

# Manual Drive Train and Axles: Drive Axle Diagnosis and Repair

## Ring and Pinion Gears and Differential Case Assembly

### Student/intern information:

Name \_\_\_\_\_ Date \_\_\_\_\_ Class \_\_\_\_\_

### Vehicle used for this activity:

Year \_\_\_\_\_ Make \_\_\_\_\_ Model \_\_\_\_\_

Odometer \_\_\_\_\_ VIN \_\_\_\_\_

Learning Objective/Task	CDX Tasksheet Number	2013 MLR NATEF Reference Number; Priority Level	2013 AST NATEF Reference Number; Priority Level	2013 MAST NATEF Reference Number; Priority Level
• Check and adjust differential housing fluid level.	C911	3E2; P-1	3E1:2; P-1	3E1:2; P-1
• Drain and refill differential housing.	C912	3E3; P-1	3E1:3; P-1	3E1:3; P-1
• Clean and inspect differential housing; check for leaks; inspect housing vent.	C785	3E1, P-2	3E1:1, P-2	3E1:1, P-2
• Inspect and replace companion flange and pinion seal; measure companion flange runout.	C889		3E1:4; P-2	3E1:5; P-2
• Diagnose noise and vibration concerns; determine necessary action.	C138			3E1:4; P-2
• Inspect ring gear and measure runout; determine necessary action.	C780			3E1:6; P-3
• Remove, inspect, and reinstall drive pinion and ring gear, spacers, sleeves, and bearings.	C890			3E1:7; P-3
• Disassemble, inspect, measure, and adjust or replace differential pinion gears (spiders), shaft, side gears, side bearings, thrust washers, and case.	C147			3E1:12; P-3
• Measure and adjust drive pinion depth.	C781			3E1:8; P-3
• Measure and adjust drive pinion bearing preload.	C782			3E1:9; P-3
• Reassemble and reinstall differential case assembly; measure runout; determine necessary action.	C148			3E1:13; P-3
• Measure and adjust side bearing preload and ring and pinion gear total backlash and backlash variation on a differential carrier assembly (threaded cup or shim types).	C145			3E1:10; P-3
• Check ring and pinion tooth contact patterns; perform necessary action.	C783			3E1:11; P-3

Time off \_\_\_\_\_

Time on \_\_\_\_\_

Total time \_\_\_\_\_

### Materials Required

- Drive axle assembly
- Dial indicator
- Prussian Blue or gear paste
- Puller set
- Seal puller
- Torque wrenches
- Manufacturer-specific tools

### Some Safety Issues to Consider

- Vehicle hoists are important tools that increase productivity and make the job easier. However, they can also cause severe injury or death if used improperly. Make sure you follow the manufacturer's operation procedures. Also, make sure you have your supervisor's/instructor's permission to use any particular type of lifting equipment.
- When running any vehicles in the shop, make sure you use the shop's exhaust ventilation system to discharge all exhaust gas safely outside.
- Diagnosis of this fault may require test-driving the vehicle on the school grounds. Attempt this task only with full permission from your instructor and follow all the guidelines exactly.
- Castings and machined parts may have sharp edges. Handle these parts with care.
- Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

### Performance Standard

**0—No exposure:** No information or practice provided during the program; complete training required

**1—Exposure only:** General information provided with no practice time; close supervision needed; additional training required

**2—Limited practice:** Has practiced job during training program; additional training required to develop skill

**3—Moderately skilled:** Has performed job independently during training program; limited additional training may be required

**4—Skilled:** Can perform job independently with no additional training