



Emission Inspector Training Program
I N S P E C T I O N E Q U I P M E N T
H A N D S - O N T R A I N I N G

Georgia's Clean Air Force (GCAF)



ATTENDANCE AND PARTICIPATION FORM

Student's Name:

Social Security Number:

Today's Date:

Training Facility:

Instructor's Name:

Type of equipment where you work?

- ESP
- SUN/SnapOn/John Bean
- SPX
- WEP Worldwide
- Other
- No place of employment yet

I have read and agree to follow the rules of conduct and safety for participation in the hands-on training.

Student Signature:

Instructor's Notes:

- Complete/Passed
- Complete/Failed (Instructor to provide explanation in the notes above)
- Incomplete/Failed

Instructor's Signature:

INTRODUCTION

Welcome to Equipment Training. This part of your training utilizes a “hands-on” approach. The training will be conducted in the shop area. You are required to pay attention to your instructor and follow his/her instructions precisely. Improper operation of the inspection equipment or carelessness could result in injury to self or others and could cause damage to property. Such improper behavior might cause your removal from the shop area and the training class.

TRAINING TASKS

Your training consists of five tasks. The instructor will cover each of these tasks in detail. Most of the information is generic. It is your responsibility to make notes as appropriate to the test equipment used in the shop where you are currently employed.

- Task 1 – General Description of the Inspection Equipment
- Task 2 – Safety-Related Issues
- Task 3 – Equipment Calibration
- Task 4 – Equipment Maintenance
- Task 5 – Equipment Operation

ITEMS YOU NEED

You will need the following items during your hands-on training session:

- ✦ Hands-on workbook
- ✦ The Georgia Emission Inspector Training Manual
- ✦ Pencil or pen

RULES OF CONDUCT AND SAFETY FOR PARTICIPATION IN THE HANDS-ON TRAINING

Your participation in the hands-on training session is required. While in the shop area you must adhere to all instructions, misconduct and lack of participation will cause you to fail your certification class. The following are the basic requirements and rules of conduct.

- ✦ Complete the Attendance and Participation Form, which is attached to this workbook, and write your name on the cover of the workbook.
- ✦ You must recognize all safety precautions. Any safety violation will be cause for expulsion from the training session and an overall failure of your certification class.
- ✦ Do not leave the shop area or wander around. Remain focused and pay attention to your instructor.
- ✦ Smoking, eating and drinking during the session are prohibited. You may smoke, eat and drink only during break time and only in designated areas.

- ✦ Unlike the classroom, if you wish to leave the shop area for any reason, including using the restroom, clear it with your instructor first.
- ✦ When assigned to a group, you must play an active role and remember:
 - Remain with the group
 - Participate in all group functions as appropriated
 - Carry out your assigned tasks
 - Ask for help from your group first, then the instructor if you cannot solve the issue at hand within the group
- ✦ Complete all required entries in your workbook
- ✦ At the conclusion of the session, make sure to hand your workbook to the instructor for review, comments and signature.

TASK 1: GENERAL DESCRIPTION OF THE INSPECTION EQUIPMENT

Goal: Learn to identify each component (part) of the inspection system by its common name and know its basic function and use.

References: Instructor's explanation, this workbook, the Georgia Inspector Certification Training Manual (specifically Chapter 12), and the manuals and reference material supplied by the Equipment Manufacturer with the equipment.

Basic Instructions: Listen to your instructor and make notes, especially note unique issues relating to the specific equipment you will be using at the station where you are currently employed. *Ask questions if something is not clearly understood.*

Component Name	Important Notes	Function	Student's Notes
Tamper Proof Cabinet	Do not open cabinet	Houses the computer and the gas analyzer bench	
Computer	Inside the tamper proof cabinet	Runs the Georgia inspection software and the software to communicate with the VID	
Gas Analyzer Bench	Inside the tamper proof cabinet	Collects and analyzes tailpipe emissions and reports the results to the computer	
Weather Station	Only required on ASM test system	Measures ambient temperature, humidity and barometric pressure and reports the results to the computer	
Filter Assembly	Attached to the exterior of the cabinet and connected to the gas analyzer bench by internal hoses	Two filters to filter out the moisture and large particulates from the vehicle's exhaust system	
Probe Line	Attached to the filter assembly at the cabinet	Delivers the vehicle's tailpipe emissions sample into the gas analyzer bench through the filter assembly	
Probe	Attached to the probe line	The probe has an insulated grip so the inspector can safely handle the hot probe	

		assembly when inserting or removing the probe tip from the tailpipe of a vehicle
Probe Tip	Flex or needle type, attached to the probe	Inserted into the vehicle's tailpipe to collect tailpipe emissions sample
Dual Probes		Used to test dual exhaust equipped vehicles
Engine Speed Pickup Leads (tachometer leads)	Various types; <i>note the ones on your respective equipment</i>	Senses engine speed (RPM) and relays the signal to the computer
OBD Test Lead	Tethered or wireless	Used to connect the GAS unit to the vehicle's DLC to establish communications between the GAS unit and the vehicle's on-board computer (PCM) to conduct OBD inspections
Monitor		Displays required input, inspector's entries and information about test status
Keyboard	Main data input device	Used to input information into the computer
Remote Control	Not a required input device but some GAS units might have one	Used to input information into the computer
Printer	Must be turned on and have paper	Prints VIRs and other required documents
Analyzer Calibration Accessories	Various types; <i>make notes as your instructor explains</i>	Used to perform the gas bench calibration and leak check
Analyzer Calibration Gas	Only use approved calibration gas	Used to calibrate the gas analyzer bench
Fuel Cap Pressure Tester	ESP, WEP – Internal Others – External	Used to perform the Fuel Cap Pressure Test. The tester has a receptacle where the fuel cap is fitted for testing.
Fuel Cap Adaptors	Color coded adaptors	All the adaptors fit into the receptacle of the fuel

		cap pressure tester. Various fuel caps that do not fit the receptacle will fit into the different adapters for testing
Dynamometer (Dyne, Dyno)	In-ground or above ground	Like a treadmill for vehicles. Allows the vehicle to be driven in place. Puts a small load on the vehicle being tested-loaded mode testing.
Dynamometer Electric Motor	Internal; all units have an electric motor except the LAD	Used to spin the dyne rollers during calibration. LAD units use the vehicle to spin rollers for calibration.
Dynamometer Internal Parts	Various units like the absorption unit, gears, belts and load unit	Control the dyne rollers during calibration and during ASM testing
Dynamometer Rollers	Two sets of two rollers each. All geared together; except LAD	Cradle the vehicle's drive wheels. The wheels of the vehicle spin the rollers during the ASM test. Load is applied to the rollers to create the required resistance to simulate a specific drive condition during an ASM test.
Dynamometer Lifts	Two lifts each positioned between two rollers (a set of rollers)	The vehicle's drive wheels are positioned on the lifts. The lifts go down allowing the drive wheels to settle between the rollers. When the lift is up, it holds the rollers with a set of brake pads to prevent the rollers from moving allowing the vehicle to be driven on or off the dyne.
Dynamometer Control Panel	<i>Note where the control panel is located</i>	Hosts electrical and electronic devices that communicate with the GAS unit and control the dyne
Restraint Rollers	Moveable parts of the	Manually positioned about a fist-width away from the

	dyne chassis assembly	side of each wheel to keep the vehicle from "walking off" the dyne during an ASM test
Cooling Fan	Stand-alone unit 3,000 CFM minimum capacity	Used during an ASM test when the GAS prompts for it. The fan is positioned to establish sufficient airflow to the vehicle's radiator to prevent vehicle overheating.
Wheel Chocks	Stand-alone units (various types) – ASM, TSI and OBD testing	Used to ensure safe inspections. In addition to safety, chocking the non-drive wheels helps stabilize the vehicle while being driven on the dyne. Wheel chocks must be used during every inspection, regardless of inspection type.
Lateral Restraint Straps	Stand alone units (various types) – ASM testing	Used to ensure safe ASM testing. Prevent the vehicle from "wandering." Not used to "tie-down" but to provide lateral stabilization (side to side).
Miscellaneous Maintenance Items	Various types such as filters, probe tips, probe lines, calibration gas, etc.	Used to maintain proper equipment functionality and operation
Calibration Gas: Zero, High	Blend values entered by keyboard or barcode reader - specific to each tank	Used to check accuracy of gas bench and to set calibration points

TASK 2: SAFETY-RELATED ISSUES

Goal: Recognize all safety-related issues associated with inspecting vehicles, the use of test equipment and performing any of the Georgia I/M program inspections.

References: Instructor's explanation, this workbook, the Georgia Inspector Certification Training Manual (review the safety notes throughout the manual, especially at the end of the TSI and ASM chapters) and the manuals and reference material supplied by the Equipment Manufacturer with the equipment.

Basic Instructions: Listen to your instructor, make notes and adhere to all safety-related instructions. *Ask questions if something is not clearly understood.* **Violating any safety issue while in the shop area, regardless of how minor it may seem, will cause you to be dismissed and will cause you to fail the certification class.**

Exercise Instructions: Complete the following two exercises.

Exercise 1: General Safety Issues

Assignment	Your Response
1. List at least three reasons that could make working with vehicles, equipment or machinery dangerous.	
2. List at least three safety concerns related to vehicles that you should be aware of prior to, during or after the performance of an inspection.	
3. What are some of the dangers associated with handling calibration gas cylinders?	

Exercise 2: Equipment-Related Safety Issues

Assignment

Your Response

1. Name at least two equipment components that might be classified as *trip hazard* and briefly describe methods of prevention.

2. Briefly explain your understanding of *shock hazard* as it relates to the inspection equipment.

3. List at least two equipment components that might cause *human injury* and give a very brief explanation on each item.

4. List at least two components used during an inspection to ensure safe testing of vehicles. Give a brief explanation of each component's function and the role in providing a safe inspection.

5. Briefly explain how poor housekeeping practices might turn out to be a *safety hazard*. Give at least one example.

6. Choose the time a dynamometer operation could be considered most hazardous if people do not pay attention to their surroundings. Briefly explain why.

- During an ASM test
- During dyne calibration
- When driving the vehicle onto the dyne
- When driving the vehicle off the dyne

Explanation:

TASK 3: EQUIPMENT CALIBRATION

Goal: Learn how to calibrate the inspection equipment: Analyzer Gas Calibration and Leak Check, Fuel Cap Pressure Test Calibration, and Dynamometer Calibration.


References: Instructor's explanation, this workbook and the manuals and reference material supplied by the Equipment Manufacturer with the equipment.

Basic Instructions: Listen to your instructor and make notes, especially note unique issues relating to the specific equipment you will be using at the shop you are currently employed at. *Ask questions if something is not clearly understood.*

Exercise

Instructions: Complete the following three exercises.

Exercise 1: Analyzer Calibration

Assignment	Your Response
<p>1. Look at the calibration gas cylinder, find the label and fill in the blanks on the opposite side.</p> 	<p>Blend Code: Approved by: The CO value is: The HC value is: The NOx value is: Balance: The cylinder expires on:</p>
<p>2. Which of the values you collected in #1 above did the instructor use during the gas calibration of the analyzer? List them.</p>	
<p>3. Do you have to check the values on the screen against the cylinder every time you perform a gas calibration? Why or why not?</p>	
<p>4. Look at the gauge at the calibration gas cylinder and fill</p>	<p>The pressure of the cylinder is _____ psi.</p>

in the blanks on the opposite side.

5. What other gas did the instructor use while performing analyzer calibration?

6. How many probes did the instructor use while performing analyzer calibration?

7. How often is the gas calibration and leak check required?

Exercise 2: Fuel Cap Pressure Tester Calibration

Assignment	Your Response
------------	---------------

1. Describe the master calibration caps the instructor used. Are the caps color-coded? What does each color mean?

2. If the Fuel Cap Pressure Tester is an external unit, how did the computer in the GAS unit know the fuel cap pressure tester passes or failed calibration?

- The instructor manually entered the Fuel Cap Pressure Tester calibration results into the GAS unit.
 - The Fuel Cap Pressure Tester was connected to the GAS unit and automatically communicated with calibration results to the computer.
-

3. Are you allowed to use the master calibration caps during the inspection of a vehicle? If yes, list at least two conditions that require you to use them during a vehicle inspection.

Exercise 3: Dynamometer Calibration

Assignment

Your Response

1. List the types of calibrations the instructor went through while calibrating the dynamometer.

2. What was the highest speed the rollers spun at during the coast down calibration?

3. What does *Parasitic Loss* mean?

4. How often is the dynamometer calibration required?

5. Did the instructor use zero air to calibrate the dynamometer? Why or why not?

6. Use the picture below to fill in the blanks on the opposite side.



What is the name of each of the marked components?

M are the:

S are the:

Y are the:

TASK 4: MAINTENANCE OF THE EQUIPMENT

Goal: Become familiar with basic equipment maintenance.

References: Instructor's explanation, this workbook and the manuals and reference material supplied by the Equipment Manufacturer with the equipment.

Basic Instructions: Listen to your instructor and make notes, especially note unique issues relating to the specific equipment you will be using at the shop you are currently employed at. *Ask questions if something is not clearly understood.*

Exercise

Instructions: Complete the following exercise.

Exercise 1: General Equipment Maintenance

Assignment	Your Response
1. List at least five items you are allowed to maintain or replace on the inspection equipment.	1. 2. 3. 4. 5.
2. Explain briefly how can poor housekeeping (cleaning dirt and dust from equipment, etc.) practices affect equipment. Give at least two examples of equipment failure that can be associated with poor housekeeping practices.	
3. What will happen if you attempt to access the <i>Controlled-Access Area</i> of the GAS unit cabinet?	
4. What effect will pinching or leaving the "O" ring out while replacing the filter in the sampling system have on a GAS unit? Explain your answer.	

5. List at least two items that you are allowed to replace that might cause a "low flow" problem.

6. List at least three components that cannot be replaced or maintained by the inspector or the shop owner.

- 1.
- 2.
- 3.

7. Are you allowed to alter the probe tip in any way?

TASK 5: EQUIPMENT OPERATION

Goal: Observe and participate in performing an inspection on a vehicle.

References: Instructor's explanation, this workbook, the Georgia Inspector Certification Training Manual (especially the TSI and ASM chapters) and the manuals and reference material supplied by the Equipment Manufacturer with the equipment.

Basic Instructions: Listen to your instructor, make notes and adhere to all the safety-related instructions. *Ask questions if something is not clearly understood.*

Exercise

Instructions: Per your instructor's direction, complete the following two exercises

Exercise 1: Collecting Vehicle Information and Testing the Vehicle

Assignment	Your Response
1. Vehicle Make	
2. Vehicle Model	
3. Record the license plate and issuing state	
4. Write the tenth digit of the VIN	
5. According to the tenth digit of the VIN, what is the model year of the vehicle?	
6. Locate the under-hood Vehicle Emission Control (VEC) label and then answer all of the questions listed on the opposite side.	a. What <i>regulations</i> does this vehicle conform to? b. What model year regulations does this vehicle conform to? c. Does the year in your answer to item "b" match your answer to #5 above?

d. What is the *engine size* listed on the label?

e. According to the VEC, does this vehicle require a *catalyst*?

7. What type of inspection is this vehicle subject to and why?

8. Does the vehicle pass the *tamper (visual) inspection*?

9. What color fuel cap adapter will you use to perform the Fuel Cap Pressure Test on this vehicle?

10. Does the vehicle have a single or dual exhaust system?

11. Record the vehicle's body type. If the GVWR is required for the inspection, find it and record it.

To complete the below exercise, *observe* the instructor perform the inspection on a vehicle (this might be a different vehicle than the one you collected the information from), use the appropriate chapter in your training manual to follow the inspection procedures and make notes as needed. After the instructor completes the inspection, complete the assignment below.

12. Did the VID return a match for the vehicle being tested? Explain briefly if you noticed anything unique about the information received from the VID.

13. Did the instructor perform an Initial test or an After Repair test?

14. What was the overall test result? If other than pass, explain what happened.

15. Which tachometer lead did the instructor use?

Exercise 2: Conduct an OBD Inspection

Assignment	Your Response
1. Vehicle Make	
2. Vehicle Model	
3. Write the tenth digit of the VIN	
4. According to the tenth digit of the VIN, what is the model year of the vehicle?	
5. Locate the under-hood Vehicle Emission Control (VEC) label and then answer all of the questions listed on the opposite side.	a. What <i>regulations</i> does this vehicle conform to? c. Does the year in your answer to item "a" match your answer to #4 above? e. What is the <i>engine size</i> listed on the label? e. According to the VEC, is this vehicle equipped with an OBDII system?

6. What type of inspection is this vehicle subject to and why?

7. Locate the MIL on the vehicle's instrument panel and then answer the question on the opposite side.

How is the MIL labeled?

You might have to turn the ignition key on without starting the engine to see the MIL. You also may reference the OBD section of the training manual.

8. Make sure the ignition key is in the off position. Turn the ignition key on, do not start the engine, observe the MIL. Answer the questions on the opposite side.

a. Did the MIL illuminate and remain on?

b. Did the MIL illuminate briefly and go off?

c. Based on your observation, does the vehicle pass the visual inspection of the MIL?

9. Using *Attachment 4* in your training manual to locate the DLC on the vehicle, note the information you read in *Attachment 4*, including listed connector location and access and comments/description.

10. Physically locate the DLC on the vehicle and plug in the OBD test lead into the DLC.

Is the information in *Attachment Four* accurate?

If not, why?

You are done, review your work and hand your workbook to your instructor as directed.