



Vehicle Servicing and Repairing Level II

Learning Guide -#45

Unit of Competence: - Install, Test and Repair

Vehicle Lighting and Wiring Systems

Module Title: - Installing, Testing and Repairing

Vehicle Lighting and Wiring Systems

LG Code: **EIS VSR2 M12 LO3-LG- 45**

TTLM Code: **EIS VSR2 TTLM 0919v1**

**LO3: Clean-up work area and maintain
equipment**

Instruction Sheet	Learning Guide #3
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This learning guide is developed to provide you the necessary information regarding the following content coverage and topics –

- ✓ Collect and store reuse material.
- ✓ Remove waste and scrap.
- ✓ Clean and inspect equipment and work area.
- ✓ Identify, tag and isolate faulty equipment.
- ✓ Complete operator maintenance.
- ✓ Maintain tools and equipment.

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, you will be able to –

- Material that can be reused is collected and stored.
- Waste and scrap are removed following workplace procedures.
- Equipment and work area are cleaned and inspected for serviceable condition according to workplace procedures.
- Faulty equipment are identified, tagged and isolated according to workplace procedures.
- Operator maintenance is completed according to manufacturer and component supplier specifications and site procedures.

Tools and equipment are maintained according to workplace procedures. **Learning**

Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described in number 2 to 17.
3. Read the information written in the “Information Sheets 1”. Try to understand what are being discussed. Ask you teacher for assistance if you have hard time understanding them.
4. Accomplish the “Self-check 1” in page 8 .
5. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering the Self-check 1).

6. If you earned a satisfactory evaluation proceed to “Information Sheet 2”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Learning Activity #1.
7. Submit your accomplished Self-check. This will form part of your training portfolio.

Information Sheet-1	Collect and store reuse material.
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1.1 Harmful Effects of Wastes

i. Solid wastes materials

The following are the harmful effects of the solid waste materials if disposed improperly in the environment

1. Clogging of public sewerage system which eventually causes flooding
2. Breeding grounds for flies, mosquitoes and other disease-carrying insects
3. Pollution of land, water and air
4. Poor health or even death of human beings, animals and other living things
5. Negative impression to our country.
6. Negative impact to our tourism industry.
7. Poor economy

ii. Used oil

It contains hydrocarbons, carbon monoxide, sludge and other toxic materials that pose health hazards to human beings and other living things. When inhaled, or taken internally. Used oil when disposed in the public sewerage system find its way to the river and the seas and makes the huge body of water polluted and exterminate sea creatures. Large amount of oil pollutants in land, air and water affects the environment.

Cleaning and Inspecting Equipment

Generally, equipment of all types should be cleaned at the location of last use before being moved to a new location. If this is not possible, arrange for cleaning at a facility that is specifically designed for equipment cleaning.

If equipment is used at a location known to be infested with an invasive species, the equipment should undergo a pre inspection, followed by thorough cleaning, and a final inspection before being moved off the worksite.

At the new location, the equipment should be inspected again, preferably by someone other than the original inspector before the equipment is placed into service. If, on re-inspection, contamination is found on the equipment, do not allow the equipment entry on the new worksite; either return the equipment to the location of last use for additional cleaning or arrange for cleaning at a location that is specifically designed for equipment cleaning.

Kinds of Cleaning Solvents

Solutions are homogeneous mixture of two or more components. They can be gaseous, liquid or solid. When we speak of a solution, we usually think of a solid dissolved in water. While water is the most common solvent, other liquids are frequently employed as solvents for certain substances – for example wax maybe dissolved in gasoline. The dissolved material in a solution is termed as solute (e.g. wax) while the dissolving medium is called solvent (e.g. gasoline). However, the term can be interchanged depending on which substance is of greater amount.

Solvent is a component of a solution that dissolves solute and is usually present in large proportion or amount. It can be classified as polar or nonpolar. Polar solvents are solvents which dissolve/are soluble in water; while nonpolar solvents are solvents which do not dissolve/are insoluble in water.

Solvents usually used for cleaning in automotive shops are: water, gasoline, kerosene, thinner and detergent soap.

The table below shows the kinds of cleaning solvents based on their solubility in water.

Cleaning Solvents	Solubility in Water	Polar	Nonpolar
a. water	soluble	x	
b. gasoline	insoluble		x
c. kerosene	insoluble		x
d. thinner	insoluble		x
e. detergent soap	soluble	x	

Properties of Cleaning Solvents

A useful generalization much quoted is that “Like dissolves like”. More specifically, high solubility occurs when the molecules of the solute are similar in structure and electrical properties to the molecules of the solvent.

When there is a similarity of electrical properties; e.g. high dipole element between solute and solvent, the solute-solvent attractions are particularly strong. When there is dissimilarity, solute-solvent attractions are weak. For this reason, a polar

substance such as H₂O usually is a good solvent for a polar substance such as detergent soap but a poor solvent for a nonpolar substance such as gasoline.

Uses of Cleaning Solvents

Cleaning Solvents	Uses
1. Gasoline	- It is used to wash oil/greasy tools/equipment.
2. Diesoline	- It is used to wash oil engine, transmission and other parts of the vehicle.
3. Kerosene	- It is used to remove dust, grease oil, paint, etc.
4. Thinner	- It is used to remove spilled paint on the floor, walls and tools.
5. Soap and water	- It is used to wash/clean upholstered furniture such as seats, tables, cabinets, etc.

Occupational Health and Safety Practices in Handling Cleaning Solvents

A great percentage of eye injury and cuts results from a disregard for the simplest of rules in handling cleaning solvents. You should never use compressed air to clean your clothes, hands or body. The pressure could cause the cleaning solvents and dirt particles to penetrate your skin, resulting in infection and /or blood poisoning. Do not use compressed air to clean an object immediately after it has been removed from a hot cleaning tank. First, rinse the cleaning solvents away with water. Do not use carbon tetrachloride as a cleaning solution. The fumes, when inhaled can cause serious internal injury and possibly result in death. When steam-cleaning, place the object to be cleaned on a pallet and wear a face shield and rubber gloves for protection against loose debris.

If a job or cleaning task requires the use of gloves, use the appropriate gloves. Do not for instance use welding gloves when removing an object from a hot tank, or rubber gloves when welding. If you have cut, nicked, or burned yourself, or something has got into your eyes, report immediately to the first-aid person.

Keep all inflammable cleaning solvents in closed tin containers and whenever possible, store them in a separate area.

- **Identify, tag and isolate faulty equipment.**

Why Maintain Inventory of Tools and Equipment

The most importance advice you can be given at the beginning of your career is to

purchase top-grade tools. These are made from high-quality steel and manufactured to precision. Special care is necessary so that the tools/equipment can be properly maintained thus preventing losses. Since you, the technician must work with your tools daily, regular inventory of tools/equipment is very important.

The initial cost of even a minimum number of tools is high but the accompanying warranty guarantees satisfaction and many years of service. It is better, in the long run, to start with a few carefully selected tools that will take care of your most common needs and then gradually build-up to a complete set. It is sometimes hard to identify and memorize the huge number of tools and equipment in the workshop, hence maintaining the inventory record is of great value.

Do Not Use the equipment -

- without reading the manual of instructions
- outside of the intended limit
- disabling safety system and removal of hazard notices
- modification and conversion of the instrument
- open with instruments / tools, unless specified or required
- use of accessories from other manufacturers without approval

Care and Support

- Never carry the instrument loose in a vehicle. It can be affected by shock and vibration. Make sure it is carried in its case always
- When dispatching the instrument make sure it is complete package always
- When transporting the instruments make sure it is protected from shock and vibration

Storage

- Make sure the instrument is dry before storing.
- Damp instrument must be unpacked

Cleaning

- Use dry clean, soft and stain free cloth for cleaning. If necessary moisten the cloth with pure alcohol. Use no other liquids.

Self-Check -1	Written Test
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Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Name: _____

Date: _____

Directions: Answer all the questions listed below. Illustrations may be necessary to aid some explanations/answers.

Instructions: Answer the following as indicated. Use answer sheet to be provided by your trainer.

- i. Classify the following cleaning solvents whether Polar or Nonpolar. Write P for polar and NP for nonpolar.
 - a. water
 - b. gasoline
 - c. kerosene
 - d. diesoline
 - e. thinner
 - f. detergent soap
- ii. Identify the cleaning solvents used for the following substances.
 1. Polar substances
 - a. dust
 - b. mud
 2. Nonpolar substances
 - c. oil
 - d. grease oil

- iii. Match the cleaning solvents at the right with their uses at the left. Write only the letter of your answer.

Uses	Cleaning Solvents
1. It is used to clean upholstery and other furniture.	A. alcohol
2. It is used to wash out spilled paint on the floors and walls as well as on the tools/equipment.	B. diesoline C. gasoline
3. It is used to wash oil, greasy tools and equipment.	D. kerosene
4. It is used to remove dust, grease and oil.	E. soap and water
5. It is used to clean oil engine, transmission and other parts of the vehicle.	F. thinner

- iv. Select the best answer. Write the letter of your choice on the answer sheet provided.

1. Which of the following injuries will be caused by compressed air if used to clean clothes, hands or body soiled with a flammable cleaning solvent?
 - a. pimples
 - b. burn
 - c. blood poisoning
2. Which of the following solvents should not be used as a cleaning solution for it poses hazards to health?
 - a. gasoline
 - b. kerosene
 - c. carbon tetrachloride
3. As a safety precaution, which of the following safety devices should be worn in steam-cleaning engine parts?
 - a. face shield
 - b. rubber gloves
 - c. all of the above
4. Which of the following should we use to keep a flammable cleaning solvent?
 - a. closed tin container
 - b. plastic pail
 - c. aluminum basin

5. Mechanic A says it is all right to go under a car supported by a floor jack provided the saddle is properly located. Mechanic B says you should never go under a car unless it is supported by safety stands. Who is right?
 - a. Mechanic A
 - b. Mechanic B
 - c. neither A or B
 - d. both A and B
6. The two basic types of tools used in the shop are:
 - a. power tools and machine tools
 - b. hand tools and power tools
 - c. screwdrivers and wrenches
 - d. hand tools and cutting tools
7. To tighten nuts or bolts accurately, use:
 - a. tension wrench
 - b. torque wrench
 - c. two box wrenches
 - d. open-end wrenches

Note: Satisfactory rating 60%

Unsatisfactory - below 60%

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

Short Answer Questions



Operation Sheet-1	Cleaning and maintaining equipment
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Objective: Given cleaning solvents, rags, brooms, air compressor, washing pan and safety apparel, you will clean tools and work area and observe Occupational Health and safety practices to the satisfaction of your trainer.

Instructions:

A. Tools

1. Wear protective clothing and goggles.
2. Gather the tools to be cleaned in the designated area for cleaning.
3. Segregate the tools according to the kind of dirt they have.
4. Measure and pour enough amount of cleaning solvent to the washing pan.
5. Submerge the tools in the washing pan.
6. Use paint brush to remove the dirt from the tools.
7. Get the tools from the washing pan and wipe them with rags until dry.
8. Clean and keep all materials used for cleaning.

B. Work Area

1. Wear protective clothing and goggles.
2. If there is dirt on the floor such as paint, used oil, grease, rust, etc., remove it first using the appropriate cleaning solvent.
3. Use the air compressor to dry the floor and the broom in cleaning the remaining dirt in the work area.

Title: Labeling, Segregating, Placing and Disposing Wastes

Objective: Given the supplies and materials needed, you will label, segregate and dispose wastes properly.

Instructions:

1. Gather the following materials:
 - a. cartolina
 - b. glue
 - c. pair of scissors
 - d. 3 waste receptacles of different colors – Green, Red and Blue
2. Using a computer, make labels for the three types of wastes-Biodegradable, Nonbiodegradable and Recyclable- with the following specifications: Font style- Arial and font size- 48. Print the name in a cartolina and cut with a dimension of 1" x 12"
3. Label the waste receptacles as follows:
 - a. Green – Biodegradable
 - b. Red – Nonbiodegradable
 - c. Blue – Recyclable
4. Segregate the waste materials according to types and place them in their proper containers.
5. Dispose the waste materials in the designated area:
 - a. Compost pit – Biodegradable
 - b. Land fill – Nonbiodegradable
 - c. Junk shop – Recyclable

Objective: Given a tool cabinet and a tool rack, you will arrange and store tools and equipment accordingly.

Instructions:

1. Classify the tools and equipment according to types.
2. Arrange the tools by types in the shelves/racks.

3. Place equipment in designated places or location.

Objective: Using a computer and given a cartolina, pair of scissors and glue, please make and post visible corresponding labels on tools and equipment.

Instructions:

1. Prepare necessary tools, supplies and materials.
2. Determine the number of tools and equipment to be labeled according to type.
3. In the computer, type the name of the tools using arial font style and a font size of 60.
4. Print in the cartolina the name of the tools and equipment.
5. Cut the cartolina with a dimension of 1" x 8".
6. Post appropriate labels on the tools and equipment.
7. Review your work to check the accuracy of the labels posted.

Objective: Given a record book, ball pen and correction fluid, please log-in tools and equipment in the record book satisfactorily.

Instructions:

1. Enter the item number of tools and equipment.
2. Specify the quantity-number of tools/equipment available.
3. Specify unit (e.g. pcs, dozen, unit, etc.)
4. Write the description including the:
 5. name of tools/equipment
 - a. brand
 - b. dimension/capacity/power rating
6. Indicate the date of acquisition- data to be taken from the Memorandum Receipt.
7. Indicate the date of issuance- data to be taken from the Memorandum Receipt.
8. Submit your record book to your trainer for assessment.

9. Lock the workshop.

Objective: Given the Record Book/Memorandum Receipts, Inventory form, ball pen and correction fluid, you will conduct inventory of tools and equipment, identify, record and report damaged tools and equipment and give repair recommendations if repairable.

Instructions:

1. Secure inventory forms/memorandum receipt of tools and equipment.
2. Study the parts of the Inventory Form
3. Check whether the list of tools and equipment in the memorandum receipt tallies with the existing tools and equipment found in the workshop including their specifications and condition.
4. List down any losses and damages found during the inventory.
5. Fill out the remarks column of the inventory forms for any losses/damages.
6. Recommend for replacement of lost tools and equipment and repair of damaged tools and equipment if repairable.

LAP Test	Practical Demonstration
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Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions:

1. You are required to perform any of the following:

- Identify cleaning solvents
- Inspect and clean tools and work area
- Arrange/store tools/equipment
- Post and visible corresponding labels
- Secure and log tools in a record book
- Dispose waste and lubricants
- Label waste/used lubricants according to type of waste
- Maintain complete inventory
- Identify and record damage/lost tools/equipment
- Report damage/lost tools/equipment

2. Request your teacher for evaluation and feedback

List of Reference Materials

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7. Classroom Manual for Automotive Electricity And Electronics Fifth Edition Barry Hollembeak © 2011 Delmar, Cengage Learning