

VERMONT GENERAL SERVICE TECHNICIAN PROGRAM

The NATEF Automobile Technician Training Program task list was reviewed and updated in February 2009 by a committee of individuals representing the major automobile manufacturers, automobile repair shop owners and technicians, automobile instructors and trainers, and automobile equipment and parts suppliers. **The General Service Technician Program task list is a subset of the 2008 automobile program task list.**

Note: an asterisk denotes the areas assessed using the VT DOE GST Assessments

The NATEF Board of Trustees and ASE Board of Directors approved the revised program standards in May 2009. The committee reviewed the task list, tools and equipment list, program hours, and instructor qualifications. The committee was also provided the most current National Institute for Automotive Service Excellence (ASE) Automobile Technician Tests Task Lists for reference purposes.

Theory instruction and hands-on performance of all the basic tasks will provide initial training for employment in the automotive service field or further training at a post-secondary institution. Competency in performing the tasks will indicate to employers that the graduate is skilled in that area.

GST programs are required to teach 100% of the tasks listed, therefore, priority numbers are not assigned to the GST task list as they are in the eight areas for traditional automobile certification. *Note: A task is a psychomotor or cognitive entry-level learning activity consisting of one or more measureable steps accomplished through an instructor presentation, demonstration, visualization or a student application.*

The tasks identified in Introduction to Auto Shop and Personal Safety, Tools and Equipment, Looking for Information, Preparing Vehicle for Service, and Preparing Vehicle for Customer relate to some of the following assumptions:

1. It is assumed that:

- * appropriate theory, safety, and support instruction will be required for performing each task;
- * the instruction has included identification and use of appropriate tools and testing and measurement equipment required to accomplish certain tasks;
- * the student has received the necessary training to locate and use current reference and training materials from accepted industry publications and resources;
- * the student has demonstrated the ability to write work orders and warranty reports, to include information regarding problem resolution and the results of the work performed for the customer and manufacturer. The writing process will incorporate the “Three C’s” (concern, cause and correction) as a format to communicate this information.

2. It is assumed that:
 - all diagnostic and repair tasks described in this document are to be accomplished in accordance with manufacturer's recommended procedures and safety precautions as published.
3. It is assumed that:
 - * individual training programs being evaluated for certification should have written and detailed performance standards for each task taught in the curriculum;
 - * learning progress of students will be monitored and evaluated against these performance standards;
 - * a system is in place that informs all students of their individual progress through all phases of the training program.
4. It is assumed that:
 - * individual courses of study will differ across general service technician programs;
 - * development of appropriate learning delivery systems and tests which monitor student progress will be the responsibility of the individual training program.
5. It is assumed that:
 - * all students will receive instruction in the storage, handling, and use of Hazardous Materials as required in Hazard Communication Title 29, Code of Federal Regulation Part 1910.1200, 'Right to Know Law', and state and local requirements;
 - * hazardous and toxic materials will be handled, removed and recycled or disposed of according to federal, state, and local regulations.

DEFINITIONS – TECHNICAL TERMS

ADJUST - To bring components to specified operational settings.

ALIGN - To restore the proper position of components.

ANALYZE - Assess the condition of a component or system.

ASSEMBLE (REASSEMBLE) - To fit together the components of a device or system.

BALANCE - To establish correct linear, rotational or weight relationship.

BLEED - To remove air from a closed system.

CAN – Controller Area Network. CAN is a network protocol (SAE J2284 / ISO 15765- 4) used to interconnect a network of electronic control modules.

CHARGE - To bring to a specified state, e.g., battery or air conditioning system.

CHECK - To verify condition by performing an operational or comparative examination.

CLEAN - To rid component of foreign matter for the purpose of reconditioning, repairing, measuring or reassembling.

DEGLAZE – To remove a smooth, glossy surface.

DETERMINE - To establish the procedure to be used to perform the necessary repair.

DETERMINE NECESSARY ACTION – Indicates that the diagnostic routine(s) is the primary emphasis of a task. The student is required to perform the diagnostic steps and communicate the diagnostic outcomes and corrective actions required addressing the concern or problem. The training program determines the communication method (worksheet, test, verbal communication, or other means deemed appropriate) and whether the corrective procedures for these tasks are actually performed.

DIAGNOSE - To identify the cause of a problem.

DISASSEMBLE - To separate a component's parts as a preparation for cleaning, inspection or service.

DISCHARGE - To empty a storage device or system.

EVACUATE - To remove air, fluid or vapor from a closed system by use of a vacuum pump.

FLUSH - To internally clean a component or system.

HIGH VOLTAGE – Voltages of 50 volts or higher.

HONE - To restore or resize a bore by using rotating cutting stones.

JUMP START - To use an auxiliary power supply to assist a battery to crank an engine.

LOCATE – Determine or establish a specific spot or area.

MEASURE - To determine existing dimensions/values for comparison to specifications.

ON-BOARD DIAGNOSTICS (OBD) - Diagnostic protocol which monitors computer inputs and outputs for failures.

PARASITIC DRAW - Electrical loads which are still present when the circuit is turned OFF.

PERFORM - To accomplish a procedure in accordance with established methods and standards.

PERFORM NECESSARY ACTION – Indicates that the student is to perform the diagnostic routine(s) and perform the corrective action item. Where various scenarios (conditions or situations) are presented in a single task, at least one of the scenarios must be accomplished.

PURGE - To remove air or fluid from a closed system.

REMOVE - To disconnect and separate a component from a system.

REPAIR - To restore a malfunctioning component or system to operating condition.

REPLACE - To exchange a component; to reinstall a component.

RESURFACE – To restore correct finish.

SERVICE - To perform a procedure as specified in the owner's or service manual.

TEST - To verify condition through the use of meters, gauges or instruments.

TORQUE - To tighten a fastener to specified degree or tightness (in a given order or pattern if multiple fasteners are involved on a single component).

VERIFY - To establish that a problem exists after hearing the customer's concern; or to confirm the effectiveness of a repair.

VOLTAGE DROP - A reduction in voltage (electrical pressure) caused by the resistance in a component or circuit.

General Service Technician Program Task List

***Introduction to Auto Shop and Personal Safety**

- Identify general shop safety rules and procedures.
- Utilize safe procedures for handling of tools and equipment.
- Identify and use proper placement of floor jacks and jack stands.
- Identify and use proper procedures for safe lift operation.
- Utilize proper ventilation procedures for working within the lab/shop area.
- Identify marked safety areas.
- Identify the location and the types of fire extinguishers and other fire safety equipment; demonstrate knowledge of the procedures for using fire extinguishers and other fire safety equipment.
- Identify the location and use of eye wash stations.
- Identify the location of the posted evacuation routes.

- Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities.
- Identify and wear appropriate clothing for lab/shop activities.
- Secure hair and jewelry for lab/shop activities.
- Demonstrate awareness of the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits.
- Demonstrate awareness of the safety aspects of high voltage circuits (such as high intensity discharge (HID) lamps, ignition systems, injection systems, etc.).
- Locate and demonstrate knowledge of material safety data sheets (MSDS).

***Tools and Equipment**

- Identify tools and their usage in automotive applications.
- Identify standard and metric designation.
- Demonstrate safe handling and use of appropriate tools.
- Demonstrate proper cleaning, storage, and maintenance of tools and equipment.

***Looking for Information**

- Identify sources of service information
 - Locate and use paper and electronic service information.
 - Locate and use Technical Service Bulletins (TSBs).
 - Demonstrate awareness of special service messages, service campaigns/recalls, vehicle/service warranty applications, and service interval recommendations.
- Vehicle identification information
 - Locate Vehicle Identification Number (VIN) and production date code.
 - Apply knowledge of Vehicle Identification Number (VIN) information.
 - Demonstrate awareness of other vehicle information labels (such as tire, emissions, etc.).

***Preparing Vehicle for Service**

- Identify information needed and the service requested on a repair order.
- Identify purpose and demonstrate proper use of fender covers, mats.
- Demonstrate use of the three C's (concern, cause, and correction).
- Review vehicle service history.
- Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.

***Preparing Vehicle for Customer**

- Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

***Basic Vehicle Service**

- Determine fluid type requirements and identify fluid.
- Check and adjust engine oil level.
- Check and adjust engine coolant level.
- Check and adjust power steering fluid level.
- Check and adjust brake fluid level.
- Check and adjust windshield washer fluid level.
- Check and adjust differential/transfer case fluid level.
- Check and adjust transmission fluid level.
- Check and replace wiper blades.
- Inspect, replace, and adjust drive belts, tensioners, and pulleys; check pulley and belt alignment.
- Inspect and replace air filter.
- Check and adjust tire air pressure.

- Inspect exhaust system components.

Engine Repair

- Demonstrate knowledge of four-cycle engine operation.
- Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action.
- Perform cooling system pressure tests; test coolant condition; inspect and test radiator, pressure cap, coolant recovery tank, and hoses; perform necessary action.
- Test cooling system for the presence of combustion gases.
- Drain and recover coolant; flush and refill cooling system with recommended coolant; bleed air as required.
- Perform oil and filter change; reset oil life monitoring system where applicable.
- Remove and replace radiator; replace radiator hoses.
- Inspect powertrain mounts; determine necessary action.

Automatic Transmission

- Perform visual inspection of transmission; replace fluid and filters.

Manual Drive Train and Axles

- Diagnose fluid loss, level, and condition concerns; determine necessary action.
- Drain and fill transmission/transaxle and final drive unit.
- Identify and inspect clutch pedal linkage, cables, automatic adjuster mechanisms, brackets, bushings, pivots, and springs; determine necessary action.
- Identify and inspect hydraulic clutch slave and master cylinders, lines, and hoses; determine necessary action.
- Bleed clutch hydraulic system.
- Inspect and replace wheel studs and lug nuts.
- Inspect constant velocity (CV) joint boots.
- Remove and replace rear wheel drive driveshaft.

***Suspension and Steering**

- Identify and interpret suspension and steering system concerns; determine necessary action.
- Determine proper power steering fluid type; inspect fluid levels and condition.
- Flush, fill, and bleed power steering system.
- Diagnose power steering fluid leakage; determine necessary action.
- Lubricate suspension and steering systems.
- Inspect, remove, and replace shock absorbers.
- Inspect, remove, and install stabilizer bar bushings, brackets, and links.
- Inspect, remove, and install strut cartridge or assembly, strut coil spring, insulators (silencers), and upper strut bearing mount.
- Perform pre-alignment inspection and measure vehicle ride height; determine necessary action.
- Demonstrate knowledge of the principals of steering geometry using caster, camber and toe.
- Inspect tires; identify abnormal tire wear patterns; determine necessary action.
- Demonstrate knowledge of the causes of wheel tire vibration, shimmy, and noise.
- Identify vehicles equipped with a tire pressure monitoring system (TPMS).
- Demonstrate knowledge of service considerations of vehicles equipped with a tire pressure monitoring system (TPMS).
- Rotate tires according to manufacturer's recommendations.
- Balance wheel and tire assembly.
- Dismount, inspect, and remount tire on wheel.
- Repair tire using internal patch.
- Reinstall wheel; torque lug nuts.

***Brakes**

- Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging or wear; tighten loose fittings and supports; determine necessary action.
- Select, handle, store, and fill brake fluids to proper level.
- Bleed brake system.
- Test brake fluid for contamination; determine necessary action.
- Remove, clean inspect, and measure brake drums; determine necessary action.
- Refinish brake drum; measure final drum diameter.
- Remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates; lubricate and reassemble.
- Inspect and install wheel cylinders.
- Pre-adjust brake shoes and parking brake; install brake drums or drum/hub assemblies and wheel bearings.
- Install wheel, torque lug nuts, and make final checks and adjustments.
- Remove caliper assembly; inspect for leaks and damage to caliper housing; determine necessary action.
- Clean and inspect caliper mounting and slides/pins for wear, operation, and damage; determine necessary action.
- Remove, inspect and replace pads and retaining hardware; determine necessary action.
- Reassemble, lubricate, and reinstall caliper, pads, and related hardware; seat pads, and inspect for leaks.
- Clean, inspect, and measure rotor thickness, lateral runout and thickness variation; determine necessary action.
- Remove and reinstall rotor.
- Refinish rotor on vehicle; measure final rotor thickness.
- Refinish rotor off vehicle; measure final rotor thickness.

- Install wheel, torque lug nuts, and make final checks and adjustments.
- Check vacuum supply (manifold or auxiliary pump) to vacuum-type power booster.
- Inspect vacuum-type power booster unit for leaks; inspect the check valve for proper operation; verify proper booster function.
- Demonstrate knowledge of the causes of wheel bearing noises, wheel shimmy, and vibration concerns.
- Check parking brake cables and components for wear, binding, and corrosion; clean, lubricate, adjust or replace as needed.
- Check parking brake and indicator light system operation; determine necessary action.
- Check operation of brake stop light system; determine necessary action.
- Replace tapered roller wheel bearing and race.
- Clean, inspect, lubricate, install and adjust wheel bearing.
- Identify and inspect electronic brake control system components; determine necessary action.
- Demonstrate knowledge of the operation of the brake hydraulic failure warning light.

***Electrical/Electronic Systems**

- Demonstrate knowledge of the operation of series, parallel and series-parallel circuits using principles of electricity (Ohm's Law).
- Use wiring diagrams during diagnosis of electrical circuit problems.
- Demonstrate the proper use of a digital multimeter (DMM) during diagnosis of electrical circuit problems, including source voltage, voltage drop, current flow and resistance.
- Check electrical circuits with a test light; determine necessary action.
- Check electrical circuits using fused jumper wires; determine necessary action.
- Demonstrate knowledge of the causes and effects of shorts, grounds, opens, and resistance problems in electrical/electronic circuits.
- Measure key-off battery drain (parasitic draw); determine necessary action.

- Inspect and test fusible links, circuit breakers, and fuses; determine necessary action.
- Inspect and test switches, connectors, relays, and wires of electrical/electronic circuits.
- Repair connectors and terminal ends.
- Perform solder repair of electrical wiring.
- Perform battery state-of-charge test; determine necessary action.
- Perform battery capacity test; confirm proper battery capacity for vehicle application; determine necessary action.
- Maintain or restore electronic memory functions.
- Inspect, clean, fill, and/or replace battery, battery cables, connectors, clamps, and hold-downs.
- Perform battery charge.
- Start a vehicle using jumper cables or an auxiliary power supply.
- Perform starter current draw tests; determine necessary action.
- Perform starter circuit voltage drop tests; determine necessary action.
- Inspect and test starter relays and solenoids; determine necessary action.
- Remove and replace starter.
- Perform charging system output test; determine necessary action.
- Remove and replace generator (alternator).
- Diagnose the cause of dim or no light operation; determine necessary action.
- Inspect, replace, and aim headlights and bulbs.

Heating and Air Conditioning

- Identify and visually inspect A/C system components.
- Locate refrigerant label and identify specified refrigerant type (e.g., R-12, R-134a).

- Conduct preliminary performance test of A/C system (i.e., verify compressor engagement, measure outlet duct temperature, sense temperature change across A/C components); determine necessary action.
- Identify refrigerant type; select and connect proper gauge set; record temperature and pressure readings.
- Conduct performance test of the heater/ventilation system.
- Inspect and replace cabin air filter.

Engine Performance

- Perform engine cranking and running vacuum tests; determine necessary action.
- Perform cylinder power balance test; determine necessary action.
- Perform cylinder cranking compression test; determine necessary action.
- Perform cylinder leakage test; determine necessary action.
- Verify engine operating temperature; determine necessary action.
- Prepare 4 or 5 gas analyzer; inspect and prepare vehicle for test and obtain exhaust readings; determine necessary action.
- Retrieve and record stored diagnostic trouble codes, OBD monitor status, and freeze frame data; clear codes when applicable.
- Obtain and interpret scan tool data.
- Perform fuel pressure test.
- Replace fuel filters.
- Remove and replace secondary ignition components.
- Remove and replace thermostat and gasket/seal.
- Perform common fastener and thread repair, to include: remove broken bolt, restore internal and external threads, and repair internal threads with a threaded insert.