task List (ASE Test A4)

80  7.1 Identify wheel alignment tools

81   7.2 Explain practical application of tools

82  7.3 Identify OEM alignment products

83   7.3.1 Explain practical application or use of OEM products

84  7.3.2 Identify aftermarket alignment products

85  7.3.3 Explain practical application or use of aftermarket products

86  7.4 Identify steering suspension components 7.5 Explain alignment theory

87  7.6 Explain diagnosis of alignment conditions

88  7.7 Use reference materials provided

90  AST 8.0 — Perform manual drive train service, testing and diagnosis to related tasks identified in the NATEF Automobile Program Standards — Automobile Manual Drive Train and Axles Task List (ASE Test A3)

91  8.1 Identify components manual drive trains, axles, drivelines and transfer cases

92  8.2 Inspect clutch operating components for wear/damage and determine necessary action

93  8.2.1 Measure flywheel run-out and crankshaft endplay and determine necessary action

94  8.2.2 Inspect transmission/transaxle

95  8.2.3 Measure endplay/preloads on transmission/transaxle shafts and determine necessary action

96  8.2.4 Inspect, measure, reassemble and/or reinstall synchronizer assemblies

97  8.2.5 Inspect, measure, adjust and/or reassemble transaxle final drive assemblies

98  8.2.6 Check driveshaft phasing, measure driveshaft run out and measure driveshaft operating angles

99  8.2.7 Measure companion flange run-out and determine necessary action

100  8.2.8 Inspect ring gear and measure run-out and determine necessary action

101  8.2.9 Measure and adjust drive pinion depth and drive pinion bearing preload

102  8.2.10 Measure and adjust side bearing preload, ring and pinion gear backlash and backlash variation

103  8.2.11 Check ring and pinion gear contact patterns and determine necessary action

104  8.2.12 Measure rotating torque on a limited slip differential and determine necessary action

105  8.2.13 Inspect and reinstall limited slip clutch components

106  8.3 Use factory service information provided to complete tasks

107  8.4 Use tools provided to complete task 8.5 Determine which components need replaced or repaired in a given situation

110  AST 9.0 — Perform brake service, testing and diagnosis to related tasks identified in the NATEF Automobile Program Standards—Automobile Brakes Task List (ASE Test A5)

111  9.1 Identify different brake components for wear/damage and determine necessary action
9.2 Diagnose pressure concerns in the brake
9.2.1 Fabricate brake lines (double flare and ISO types)
9.2.2 Inspect and measure brake drums and determine necessary action
9.2.3 Remove, inspect and install brake shoes, springs, pins, clips, levers, adjusters and other brake hardware
9.2.4 Remove, inspect and install wheel cylinders
9.2.5 Pre-adjust brake shoes and parking brake before installing brake drums
9.2.6 Remove, inspect and install caliper, pads and related hardware and determine necessary action
9.2.7 Clean, inspect and measure rotor with a dial indicator and a micrometer and determine necessary action
9.2.8 Adjust calipers equipped with an integrated parking brake system
9.2.9 Inspect brake booster and determine necessary action
9.2.10 Remove, clean, inspect, repack and install wheel bearings; install hub and adjust wheel bearings
9.3 Identify and inspect ABS components and determine necessary action
9.3.1 Diagnose ABS electronic controls and components
9.3.2 Test, diagnose and service ABS
9.4 Use factory service information provided to complete the above task
9.5 Use tools provided to complete the above task

10.1 Identify components on a transmission
10.2 Diagnose and inspect a transmission
10.2.1 Check input or output shaft
10.2.2 Check clutch clearances
10.2.3 Perform air checks on the clutches
10.2.4 Measure pump clearances
10.2.5 Diagnose electrical components on a transmission
10.3 Perform adjustments on a transmission
10.3.1 Perform valve body adjustments
10.3.2 Perform input or output shaft adjustments
10.3.3 Perform clutch pack adjustments
10.3.4 Perform range sensor adjustments
10.4 Disassemble and assemble components of a transmission
10.4.1 Disassemble and assemble the planetary gear train
10.4.2 Disassemble and assemble the front pump
10.4.3 Disassemble and assemble the valve body
10.4.4 Disassemble and assemble clutch packs
10.5 Use factory service information provided to complete tasks
10.6 Use tools provided to complete tasks

11.0 — Perform engine measuring, inspecting, service and diagnosis on the head or block of an engine to related tasks identified in the NATEF Automobile Program Standards — Automobile Engine Repair Task List (ASE Test A1)

11.1 Measure and inspect the pistons and connecting components
rods
156 11.2 Measure and inspect cylinder diameter. 11.3 Measure and inspect cylinder taper and bore with a dial bore gauge
157 11.4 Measure and inspect the cylinder head. 11.5 Measure and inspect valve guides
158 11.6 Measure and inspect the valves
159 11.7 Measure and inspect valve stem to guide clearance
160 11.8 Measure and inspect the camshaft or crankshaft
161 11.9 Measure and inspect the valve springs. 11.10 Measure and inspect valve or ignition timing
162 11.11 Measure and inspect the timing chain. 11.12 Identify the clearance specifications for any item requiring measuring and inspecting
163
164
165 11.13 Use the factory service information provided
166 11.14 Determine which components need to be replaced or repaired on a given engine head or block
167 11.15 Use the precision engine measurement tools required for measuring or inspecting
168
169
170
171 Standards and Competencies: College/Postsecondary Standards
172 AST 1.0 — Perform vehicle HVAC system diagnosis and testing to related tasks in the NATEF Automobile Program Standards — Automobile Heating and Air Conditioning Task List (ASE Test A7)
173 1.1 Diagnose and repair an inoperative HVAC system on a current model vehicle. 1.2 Use a provided factory scan tool for
174 current model vehicle
175 1.2.1 Read DTC with scan tool
176 1.2.2 Read data with scan tool
177 1.2.3 Perform an actuator test with scan tool
178 1.3 Use factory service information provided
179 1.3.1 Identify correct test procedures
180 1.3.2 Follow the correct test procedure
181 1.3.3 Identify connector pin-outs. 1.3.4 Identify component locations. 1.3.5 Use wiring schematics
182 1.4 Use provided test equipment correctly
183 1.4.1 Use a DVOM or DMM
184 1.4.2 Use a test light
185 1.4.3 Use A/C service gauges
186 1.5 Use a repair order
187 1.5.1 Verify complaint
188 1.5.2 Repair vehicle
189 1.5.3 Verify repair was successful
190 AST 2.0 — Perform vehicle engine performance diagnosis and testing on a current model vehicle to related tasks in the NATEF Automobile Program Standards — Automobile Engine Performance Task List (ASE Test A8)
191 2.1 Use a provided factory scan tool for current model vehicle
192 2.1.1 Read DTC with scan tool
193 2.1.2 Read data with scan tool
194 2.2 Use factory service information provided
195 2.2.1 Identify correct test procedures
196 2.2.2 Follow the correct test procedure
197 2.2.3 Identify connector pin-outs. 2.2.4 Identify component locations. 2.2.5 Use wiring schematics
198 2.6 Use provided test
2.6.1 Use a DVOM or DMM
195
2.6.2 Use a test light
196
2.6.3 Use a fuel pressure gauge
197
2.7 Use a repair order
198
2.7.1 Verify complaint
199
2.7.2 Repair vehicle
200
2.7.3 Verify repair was successful
201
AST 3.0 — Perform steering, suspension and wheel alignment to related tasks identified in the NATEF Automobile Program Standards — Automobile Suspension and Steering Task List (ASE Test A4)
202
3.1 Prepare to complete a wheel alignment
3.1.1 Read and interpret a repair order
3.1.2 Perform complete pre-alignment inspection
3.1.3 Evaluate vehicle condition and readiness for alignment
203
3.2 Identify vehicle suspension system and components
204
3.3 Identify vehicle steering system and components
205
3.4 Identify alignment procedure required
3.5 Take alignment measurements using alignment system provided
206
3.6 Record alignment measurements
3.7 Recall and record vehicle alignment specifications
207
3.8 Evaluate vehicle alignment condition
3.9 Explain vehicle alignment adjustment procedures
208
3.10 Explain advanced alignment diagnostic procedures
209
3.11 Explain use of aftermarket alignment products
210
AST 4.0 — Demonstrate application of environment, health and safety knowledge in auto service situations to related OSHA section 1910 standards and EPA standards
211
4.1 Identify personal protective equipment
4.2 Explain the use of personal protective equipment
212
4.3 Recall information about related EPA and OSHA requirements
213
4.4 Identify blood-borne pathogens kits
4.5 Explain the use of blood-borne pathogens kits
214
4.6 Answer questions from a provided MSDS sheet
215
4.7 Describe proper use of a fire extinguisher
216
AST 5.0 — Demonstrate customer service skills to commonly accepted standards of performance
217
5.1 Answer questions posed by a customer
5.2 Use appropriate and professional manner in customer meeting
218
5.3 Clearly and effectively communicate with the customer information on the diagnosis and repair of the vehicle
219
AST 6.0 — Perform electronic circuit diagnosis, testing and wire repair to related tasks identified in ASE Catalog of Automobile Tests – Automobile Test A6 (Electrical/Electronic Systems)
220
6.1 Construct an electrical circuit from supplied material and a wiring diagram
6.2 Check electrical circuit operation
221
6.3 Take electrical readings on the circuit with a DVOM
222
6.4 Diagnose and repair the circuit
223
6.5 Confirm the repair of the circuit
224
AST 7.0 — Perform electronic circuit diagnosis, testing and wire repair to related tasks identified in the NATEF Automobile Program Standards —
Automobile Electrical/Electronic Systems Task List (ASE Test A6)

7.1 Electrical circuit diagnosis through oscilloscope pattern interpretation
7.1.1 Use a provided oscilloscope
7.1.2 Answer questions based on oscilloscope readings
7.1.3 Explain basic oscilloscope operation

AST 8.0 — Perform service, testing and diagnosis of manual drive trains, axles, drive trains and transfer cases to related tasks identified in the NATEF Automobile Program Standards — Automobile Manual Drive Train and Axles Task List (ASE Test A3)

8.1 Identify components of manual drive trains, axles, drive trains and transfer cases
8.2 Inspect clutch operating components for wear/damage and determine necessary action
8.2.1 Measure flywheel run-out and crankshaft endplay and determine necessary action
8.2.2 Inspect transmission/transaxle components for wear/damage and determine necessary action
8.2.3 Measure endplay/preloads on transmission/transaxle shafts and determine necessary action
8.2.4 Inspect, measure, reassemble and/or reinstall synchronizer assemblies
8.2.5 Inspect, measure, adjust and/or reassemble transaxle final drive assemblies
8.2.6 Check driveshaft phasing, measure driveshaft run out and measure driveshaft operating angles
8.2.7 Measure companion flange run-out and determine necessary action
8.2.8 Inspect ring gear and measure run-out and determine necessary action
8.2.9 Measure and adjust drive pinion depth and drive pinion bearing preload
8.2.10 Measure and adjust side bearing preload, ring and pinion gear backlash and backlash variation
8.2.11 Check ring and pinion gear contact patterns and determine necessary action
8.2.12 Measure rotating torque on a limited slip differential and determine necessary action
8.2.13 Inspect and reinstall limited slip clutch components
8.3 Use factory service information provided to complete tasks
8.4 Use tools provided to complete tasks
8.5 Determine which components need to be replaced or repaired in a given situation

AST 9.0 — Perform brake service, testing and diagnosis on a brake system on a bench to related tasks identified in the NATEF Automobile Program Standards — Automobile Brakes Task List (ASE Test A5)

9.1 Identify brake components
9.2 Diagnose pressure concerns in the brake system using hydraulic principles
9.2.1 Fabricate brake lines (double flare and ISO types)
9.2.2 Inspect and measure brake drums and determine necessary action
9.2.3 Remove, inspect and install brake shoes, springs, pins, clips, levers, adjusters and other brake hardware
9.2.4 Remove, inspect and install wheel cylinders
9.2.5 Re-adjust brake shoes and parking brake before install brake drums
9.2.6 Remove, inspect, install...
caliper, pads and related hardware and determine necessary action

268 9.2.7 Clean, inspect and measure rotor with a dial indicator and a micrometer and determine necessary action

269 9.2.8 Adjust calipers equipped with an integrated parking brake system

270 9.2.9 Inspect brake booster and determine necessary action

271 9.2.10 Remove, clean, inspect, repack and install wheel bearings; install hub and adjust wheel bearings

272 9.3 Identify and inspect ABS components and determine necessary action

273 9.3.1 Diagnose ABS electronic controls and components

274 9.3.2 Test, diagnose and service ABS speed sensors, toothed rings and circuits using an oscilloscope or DVOM

275 9.4 Use factory service information provided to complete the above task

276 9.5 Use tools provided to complete the above task

277 10.4.3 Perform clutch pack adjustments 10.4.4 Perform range sensor adjustments

278 10.5 Disassemble and assemble components of an automatic transmission

279 10.5.1 Disassemble, assemble and inspect the planetary gear train and determine necessary action

280 10.5.2 Disassemble, assemble and inspect the front pump and determine necessary action

281 10.5.3 Disassemble, assemble and inspect the valve body and determine necessary action

282 AST 10.0 — Perform automatic transmission service, testing and diagnosis to related tasks identified in the NATEF Automobile Program Standards—Automobile Automatic Transmission/Transaxle Task List (ASE Test A2)

283 10.1 Identify different components on the transmission

284 10.2 Diagnose and inspect a transmission on a bench

285 10.2.1 Check input or output shaft endplay and determine necessary action

286 10.2.2 Check clutch clearances and determine necessary action

287 10.2.3 Perform air checks on the clutches and determine necessary action

288 10.2.4 Measure pump clearances and determine necessary action

289 10.3 Diagnose electrical components on the transmission and determine necessary action

290 10.4 Adjust components of an automatic transmission

291 10.4.1 Perform valve body adjustments 10.4.2 Perform input or output shaft adjustments

292 10.5.4 Disassemble, assemble and inspect clutch packs and determine necessary action

293 10.6 Use factory service information provided to complete tasks

294 10.7 Use tools provided to complete tasks

295 AST 11.0 — Perform engine measuring, inspecting, service and diagnosis on the head or block of an engine to related tasks in the NATEF Automobile Program Standards — Automobile Engine Repair Task List (ASE Test A1)

296 11.1 Measure and inspect the pistons and connecting rods and determine necessary action

297 Skills USA NY Standards
11.2 Measure and inspect cylinder diameter and determine necessary action

11.3 Measure and inspect cylinder taper and bore with a dial bore gauge and determine necessary action

11.4 Measure and inspect the cylinder head and determine necessary action

11.5 Measure and inspect valve guides and determine necessary action

11.6 Measure and inspect the valves and determine necessary action

11.7 Measure and inspect valve stem to guide clearance and determine necessary action

11.8 Measure and inspect the camshaft of crankshaft and determine necessary action

11.9 Measure and inspect the valve springs and determine necessary action

11.10 Measure and inspect valve or ignition timing and determine necessary action

11.11 Measure and inspect the timing chain and determine necessary action

11.12 Identify the clearance specifications for any item requiring measuring and inspecting

11.13 Use the factory service information provided

1.14 Determine which components need to be replaced or repaired in a given situation

11.15 Use the precision engine measurement tools required for measuring or inspecting

AST 12.0 — Use electrical service information resources

12.1 Locate specifications and other service information using electronic service information resources

1.16