MODULE CONTENT

| Unit of Competency | **DIAGNOSE AND REPAIR ENGINE COOLING AND LUBRICATION SYSTEM** |
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| Module Title | **DIAGNOSING AND REPAIRING ENGINE COOLING AND LUBRICATION SYSTEM** |
| Module Descriptor | This unit describes the performance outcomes required to diagnose and repair faults in the cooling systems of  vehicles such as radiator, water pump, and thermostat  and lubrication systems such as oil pump, oil cooler,  hoses and oil pressure switch. It covers the knowledge,  skills, and attitudes required to prepare to diagnose and  repair engine cooling and lubrication systems, diagnose  and repair engine cooling and lubrication system and  complete work processes. |
| Nominal Duration | **hours** |
| Summary of the Learning Outcomes: | |
| Upon completion of this module the student must be able to: | |
| LO1. Prepare to diagnose and repair drive lines | |
| LO2. Diagnose drive lines | |
| LO3. Repair drive lines | |
| LO4. Complete work processes | |

**LEARNING EXPERIENCES**

**LEARNING OUTCOMES NO. 1**

**DIAGNOSE DRIVE LINES**

| **Learning Activities** | **Special Instructions** |
| --- | --- |
| Read Information Sheet 3.1-1 Diagnose drive lines | If you have some problem with the content of the information sheet don’t hesitate to approach your Trainer.  If you feel that you are now knowledgeable on the content of the information sheet, you can now answer the self-check provided in the module. |
| Answer Self-Check 3.1-1 on Diagnose drive lines | Try to answer the Self-check without looking at the Answer Key  Compare your answer to Answer Key 3.1-1 |
| Observe Trainer’s demonstration on Task Sheet 3.1-1 on Diagnose drive lines | Listen carefully and attentively so that you may be able to perform a task correctly  Ask questions if are in doubt for clarification |
| Perform the Task Sheet 3.1-1 on Diagnose drive lines | Remember the step-by-step procedure the Diagnose drive lines |
| Evaluate the performance using the Performance Criteria Checklist 3.1-1 | Repeat the task in case fail to meet the criteria |

**INFORMATION SHEET 1.1-1**

**DIAGNOSE DRIVE LINES**

**Learning Objectives:**

After reading this **Information Sheet**, you must be able to:

1. Analyzed symptoms.
2. Carried out diagnosis.
3. Compared diagnosis results.
4. Reported diagnosis findings and recommendations.
5. Applied safety practices.

**DRIVE LINES**

**Driveline Inspection**

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**To prevent serious eye injury, always wear eye protection gear when you perform vehicle maintenance or service.**

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**Do not service a driveshaft with the engine**

**running. A rotating drive shaft can cause**

**serious personal injury.**

For efficient operation, inspect the driveshaft at regular intervals. Loose end yokes, excessive radial looseness, slip spline radial looseness, bent shaft tubing, or missing plugs in the slip yoke can cause driveline failure.

Inspect the driveline as follows:

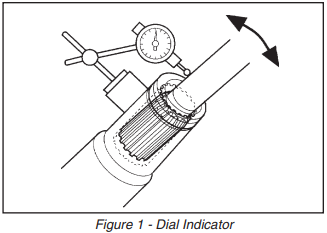
1. Check the output and input end yokes on both the transmission and axle for axial looseness. Refer to the axle or transmission service information for the correct specifications.

2. If loose, disconnect the driveshaft. Tighten the end yoke retaining nut to the proper specification. Refer to the axle or transmission service information for the correct specifications.

3. Check for worn cross assemblies. Apply vertical force of about 50 lbs. to the driveline near the cross assemblies. If movement is in excess of 0.006 inches (0.152 mm), replace the cross assembly.

4. Using a dial indicator, examine the slip yoke spline for excessive radial movement. Radial looseness between the slip yoke and the tube shaft should not exceed 0.007 inches (0.178 mm). If excessive looseness exists, replace the slip yoke and the propshaft (see Figure 1).

5. Examine the shaft for damaged or bent tubing. Carefully remove any foreign material that has built up on the shaft, such as mud, road contamination, etc.

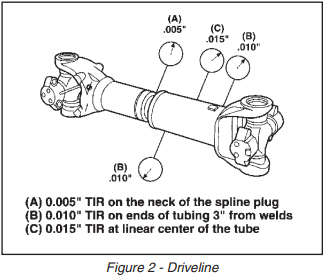


6. If Total Indicator Runout (TIR) readings are required after you examine the shaft, obtain the readings with the driveshaft mounted on the vehicle.

a. Put the transmission in NEUTRAL.

b. Remove the axle shafts or set the axles on jack stands.

c. Rotate the driveshaft by hand to check TIR. Take readings at various positions around the driveshaft. If the readings exceed the manufacturer’s specifications, repair or replace the driveline (see Figure 2).



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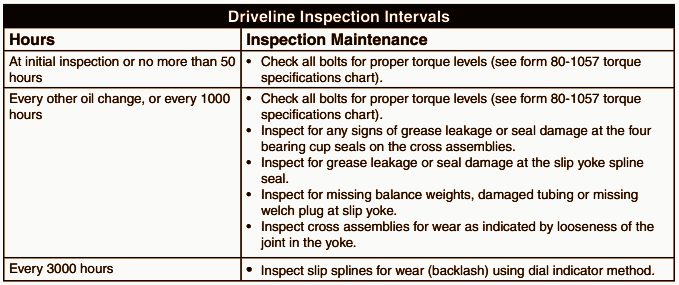
**Inspect drivelines for loose or missing cap screws. Loose or missing fasteners can allow the driveline to separate from the vehicle. Serious personal injury and damage to components can result. If fasteners are loose or missing, install new cap screws and torque (see form 80-1057 torque specifications chart).**

Cross Assembly Capscrews As part of regularly scheduled maintenance, Allied Systems Company recommends that you inspect cap screws after the first 50 hours, or at the first engine oil change, whichever comes first.

1. Check that cap screws are installed in all cross assembly positions.

2. If cap screws are missing, check for damage to the cross assembly and yoke.

3. Replace damaged parts.



4. Replace missing capscrews. Refer to the relevant parts coverage for part numbers.

5. Use a torque wrench to verify that capscrews are tightened (see form 80-1057 torque specifi cations chart).

If Capscrews Have Loosened

1. Remove and discard loose capscrews. Install new grade 8 capscrews.

2. Check for damage to the cross assembly and yoke.

3. Replace damaged parts.

4. Use a torque wrench to verify that capscrews are tightened (see form 80-1057 torque specifi cations chart).

**Driveline Inspection Intervals**

The drivelines require regular inspection. Allied Systems Company recommends periodic teardown inspection at the intervals in the following chart, which will help you to determine the hours at which you should replace cross assemblies.